

The naturopathic approach to managing endometriosis: Clinical insights into naturopathic practice

by **Rebecca Janelle Redmond**

Thesis submitted in fulfilment of the requirements for
the degree of

Doctor of Philosophy (Public Health)

under the supervision of Associate Professor Amie
Steel, Distinguished Professor Jon Adams, and
Professor Jon Wardle.

University of Technology Sydney
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Integrative Medicine

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Certificate of original authorship

I, Rebecca Janelle Redmond, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy (Public Health) in the Faculty of Health at the Australian Research Centre in Complementary and Integrative Medicine - Faculty of Health, at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

This research is supported by the Australian Government Research Training Program.

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I dedicate this work to my fellow endo warriors.

Thesis structure

This thesis is presented as a *Thesis by Compilation*. This thesis comprises a conventional thesis with a structured introduction, literature review, methodology, result chapters, and a discussion including limitations and future research directions. The thesis by compilation combines content unique to the thesis with published manuscripts in peer-reviewed journals, as evident in the Appendices. Some minor adaptations have been made to the published manuscripts before inserting them in this thesis. The minor amendments made were conducted to ensure consistency in this thesis which may have been affected by idiosyncrasies of journal styles, formatting requirements, and peer-review feedback.

The structure of the thesis is as follows:

<p><u>Chapter 1</u></p> <p>Provides background knowledge relating to the contemporary understanding of endometriosis as a chronic systemic reproductive disease, an overview of naturopathy as a health care profession, and the prevalence and use of naturopathy in women's reproductive health.</p>
<p><u>Chapter 2</u></p> <p>Provides an overview of the thesis structure including the relevant research questions and research aims.</p>
<p><u>Chapter 3</u></p> <p>Provides a narrative literature review pertaining to the prevalence of complementary medicine (including naturopathy) consultations with women with menstrual disorders and diseases.</p>
<p><u>Chapter 4</u></p> <p>Presents the research design and methodology for this multiphase mixed-methods study.</p>

Chapter 5

Details the empirical findings of Phase 1: Naturopathy utilisation by Australian women with diagnosed endometriosis: A cross-sectional survey.

Chapter 6

Reports the empirical findings of Phase 2A: Naturopathic medicine for the management of endometriosis, dysmenorrhea and menorrhagia: A textual analysis.

Chapter 7

Reports the additional empirical findings of Phase 2A: Interprofessional, self-care and dietary recommendations for women with endometriosis: A naturopathic textual analysis.

Chapter 8

Provides the empirical findings of Phase 2B: Perceived effectiveness and use of naturopathic treatments for endometriosis: A cross-sectional survey of Australian naturopaths experienced in endometriosis management.

Chapter 9

Reports on additional empirical findings from Phase 2B: Naturopathic knowledge and approaches to managing endometriosis: A cross-sectional survey of naturopaths with experience in endometriosis care.

Chapter 10

Discusses the implications of the research findings as they relate to areas in the Australian Endometriosis Clinical Practice Guideline. This chapter also describes the limitations of the thesis and emphasises potential areas for future research.

List of publications

Peer-reviewed publications incorporated into the thesis

1. Reid, R., Steel, A., Wardle, J., & Adams, J. (2019). Naturopathic medicine for the management of endometriosis, dysmenorrhea, and menorrhagia: A Content Analysis. *The Journal of Alternative and Complementary Medicine*, 25(2), 22–226. <https://doi.org/10.1089/acm.2018.0305>
2. Redmond, R., Steel, A., Wardle, J., & Adams, J. (2022). Naturopathic utilisation by Australian women with diagnosed endometriosis: a cross-sectional survey. *Complementary Therapies in Clinical Practice*, 46, 101539, <https://doi.org/10.1016/j.ctcp.2022.101539>
3. Redmond, R., Steel, A., Wardle, J., & Adams, J. (2022). Perceived effectiveness and use of naturopathic treatments for endometriosis: A cross-sectional survey of Australian naturopaths experienced in endometriosis management. *European Journal of Integrative Medicine*, 54, 1021172. <https://doi.org/10.1016/j.eujim.2022.102172>
4. Redmond, R., Steel, A., Wardle, J., & Adams, J. (2022). Naturopathic knowledge and approaches to managing endometriosis: A cross-sectional survey of naturopaths with experience in endometriosis care. *Journal of Complementary and Integrative Medicine*. <https://doi.org/10.1515/jcim-2022-0175>

Peer-reviewed publications not incorporated into the thesis

1. Reid, R., Steel, A., Wardle, J., McIntyre, E., Harnett, J., Foley, H., & Adams, J. (2019). The prevalence of self-reported diagnosed endometriosis in the Australian population: results from a nationally-representative survey. *BMC Research Notes*, 12(1), 88–88. <https://doi.org/10.1186/s13104-019-4114-6>
2. East-Powell, M., & Reid, R. (2019). Medical synopsis: Antioxidant supplementation may support reduction in pelvic pain in endometriosis. *Advances in Integrative Medicine*, 6(4), 181–182. <https://doi.org/10.1016/j.aimed.2019.07.004>

3. Reid, R., & Schloss, J. (2019). Medical synopsis: The use of vitamin E and omega 3 fatty acids for the management of primary dysmenorrhea. *Advances in Integrative Medicine*, 6(3), 139–140. <https://doi.org/10.1016/j.aimed.2019.04.004>
4. Reid, R., & Schloss, J. (2018). Characteristics of naturopathic texts for the management of endometriosis over the last 200 years. *Journal of the Australian-Traditional Medicine Society*, 24(4), 230–236.
<https://search.informit.org/doi/10.3316/informit.079587125060359>
5. Steel, A., & Reid, R. (2016). A need for a better understanding of the role, value, and effectiveness of complementary and integrative medicine for women with endometriosis. *Advances in Integrative Medicine*, 4(1), 3–4. <https://doi.org/10.1016/j.aimed.2016.12.001>

Published conference abstracts based on the thesis results

1. Redmond, R., Steel, A., Wardle, J., & Adams, J. (2019). An examination of the naturopathic utilisation by women with endometriosis. *Advances in Integrative Medicine*, 6, S39.
2. Redmond, R., Steel, A., Wardle, J., & Adams, J. (2019). Historical and contemporary naturopathic recommendations for cases of endometriosis, dysmenorrhea, and menorrhagia. *Australian Journal of Herbal Medicine*. 31(1):16.
3. Redmond, R., Steel, A., Wardle, J., & Adams, J. (2019). Knowledge mobilisation and implementation of traditional sources into contemporary naturopathic clinical practice. *UK Knowledge Mobilisation Forum*.
4. Redmond, R., Steel, A., Wardle, J., & Adams, J. (2017). The traditional naturopathic treatments utilised for the management of endometriosis and associated menstrual symptoms. *American Association of Naturopathic Physicians Annual Convention*.
5. Reid, R., Steel, A., Wardle, J., & Adams, J. The traditional naturopathic treatments utilised for the management of endometriosis and associated symptoms. *Australian Journal of Herbal Medicine*. 2017 Mar 1; 29(1):38-9.

Statement of contribution of authors contained in the thesis

This thesis contains five result chapters, four have been published in relevant peer-reviewed journals, as displayed in the appendices. For each of these articles, I have been primarily responsible for the development of the research questions, drafting the methodology protocols, performing analysis, drafting the full manuscripts, submitting the manuscripts for publication, and responding to peer-review comments.

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List of Abbreviations

ACE: Australian Coalition of Endometriosis

ALSWH: Australian Longitudinal Study on Women's Health

ALT: Alanine Transaminase

AST: Aspartate Transaminase

AUD: Australian Dollar

CHERRIES: Checklist for Reporting Results of Internet E-Surveys

CI: Confidence Interval

CM: Complementary Medicine

CPPD: Cyclic Perimenstrual Pain and Discomfort

DHA: Docosahexaenoic Acid

DIE: Deep Infiltrating Endometriosis

EBP: Evidence-Based Practice

ECQ: ENDOCARE Questionnaire

EPA: Eicosapentaenoic Acid

EPHP – 30: Endometriosis Health Profiles

EPHP – 5: Endometriosis Health Profile

FODMAP: Fermentable Oligosaccharides, Disaccharides, Monosaccharides And Polyols

GP: General Practitioner

HPA: Hypothalamic-Pituitary-Adrenal Axis

HPO: Hypothalamic-Pituitary-Ovarian Axis

HREC: Human Research Ethics Committee

IBS: Irritable Bowel Syndrome

IL-1 β : Interleukin 1 Beta

IL-6: Interleukin 6

IL-8: Interleukin 8

IP: Internet Protocol

NICE: National Institute for Health and Care Excellence

NUNM: National University of Natural Medicine

OR: Odds Ratio

PBRN: Practice-based research network

PGE2: Prostaglandin E2

PMS: Premenstrual Syndrome

PRACI: Practitioner Research And Collaboration Initiative

PROMs: Patient-Reported Outcome Measures

QoL: Quality of Life

TCM: Traditional Chinese Medicine

T&CM: Traditional and Complementary Medicine

TENS: Transcutaneous electrical nerve stimulation

TGA: Australian Therapeutic Goods Administration

USA: United States of America

USD: United States Dollar

WHO: World Health Organisation

WNF: World Naturopathic Federation

Abstract

Background

Women with endometriosis seek care from various health care practitioners for disease management. Naturopathy is frequently utilised by women with chronic diseases including reproductive diseases. However, there has been limited evidence exploring naturopathic care for women with endometriosis.

Methods

A two-phase research design was employed using a cross-sectional study (Phase 1) and a mixed-methods sequential exploratory framework (Phase 2A and Phase 2B). Phase 1 surveyed the prevalence of naturopathic consultations by women with endometriosis via Endometriosis Australia and EndoActive using a 32-item questionnaire. Phase 2A involved a textual analysis of traditional and contemporary naturopathic texts identified through naturopathic educational institutions and libraries. Phase 2B surveyed naturopaths through the Practitioner Research And Collaboration Initiative (PRACI) using a 62-item questionnaire to describe the understanding, approach, and treatment characteristics of naturopathic care in managing endometriosis in clinical practice.

Results

Phase 1 identified that women with endometriosis who consult with a naturopath (19.8%) also consult with a laparoscopic surgeon, acupuncturist, physiotherapist, nutritionist/dietitian, and homeopath. These women are also more likely to experience dyspareunia (OR 2.9, CI 1.4-5.9, $p = 0.002$) and use vitamin D supplementation (OR 4.9, CI 2.5-9.9, $p \leq 0.001$) compared to non-naturopathy users. Phase 2A identified that naturopathic texts contained herbal medicine recommendations for endometriosis, dysmenorrhea, and menorrhagia, more than any other type of naturopathic modality. Both traditional and contemporary sources frequently reported self-care and dietary recommendations for dysmenorrhea and menorrhagia, while endometriosis

recommendations were absent from traditional sources. Massage therapy was the most common recommendation for multidisciplinary referrals across endometriosis, dysmenorrhea, and menorrhagia. Lifestyle recommendations were prevalent for endometriosis care in Phase 2B (75.9%). Naturopaths approached endometriosis by reducing inflammatory factors (93.1%), assessing familial genetic history (89.6%), and supporting gastrointestinal function (86.2%). Naturopaths primarily referred women with endometriosis to general practitioners, (41.3%) and acupuncturists/traditional Chinese medicine practitioners (37.9%) with the clinical reasoning that women with endometriosis require a multidisciplinary approach.

Conclusion

This thesis provides the first known investigations into naturopathy use for the management of endometriosis highlighting a significant history in the recommendation of naturopathic treatments that may have plausibility in endometriosis pathophysiology. Naturopathy consultations for endometriosis appear to align with a multidisciplinary approach that is currently the recommendation for contemporary care. Further research on the role and effectiveness of naturopathic care for women with endometriosis is warranted.

Chapter 1. Introduction

1.1 Background

This thesis provides clinical insights into naturopathy use, treatments, and approaches in endometriosis management. The following introductory chapter details endometriosis as a chronic inflammatory reproductive disease and describes the relevant medical context of the disease in contemporary settings. Further, the introductory chapter discusses naturopathy as a health care service and overviews the prevalence of naturopathy use by women¹ with menstrual disorders and diseases including endometriosis.

1.2 Estimated prevalence and cost of endometriosis

In 2017, the global prevalence of endometriosis was estimated at 10% of women of reproductive age, equating to approximately 190 million women worldwide (Zondervan et al., 2020). Australian research from 2000 and 2018 indicates that one in nine women will be diagnosed with endometriosis by the age of 44 years (Rowlands et al., 2021). The prevalence of endometriosis in Australia increased by 6.4% between the years 1998 to 2013 (Vos et al., 2015). However, endometriosis prevalence rates may be affected by recognised challenges with achieving a formal diagnosis. Challenges to endometriosis diagnosis correlate with misdiagnosis, limited health care practitioner knowledge of endometriosis, lack of policy support with endometriosis initiatives, normalisation of abnormal menstruation by health care practitioners and women, and social stigma of menstruation (O'Hara et al., 2020). These aforementioned challenges are noteworthy and impact a clear prevalence rate of endometriosis by inevitably delaying endometriosis diagnosis.

¹ In the context of this thesis, the texts and data collection tools used focused specifically on biological females who identify as women. However, menstrual health and diseases can also affect individuals who do not identify as a woman.

Despite substantial societal and personal costs, the total economic costs of endometriosis are substantial with an Australian report estimating an economic burden of \$9.7AUD billion per year based on a prevalence mapping of direct and indirect costs at the individual level (Ernst and Young, 2019). Research conducted after the Ernst and Young (2019) report estimated an economic burden of \$7.4AUD billion per annum based on an Australian national online survey (Armour et al., 2019b). Women with endometriosis incur costs related to medical fees associated with diagnostic surgeries, surgical procedures, pharmaceutical treatments, associated fertility treatments, and health care practitioner fees for ongoing management (As-Sanie et al., 2020). Women with endometriosis also experience costs associated with diagnostic delays and misdiagnosis contributing to greater use of health care treatments and services (As-Sanie et al., 2020). Women who experience chronic or severe endometriosis-associated pain may resort to pharmaceutical treatments such as opioids in conjunction with standard medications, which can further inflate out-of-pocket costs for women (As-Sanie et al., 2020).

The burden of disease associated with endometriosis and its adverse implications on women's quality of life (QoL) is also an area of concern. As endometriosis results in absenteeism from employment, loss of productivity, and in some instances dismissal from paid employment, the financial implications are noteworthy (Armour et al., 2019b; As-Sanie et al., 2020). An American multi-centre study estimated the annual societal economic cost for endometriosis to be \$69.4USD billion, with over two-thirds of the costs due to productivity loss and the rest related to direct endometriosis health care costs during the 12 months before and after endometriosis diagnosis (Soliman et al., 2018). Australian data indicates the loss of productivity is the greatest contributor to the economic burden of endometriosis with estimates of \$17,484AUD in productivity costs, \$2,640AUD direct health care costs, and \$774AUD carer costs annually per woman with endometriosis (Armour et al., 2019b).

1.3 Defining endometriosis

Endometriosis is defined as a chronic inflammatory reproductive disease that presents with tissue similar to endometrial glands and stroma tissue growing outside of the uterus (Sourial et al., 2014; Taylor et al., 2021). The disease is characterised by three types of endometriosis: *superficial peritoneal lesions*, *deep infiltrating endometriosis (DIE)*, and *endometriomas (ovarian endometriotic cysts)* (Taylor et al., 2021). There are several theories relating to the pathogenesis of endometriosis, with the most commonly accepted theory being retrograde menstruation (Taylor et al., 2021). Endometrial stem cells, coelomic metaplasia theory, and genomic inheritance are other endometriosis pathogenesis theories (Sourial et al., 2014; Taylor et al., 2021). Endometriosis presents as an oestrogen-dependent multifactorial disease involving various pathophysiological interactions including inflammatory, hormonal, immunological, genetic, and epigenetic factors (Koninckx et al., 2019). Clinically, endometriosis is classified into four stages of disease progression: *stage I – minimal*, *stage II – mild*, *stage III – moderate*, and *stage IV – severe*. Each stage is dependent on the location, presence, and severity of endometrial lesions and adhesions; importantly, each stage does not correlate with the severity or presentation of endometriosis symptoms (Schliep et al., 2015). The gold standard approach to endometriosis diagnosis involves laparoscopic surgery with histopathological confirmation and clinical evaluation of symptomology (Agarwal et al., 2019a). Despite being the gold standard approach to endometriosis diagnosis, there are challenges related to the invasive nature of laparoscopic surgery, diagnostic delay, surgical costs, and inadequate correlation of presenting symptomatology and endometriosis (Foster & Leonardi, 2021). For these reasons and others including suppression of symptoms from oral contraceptive medications, normalisation of pain and early symptom onset, laparoscopic surgery is being openly challenged which may contribute to undiagnosed and under-reported endometriosis prevalence rates for women with suspected endometriosis (Foster & Leonardi, 2021).

Endometriosis is complex, progressive, and presents with a variety of debilitating symptomology. Nearly 80% of women with endometriosis experience chronic pain-associated symptoms including dysmenorrhea (painful menstruation), chronic pelvic pain, dyspareunia (painful intercourse), dyschezia (painful defecation), and dysuria (painful urination) (Moradi et al., 2020; Schliep et al., 2015). Other common symptoms include back pain, leg pain, migraines, headaches, abdominal bloating, bowel irregularities (constipation and diarrhea), cyclic and non-cyclic intermenstrual pain, fatigue, and infertility (Agarwal et al., 2019a). These symptoms are common among women with suspected and diagnosed endometriosis, although, some women can be asymptomatic (Anastasiu et al., 2020). Women with endometriosis report negative impacts on their lives, with a significant influence on women's daily activities including their social life, mental health, personal relationships, and overall health and wellbeing (Ferreira et al., 2016). Women with endometriosis frequently report having a lower QoL in comparison to women presenting with similar symptomology but without an endometriosis diagnosis or women with asymptomatic endometriosis (Bień et al., 2020). QoL dimensions have notable negative implications for women with endometriosis including the impact on fertility, disease recurrence, long-term therapy, and uncertainty of whether repeated and costly surgical procedures will improve endometriosis-associated symptoms (Moradi et al., 2014). Women with suspected and diagnosed endometriosis are exposed to social stigmas and medical dismissals relating to menstrual taboos and myths about clinical diagnosis and management. Social stigmas about menstruation contribute to misinformation, delays in diagnosis, and clinical management by 'trial and error' (Moradi et al., 2014). The social stigmas surrounding menstruation and endometriosis stem from the misconception that health care practitioners may discount women's reports of menstrual abnormalities and pain, therefore further contributing to diagnostic delays (Sims et al., 2021). Diagnostic delays

and social stigma may contribute to some women's dissatisfaction with endometriosis care (Evans et al., 2021; Lukas et al., 2018; Rowe et al., 2021) and may drive these women to seek more comprehensive clinical care elsewhere (As-Sanie et al., 2019).

1.4 Contemporary clinical management of endometriosis

The contemporary approach to clinically managing endometriosis is often based on the intensity of endometriosis-associated pain, the impact of QoL, and the women's desire to conceive (Vannuccini et al., 2021). However, the most recent update to the Australian clinical practice guideline for the diagnosis and management of endometriosis recommends a more comprehensive approach and details up-to-date evidence-based guidance to support the Australian National Action Plan for Endometriosis. While the National Action Plan for Endometriosis focuses on three core priority areas including *awareness and education, research, and clinical care*, the Australian clinical practice guideline for the diagnosis and management of endometriosis primarily focuses on the latter. It covers elements that impact patient-focused care, the need for multidisciplinary and interdisciplinary care, and the rationale for exploring non-pharmacological treatments for endometriosis management (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). Currently, the first-line treatment for endometriosis involves a hormonal approach of pharmaceuticals including oral contraceptive pill, gonadotropin-releasing hormone agonists, progestins, and levonorgestrel-releasing intrauterine system (e.g., Mirena®, Skyla®, Liletta®, and Kyleena®) (Zito et al., 2014). The oral contraceptive pill is often a first-line of treatment that demonstrates benefits in reducing endometriosis-associated pain and satisfaction with treatment (Mehdizadeh Kashi et al., 2022). In addition, the oral contraceptive pill is often employed as a post-operative pharmaceutical treatment for ongoing management of endometriosis-associated pain and to support the reduction in symptom recurrence (Zorbas et al., 2015). While laparoscopic surgery involving excision is considered to

provide the most effective pain relief outcomes (Pundir et al., 2017), evidence suggests there is still a high recurrence of endometriosis and the debilitating symptoms that accompany the disease (Denny et al., 2018). Secondary-line treatment for endometriosis is laparoscopic surgery with ablation or excision techniques (Pundir et al., 2017). The use of a levonorgestrel-releasing intrauterine system (e.g., the product marketed as Mirena©) has been used as a secondary approach after laparoscopic surgery (Abou-Setta et al., 2013; Gibbons et al., 2021). The Mirena© has shown promise in reducing symptoms in mild to moderate stages of endometriosis and has the potential to reduce the risk of recurrence after laparoscopic surgery (Lockhat et al., 2004). While the Lockhat et al. study (2004) seems promising, the methodological design of the study was a small observational study and thus may not be representative of the greater population. Using the Mirena© has reportedly reduced dysmenorrhea, non-cyclic pelvic pain, and dyspareunia in some women (Streuli et al., 2013). The approach of using Mirena© post-surgically appears favourable when used for a minimum six-month period. A hysterectomy is an alternative approach for women who experience severe endometriosis-associated pain and do not wish to conceive (Bulletti et al., 2010). Women with endometriosis often receive lifelong treatments including repeated surgical interventions and pharmaceuticals to continue reducing symptoms, preventing the recurrence and progression of the disease, and improving fertility outcomes (Bulletti et al., 2010; D'Alterio et al., 2021). While women with endometriosis may often receive standard care beginning with pharmaceutical treatments followed by diagnostic and treatment-based laparoscopic surgeries, some women may seek care and treatments outside of conventional health care because of greater health care needs or dissatisfaction with standard care options (As-Sanie et al., 2019).

1.5 Unmet health care needs of women with endometriosis

Women with suspected and diagnosed endometriosis face several challenges in seeking health care services and treatments. Such challenges can have a significant impact on

women's QoL and health care-seeking behaviour including diagnostic delay, dissatisfaction with endometriosis care and treatment options, and surgical procedures. The aforementioned challenges can result in unmet health care needs defined as the difference between appropriate levels of health care services including access and the health care services actually received when seeking care (Pappa et al., 2013).

1.5.1 Diagnostic delay

There are noteworthy reports that women with suspected endometriosis do not receive a timely referral for endometriosis diagnosis resulting in diagnostic delay (Agarwal et al., 2019a). Diagnostic delay is an important issue for women with suspected endometriosis as Australian research indicates that women experience a 6.4-year delay in diagnosis (O'Hara et al., 2020). Women with suspected endometriosis are often misdiagnosed with other disorders such as irritable bowel syndrome (IBS), pelvic inflammatory disease, psychosexual disorders, or bladder abnormalities (Fernley, 2021; Seaman et al., 2008). The resulting misdiagnosis and delay in accurate diagnosis for women with suspected endometriosis further contribute to the level of dissatisfaction with endometriosis care resulting in a lack of patient disclosure, distrust towards health care practitioners, patient vulnerability, and social stigmatisation (Fernley, 2021). Once a diagnosis has been confirmed for women, the disease experience can result in persistent symptoms and long-term complications with disease progression (Young et al., 2014). Women with menstrual difficulties often hide their menstrual experiences to minimise the risk of social stigmatisation (Johnston-Robledo & Chrisler, 2013; O'Flynn, 2006). The social stigmatisation of women with menstrual difficulties occurs both within societal groups such as friends and family, and also in primary health care settings (Young et al., 2014). The normalisation towards menstrual abnormalities and the inability of health care practitioners to effectively understand what their patients are experiencing (Grundström et al., 2016) accounts for the delay in diagnosis at the medical level (Culley et al., 2013; Young et al., 2014). It is common for women with endometriosis to report that health care

practitioners normalise abnormal menstrual experiences (Grundström et al., 2016; Young et al., 2014). Diagnostic delay can be evident for women who undergo laparoscopic surgery. The lack of clinical evidence of endometriosis in women with suspected endometriosis further results in diagnostic delay, however, in the attempt to identify an alternative diagnosis (Mak et al., 2022). Endometriosis complications and recurrence often lead women to seek multiple avenues of care (As-Sanie et al., 2019). Numerous factors including the invasive nature of laparoscopic diagnostic methods, the various unmet health care needs, and negative health care experiences by women with endometriosis contribute to diagnostic delay (As-Sanie et al., 2019; Young et al., 2014).

1.5.2 Dissatisfaction with endometriosis care and treatments

While some women may be satisfied with standard endometriosis management, others continue to experience negative health outcomes (Lukas et al., 2018). Some dissatisfaction with endometriosis care stems from the treatments used or the care provided (Evans et al., 2021; Lukas et al., 2018). Women with endometriosis who seek care from conventional health care practitioners describe the limitations of the reductionist model in clinical care. Not being treated from a holistic and patient-focused approach has been identified as a key limitation in conventional health care by women with endometriosis (Evans et al., 2021; Lukas et al., 2018). A holistic approach to endometriosis appears to align with mental health and QoL concerns for women with endometriosis (Lukas et al., 2018). The impact on QoL parameters often leads women with endometriosis to seek a patient-centred and multidisciplinary approach (Evans et al., 2021). The reasons for unmet health care needs may vary for each woman, with the standard clinical approaches employed for endometriosis management often resulting in further unmet needs. Women who continue to have negative health care experiences may turn to other avenues of treatment, including self-managing their disease and disease symptoms (Evans et al., 2021).

Women report dissatisfaction with standard endometriosis care after diagnosis (Evans et al., 2021; Rowe et al., 2021). Women with endometriosis also claim dissatisfaction with standard endometriosis treatments (Burla et al., 2021; Evans et al., 2021; Lukas et al., 2018). Some women with endometriosis continue to report dissatisfaction with ongoing treatment due to individual side effects and insufficient effectiveness in managing painful symptoms and disease recurrence (Burla et al., 2021). For example, some women using the Mirena© have reported unpredictable menstrual cycles and side effects during the first few months of use. However, important to note is that this specific study was a small prospective clinical trial and may not be reflective of the greater population's experiences (Lockhat et al., 2005). Recurrence of problematic symptomatology may cause women with endometriosis to have repeated costly laparoscopic surgeries (Nezhat et al., 2019) and can still result in negative health outcomes (Abou-Setta et al., 2013). The personal burden of undergoing and recovering from endometriosis-associated surgeries can also result in complications that can be present from several months to years after surgical intervention (Brunes et al., 2022; Roman et al., 2021).

1.6 A need for patient-centred endometriosis care

1.6.1 A need for a patient-centred care model

Health care practitioners, patients, and researchers are increasingly recommending a patient-centred care model for endometriosis in an attempt to reduce the unmet health care needs for women and the need to address paternalism in health care settings (Apers et al., 2018; As-Sanie et al., 2019). Patient-centred care is defined as “providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions” (Baker, 2001). As a health care framework, patient-centred care is characterised by eight core dimensions that have applicability in endometriosis care such as emotional support, family and

friends, access to care, physical comfort, patient preferences, patient education, continuity and coordination of care (Kuipers et al., 2019). These patient-centred care dimensions encompass the biopsychosocial elements of health care, delivery of effective and reliable evidence-based treatments, patient involvement in decision-making including their treatment preferences, clear and informed communication, participation of the patient's family, and empathy and empowerment towards the patient (Delaney, 2018). The primary outcomes of the implementation of patient-centred care models are related to disease management and ensuring that clinical care is meaningful and valuable to the individual patient (Epstein & Street, 2011). Patient-centred care models are a vital component in the management of chronic diseases due to the various complexities in clinical care and the level of self-management that occurs for these individuals (Delaney, 2018; Pulvirenti et al., 2014). In the context of endometriosis, the recommendation for patient-centred care models has the potential to address the limitations of disease self-management while also overcoming barriers including dissatisfaction with clinical endometriosis care (Apers et al., 2018; Geukens et al., 2018). Patient-centred care models need to address the most common domains in endometriosis management and target known QoL dimensions to support the effectiveness of care and positive health outcomes (Geukens et al., 2018). Patient-centred care is primarily through addressing the values, needs and preferences of women with endometriosis who seek clinical care management (Geukens et al., 2018). In the context of patient-centred endometriosis care, an Australian qualitative study found a range of domains including patient satisfaction with care and treatment, obtaining appropriate individualised information, feeling 'heard' with respect, empathy from their health care practitioners, and health care practitioners' competence in managing the disease all require attention (Rowe et al., 2021). These aforementioned domains are important aspects of health care delivery and are gaining further research attention in supporting women with endometriosis (Schreurs et al., 2020; Schreurs et al., 2023).

Recently, patient-reported outcome measures (PROMs) have been specifically designed and validated for women with endometriosis such as ENDOCARE (Dancet et al., 2011) and the Endometriosis Health Profiles (EHP-30 and EHP-5) (Jones et al., 2004; Jones et al., 2001). The ENDOCARE, EHP-30, and EHP-5 PROMs aim to identify and measure many of the unmet health care needs in endometriosis care and can be applied in various health care settings to provide valuable patient information on women's QoL and endometriosis management (Dancet et al., 2011; Jones et al., 2004; Jones et al., 2001).

1.6.2 Women's self-management of endometriosis

Chronic diseases have complex pathophysiology that create challenges for managing patient health care. From a policymaker perspective, there are self-management strategic frameworks for chronic diseases that employ a multi-component approach to support patients at the individual, community, and public healthcare system levels (Australian Government, 2022 July; Government of Western Australia, 2022 June). The self-management strategic frameworks led by the Australian Government aim to provide resources such as the COACH program (Australian Government, 2022 August), and health care services to support individuals with diagnosed chronic diseases (Australian Government, 2022 July). In the case of endometriosis, it is difficult to determine if the provided resources and health care services reduce unmet health care needs. There are notable obstacles that coincide with managing a chronic disease such as endometriosis from the patient perspective. Such difficulties in managing endometriosis include debilitating symptomology, negative QoL dimensions, and complex treatment approaches. Additional challenges in endometriosis care include maintaining optimal health status through self-management measures (e.g., dietary and lifestyle approaches) and obtaining effective and supportive multidisciplinary health care (Grady & Gough, 2014). Individuals with chronic diseases often attempt self-management approaches to maintain health care independence and support their QoL despite health care difficulties. The traditional health care practitioner and patient relationship paradigm is evolving to

include patients' having an active role in patient-centred treatments and self-management strategies (Grady & Gough, 2014). Self-management involves patients advocating for their health care and disease management through the application of three core self-management skills including medical management, role management, and emotional management as well as six self-management skills that are required to ensure the effectiveness of self-management treatments (Lorig & Holman, 2003). Women with endometriosis face challenges in achieving individualised and effective disease management. Some women with endometriosis frequently express dissatisfaction with the management and treatment of endometriosis. As a result, some women may resort to self-management strategies to combat the disease and manage their debilitating symptoms as outlined in a nationwide survey in Australia (Armour et al., 2019d). Self-management strategies for endometriosis is an emerging field of research in Australia, which has identified that women with endometriosis self-manage various elements of their care including relationships and rapport with health care practitioners, seeking information sources, identifying and monitoring cyclic symptomology, and actively taking control of their health care decision-making (O'Hara et al., 2019). A global systematic literature review conducted in 2017 identified that women with endometriosis are self-managing behavioural, psychological, and lifestyle changes such as dietary and exercise regimes to manage their disease (O'Hara et al., 2019). Many of the described endometriosis self-management treatments involve self-selected complementary medicine (CM) treatments and approaches that may have a supportive role in encouraging women to feel empowered and involved in their disease management (Armour et al., 2019d; Evans et al., 2021; Leonardi et al., 2020b; O'Hara et al., 2019). Empowerment and self-management are essential elements to consider given the complexity of endometriosis management as previously mentioned throughout this chapter.

1.7 Stakeholder and policymaker advancements in endometriosis care

In recent years, Australian policy guidelines and census documents have examined if endometriosis met the chronic disease criteria (O'Hara et al., 2018). The policy analysis conducted by O'Hara et al. (2018) found endometriosis met five of the six categories for chronic disease classification, yet it was not incorporated into chronic disease management frameworks to support and promote individualised and multidisciplinary approaches to clinical care (O'Hara et al., 2018). Policymakers need to acknowledge endometriosis as a chronic disease and support the ongoing medical advancement, to overcome several of the modifiable unmet health care needs women face, and to support the development of patient-centred care initiatives for endometriosis care. The Australian government has undertaken initiatives to improve awareness, disease management and treatment of endometriosis as well as supporting research development to combat many of the issues raised by women with the disease (Steele et al., 2019). Despite these recent initiatives by the Australian government, more funding and research engagement are needed to ensure evidence-based approaches and treatments are implemented in clinical settings.

1.7.1 Collaboration and co-design with endometriosis consumer groups

Australian government support for endometriosis led to the development of a peak advocacy body known as the Australian Coalition of Endometriosis (ACE). Formally, ACE was founded by key stakeholders who have been actively lobbying and supporting women with endometriosis. The founding endometriosis stakeholders for ACE include the Canberra Endometriosis Network, EndoActive, QENDO, Endometriosis Australia, and the Pelvic Pain Foundation of Australia (Australian Coalition for Endometriosis, 2018 April). ACE is contributing to the increase of disease awareness, education, clinical standards of care, and supporting research. It is also prioritising the development and

implementation of endometriosis as the 10th National Health Priority Area within the Australian healthcare framework (Australian Coalition for Endometriosis, 2018 April).

1.7.2 Formalisation of national endometriosis strategies

In addition to the development of ACE, the Australian government has included endometriosis in the National Women's Healthy Strategy 2020 – 2030 (Department of Health, 2018 September-c) and supported the development of the National Action Plan for Endometriosis to invest in three important areas relating to endometriosis education and awareness, clinical care, and research (Department of Health, 2018 September-b). The National Action Plan for Endometriosis also contributed to the development of the Australian clinical practice guideline for the diagnosis and management of endometriosis as a core document to address the clinical care area in the National Action Plan for Endometriosis. This guideline document is essential to providing an evidence-based approach to care and ensuring that women with suspected and diagnosed endometriosis are receiving the highest quality care for their health care needs (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). In addition to the development of the Australian clinical practice guideline for the diagnosis and management of endometriosis, the National Action Plan for Endometriosis has also supported endometriosis-specific research funding. The increase in research funding for endometriosis from the National Action Plan for Endometriosis directed the exploration of ten research priorities relating to endometriosis prevention, remission, and cure. The research priorities and treatment objectives for endometriosis also include identifying effective non-surgical treatments and health care disciplines that may assist in managing endometriosis-associated pain and ensuring women with endometriosis have access to appropriate evidence-based treatments including CM treatments (Department of Health, 2018 September-b). In addition to research priorities, the National Action Plan for Endometriosis aims to promote a multidisciplinary clinical care approach by strengthening professional networks between health care practitioners in both

conventional and CM (Department of Health, 2018 September-b). Multidisciplinary collaboration in clinical care is often hindered due to factors relating to limited communication channels and professional credibility issues in some cases (Gray & Orrock, 2014; Wardle et al., 2013a; Wardle et al., 2014). In addition to the notable initiatives from the National Action Plan for Endometriosis, the Australian Government is supporting endometriosis research programs with an initial \$2.5 million funding pool (Department of Health, 2018 September-a) to investigate the effectiveness of current and new approaches to clinical care in a multidisciplinary approach for endometriosis (Department of Health, 2018 September-b). Several aspects of the Australian clinical practice guideline for the diagnosis and management of endometriosis have relevance to the previous topics covered throughout this chapter (detailed in Chapters 1.5 and 1.6). Three Guideline recommendations that cover discussions raised in this chapter include:

- Multidisciplinary and interdisciplinary care to manage endometriosis (Guideline recommendation 3.6)
- Factors that can guide treatment of endometriosis (Guideline recommendation 3.9)
- Non-pharmacological and non-surgical managements for pain associated with endometriosis (Guideline recommendation 3.15).

Chapter 10 of this thesis will discuss the three aforementioned Guideline recommendations as they relate to the findings of this study.

1.8 National and international naturopathy professional landscape

1.8.1 Prevalence of consultations with naturopaths

Naturopathy is one of the most common traditional systems of medicine and represents a large CM workforce (Steel et al., 2021c). CM is defined as a diverse collection of clinical-based practices (e.g., acupuncture and naturopathy) and treatments (e.g., herbal medicine and clinical nutritional medicine) that exist outside of conventional medical

practice and curricula (Reid et al., 2016). The exact international prevalence rate of consultations with naturopaths has had limited research investigation. However, recent research from 2021 has estimated that 5.5 million patients per month, consult with naturopaths, globally (Steel, 2021). The overview by Steel (2021) examined the international prevalence rates of consultations with naturopaths, indicating that approximately 110,000 naturopaths are working in clinical practice across 108 countries across all world regions (Steel, 2021). Naturopathy consultation prevalence rates vary across all countries. In the USA, there are reports of lower prevalence rates compared to other countries with 0.25% in 2002 and 0.4% in 2015 (Clarke et al., 2015; Su & Li, 2011). While the prevalence of consultations with a naturopath in the USA is low, differences in legislation requirements, private health insurance, naturopathic educational institutions, and perception of naturopathy can vary from state to state (Steel, 2021). In comparison, Canada reports a higher prevalence of naturopathy consultations of 11% in 2016 (Steel et al., 2021b), where naturopathy is considered an emerging health care profession with varying regulation and legislation status per provincial territory (Verhoef et al., 2006). Australian prevalence rates of consultations with naturopaths among the general population are estimated at 6.2% in 2017 based on a representative national cross-sectional survey (McIntyre et al., 2019). While the international prevalence of consultations with naturopaths differs, there are comparable reports of the type of naturopathy users that are consistent in research. Many naturopathic consultations are often with individuals with chronic diseases, women of middle age and with a higher income and education status (McIntyre et al., 2019; Reid et al., 2016; Steel et al., 2020b). Data from the Australian Longitudinal Study on Women's Health (ALSWH) identified that women who consult with a naturopath report poorer health status compared to non-naturopathy users (Adams et al., 2007; Steel et al., 2019b). Current research indicates that the prevalence of consultations with naturopaths can vary depending on disease type. For example, in women's reproductive health, Australian research from 2011

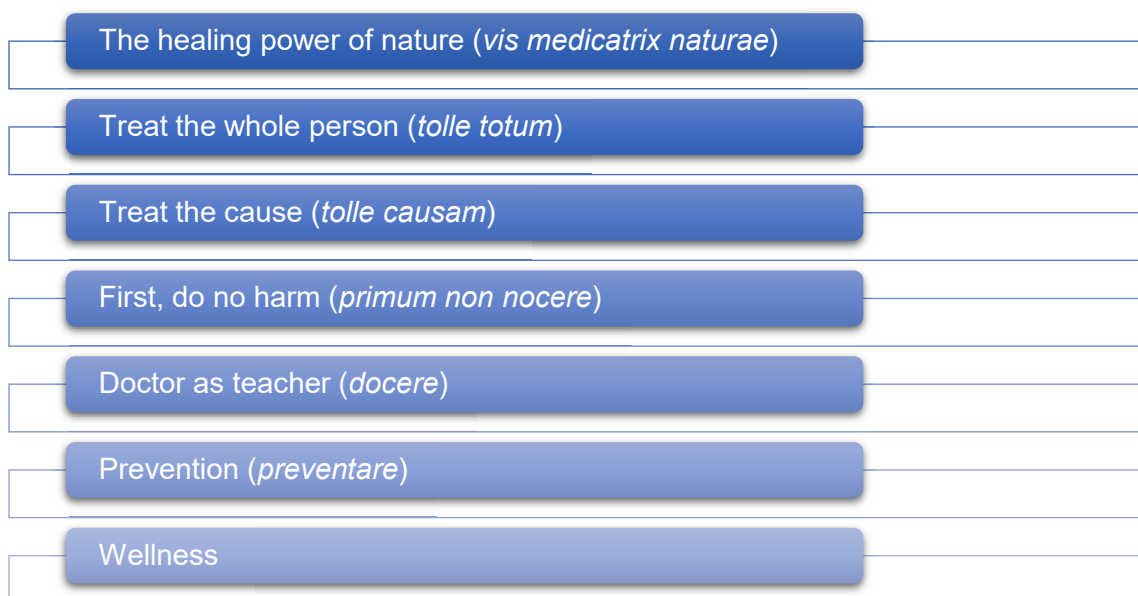
reports prevalence rates of naturopathy consultations for women with polycystic ovary syndrome at 38.8% (Arentz et al., 2014) and 10% for women seeking care from a naturopath during pregnancy based on 2009 data from the ALSWH study (Frawley et al., 2013). While the prevalence of consultations with naturopaths in various areas of women's health has been explored previously, the prevalence rate of consultations with naturopaths for women with menstrual diseases including endometriosis appears preliminary (O'Hara et al., 2020; Steel et al., 2020b). An international cross-sectional survey reported that 6% of naturopaths provided care for female reproductive health, and only 11.7% of naturopaths had consulted with women for endometriosis management (Steel et al., 2020b). Data from a 2018 Australian study identified that 16.6% of women with endometriosis consulted with a naturopath in the previous 12 months (O'Hara et al., 2020). The prevalence of naturopathy consultations by women with endometriosis is scant, further exploration is needed to assess the national prevalence rates and to evaluate the use and potential benefits of naturopathy as a health care service in endometriosis care.

1.8.2 Overview of naturopathy

Naturopathy is recognised as a traditional medicine system by the World Health Organisation (WHO) and is practised globally (Dunn et al., 2021). As a traditional medicine system, naturopathy is supported by codified philosophical principles and frameworks (Lloyd et al., 2021). The establishment of naturopathy was heavily influenced by the Water Cure practice by German practitioner Sebastian Kneipp, the Nature Cure movement by Henry Lindlahr, and homeopathy by Samuel Hahnemann during the 19th and 20th centuries (Whorton, 2004). However, much of the professional formation of contemporary naturopathy has occurred since 1901 in the USA from the early twentieth century (Snider & Zeff, 2019). The philosophical naturopathic frameworks that are foundational to the practice of naturopathy are vitalism and holism, defined as the innate ability of the body to heal itself and the recognition of all parts of the whole are connected,

respectively (Lloyd et al., 2021). Vitalism and holism are core philosophies that are overarching concepts of applying the seven philosophical principles (Lloyd et al., 2021). The seven naturopathic principles are utilised in the application of naturopathic approaches that focus on health promotion, health prevention, health education, and managing health and disease with the application of naturopathic treatments (Lloyd et al., 2021). The delivery of naturopathy is through the application of the Therapeutic Order which is a codified hierarchical seven-tier guideline that supports the use of naturopathic philosophies through safe and effective care (Finnell et al., 2019; Myers et al., 2021). Overall, the philosophical underpinning of naturopathy is framed in delivering a patient-centric approach to care through the use of naturopathic philosophical frameworks and principles (World Naturopathic Federation, 2017b).

Figure 1: The seven naturopathic philosophical principles that are the foundational tenets of the naturopathic approach to clinical care.



Naturopathy is defined by these philosophical frameworks and principles and not by the therapeutic tools used in clinical practice (Dunn et al., 2021). Typically, naturopaths utilise a variety of naturopathic treatments including herbal medicine, clinical nutritional medicine, dietary recommendations, lifestyle recommendations, manual therapies, and

mind-body practices (World Naturopathic Federation, 2016). However, the use of naturopathic treatments varies in different geographical locations depending on the evolution of the profession, legislation and registration requirements, educational standards, policy engagement, and consumer demand (World Health Organisation, 2010). Historical advancement and influences can also impact the treatments and approaches of naturopathy in clinical practice (World Naturopathic Federation, 2017b). Globally, naturopathy is practised in all world regions which contributes to differences in the levels of education and training, registration status, and incorporation into the healthcare system (Lloyd, 2021b). In the USA for instance, naturopaths have varying regulatory requirements depending on specific states. Some states and provinces have statutory registration, while others are unregulated or restricted from clinical practice. Similarly, naturopaths in Canada are regulated through statutory registration or protection of title, depending on the geographical province (Lloyd, 2021b). In comparison, Australian naturopaths are unregistered and are self-governed through negative licensing and adherence to a Code of Conduct, with several accredited degree programs offering clinical training in naturopathy (Lloyd, 2021b). The level of registration and education standards are important aspects of effective health care collaboration and integration of naturopaths into the healthcare system. Nevertheless, naturopathy in most instances sits outside of the dominant healthcare system. As naturopaths are not registered in Australia, there can be differences in the level of training and education standards amongst educational institutions. Overall, Australian naturopaths graduating with accredited degrees are comparable to those educated and trained in North America with some minor differences in the scope of practice depending on registration requirements (Dunn et al., 2021).

1.8.3 Educational standards of naturopathic curricula

Naturopathic education is delivered through various degrees depending on geographical location. However, there is consistency of subjects by education institutions that deliver

standardised and accredited degrees and programs (Lloyd, 2021b). Over 130 naturopathic education institutions that deliver naturopathic practitioner-level degrees and doctorate-level degrees, globally (Lloyd, 2021b). The World Naturopathic Federation (WNF) recommends minimum training hours for naturopathic practitioner-level degrees of 2000 hours and for doctorate-level degrees 4000 hours (Lloyd, 2021b). Standardised and accredited naturopathic degrees have been established in Canada and the USA since 1978 and in Australia since 1961 which are primarily delivered by dedicated naturopathic institutions in the university and private sector (Lloyd, 2021b). Currently, there are 11 naturopathic education institutions in North America and eight in Australia (World Naturopathic Federation, 2016). The naturopathic curricula offered in North America primarily include clinical nutritional medicine, herbal medicine, dietary advice, hydrotherapy, homeopathy, lifestyle counselling, pharmacology (including hormonal prescriptions), and manual therapies (e.g., massage, physical manipulation, osteopathy). In addition, naturopaths are educated in anatomy and physiology, pathophysiology, ethics, and business models (Steel et al., 2020b; World Naturopathic Federation, 2021). The Australian naturopathic curricula are comparable with the curricula taught in North America but with notable differences including the exclusion of homeopathy and hydrotherapy (other than as electives) and pharmaceutical prescriptions (World Naturopathic Federation, 2016). While pharmaceutical prescriptions are not within the Australian naturopathic scope of practice, naturopaths are trained in basic principles of integrative pharmacology but do not practice in this area of treatment. Due to the various influences both from inside and outside of naturopathy, much of the Australian naturopathic curricula currently focus on four core disciplines including clinical nutritional medicine, herbal medicine, diet recommendations, and lifestyle recommendations (World Naturopathic Federation, 2016). Global evidence suggests that naturopathic education institutions heavily influence the design and delivery of naturopathic curricula which can and has resulted in educational curricula

inconsistencies (Dunn et al., 2021). The design, development and delivery of naturopathic curricula entail an evidence-based practice (EBP) approach through the use of various sources of evidence.

1.8.4 Naturopathic knowledge and information sources

EBP is an important paradigm integrated into clinical decision-making where the best level of evidence is applied in the clinical setting (Sackett et al., 1996). Further, EBP acknowledges the importance of a patient-focused approach and practitioner experience and expertise when implementing evidence in clinical care (Engle et al., 2021). These EBP characteristics are evident in naturopathic practice and are used with a variety of evidence sources that guide clinical decision-making in the provision of quality care for naturopathy users (Aucoin et al., 2021). Evidence sources used in EBP in naturopathy can include information sources defined as a resource that is functional and captures meaning and relevance to a specific context (Cato et al., 2020; Dickerson, 2022). Knowledge sources are also included in the EBP framework and are considered an iterative process where information sources transform into the identification of associations and patterns that are observable (Cato et al., 2020). The above definitions will be used to describe the resources used in this thesis as detailed in Chapters 4.6.3, 4.7.2, and 4.8.4.

Naturopaths value and use numerous information sources in their clinical decision-making including empirical knowledge, traditional evidence, and scientific research (Redmond et al., 2021; Steel & Adams, 2011b). Naturopathic knowledge sources can include clinical wisdom and intuition, mentorship and colleagues' advice, clinical experience and areas of expertise, and most importantly patient knowledge of their health (Steel & Adams, 2011a; Steel et al., 2021a). Formal and informal education are also valuable knowledge sources that support continuing professional education for naturopaths (Steel et al., 2021a).

Traditional naturopathic knowledge holds significant value to the naturopathic profession despite some evidence of potential conflicts between the use of traditional knowledge and scientific evidence in clinical practice (Steel & Adams, 2011b). Naturopathic knowledge that is accepted as traditional knowledge includes empirical evidence, that is observation and documented clinical knowledge and cases by naturopathic predecessors such as the early naturopathic pioneers, Nature Cure and Water Cure practitioners (Lloyd, 2021a). While naturopathy has had several predecessors such as Nature Cure and Water Cure practitioners as previously mentioned, the Eclectics also held an influence in their knowledge that has since informed naturopathic practice. The Eclectics were medically trained professionals who founded a medical reform movement as they believed they should use herbal medicines in their clinical practice (Francis, 1998). The knowledge that the Eclectics established influenced the naturopathic scope of practice from originally using Nature Cure or drugless methods to incorporating herbal medicines (Francis, 1998). Over the evolution of naturopathy, various herbal medicine texts by the Eclectics have been recognised and accepted as traditional knowledge within the naturopathic profession. However, there is no set definition of what constitutes traditional knowledge or traditional texts (Steel & Adams, 2011b), with emerging evidence beginning to explore this area (Foley et al., 2023; Steel et al., 2023a; Steel et al., 2023b). Though the naturopathic profession deems traditional knowledge invaluable, there is often a negative discourse on its relationship and relevance to scientific research. The difference in approaches to and perceptions between traditional knowledge and scientific evidence in naturopathy has been an ongoing concern for the profession which may be a contributing factor to the limited exploration of traditional naturopathic knowledge from a scientific perspective (Ooi et al., 2018; Steel et al., 2021a; Steel et al., 2019c). Further, the disparity in the conflicts between traditional and scientific evidence has previously been explored in the naturopathic profession. A qualitative Australian study highlighted conflicting perspectives on the value of scientific research, with further

criticisms on naturopathy and scientific evidence coming from outside of the naturopathic profession (Aucoin et al., 2021). Despite the conflicts with EBP, naturopathy has embraced EBP where barriers to evidence implementation are largely due to self-efficacy in implementation as described in an Australian cross-sectional study (Leach & Veziari, 2023). Another Australian cross-sectional study also reported the uptake of scientific research within EBP by naturopaths with barriers determined by limited access to research databases (Steel et al., 2021a). While these barriers to EBP implementation at the clinical level are noteworthy, the shift to incorporate EBP at the teaching and training level for naturopaths has been used in naturopathic education institutions in Australia and North America (Ooi et al., 2018; Ooi et al., 2016). While there appears to be ongoing barriers at the individual level for evidence implementation, naturopathy has continued to uptake an EBP approach (Leach & Veziari, 2023; Ooi et al., 2016; Steel et al., 2021a).

While scientific research is utilised in naturopathic curricula and clinical settings, there are argued differences in research methodology that can effectively capture traditional naturopathic knowledge (Redmond et al., 2021). The examination of traditional knowledge from a scientific perspective is faced with many challenges and complexities. Such challenges may include the lack of consensus on what is traditional knowledge (Foley et al., 2023), barriers to interpretation and implementation (Leach & Veziari, 2023), biodiversity of herbal medicines, herbal medicine efficacy and safety, and concerns relating to protection rights (Twarog & Kapoor, 2004). In addition to these challenges, examining traditional knowledge within a reductionist approach also presents complexity and uncertainty in the appropriateness of using traditional knowledge in patient health care. However, these challenges have not gone unnoticed by the naturopathic profession. Emerging research has explored the relevance and application of traditional knowledge in the naturopathic profession. For example, a recent systematic review examined the criteria used for assess traditional knowledge's validity, particularly when used as evidence (Foley et al., 2023). The work by Foley et al. (2023),

has further expanded with the development of the Contemporary Implementation of Traditional Knowledge and Evidence in Health (CITE) Framework, whereby appraisal of traditional knowledge has been explored. Further, critical evaluation of traditional knowledge and relevant criteria has also been examined in Australia by additional research conducted by Steel and colleagues (Steel et al., 2023b). The CITE framework and traditional knowledge criteria explored in the aforementioned studies provide particular value in supporting the use of traditional knowledge (Steel et al., 2023a). There is a strong association between using the most appropriate research design and traditional knowledge. By using the most suitable methodological designs, traditional knowledge can be explored through contemporary contexts to support the validity of traditional knowledge (Redmond et al., 2021; Steel & Adams, 2011b).

With a myriad of information and knowledge sources, there can be some discrepancies in standardised approaches to clinical care, however, the use of various evidence sources is a widespread practice within naturopathy (Redmond et al., 2021; Steel & Adams, 2011b; Steel et al., 2021a). While traditional knowledge has evolved, there are concerns that traditional knowledge will be lost without the recognition of traditional knowledge as an evidence source (Twarog & Kapoor, 2004). In light of the various information and knowledge sources used within naturopathic care, this thesis will attempt to explore three evidence sources (i.e., patient knowledge, traditional evidence, and practitioner knowledge) within the context of naturopathic care for endometriosis as detailed in Chapter 4.

1.9 Naturopathy utilisation in women's reproductive health

The WHO recognises the value of naturopathy and other traditional medicine systems as a health care service in non-communicable disease management where preventative and proactive approaches to care are an important component of patient outcomes (World Health Organisation, 2013). New research exploring the prevalence of women's menstrual disorders and diseases is necessary to understand the characteristics and

level of care women receive from naturopaths including the plausibility and efficacy of naturopathic care in a complex disease like endometriosis. Research indicates that women with endometriosis are seeking care beyond conventional medicine with some women seeking health care management from naturopaths for various reasons (Cox et al., 2003b; Fisher et al., 2016a; Fisher et al., 2018; Fisher et al., 2016b). While the above-cited Australian studies have identified naturopathy use for women with endometriosis, the extent of naturopathic care for endometriosis has yet to be fully examined. Due to the limited research occurring in this space, the level of naturopathic care and treatments used in disease management requires exploration. As naturopathy encompasses a broad scope of practice that may have contemporary supportive evidence, there are potential clinical benefits of naturopathic care for women with endometriosis. The potential of naturopathic care for endometriosis may be evident in naturopathic treatments that target various aspects of endometriosis pathophysiology such as inflammation, hypothalamic-pituitary-ovarian (HPO) axis, hypothalamic-pituitary-adrenal (HPA) axis, immune system, and the gastrointestinal system, all of which are implicated in the disease (Appleyard et al., 2020; Steel et al., 2020c).

Examining the use of naturopathy for endometriosis may provide clinical insights into potential novel treatments and approaches that may support patient outcomes. However, an assessment of efficacy and plausibility profiles is also required. Currently, evidence of naturopathic treatments and approaches is limited and requires examination despite naturopathy use by women with endometriosis. While naturopathy use in reproductive care appears scarce at best, there has been some research evidence that has explored reproductive health management from the perspective of CM. Additional information overviews CM use in women's reproductive health will be detailed in Chapter 3.

1.10 Chapter summary

Women with endometriosis present with various individual and population-based unmet health care needs that may be considered a driving force behind health care seeking

behaviours. For these reasons and others relating to medical and societal perspectives of menstrual diseases, women with endometriosis are frequent users of health care services, including CM professions such as naturopathy. While women with endometriosis report consulting with naturopaths for endometriosis management, there has been limited research conducted in the last decade investigating this area of endometriosis care. As naturopathy is based on philosophical frameworks relating to holism, this profession may be suitable to incorporate into a multidisciplinary team approach focusing on patient-centred care for women with endometriosis. Doing so may modify the unmet health care needs of women with endometriosis as well as identify novel and non-pharmaceutical treatments for endometriosis management. While there is hypothetical potential for naturopathic care in supporting women with endometriosis, little is currently known about the types of naturopathic treatments used in endometriosis, including the efficacy and plausibility profile of contemporary naturopathic treatments. Although historical evidence and current trends highlight that women are using naturopathic care for disease management, there is also a theoretical rationale for why naturopathic treatments may be suitable for supporting women with endometriosis. To examine this underdeveloped area, this thesis aims to explore naturopathic approaches and treatments in endometriosis care in Australia. The thesis results will be further explored based on the theoretical alignment to the Australian clinical practice guideline for the diagnosis and management of endometriosis (described in Chapter 10).

Chapter 2. Scope of thesis

The overarching research aim of this thesis is to examine various aspects of the clinical management of endometriosis in contemporary naturopathic practice. This thesis primarily includes identifying three evidence sources (stated in Chapter 1.8.4) to describe the naturopathic treatments and approaches utilised by Australian naturopaths in the clinical care of endometriosis.

2.1 Thesis evidence sources

This thesis aimed to examine three core evidence sources to comprehensively investigate the dynamics of diverse information and knowledge sources that are pertinent to naturopathic care in endometriosis. As described in Chapters 1.6 and 1.8.2, patients and their needs, values and preferences need to be acknowledged within health care delivery, thus deeming patient knowledge as one of the knowledge sources that will be explored in this thesis (see Chapter 5). Naturopathy has a long history of traditional naturopathic evidence that is used in clinical decision-making and will be considered as an information source in this thesis (described in Chapters 6 and 7). Finally, practitioner knowledge is also of equal value and is informed by education curriculum and clinical experience and expertise. Naturopathic practitioner knowledge is also considered a knowledge source in this thesis which is explored in Chapters 8 and 9. In summary, this thesis will explore three main evidence sources (i.e., patient knowledge, traditional knowledge, and practitioner knowledge) to recognise the various interplays of knowledge and information sources that may inform naturopathic endometriosis care.

2.2 Research objectives

1. Identify the contemporary and traditional naturopathic treatments and approaches for the management of endometriosis and associated symptoms of dysmenorrhea and menorrhagia (drawing on contemporary and traditional naturopathic information sources).

2. Explore the characteristics (including demographics, experience of endometriosis, and health care utilisation) of women who seek care from naturopaths for the management of endometriosis.
3. Describe the naturopathic treatments utilised by women who seek care from a naturopath for the management of their endometriosis.
4. Explore the naturopathic approach and understanding of managing endometriosis by naturopaths in clinical practice in Australia.
5. Describe the naturopathic treatments utilised in Australian naturopathic clinical practice for the management of endometriosis.

2.3 Research questions

1. What are the treatments and approaches recommended for endometriosis and associated symptoms of dysmenorrhea and menorrhagia in naturopathic traditional and contemporary information sources?
2. Do Australian women with endometriosis seek care from naturopaths?
3. What treatments do Australian women utilise for the management of endometriosis?
4. What is the naturopathic approach to managing endometriosis in Australian naturopathic clinical practice?
5. What do naturopaths prescribe for the management of endometriosis in Australian naturopathic clinical practice?

2.4 Thesis triangulation of the research objectives

Three distinct phases were developed for this thesis to explore the phenomena of identifying naturopathic treatments and approaches in clinical endometriosis care based on the three previously mentioned evidence sources. Given the distinctiveness of the evidence sources, each phase of this study required a distinct methodological approach to address the specific research objectives. The first aspect of this study was a

standalone study to explore the use of naturopathy by women with endometriosis. The secondary phase of the thesis involved two separate studies that were triangulated to meet Research Objectives 1 and 5. The triangulation provides a comprehensive overview of common treatments employed in naturopathic clinical based on 200 years of observational traditional naturopathic knowledge and contemporary knowledge. Further detail on data source triangulation is detailed in Chapter 4.9.

2.5 Significance of thesis to the evidence-base

While there is a growing body of evidence regarding the use of CM, including naturopathy, for the management of female reproductive disorders and diseases, research on naturopathic treatments and approaches in Australia appears to be limited. This thesis aims to contribute to filling this research gap and seeks to provide foundational evidence regarding the use of naturopathy in endometriosis management. As this field of research is emerging, this project seeks to provide evidence and clinical insights into the naturopathic approaches and treatments for managing endometriosis. Evidence generated from this research may be of value to those providing care to women in the clinical setting (both naturopaths and conventional medicine practitioners). Therefore, this thesis may provide empirical evidence that the naturopathic approach to endometriosis care may have a supportive or potential role in a multidisciplinary approach to endometriosis management. In addition to the value of this thesis in examining naturopathic approaches and treatments in endometriosis care, the methodology employed in this study may be of interest as a means to explore traditional knowledge in contemporary settings. Currently, there is limited research to identify what evidence sources are being applied in naturopathic clinical decision-making and how to evaluate naturopathic treatments and approaches for endometriosis management. Without a transparent examination of naturopathic evidence sources that influence naturopathic care, it is difficult to identify and determine what naturopaths are using in

clinical practice to support this complex disease. As the naturopathic profession values multiple evidence sources including traditional knowledge, patient knowledge, and practitioner knowledge (as described in Chapter 1.8.4), this thesis sought to examine all three evidence sources in a mixed-methods multiple phase study design. Recognition of the use and value of traditional knowledge in the naturopathic profession is warranted. As such, bringing forth traditional knowledge for examination in contemporary settings may influence the way naturopaths address endometriosis which may or may not be supported by scientific evidence. While the approach of utilising traditional knowledge in naturopathic research is limited to an extent, research exploring traditional knowledge in naturopathy has begun to emerge (Foley et al., 2023; Steel et al., 2023a; Steel et al., 2023b). However, to date, there has been an ongoing gap in the research exploration of traditional knowledge with a focus on endometriosis. The value of this thesis not only lies in exploring traditional knowledge through a scientific lens but exploring both traditional and contemporary knowledge within contemporary naturopathic practice. Despite the ongoing and increasing use of naturopathy in women's reproductive diseases and disorders, there has been little research attention given to this aspect of naturopathic care. Additionally, examination at the national level has continued to be scarce despite the increasing awareness of endometriosis and health care-seeking behaviour by women with the disease. Therefore, this thesis holds significance in exploring the use of multiple evidence sources (i.e., patient knowledge, traditional knowledge, and practitioner knowledge) that may be used in the delivery of naturopathic endometriosis care in the Australian community.

Chapter 3. Prevalence of complementary medicine consultations for the management of reproductive menstrual disorders and diseases: A narrative review

3.1 Chapter introduction

This thesis seeks to identify various clinical aspects of naturopathic care for the management of endometriosis. As such this thesis must be informed by current literature that demonstrates that women with endometriosis are consulting with naturopaths for endometriosis disease management. Previous literature has described women with chronic diseases including those with reproductive concerns are frequent users of CM health care services, such as naturopathy. The current literature pertains to menstrual concerns such as dysmenorrhea and abnormal heaving bleeding. However, the identification of CM health care services including naturopathy use for endometriosis is still limited. As such, this narrative review is presented to highlight this underdeveloped area of research.

3.2 Introduction

Complementary medicine (CM) is a broad term to describe a group of health care practices and treatments that are not identified or integrated within the dominant healthcare system (World Health Organisation, 2018 June). Health care professions that are defined as a CM profession include those that are recognised as a traditional medicine system such as naturopathy (Dunn et al., 2021; World Health Organisation, 2013). High prevalence of CM consultation services is known in many world regions (Peltzer & Pengpid, 2018). The prevalence of CM services use is substantial with reports that CM users are more likely well-educated women of reproductive age (Reid et al., 2016; Steel et al., 2018; Xue et al., 2007). Current Australian literature identifies that women with reproductive diseases such as polycystic ovarian syndrome (Arentz et al.,

2014) and menstrual disorders (Fisher et al., 2019; Fisher et al., 2016a; Fisher et al., 2018) are consulting with CM practitioners for clinical care. However, there have been limited investigations into CM services use by women with prevalent menstrual disorders and diseases.

Common menstrual disorders include those defined as cyclic perimenstrual pain and discomfort (CPPD) such as premenstrual syndrome (PMS), dysmenorrhea, irregular menstrual cycles, and abnormal heavy bleeding (Fisher et al., 2016a). Menstrual disorders are prevalent with some reports that up to 97% of women of reproductive age will experience a menstrual disorder during their lifetime (Fisher et al., 2016a). Globally, up to 70% of women experience dysmenorrhea and up to 90% of Australian women experience dysmenorrhea as reported in a national Australian study in 2018 (Armour et al., 2020). Dysmenorrhea can have a strong correlation with the presentation of endometriosis (Armour et al., 2020). Prevalence rates of endometriosis are difficult to determine, however, it was estimated in 2018 to affect 18% of women worldwide (Moradi et al., 2021). Endometriosis is associated with frequent health care use and a substantial economic burden for both women and the healthcare system (Armour et al., 2019b). Women are known to use various health care services including CM for chronic diseases (Reid et al., 2016; Steel et al., 2018). Although there is evidence to support CM use by women, there is limited evidence on the prevalence of CM consultations for the management of prevalent menstrual disorders and diseases. To examine this gap in the literature, this narrative review aims to identify the prevalence of CM consultations for the management of prevalent reproductive menstrual disorders and diseases.

3.3 Methods

A database search was conducted to identify original research evidence that explored the prevalence of CM consultations for the management of prevalent menstrual disorders and diseases. The databases included PubMed, CINAHL, Scopus, and Academic Search Complete. The search terms were *complementary medicine*, *complementary*

therapies, alternative medicine, alternative therapies, naturopathy, naturopathic medicine, consultation, referral, use, health service, menstruation, reproductive disease, endometriosis, dysmenorrhea, and irregular menses. Most of the search terms used were MeSH terms. However, *naturopathic medicine, use, and reproductive disease* were standard text search terms. Manual searching of the references in relevant systematic reviews was also conducted as was identifying additional articles through references listed in the selected articles. Articles were included if they presented original peer-reviewed research, were published between the years 2012 – 2022, reported observational studies (i.e., cross-sectional surveys, and cohort studies), and were published in English. There were no geographical restrictions to the database search. Articles were excluded if they were clinical trial designs, qualitative research, non-peer-reviewed articles, not original studies, and were not in English. All identified citations (n=1,803) were downloaded into EndNote© referencing management software and were individually assessed against the inclusion criteria. Categorical grouping was conducted on the selected papers, which involved reading and rereading the articles to extract relevant key data into identified categories. Each article was allocated to the relevant categories identified in the data extraction process. The results of the selected articles are displayed in Table 1.

Figure 2: Displays the database, search terms, and search string for the narrative review to examine the prevalence of CM consultations for the management of reproductive menstrual disorders and diseases.

Databases	Search string
PubMed	complementary medicine OR complementary therapies OR alternative medicine OR alternative therapies OR (Naturopathy)) OR naturopathic medicine AND (2012:2022[pdat]) AND consultation OR referral OR use OR health service OR prevalence AND

	(2012:2022[pdat]) AND menstrua* OR reproductive disease* OR endometriosis OR dysmenorrhea OR irregular mens* AND (2012:2022[pdat])
CINAHL	complementary medicine OR complementary therapies OR alternative medicine OR alternative therapies OR naturopathy OR naturopathic medicine AND consultation OR referral OR use OR health service OR prevalence AND menstruation OR reproductive disease OR endometriosis OR dysmenorrhea OR irregular menstruation
Scopus	complementary AND medicine OR complementary AND therapies OR alternative AND medicine OR alternative AND therapies OR naturopathy OR naturopathic AND medicine AND (2012 - 2022) AND consultation OR referral OR use OR health AND service OR prevalence AND (2012 - 2022) AND menstruation OR reproductive AND disease OR endometriosis OR dysmenorrhea OR irregular AND menstruation AND (2012 - 2022)
Academic Search Complete	complementary medicine OR complementary therapies OR alternative medicine OR alternative therapies OR naturopathy OR naturopathic medicine AND consultation OR referral OR use OR health service OR prevalence AND menstruation OR reproductive disease OR endometriosis OR dysmenorrhea OR irregular menstruation

3.4 Results

3.4.1 Characteristics of selected articles

From the literature selection process, five (n=5) studies met the inclusion criteria of this presented narrative review. Three (n=3) studies were cross-sectional surveys (Fisher et

al., 2016a; Malik et al., 2022; Pan et al., 2014), and two (n=2) were longitudinal studies (Fisher et al., 2018; Yang et al., 2017). There was limited diversity in the range of countries of the selected studies, with the majority (n=4) from Australia (Fisher et al., 2016a; Fisher et al., 2018; Malik et al., 2022; Yang et al., 2017) and one (n=1) from Taiwan (Pan et al., 2014).

3.4.2 Summary of findings

Four (n=4) studies reported on CM consultations for a specific women's menstrual disorder or disease (Fisher et al., 2016a; Fisher et al., 2018; Malik et al., 2022; Pan et al., 2014) and one (n=1) study reported on women's health more generally (Yang et al., 2017). Two (n=2) studies specifically described CM consultations for CPPD (Fisher et al., 2016a; Fisher et al., 2018), two studies on chronic pelvic pain (Malik et al., 2022), and one study on dysmenorrhea (Pan et al., 2014). Three (n=3) studies described the prevalence of a variety of CM consultations (Fisher et al., 2016a; Fisher et al., 2018; Malik et al., 2022). Two (n=2) studies specifically reported on TCM including acupuncture (Pan et al., 2014; Yang et al., 2017).

3.4.3 Prevalence of CM consultations by women with CPPD

Two (n=2) studies described CM consultation prevalence rates for women with CPPD (Fisher et al., 2016a; Fisher et al., 2018). Both studies were from the same authors and described varying CM consultation rates based on women who '*often*' sought care from a CM practitioner for CPPD management. In the earlier 2012 study (Fisher et al., 2018), women with PMS reported prevalence consultation rates for massage therapists (6.1%), acupuncturists (1.5%), and naturopaths/herbalists (2.3%) (Fisher et al., 2018). Women with heavy menstruation reported prevalence consultation rates for massage therapists (4.6%), acupuncturists (1.1%), and naturopaths/herbalists (1.7%) (Fisher et al., 2018). Women with irregular menstruation consulted with CM practitioners including massage

therapists (3.8%), acupuncturists (1.0%), and naturopaths/herbalists (1.3%) (Fisher et al., 2018).

The later study published in 2016, reported that women with PMS had consulted with massage therapists (14.0%), acupuncturists (17.0%), naturopaths/herbalists (21.0%), and other undefined CM practitioners (17.0%) (Fisher et al., 2016a). Women with heavy menstruation reported higher prevalence consultations rates for the same CM health care professions including massage therapists (11.0%), acupuncturists (12.0%), naturopaths/herbalists (15.0%), and other undefined CM practitioners (14.0%) (Fisher et al., 2016a). Similarly, women with irregular menstruation who consulted with a CM practitioner reported higher prevalence rates compared to the earlier study including massage therapists (9.0%), acupuncturists (9.0%), naturopaths/herbalists (9.0%), and other undefined CM practitioners (11.0%) (Fisher et al., 2016a).

3.4.4 Prevalence of CM consultations by women with chronic pelvic pain

One study stated that 18.8% of women with chronic pelvic pain sought care from a CM practitioner for the management of chronic pelvic pain (Malik et al., 2022). The reported prevalence rates for CM consultations from women with chronic pelvic pain included naturopaths (5.8%), acupuncturists (4.4%), and nutritionists (4.4%) at two months before data collection (Malik et al., 2022).

3.4.5 Prevalence of CM consultations by women with dysmenorrhea

One study based on data from 2012 stated women with dysmenorrhea '*often*' sought care from massage therapists (3.4%), acupuncturists (1.0%), and naturopaths/herbalists (1.4%) in the previous 12 months (Fisher et al., 2018). Another study by the same authors conducted in 2016, found a higher prevalence rate of CM consultations for women with dysmenorrhea who '*often*' sought care from a massage therapist (8.0%), acupuncturists (11.0%), naturopaths/herbalists (13.0%), and other undefined CM practitioners (10.0%) in the previous 12 months (Fisher et al., 2016a). One study specifically reported TCM

use by women with primary dysmenorrhea with prevalence consultation rates determined at 53.4% (Pan et al., 2014).

3.4.6 Prevalence of CM consultations by women with endometriosis

Across all the included studies, CM consultations for endometriosis were the most prevalent (n=4) (Fisher et al., 2016a; Fisher et al., 2018; Malik et al., 2022; Yang et al., 2017). Massage therapy prevalence consultation rates for women with endometriosis were described in three (n=3) studies ranging from 1.9% (Fisher et al., 2018), 5.0% (Fisher et al., 2016a), to 18.1% (Malik et al., 2022). Prevalence rates for acupuncture consultations for women with endometriosis were reported at 0.6% (Fisher et al., 2018), 6.9% (Yang et al., 2017), 7.0% (Fisher et al., 2016a), and 18.1% (Malik et al., 2022) over the previous 12 months. Consultations with a naturopath for women with endometriosis were evident in three (n=3) studies with prevalence rates of 0.7% (Fisher et al., 2018), 6.0% (Fisher et al., 2016a), and 16.2% (Malik et al., 2022), over the previous 12 months. Two (n=2) studies did not differentiate which CM professions were consulted with for women with endometriosis which reported varying prevalence rates including 5.0% (Fisher et al., 2016a) and 7.5% over the previous 12 months (Yang et al., 2017). Table 1 presents the prevalence of CM consultations by women with menstrual disorders or diseases including the use of naturopathy by women with endometriosis.

Table 1: Prevalence of CM consultations by women with menstrual disorders or diseases including endometriosis.

Author & Year	Design	Country	Sample	Menstrual disorder	Acupuncturists	Massage Therapists	Naturopaths /Herbalists	Nutritionists	TCM	Other CM
Pan et al., 2014	Cross-sectional survey	Taiwan	National n=12,349	Primary dysmenorrhea	-	-	-	-	53.4%	-
Fisher et al., 2016a	Cross-sectional survey	Australia	National n=7,427	PMS	17.0%	1.4%	21.0%	-	-	17.0%
				Heavy menstrual	12.0%	11.0%	15.0%	-	-	14.0%
				Irregular menstruation	9.0%	9.0%	9.0%	-	-	11.0%
				Painful menstruation	11.0%	8.0%	13.0%	-	-	10.0%
				Endometriosis	7.0%	5.0%	6.0%	-	-	5.0%
Yang et al., 2017	Longitudinal study	Australia	National n=17,161	Endometriosis	6.9%	-	-	-	-	7.5%

Fisher et al., 2018	Longitudinal study	Australia	National n=25,355	PMS	1.5%	6.1%	2.3%	-	-	-
				Heavy menstrual	1.1%	4.6%	1.7%	-	-	-
				Irregular menstruation	1.0%	3.8%	1.3%	-	-	-
				Painful menstruation	1.0%	3.4%	1.4%	-	-	-
				Endometriosis	0.6%	1.9%	0.7%	-	-	-
Malik et al., 2022	Cross-sectional survey	Australia	National n=409	Chronic pelvic pain	4.4%	-	5.8%	4.4%	-	-
				Endometriosis	18.1%	18.1%	16.2%	-	-	-

3.5 Discussion

This narrative review highlighted that women with menstrual disorders and diseases are using CM health care services to support the management of their menstrual disorder or disease. Current literature reports an increase in CM health services use over the last decade as reported in an Australian nationally representative cross-sectional survey (Steel et al., 2018). As evident in this narrative review, this same trend of frequent CM use appears to align with an increase in CM prevalence rates more broadly (Tangkiatkumjai et al., 2020). Previous systematic literature reviews have estimated that over 70% of the general population uses CM and most users are women during their reproductive years (Tangkiatkumjai et al., 2020; Xue et al., 2007). Additional global data also indicates CM health services use has a constant trend across all world regions (Peltzer & Pengpid, 2018). CM use is prevalent among individuals diagnosed with chronic health diseases (Reid et al., 2016; Steel et al., 2018). Individuals with chronic and co-morbid diseases who have frequent use of CM could be utilising the CM workforce for various reasons with some global research reporting that this phenomenon may align with unmet health care needs or personal health beliefs regarding CM approaches (Tangkiatkumjai et al., 2020). This phenomenon of increased CM health care utilisation has gained scholarly attention for women who experience menstrual disorders and diseases that speculates that women may utilise CM for various push and pull factors (Steel & Reid, 2017).

As reported in this narrative review, there was a more frequently reported prevalence of acupuncture and naturopathy use across four menstrual disorders and diseases including PMS, heavy menstruation, painful menstruation, and endometriosis. All three menstrual disorders are prevalent in women and can be associated with the presentation of a chronic reproductive disease such as endometriosis (Young et al., 2014). The potential association of these menstrual disorders and the possibility of undiagnosed endometriosis may contribute to the increase in CM services over the last few years

among women with endometriosis compared to other menstrual disorders. Therefore, pushing the CM prevalence rates of naturopathy use among women with endometriosis higher. The rationale for the higher prevalence of CM rates for women with this disease may align with the unmet health care needs reported by women with endometriosis as reported in a systematic qualitative review (Young et al., 2014) or the increase in research and policymaker attention, particularly in Australia with the launch of the National Endometriosis Action Plan (Australian Coalition for Endometriosis, 2018 April). The use of CM in endometriosis care has received research interest due to the potential alignment between some CM practices and treatments and the pathophysiological processes targeted for endometriosis management (Mirzaee & Ahmadi, 2021). The increase in research attention and potential effectiveness of CM treatments such as acupuncture to reduce endometriosis-associated pain may also drive the use of CM health care services for menstrual disorders and diseases (Xu et al., 2017). While it can be speculated as to why there may be an increase in CM use over the last few years in supporting women with endometriosis, additional research that highlights the use of CM professionals in managing endometriosis for these women is needed.

3.5.1 Limitations

The findings of this narrative review are not without limitations. Firstly, this narrative review was not conducted as a systematic review and as such may not represent an accurate picture of the broader literature. Additionally, as specific methodological designs were included, some studies may have been missed due to the restrictions on the inclusion criteria of this narrative review. The date restrictions of the review may have resulted in missed studies that were relevant to the research aim. Additionally, this review did not assess the methodological quality or apply risk of bias assessments to the included studies. Despite these limitations, this review highlights that women with menstrual disorders and diseases are utilising CM health care services.

3.5.2 Further research

Further rigorous research is needed to examine the prevalence and level of CM health care services used in the management of women's menstrual disorders and diseases that are known to incorporate increased health care use such as endometriosis. As evident in the findings, there appears to be speculation on the increase in CM use for this population. While this narrative review did not aim to address reasons for an increase in health care-seeking behaviour, this is an interesting finding, nonetheless. As such, exploration of why women are exhibiting a higher health care-seeking behaviour for menstrual-related disorders and diseases is warranted. Investigation into the role of CM health care services and the treatments used in women's menstrual disorders and diseases may identify novel or complementary health care approaches. An examination of the efficacy and plausibility of CM approaches and treatments in menstrual disorders and diseases is equally important and warrants research development.

3.6 Chapter summary

This narrative review investigated the prevalence of CM consultations for the management of prevalent menstrual disorders and diseases. The existing literature on the prevalence of CM consultations emphasised that women with menstrual disorders and diseases seek care from CM practitioners. These studies also identified that the prevalence rate for CM consultations has increased over the last decade. The literature offers little insight into why there has been an increase in CM use by women with menstrual disorders and diseases. Speculation could include the various reports of unmet health care needs that have previously been reported in other literature about menstrual diseases such as endometriosis as well as the perception that CM may provide better health outcomes for women. This narrative review also identified that women with endometriosis have a higher prevalence of CM consultations when compared to women with other menstrual disorders. This finding may align with the recent policy marker and stakeholder engagement in supporting women with

endometriosis. Such as policymaker and stakeholder engagement in the endometriosis landscape in Australia including the groups and initiatives detailed in Chapter 1.7. Nonetheless, women with endometriosis are utilising CM health care services, including naturopathy. Yet, there continues to be limited evidence on what treatments may be employed for these women as well as how naturopathic approaches manage this complex reproductive disease. Further research is needed to provide a deeper examination of the use and role CM health care services may have in managing these menstrual disorders, especially menstrual diseases that are associated with high health care use.

Chapter 4. Methodology

4.1 Chapter introduction

The use of diverse research methodologies in a study design has gained recognition in various disciplines. Recognition of using diverse methodologies relates to their ability to conduct robust research, support the development of sequential research, and contribute to the development of foundational evidence. In the context of this thesis, an approach was undertaken to utilise diverse methodological approaches in an attempt to capture various nuances within the field of naturopathic care in endometriosis management. As such, a multiple-phase design was developed which incorporated a mixed-methods sequential exploratory framework. The multiple-phase design of this thesis used two phases of research. Phase 1 consisted of a quantitative cross-sectional survey and Phase 2 was a mixed-methods sequential exploratory study involving a textual analysis approach (Phase 2A) and a quantitative cross-sectional survey (Phase 2B). Relevant data collected from Phase 2A that aligned with the research aims and questions for Phase 2B was used in the development and design of Phase 2B. The incorporation of Phase 2A into Phase 2B included the use of traditional and contemporary naturopathic knowledge of commonly reported naturopathic treatments from the following disciplines herbal medicines, clinical nutritional medicine, homeopathic remedies, hydrotherapy, dietary recommendations, and lifestyle recommendations.

4.2 Diverse methodologies

Diverse methodologies can be conducted in various interrelated frameworks as well as through singular and parallel research studies (Östlund et al., 2011). The direct application and result of different methodological approaches can balance the strengths and limitations evident in some research designs, thus contributing to a more robust approach (Crilly, 2019). The lack of diversity within a study design can contribute to the limited applicability or utilisation of research findings and can also be a threat to the

relevance of the research and the subsequent research outcomes (Crilly, 2019). The applications of diversity and variability are key elements in the complex nature of research. However, the level of methodological diversity needs to be appropriate to the discipline being investigated (Crilly, 2019). In health research, it is important to ensure methodological diversity to capture the individual complexity of health care and disease management (Bowers et al., 2013; Creswell et al., 2011). A multi-methods research approach can also be a central component in achieving the necessary reflective and inclusive nature of health care approaches for the community (Woolf & Hulsizer, 2019) as well as the diversity within discipline-specific research. Diverse methodologies are pragmatic and have the capabilities to explore elements within health care from both the patient and practitioner perspectives as well as understanding multidisciplinary approaches to clinical care.

One framework that applies a range of diverse methodologies is the mixed-methods framework. Mixed-methods research is a framework defined by the combination of both quantitative and qualitative methodologies within the same study design (Bowers et al., 2013; Creswell & Clark, 2018). Quantitative research is concerned with measuring prevalence and analysing data collected using a deductive and systematic approach (Curtis & Drennan, 2013). In comparison, qualitative research involves the exploration and interpretation of experiences, perceptions, and meanings of individuals involved in research (Merriam & Tisdell, 2015). The quantitative aspects of the mixed-methods framework can capture the quantifiable nature of a research question and examine the level of association between specific variables in testing hypotheses. However, a quantitative approach can be limited by its lack of real-world context which is established in qualitative research (Castro et al., 2010; Creswell & Clark, 2018). Utilising multiple research methodologies such as a mixed-methods framework is intended to explore data at a deeper level and produce more robust research findings in comparison to single-design methodologies (Creswell & Clark, 2018; Tariq & Woodman, 2013). Utilising the

strengths of quantitative and qualitative research and offsetting the limitations of each can be achieved through a mixed-methods framework (Creswell & Clark, 2018). In the context of this presented thesis, utilising a diverse methodological approach provides a unique perspective and insights into an under researched area in clinical naturopathic care. Further, by employing various methods, a more comprehensive understanding of the research phenomena can be realised by drawing on different facets and evidence sources during data collection which can be triangulated into the consecutive phase of study. This triangulation approach is particularly valuable for its ability to assist in offsetting study limitations and potential bias (Turner et al., 2017). Such research designs that are established within a mixed-methods approach can have the potential to draw on multiple aspects of a research phenomenon such as using the exploratory sequential design framework.

4.2.1 Exploratory sequential design

The exploratory sequential design framework is a commonly used mixed-methods approach and its primary purpose is to explore a phenomenon using a qualitative approach in the first instance to guide the quantitative aspects of the study's research aims and objectives (Creswell & Clark, 2018). An exploratory sequential design study is suitable for investigating an unknown phenomenon in which quantitative data is not known in contemporary evidence. Therefore, aiming to identify new research questions as a consequence of undertaking a systematic analysis of a substantial quantitative data sample (Creswell & Clark, 2018). Utilising a mixed-methods approach allows for the ability to draw on the strengths of qualitative and quantitative research approaches and provides a clear delineation of the research findings through the summarised amalgamation of the end research result (Creswell & Clark, 2018; Wisdom & Creswell, 2013). However, limitations on the integration of both research approaches in a cohesive data analysis are notable (Castro et al., 2010; Creswell & Clark, 2018). Additional limitations in an exploratory sequential design framework can include the complexity of

the design, execution, and analysis of each phase, the increase in data resources, and the intensive nature of conducting a multiple-phase study (Creswell & Clark, 2018). Despite the aforementioned limitations, the strengths of an exploratory sequential design are evident in the separate yet sequential phases, the cross-comparison of qualitative and quantitative results, methodological flexibility, and the result of rich and comprehensive data (Creswell & Clark, 2018).

4.3 Survey research

Survey research is a multidisciplinary, scientific descriptive methodology that collects information from a sample of individuals through their responses to specific questions (Groves et al., 2009). The purpose of survey research is to collect individual responses to describe the characteristics of a larger sample of individuals of interest as relevant to the research questions and aims (Ponto, 2015). Survey research has a long history in the exploration of human behaviours and is a commonly reported methodology in health research (Ponto, 2015). Data is collected through the use of a questionnaire that consists of predetermined questions (Check & Schutt, 2011) and can also include reliable and validated instruments (Ponto, 2015). Surveys can use various research designs that involve both quantitative and qualitative data collection or both in terms of a mixed-methods approach using closed and open questions (Check & Schutt, 2011). The adaptability and design of survey research can be conducted to ensure the delivery of high-quality outcomes by ensuring a rigorous approach using appropriate recruitment strategies and sample techniques, survey distribution methods, and approaches to reducing bias (Ponto, 2015).

4.3.1 Cross-sectional survey

One commonly utilised survey research design is a cross-sectional survey. Cross-sectional surveys are a type of observational study that collects and analyses data from a single point in time (Setia, 2016) and is used in prevalence, epidemiology, health care

workforce issues, health care delivery and management. Cross-sectional surveys are often utilised to determine prevalence and are relatively easy to establish and perform (Mann, 2003). Participant recruitment and selection are based on the inclusion and exclusion criteria of the study design and follow the participant's responses rather than determining the cause and effect (Mann, 2003). Cross-sectional surveys allow for the investigation of specific outcomes, exposures, prevalence, and associations between variables (Setia, 2016). The strength of the cross-sectional survey design is associated with its relatively quick delivery, inexpensive approach, usability for baseline studies, applicability to obtaining relevant prevalence data, and its suitability for understanding areas of health and disease (Mann, 2003; Setia, 2016). Disadvantages in cross-sectional surveys include an inability to determine cause and effect from associations between variables, the focus on one data collection point, and concerns with prevalence-incidence bias (Connelly, 2016; Mann, 2003).

Survey research using a cross-sectional survey design has several benefits that are advantageous to this thesis. Primarily, this includes the ability to capture data from one point in time to ascertain prevalence concerning the research questions and aims, and the flexibility and versatility of data collection from the participants (Connelly, 2016). The cross-sectional survey design was determined suitable for Phase 1 and Phase 2B due to the ability to capture descriptive data. By using this cross-sectional survey design, the data captured in Phase 1 and Phase 2B can be identified as foundational evidence in this underdeveloped field of research pertaining to naturopathy use in endometriosis management.

4.4 Textual analysis

Textual analysis refers to a research methodology that involves the systematic process of interpreting the meaning of the collected data, data analysis, and developing the concepts or categories from the data to describe the research phenomenon. The textual analysis approach aims to identify interpretations of data through the examination of

various data sources including texts, documents, reports, periodicals, and other evidence sources (Kuckartz et al., 2014). Additionally, textual analysis requires the text or source author, end-users and researchers' perspectives to be an important consideration in influencing the result of the research (Park et al., 2012).

Textual analysis is a broader category of qualitative content analysis (Brennen, 2021; Ignatow & Mihalcea, 2018; Lockyer, 2008) that involves three phases of data gathering including the process of preparation, organisation, and reporting of extracted textual results (Elo et al., 2014). The textual analysis process can be conducted in a deductive or inductive manner where coding is pre-categorised or opening coding is used during the organisation phase (Elo et al., 2014). Deductive coding is a suitable approach when building upon previous research, assessing a hypothesis, or comparing categories. Whereas the inductive approach is used when no previous studies have explored the phenomenon (Elo & Kyngäs, 2008). Consequently, a textual analysis framework can be used to examine qualitative data to answer research questions by examining the frequency of specific words and phrases in selected textual sources (Banks et al., 2018) by coding and categorising data (Ignatow & Mihalcea, 2018; Kuckartz et al., 2014). Methods involving textual analysis can vary between disciplines and can have idiosyncrasies and different strengths and weaknesses (Banks et al., 2018). The use of textual analysis can provide a low level of data interpretation when descriptive in a quantitative manner. While these limitations are noteworthy, a textual analysis framework can be suitable for exploring an unknown phenomenon (Kuckartz et al., 2014). This rationale relates to its highly adaptable and flexible nature in various research designs, its ability to analyse large volumes of qualitative data, and its capability to be conducted systematically (Kuckartz et al., 2014).

4.5 Research design

As described in the previous chapter section (detailed in Chapters 4.1 – 4.4), this thesis consisted of two phases of diverse methodological approaches to identify three evidence

sources to describe the naturopathic treatments and approaches utilised by Australian naturopaths in the clinical care of endometriosis (see Figure 3). The methodologies of the two study phases were conceptualised *a priori* based on their suitability to answer research questions and their ability to explore the research topic through an EBP approach whereby various evidence sources could explore the thesis topic. As described in Chapter 1.8.4, the naturopathic profession values numerous sources of knowledge to aid their clinical decision-making in patient care. To explore the thesis topics within the scope of acceptable evidence sources, the thesis explores three valuable evidence sources (i.e., patient knowledge, traditional knowledge, and practitioner knowledge) in the context of naturopathic care and endometriosis.

As detailed in Chapter 1, there is evidence that women experiencing menstrual disorders and diseases such as endometriosis, are seeking care from CM practitioners including naturopaths. The first phase of this thesis was informed by the narrative literature review (see Chapter 3) to explore the contemporary prevalence of naturopathy consultations. The first phase was a cross-sectional survey that sampled women with diagnosed endometriosis to complete an online questionnaire to examine the contemporary prevalence of naturopathy consultations, treatments used by women with endometriosis, and the characteristics of women who seek naturopathic care. The second phase of this thesis used a mixed-methods framework involving an exploratory sequential design. The second phase included two stages of research. The first phase of Phase 2 (Phase 2A) was a textual analysis that aimed to identify the contemporary and traditional naturopathic treatments and approaches for the management of endometriosis and associated symptoms of dysmenorrhea and menorrhagia by using information sources including traditional and scientific knowledge. The second phase of Phase 2 (Phase 2B) used survey research in the form of a cross-sectional survey to examine the naturopathic treatments and approaches by naturopaths in managing endometriosis in the Australian naturopathic community.

Figure 3: Presents the multiple phases of this mixed-methods exploratory project.

Phase 1

Methodology: Cross-sectional survey.

Sample: Women with diagnosed endometriosis recruited from EndoActive and Endometriosis Australia.

Survey domains: Sociodemographics; experience of endometriosis; health services utilisation for endometriosis management; cost of health care for endometriosis; use of pharmaceutical medications for endometriosis; use of CM practice and products for endometriosis; disclosure of CM use and pharmaceutical use for endometriosis management, and experience of patient-centred care by women's primary treating practitioner for endometriosis care.

Phase 2A

Methodology: Textual analysis.

Sample: Traditional and contemporary naturopathic texts and periodicals.

Analysis: Textual analysis approach.

Nodes: Herbal medicine; mineral medicine; clinical nutrition medicine; homeopathic remedies; hydrotherapy; and chemical-based medicines.



Results from Phase 2A informed survey development including domains and survey questions in Phase 2B.

Phase 2B

Methodology: Cross-sectional survey.

Sample: Naturopaths recruited through the PRACI.

Survey domains: naturopath demographics; practitioner knowledge of endometriosis; treatments for endometriosis; naturopathic case management; and multidisciplinary case management.

4.6 Phase 1: Cross-sectional survey of women with diagnosed endometriosis

4.6.1 Study design

The initial data collection phase employed a cross-sectional design of women diagnosed with endometriosis in the Australian community.

The research questions to address were:

- Do Australian women with endometriosis seek care from naturopaths? (research question 2)
- What treatments do Australian women utilise for the management of endometriosis? (research question 3)

The research objectives to address these questions were:

- Explore the characteristics (including demographics, experience of endometriosis, and health care utilisation) of women who seek care from naturopaths for the management of endometriosis (research aim 2)
- Describe the naturopathic treatments utilised in Australian naturopathic clinical practice for the management of endometriosis (research aim 3)

4.6.2 Setting

The survey was administered online via the SurveyGizmo© platform (Alchemer, 2016 April). Utilising an online platform provided many advantages to data collection including the ease of access for design, implementation, data collection, and the ability to reach a wider audience. Notable disadvantages include incomplete responses, non-responders, and self-selection bias (Evans & Mathur, 2018).

4.6.3 Participants

The survey used a convenience sample of women diagnosed with endometriosis. Recruitment occurred through two Australian not-for-profit organisations, Endometriosis Australia and EndoActive. Endometriosis Australia is a nationally accredited not-for-profit organisation that provides support and awareness of endometriosis in the medical and public communities and also supports the development of new research to increase research knowledge on endometriosis (Endometriosis Australia, 2016 July). EndoActive is an independent not-for-profit organisation that promotes the awareness and advocacy of women with endometriosis in Australia (EndoActive, 2016 July). Both organisations have a strong presence in the endometriosis community and have advocated for women with endometriosis in government lobbying as well as supporting the conduct of endometriosis research. These two endometriosis not-for-profit organisations were selected to support the recruitment of women with endometriosis due to their large membership numbers, their successful lobbying campaigns, and their willingness to engage and support research activities in the endometriosis field. There is potential that the participants recruited through Endometriosis Australia and EndoActive are a particular subset of the endometriosis population due to their involvement in peer-facilitated support groups and activities. Such involvement in community organisations and groups may increase health literacy, disease education, and self-advocacy as it relates to their health journey which has been demonstrated in other studies (Thompson et al., 2022). Invitations for participation were distributed to Endometriosis Australia and EndoActive social media platforms from June 2017 to December 2017.

4.6.4 Inclusion and exclusion criteria

Participants were eligible for inclusion if they had previously received a formal diagnosis of endometriosis via laparoscopic surgery and were residents of Australia. Participants were also included if they were able to read English. Participants were excluded if they

had not received a diagnosis of endometriosis by laparoscopic surgery and did not reside in Australia at the time of data collection.

4.6.5 Sampling technique and size

A convenience sample of women with diagnosed endometriosis was utilised. At the time of the study design, Endometriosis Australia had n=10,500 online members (Endometriosis Australia, 2017 December) and EndoActive n=8,500 online members (EndoActive, 2017 December) on their social media platforms. A sample size calculation was predetermined based on a population of n=19,000, a confidence level of 95%, and a margin of error of 5%. The sample size was determined at n=380, in alignment with the requirements for descriptive survey studies (Jekel et al., 2007).

4.6.6 Data instrument

The survey was conducted as a cross-sectional survey using a self-administered questionnaire of 32-items across eight domains. The eight domains were: *sociodemographics; experience of endometriosis; health services utilisation for endometriosis management; cost of health care for endometriosis; use of pharmaceutical medications for endometriosis; use of complementary medicine (CM) practice and products for endometriosis; disclosure of CM use and pharmaceutical use for endometriosis management; and experience of patient-centred care by women's primary treating practitioner for endometriosis care*. The questionnaire also included two validated instruments to capture women's experiences of endometriosis (Endometriosis Health Profile - EPH-5) (Jones et al., 2004) and their experiences of patient-centred care from their primary health care professional (ENDOCARE Questionnaire - ECQ).

The Endometriosis Health Profile – EPH-5 is a reliable and validated short-form instrument to measure the QoL of women with endometriosis. The questions in the Endometriosis Health Profile – EPH-5 are taken from the core topics in the Endometriosis

Health Profile – EPH-30. The use of the EPH-5 from EPH-30 uses one question from each core topic to cover aspects of women’s lives, specifically:

- Pain
- Control and powerlessness
- Social support
- Emotional wellbeing
- Self-image

The Endometriosis Health Profile - EPH-5 was deemed appropriate to use in Phase 1 as the questions specifically related to important areas of women’s experiences of having endometriosis.

The ENDOCARE Questionnaire is a validated and reliable questionnaire that concentrates on patient-centred endometriosis care. The topics in ENDOCARE relate to important aspects of women who have endometriosis and the care they receive from health care professionals. The ENDOCARE questionnaire was suitable to embed in the Phase 1 design due to its usefulness in capturing women’s experiences of endometriosis across several notable areas.

The questions in ENDOCARE related to:

- Respect for patient’s values, preferences, and expressed needs
- Coordination and integration of care
- Information communication and education
- Physical comfort
- Emotional support and all
- Involvement of family and friends
- Continuity and transition
- Access to care

- Technical skills
- Care from endometriosis clinic staff

4.6.7 Statistical analysis

Raw data was extracted from the SurveyGizmo© platform into Microsoft Excel© (Microsoft, 2021 July-a). Cleaned data were imported into the statistical software program STATA 14© (StatCorp LLC, 2021 February) for analysis. Categorical and binary variables were developed as per the design of the survey questions and responses. Statistical analysis was conducted using descriptive statistics with the use of frequencies and percentages; cross-tabulation using the Chi-squared test was also conducted to determine the characteristics of women with endometriosis who consulted with a naturopath for the management of their endometriosis in the last 12 months compared to women with endometriosis who did not consult with a naturopath. Backwise step logistic regression was conducted using binary variables with those who reported consulting with a naturopath over the last 12 months for the management of their endometriosis, as the predictor variable within the regression model. Binaries used in the regression model were selected based on a *p-value* of <0.15. Additional analysis was conducted using Cramer's V to assess the strength of associations. The effect size was determined as a negligible association (.00 and under .10); weak association (.10 and under .20); moderate association (.20 and under .40); relatively strong association (.40 and under .60); strong association (.60 and under .80) and very strong association (.80 and under 1.00). Upon completing the statistical analysis, the significance was set to $p < 0.05$. Any open-text responses from the participants were not analysed for this presented study.

4.6.8 Ethical considerations

Phase 1 received ethics approval from the Human Research Ethics Committee (HREC) at the University of Technology Sydney (approval #ETH16-0616) and the HREC at

Endeavour College of Natural Health (approval #20161131). Both aforementioned institutions granted ethical approval due to requirements at the student's place of employment and the University of Technology Sydney where the student was enrolled in their Doctor of Philosophy (Public Health).

4.6.9 Phase 2: Sequential exploratory design

The sequential exploratory design consisted of two phases. Phase 2A of the study involved a design utilising a textual analysis approach and Phase 2B employed a cross-sectional survey.

4.7 Phase 2A: Textual analysis of naturopathic information sources

Phase 2A of the sequential exploratory design used textual analysis to identify traditional and contemporary information sources for naturopathic recommendations for endometriosis-associated menstrual symptoms, specifically dysmenorrhea and menorrhagia.

The research questions to address were:

- What are the treatments and approaches recommended for endometriosis and associated symptoms of dysmenorrhea and menorrhagia in naturopathic traditional and contemporary information sources? (research question 1)

The research objectives to address this question were:

- Identify the contemporary and traditional naturopathic treatments and approaches for the management of endometriosis and associated symptoms of dysmenorrhea and menorrhagia (drawing on contemporary and traditional naturopathic information sources) (research aim 1)

4.7.1 Study design

This textual analysis phase of the thesis involved systematically coding and categorising large amounts of textual data obtained in naturopathic texts and periodicals, to identify trends and themes within the data relating to the naturopathic treatments used to manage endometriosis and endometriosis-associated menstrual symptoms. Textual analysis as a framework is particularly useful for exploring a research topic where there is limited evidence (Vaismoradi et al., 2013).

4.7.2 Data sources

Data sources were selected from a range of libraries and collections based in Australia, Canada, and the USA. The rationale for the selection of these three countries pertains to the acknowledgment that most of the research and scholarly work conducted on naturopathy comes from these aforementioned countries based on a report from the WNF (World Naturopathic Federation, 2015). Additionally, naturopathic education and naturopaths in clinical practice in these three countries have similar training and education standards as well as scope of practice (Lloyd, 2021b; World Naturopathic Federation, 2023).

4.7.2.1 Traditional data sources

Traditional texts were primarily identified through an electronic search conducted on the National University of Natural Medicine (NUNM) library database of the Friedhelm Kirchfeld Rare Book Collection. The collection of traditional texts at the Friedhelm Kirchfeld Rare Book Collection was donated by collectors to the naturopathic profession and holds over 2,000 texts and periodicals that are accessible for research and teaching purposes (National University of Natural Medicine, 2021 October). Additionally, the Friedhelm Kirchfeld Rare Book Collection is recognised as the largest repository of historical naturopathic texts, globally (Naturopathic Doctor News & Review, 2011 June). Traditional texts were also accessed through a supplemental search on Internet Archive.

Internet Archive is a non-profit digital library that contains a range of digitised materials (Internet Archive, 2016 July) including materials that relate to naturopathy.

The catalogue search involved employing search terms with the following restrictive parameters: *women's health* AND *naturopath** OR *herbal medicine* OR *eclectic**. Restrictions included the English language and were published from 1800 to 1941. The rationale for publication restriction was selected based on the three generations rule (75 years) used by the Australian Therapeutic Goods Administration (TGA) (Therapeutic Goods Administration, 2021 October). The TGA is the only governing regulator of the three included countries (Australia, Canada, and the USA) that identifies evidence within a time limit and has ongoing acceptance as an appropriate guideline in identifying evidence that is recognised as traditional evidence (Therapeutic Goods Administration, 2021 October). A manual search of the library catalogue and a hand search of the Friedhelm Kirchfeld Rare Book Collection was conducted to ensure no traditional texts were overlooked.

4.7.2.2 Traditional and contemporary periodicals

Naturopathic periodicals (i.e., newsletters and journal articles) published from 1800 to 2016 were also included. Periodicals were identified through the Friedhelm Kirchfeld Rare Book Collection, the National Library of Australia, and the State Library of South Australia. These libraries were selected as they hold a well-regarded collection of periodicals from the naturopathic profession that is not accessible at other libraries. Periodicals published from 1800 to 1941 were identified as traditional periodicals while contemporary periodicals were identified as being published from 1942 to 2016 as stipulated within the TGA evidence rule.

4.7.2.3 Contemporary texts

Contemporary texts were identified from higher naturopathic education institutions in Australia, Canada, and the USA [the three countries where most scholarly work is known

to exist (World Naturopathic Federation, 2015)]. The naturopathic institutions were either accredited (USA and Canada) or degree-granting (Australia) institutions at the time Phase 2A was conducted in 2016. These naturopathic institutions were selected based on their status as education members of the WNF which represents the global naturopathic profession and aims to support naturopathic education standards to the highest level (World Naturopathic Federation, 2021 December). At the time of Phase 2A design, the below naturopathic education institutions were registered members of the WNF.

- Endeavour College of Natural Health, Australia
- Southern School of Natural Therapies, Australia
- Australian College of Natural Therapies, Australia
- National University of Natural Medicine (NUNM), USA
- Southwest College of Naturopathic Medicine, USA
- Canadian College of Naturopathic Medicine, Canada
- Bastyr University, USA

4.7.3 Inclusion and exclusion criteria

4.7.3.1 Traditional texts

Traditional texts were included if they reported on the naturopathic medicine treatments for women with endometriosis, dysmenorrhea, or menorrhagia from the years 1800 until 1941. Additional criteria included being published in the English language, published in Australia, Canada, or the USA, and having a direct reference to naturopathy. Traditional texts were excluded if there was no clear reference to the naturopathic profession, were published outside of Australia, Canada, or the USA, were not written in English, or were published outside of 1800 to 1941.

4.7.3.2 Traditional periodicals

Traditional periodicals were included based on the same criteria as traditional texts. Inclusion criteria for the traditional periodicals were a direct reference to the naturopathic profession, reporting on naturopathic treatments for women with endometriosis, dysmenorrhea, or menorrhagia, printed from 1800 until 1941, published in Australia, Canada, or the USA, and published in English. Traditional periodicals were excluded if there was no clear reference to the naturopathic profession, were published outside of Australia, Canada, or the USA, were not written in English, or were published outside of 1800 to 1941.

4.7.3.3 Contemporary texts

The contemporary texts were from subjects in a naturopathic qualification that related to naturopathic clinical practicum, naturopathic therapeutics, naturopathic theory, and naturopathic gynaecology subjects based on the recommended naturopathic textbooks from the included naturopathic education institutions in Australia, Canada, and the USA. Contemporary texts were included if they reported naturopathic treatments for the management of endometriosis, dysmenorrhea, and menorrhagia and were published in English. Additionally, contemporary texts were included if they were published between 1942 and 2016. The specific date range for contemporary texts was based on traditional evidence being defined as 1800 to 1941 and the remaining years after 1942 until the time of data collection in 2016 being identified as contemporary texts. Contemporary texts were excluded if they were published outside of Australia, Canada, or the USA, were not written in English, and were published outside of 1942 to 2016.

4.7.3.4 Contemporary periodicals

Contemporary periodicals were included if they reported on the naturopathic treatments for endometriosis, dysmenorrhea, or menorrhagia, published in English, and published from 1942 until 2016. Contemporary periodicals were excluded if there was no clear

reference to the naturopathic profession, were published outside of Australia, Canada, or the USA, were not written in English, or were published outside of 1942 to 2016.

4.7.4 Data collection

Identified naturopathic texts and periodicals underwent assessment for meeting the inclusion criteria of providing naturopathic medicine recommendations for endometriosis, dysmenorrhea, and menorrhagia. The assessment included reading the title, table of contents, and chapters for relevance to the research topic. Texts and periodicals that met the criteria were extensively read and relevant data were extracted into individual Microsoft Word© (Microsoft, 2021 July-b) files which were uploaded into the software program NVivo© (QSR International, 2021 November).

4.7.5 Textual analysis

The textual analysis involved the identification of endometriosis, dysmenorrhea or menorrhagia mentioned in the included texts and periodicals. The included sources were read and reread to identify naturopathic treatments that were recommended for the management of endometriosis, dysmenorrhea, or menorrhagia. Identified data was then uploaded into NVivo© (QSR International, 2021 November) for categorical analysis in an inductive manner. Direct references to the terms '*menstrual cramps*', '*painful menstruation*' '*uterine cramps*', and '*uterine pain*' within included sources were aggregated to the '*dysmenorrhea*' node. Likewise, '*excessive menstruation*' and '*profuse menstruation*' were coded to the '*menorrhagia*' node. Each naturopathic treatment for the management of endometriosis, dysmenorrhea or menorrhagia was allocated to an individual naturopathic treatment node and cross-coded against the specific menstrual disorders that were mentioned. After cross-coding, each naturopathic treatment that was allocated to either endometriosis, dysmenorrhea, or menorrhagia was counted with frequencies and percentages to identify the number of recommendations for each naturopathic treatment in both the traditional and contemporary sources. At the time of

data collection and analysis, herbal medicine names were extracted verbatim; however, some herbal medicine names have changed since the completion of this phase of the thesis. Herbal medicine names throughout this thesis have been updated to their contemporary synonym.

4.7.6 Ethical considerations

Phase 2A did not require ethics approval due to the nature of textual analysis which did not require human participants and focused on secondary analysis of publicly accessible information.

4.8 Phase 2B: Quantitative cross-sectional survey of naturopaths

Phase 2B of the sequential exploratory design aspect of this thesis was conducted as a cross-sectional survey of naturopaths who consult with women for the management of endometriosis.

The research questions to address were:

- What is the naturopathic approach to managing endometriosis in Australian naturopathic clinical practice? (research question 4)
- What do naturopaths prescribe for the management of endometriosis in Australian naturopathic clinical practice? (research question 5)

The research objectives to address these questions were:

- Explore the naturopathic approach and understanding of managing endometriosis by naturopaths in clinical practice in Australia (research aim 4)
- Describe the naturopathic treatments utilised in Australian naturopathic clinical practice for the management of endometriosis (research aim 5)

4.8.1 Study design

Phase 2B was conducted as a cross-sectional survey of naturopaths who consult with women for the management of endometriosis. Phase 2B was a sub-study of the PRACI – Australia’s largest practice-based research network (PBRN) of CM practitioners (Steel et al., 2017).

4.8.2 Setting

Phase 2B was conducted via an online self-administered survey through the SurveyGizmo® platform (Alchemer, 2016 April). The data collection instrument was conveyed to naturopaths who self-reported expertise in menstrual health in the PRACI PBRN over 10 weeks. Participants were invited to participate in the study through email invitations from June 2019 until September 2019.

4.8.3 Practitioner Research And Collaboration Initiative

PRACI is a PBRN of multidiscipline health care professions representing the CM landscape in Australia. PRACI was developed in 2014 and aims to present the current CM workforce of 14 CM professions including naturopathy. CM practitioners were recruited through their professional associations who were collaborators in supporting the PRACI network and the various sub-studies conducted through the network. At the time of conducting this survey sub-study (Phase 2B), the PRACI network had n=316 naturopaths who were interested in participating in research (Steel et al., 2017).

4.8.4 Participants

From the n=316 naturopathic practitioners listed in the PRACI PBRN database, n=109 naturopaths were identified as ‘often’ treating menstrual disorders and received an invitation to participate in the Phase 2B survey of this thesis. Recruitment for naturopaths for Phase 2B was conducted from June 2019 until August 2019. The first invitation was sent to naturopaths for participation on 26 June 2019, with reminder invitations sent on 11 July 2019, and a final reminder on 8 August 2019. The survey closed on 4 September

2019. The recruitment period was open for 10 weeks. Potential participants were provided with a participant information consent form and inclusion criteria before commencing the survey.

4.8.5 Inclusion and exclusion criteria

Naturopaths were included in the study if they were in naturopathic clinical practice in Australia, listed as a member of PRACI, had provided implied consent to receive sub-study invitations, and self-identified as having experience in women's menstrual disorders. Naturopaths were excluded from the survey if they were not currently working in clinical practice as naturopaths in Australia and were not registered as PRACI members in the PBRN.

4.8.6 Sampling technique and size

Participants were sampled from the PRACI PBRN who were identified in the PRACI workforce survey as being naturopaths in clinical practice in Australia (n=317). From this sample, n=109 (34.4%) were identified as having a clinical interest in women's menstrual disorders. Utilising a confidence level of 95%, and a margin of error of 5%, the sample size was calculated at n=86 participants to ensure meaningful data could be captured.

4.8.7 Data instrument

The data instrument involved a 62-item questionnaire that covered five core domains: *naturopath demographics*; *naturopath knowledge of endometriosis*; *naturopathic treatments for endometriosis*; *naturopathic case management* and *multidisciplinary case management*. Each domain included several multiple-choice questions and open-text responses.

4.8.8 Phase 2A integration

Phase 2B sought to obtain evidence of naturopathic treatments and naturopathic approaches to managing endometriosis in contemporary clinical practice. Aspects relating to the aims and research questions of Phase 2B were drawn from both traditional

and contemporary data obtained in Phase 2A. The integration of Phase 2A into Phase 2B included specific treatments that are within the naturopathic scope of practice and training standards in Australia.

- Herbal medicines
- Clinical nutritional medicines
- Homeopathic remedies
- Hydrotherapy
- Dietary recommendations
- Lifestyle recommendations

The top ten naturopathic treatments for each category from traditional and contemporary naturopathic information sources were incorporated from the Phase 2A data set into the Phase 2B survey design.

4.8.9 Statistical analysis

Raw data was extracted from the SurveyGizmo© platform (Alchemer, 2016 April) into Microsoft Excel© (Microsoft, 2021 July-a) for data cleaning. Cleaned data was uploaded into STATA 16© (StataCorp) (StatCorp LLC, 2021 February) for analysis. Descriptive analysis was undertaken with the use of frequencies and percentages. Associations between specific categorical variables were determined utilising Pearson's Chi-squared test. Any open-text responses from the participants cross were not analysed for this presented study.

4.8.10 Ethical considerations

Phase 2B of the exploratory sequential design obtained ethics approval from the University of Technology Sydney HREC (approval #ETH18-2913) and the Endeavour College of Natural Health HREC (approval #20190417-RR-1). Both aforementioned institutions granted ethical approval due to requirements at the student's place of employment, PRACI was administrated by Endeavour College of Natural Health and the

University of Technology Sydney where the student was enrolled in their Doctor of Philosophy (Public Health).

4.9 Triangulation of the phases

As previously described at the start of this chapter, this thesis encompasses three studies involving distinct datasets with data source triangulation occurring during the Phase 2A and Phase 2B studies. The aim of triangulation across the Phase 2 study was to develop a more comprehensive understanding of the contemporary naturopathic treatments and approaches of endometriosis, based on the value of the evidence sources previously described in Chapter 2.1. The data collection and analysis of Phase 2A informed the development of the Phase 2B study (detailed in Chapters 8 and 9).

The combined results from Phase 2A and Phase 2B describe the naturopathic treatments and approaches utilised by Australian naturopaths in the clinical care of endometriosis. In Chapter 10 of this thesis, these findings will be discussed, and their implications will be assessed in relation to the Australian clinical practice guideline for the diagnosis and management of endometriosis. Supplementary evidence of the triangulation of the results of the phases is demonstrated in Appendix 10.1.

4.10 Chapter summary

This thesis used two phases of data collection involving an initial survey phase (Phase 1) and a mixed-methods sequential exploratory design (Phase 2A and 2B) to identify and explore the research aims. The data collected involved key stakeholders (i.e., women with endometriosis and naturopaths who manage endometriosis in contemporary clinical practice) and evidence sources that may be used in naturopathic clinical practice for the management of endometriosis. By exploring areas of naturopathy health services used by women with endometriosis, naturopathic curricula, and naturopathic knowledge, insights into the naturopathic approach to care for women with endometriosis may be realised and provide foundational evidence for future research. Additionally, the results

of this thesis as determined by the methodological approach in this chapter will be discussed in the context of the Australian clinical practice guideline for the diagnosis and management of endometriosis (detailed in Chapter 10).

Chapter 5. Naturopathy utilisation by Australian women with diagnosed endometriosis: A cross-sectional survey

5.1 Declaration of authorship

All authors contributed to the conceptualisation and design of the research protocol of this manuscript. RR and AS conducted the data cleaning, data analysis, and interpretation of data. RR drafted the manuscript. All authors contributed to critically revising the final version to be submitted for publication.

5.1.1 Publication

The results of this chapter have been published in the journal *Complementary Therapies in Clinical Practice*.

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The published version is attached in Appendix 5.1.1

5.2 Chapter introduction

The presented chapter has minor adaptations compared to the published article. These adaptations relate to the peer-review requirements and idiosyncrasies of journal styles and formatting requirements. Amendments have been made to ensure consistency in the thesis.

Chapter 3 highlighted that women with endometriosis reported using CM health care services more than other menstrual disorders with growth in CM utilisation over the last ten years. The frequent health care utilisation by women with endometriosis may be attributed to the increase in policymaker and stakeholder involvement in endometriosis

awareness or the reported areas of unmet health care needs which contributes to women seeking care from various health care avenues. Additional increase in CM use may also be attributed to the potential for CM to support areas of women's unmet health care needs as well as other drivers for use. Based on the findings of the narrative review detailed in Chapter 3, it is evident that CM and naturopathy are health care professions that are being used by women with endometriosis. However, an exploration of the prevalence of consultations with naturopaths for women with diagnosed endometriosis has yet to be fully examined. In response to this research gap, the following chapter presents Phase 1 of this thesis which reports Australia's first preliminary exploration of the use of naturopathy for the management of diagnosed endometriosis in the general population. The results of this chapter sought to answer research question 2 and research question 3 of this thesis. This chapter explores five domains: sociodemographics of naturopathy users for endometriosis management, experiences of endometriosis, health care service utilisation (including both conventional health care and complementary medicine), endometriosis treatment utilisation (including pharmaceuticals and complementary medicine), and self-reported effectiveness of treatments.

5.3 Introduction

Women with endometriosis – known as a chronic and painful female reproductive disease – experience many difficulties when seeking care or obtaining adequate treatment (Cox et al., 2003b). In addition to direct impacts on the menstrual cycle such as dysmenorrhea and menorrhagia, women with endometriosis can also present with urinary and bowel irregularities, dyspareunia, chronic pelvic pain, and physiological difficulties with fertility. While less frequent, women can also experience nausea and fatigue, and some women can be asymptomatic (Dunselman et al., 2014). Unfortunately, due to various reasons such as limited medical education and menstruation stigmatisation, women with suspected endometriosis often face a delay in diagnosis,

barriers to early intervention, and limited or delayed access to specialist care (Parasar et al., 2017).

Current evidence indicates that 1 in 10 women are diagnosed with endometriosis with approximately 176 million women and young girls diagnosed with the disease across the globe (Department of Health, 2018 September-b). Within Australia, recent research estimates that 3.4% of women of reproductive age are diagnosed with endometriosis, however, due to the potentially asymptomatic nature of the disease, an accurate prevalence rate is difficult to determine (Reid et al., 2019b). Both at the individual and population level, women with endometriosis report a substantial burden of disease, which impacts all areas of life including social and economic areas such as absenteeism and excessive health care costs (Department of Health, 2018 September-b). These reasons led women to seek care from various avenues.

Women with endometriosis are known to seek care from multiple health care practitioners and use self-care treatments for symptom relief (Armour et al., 2019d; Young et al., 2014) but also report high levels of dissatisfaction with their care and the available treatments for both symptom management and disease cure (Young et al., 2014). The degree of dissatisfaction is subject to the woman's experience of care but can be influenced by the perception of insufficient treatment options, dismissal of women's concerns by health care professionals, inadequate improvement in outcomes, and the need for repeated surgeries, particularly for those with severe endometriosis (As-Sanie et al., 2019). Partly because of this dissatisfaction, some women explore treatment options beyond mainstream health care.

Women are increasingly stepping out of the conventional health care domain in search of treatments that can assist in reducing symptoms associated with menstrual irregularities including endometriosis (Fisher et al., 2016a; Fisher et al., 2018; Fisher et al., 2016b). There is some evidence to suggest that women are now looking to holistic and patient-centred forms of health care (Dancet et al., 2014).

Naturopathy is a traditional system of health care defined by a set of philosophical principles classified in the late 19th and 20th centuries with succinct roots from European traditional medicine and later codified by key founders of the Germanic Nature Cure movement and eclectic medicine pioneers (Reid et al., 2019a). As a profession, naturopathy is practised across the globe (Steel et al., 2020c; World Naturopathic Federation, 2019) and is considered one of the main CM professions (Wardle et al., 2013a). The approach to care is defined by philosophical principles and frameworks that focus on characteristics of patient-centred care (Sarris & Wardle, 2014). However, research has yet to fully explore naturopathy and its role in providing care for women with endometriosis. Recent Australian research has highlighted those women experiencing common menstrual complaints are consulting with naturopaths (Fisher et al., 2016a; Fisher et al., 2018; Fisher et al., 2016b). This body of research suggests women exhibiting known symptoms of endometriosis or with a diagnosis of endometriosis are consulting with naturopaths to manage the disease (Fisher et al., 2018). However, the extent of naturopathy use by women with endometriosis has yet to be fully examined. As such, this study aims to identify the prevalence of consultations with a naturopath by Australian women with endometriosis for managing their disease, and the characteristics of these women.

5.4 Materials and methods

5.4.1 Design

The study presents a cross-sectional survey design of data collected from women with diagnosed endometriosis in the Australian community.

5.4.2 Setting

Data were collected from participants in the form of a self-administered questionnaire through the online platform Survey Gizmo (Alchemer, 2016 April).

5.4.3 Participants

Participants were recruited through the major Australian not-for-profit endometriosis support organisations, Endometriosis Australia (Endometriosis Australia, 2017 December) and EndoActive (EndoActive, 2017 December) via social media platforms between June 2017 to December 2017. Participants were eligible for inclusion in the study if they self-reported that they had received a formal diagnosis of endometriosis via laparoscopic surgery and were an Australian resident. Participants were excluded if they were over 54 years old. Potential participants over 54 years were only excluded as they (n=2) did not complete any of the survey questions outside of basic demographics.

5.4.4 Sample size

A convenience sample of women with diagnosed endometriosis was recruited through Endometriosis Australia (n=10,500 online members) (Endometriosis Australia, 2017 December) and EndoActive (n=8,500 online members) (EndoActive, 2017 December) social media platforms. In line with sample size calculations for descriptive survey studies (confidence level of 95%, error of margin of 5%) and a power level of 80% (Jekel et al., 2007), the sample size was calculated at n=377. Using the reporting guidelines CHERRIES to ensure best practice and transparent reporting of the sample size, various rates of participation were determined to identify the sample size (Eysenbach, 2004). Survey visitor rates were determined by the number of unique IP (Internet Protocol) addresses linked to opening the survey and a view rate of the number of individuals who responded to the first survey page (Eysenbach, 2004). Recruitment rates were identified by those who provided informed consent. Completion rates were determined as participants who provided informed consent to complete the survey and provided data for the first five domains of the survey compared with the number of participants who provided informed consent but did not provide any data to the survey items (Eysenbach, 2004). The five survey domains included participant sociodemographics, the experience

of endometriosis, health services utilisation, cost of health care, use of pharmaceutical medications, and use of complementary practice and products.

5.4.5 Data instrument

The survey was a self-administered questionnaire via the online survey platform SurveyGizmo. The survey underwent pilot testing for face validity by a sample (n=5) of women with endometriosis before active recruitment began. This study examined participant sociodemographics, the experience of endometriosis, health services utilisation, cost of health care, use of pharmaceutical medications, use of CM practice and products, disclosure of CM, and pharmaceutical use, and experience of primary practitioner care. Additionally, within the survey were two validated instruments, the ENDOCARE Questionnaire (ECQ) (Dancet et al., 2011) and the Endometriosis Health Profile (EPH-5) (Jones et al., 2004). This article presents the findings of naturopathy users among women with endometriosis, their experiences of endometriosis, and aspects of associated care including treatment utilised and the effectiveness of treatments.

5.4.6 Statistical analysis

Raw data was extracted from the SurveyGizmo platform via Microsoft Excel© which was imported into the statistical software program STATA 14.2©. During the data cleaning process, incomplete or missing data were removed from the data set prior to statistical analysis. Categorical and binary variables were developed as per the design of the survey questions and relevant analysis. Statistical analysis was conducted using descriptive statistics with the use of frequencies and percentages; cross-tabulation using the Chi-squared test was also conducted to determine the characteristics of women with endometriosis who consulted with a naturopath for the management of their endometriosis in the last 12 months compared to women with endometriosis who did not consult with a naturopath. Further analysis of effect size was also conducted to assess

the strength of associations using Cramer's V. The effect size was determined as a negligible association (0.00 and under 0.10); weak association (0.10 and under 0.20); moderate association (0.20 and under .40); relatively strong association (0.40 and under 0.60); strong association (0.60 and under 0.80) and very strong association (0.80 and under 1.00) (Rea & Parker, 2014). Backward stepwise logistic regression was conducted to identify the associations of naturopathy users and aspects of their endometriosis presentation and health care management of the disease. The binary variable of those who reported consulting with a naturopath over the last 12 months for the management of their endometriosis, was the predictor variable within the regression model. Binaries used within the regression model were selected based on a P-value of <0.25 as tabulated within the results. The model was revised and verified via a likelihood ratio test at each relevant step of the analysis. Upon completing the statistical analysis, the significance was set to $p < 0.05$. Any open-text responses from the participants were not analysed for this presented study.

5.4.7 Ethics approval

This study was granted ethics approval by the HREC at Endeavour College of Natural Health (approval #20161131) and the HREC at the University of Technology Sydney (approval #ETH-16-0616). Both aforementioned institutions granted ethical approval due to requirements at the student's place of employment at Endeavour College of Natural Health and the University of Technology Sydney where the student was enrolled in their Doctor of Philosophy (Public Health) where HREC reciprocal approval was granted

5.5 Results

The survey was opened and visited by 387 potential participants. All the potential participants (n=387) read the first survey page pertaining to the study information and consent. Only one potential participant declined to consent to participate in the study (n=386). A view rate was thus calculated at 0.99% (Eysenbach, 2004) and a recruitment

sample of 386 participants. During data cleaning, 15 survey responses were removed due to: duplicate entries based on IP addresses (n=5); reported not being an Australian resident (n=8) and did not provide consent (n=1). The remaining responses (n=372) were further cleaned for completion rates. Thirty-five participants did not provide sociodemographic information, and another 34 did not respond to the five survey domains. The remaining 303 participants completed the survey (completion rate: 78.4%). The confidence level was calculated based on the completed surveys because the completion rate did not meet the power level. Of the 303 participants, n=60 (19.8%, CI 95%) participants reported consulting with a qualified naturopath for the management of their endometriosis in the previous 12 months.

5.5.1 Sociodemographic of naturopathy users

The 60 participants (19.8%) who reported consulting with a qualified naturopath for the management of their endometriosis in the previous 12 months, reported no significant difference in age, marital status, level of education, employment, income, or stage of endometriosis compared to those that did not consult with a naturopath for disease management. Women who reported consulting with a naturopath (19.8%, $p=0.02$), reported experiencing unbearable or severe levels of pain associated with the disease and regularly experienced episodes of diarrhoea (66.7%, $p=0.04$) compared to women who did not seek care from a naturopath in the previous 12 months. Naturopathy users also reported regularly experiencing diarrhoea (40%, $p=0.04$) and bothersome episodes of dyspareunia (53.3%, $p=0.01$) more frequently than women who did not consult with a naturopath. Statistical analysis identified a negligible association between consultations with a naturopath and unbearable or severe endometriosis pain (Cramer's V 0.0159, $p=0.02$). Weak associations were found between consulting with a naturopath and regularly experiencing diarrhoea (Cramer's V 0.1186, $p=0.04$), bothered by diarrhoea (Cramer's V 0.1199, $p=0.04$), and bothered by dyspareunia (Cramer's V 0.1575, $p=0.15$).

Table 2 summarises the sociodemographic characteristics of women with endometriosis who sought care from a naturopath in the previous 12 months.

Table 2: Sociodemographic characteristics of women with diagnosed endometriosis who consulted with a naturopath for endometriosis care.

Sociodemographics	Did not consult with a naturopath		Consulted with a naturopath		Cramer's V	P-value
	n	%	n	%		
Age (years)						
<18	4	1.7	0	0.0	-	0.89
18-24	39	16.3	9	15.0	-	
25-34	108	45.0	28	46.7	-	
35-44	75	31.3	19	31.7	-	
44-54	14	5.8	4	6.7	-	
Marital Status						
Single	82	33.7	18	30.0	-	0.5
De facto	63	25.9	18	30.0	-	
Married	84	34.6	24	40.0	-	
Separated	12	4.9	0	0.0	-	
Divorced	1	0.4	0	0.0	-	
Widowed	1	0.4	0	0.0	-	
Qualification						
No school certificate	2	0.8	0	0.0	-	0.40
Primary school certificate	2	0.8	1	1.7	-	
High school or equivalence certificate	42	17.3	4	6.7	-	

Trade or apprenticeship	8	3.3	2	3.3	-	
Certificate or diploma	65	26.8	18	30.0	-	
University degree or higher	124	51.1	35	58.3	-	
Working hours per week						
0 hours	32	13.2	7	11.7	-	0.10
1-15 hours	20	8.2	7	11.7	-	
16-29 hours	32	13.2	8	13.3	-	
30-34 hours	38	15.6	10	16.7	-	
35-40 hours	82	33.7	18	30.0	-	
41-49 hours	34	14.0	8	13.3	-	
50 or more hours	5	2.1	2	3.3	-	
Household income						
No income	7	2.9	3	5.4	-	0.55
\$1-\$6,239	9	3.7	1	1.8	-	
\$6,240-\$15,599	6	2.5	0	0.0	-	
\$15,600-\$25,999	12	4.9	4	7.1	-	
\$26,000-\$36,399	16	6.6	2	3.6	-	
\$36,400-\$51,999	21	8.7	3	5.4	-	
\$52,000-\$77,999	35	14.5	10	17.9	-	
\$78,000-\$103,999	40	16.6	12	21.4	-	
\$104,000-\$129,999	31	12.9	4	7.1	-	
\$130,000-\$155,999	20	8.3	7	12.5	-	
\$156,000 or more	36	14.9	6	10.7	-	
I do not know	8	3.3	4	7.1	-	

Stage of endometriosis						
Stage 1	11	4.6	5	8.3	-	0.70
Stage 2	29	12.0	5	8.3	-	
Stage 3	35	14.5	11	18.3	-	
Stage 4	85	35.1	19	31.7	-	
I was not told by my GP	69	28.5	18	30.0	-	
I do not know if I was assessed	13	5.4	2	3.3	-	
Severity						
Unbearable/Severe	124	51.0	41	68.3	0.0159	0.02
Moderate	85	35.1	15	25.0	-	0.14
Mild/ Unnoticeable	33	13.6	4	6.7	-	0.14
Symptoms experience regularly						
Dysmenorrhea	209	86.0	53	88.3	-	0.63
Menorrhagia	142	58.4	40	66.7	-	0.24
Bloating	199	81.9	54	90.0	-	0.13
Constipation	147	60.5	36	60.0	-	0.94
Diarrhoea	126	51.9	40	66.7	0.1186	0.04
Fatigue	208	85.6	54	90.0	-	0.37
Lower abdominal pain while not menstruating	200	82.3	49	81.7	-	0.90
Pelvic pain	203	83.5	50	83.3	-	0.10
Dyspareunia	148	60.9	43	71.7	-	0.12
Most bothersome symptoms						
Dysmenorrhea	107	44.0	33	55.0	-	0.13
Menorrhagia	60	24.7	16	26.7	-	0.75

Bloating	112	46.1	35	58.3	-	0.09
Constipation	68	27.0	22	36.7	-	0.19
Diarrhoea	64	26.3	24	40.0	0.1199	0.04
Fatigue	166	68.3	45	75.0	-	0.31
Lower abdominal pain while not menstruating	165	67.9	41	68.3	-	0.95
Pelvic pain	153	63.0	36	60.0	-	0.70
Dyspareunia	83	34.2	32	53.3	0.1575	0.01

5.5.2 Health care service utilisation

Women consulting with a naturopath for endometriosis reported visiting numerous other types of health professionals. During the previous 12 months, more than half of these women reported consulting with a laparoscopic surgeon (66.7%, $p=0.01$), or an acupuncturist in addition to their naturopath (53.3%, $p\leq 0.01$) compared to women who did not consult with a naturopath for endometriosis management. Consultations with a physiotherapist (41.7%, $p=0.01$), nutritionists/dietitians (36.7%, $p=0.01$) or homeopath (15.0%, $p\leq 0.001$) were reported more frequently among users of naturopathy than in women who did not consult with a naturopath. The bivariate analysis reported weak associations for women consulting with a naturopath and laparoscopic surgeon (Cramer's $V=0.1805$), physiotherapist (Cramer's $V=0.1633$), and nutritionist/dietitian (Cramer's $V=0.1694$) in the previous 12 months. Moderate associations were identified for women consulting with a naturopath and an acupuncturist (Cramer's $V=0.3921$) or homeopath (Cramer's $V=0.2626$) in the last 12 months. Women with endometriosis who sought care from a naturopath reported that a gynaecologist (40.0%, $p=0.05$) or acupuncturist (8.3%, $p=0.03$) was their primary practitioner for their endometriosis management more frequently than women who did not consult with a naturopath. A moderate association was identified from naturopathy users who reported that a

naturopath was their primary practitioner (15%, $p \leq 0.001$) compared to non-naturopathic users. A weak association was evident from the analysis of naturopathy users and women reporting an acupuncturist as their primary health care practitioner (Cramer's $V=0.1249$). Table 3 displays health professionals consulted with for the previous 12 months and women's main consulting practitioner for endometriosis management.

Table 3: Use of health care services by women with diagnosed endometriosis.

Health care service utilisation	Did not consult with a naturopath		Consulted with a naturopath		Cramer's V	P-value
	n	%	n	%		
Professionals consults over 12 months						
General practitioner	196	80.7	52	86.7	-	0.28
Gynaecologist	173	71.2	48	80.0	-	0.17
Laparoscopic surgeon	107	44.0	40	66.7	0.1805	0.01
Physiotherapist	57	23.5	25	41.7	0.1633	0.01
Acupuncturist	32	13.2	32	53.3	0.3921	<0.001
Homeopath	4	1.7	9	15.0	0.2626	<0.001
Nutritionist/Dietitian	46	18.9	22	36.7	0.1694	0.01
Other conventional practitioners	8	3.3	1	1.7	-	0.50
Other allied health practitioners	35	14.4	8	13.3	-	0.83
Other CM practitioners	4	1.7	2	3.3	-	0.40
Did not see any practitioners	3	1.2	0	0.0	-	0.39
Main consulting practitioner						

General practitioner	66	27.2	17	28.3	-	0.85
Gynaecologist	131	53.9	24	40.0	0.1109	0.05
Laparoscopic surgeon	23	9.5	4	6.7	-	0.50
Physiotherapist	2	0.8	1	1.7	-	0.55
Acupuncturist	6	2.5	5	8.3	0.1249	0.03
Naturopath	0	0.0	9	15.0	0.3521	<0.001
Nutritionist/Dietitian	1	0.4	0	0.0	-	0.62
Other allied health practitioners	2	0.8	0	0.0	-	0.48
Other CM practitioners	2	0.8	0	0.0	-	0.48
Did not have a main practitioner	5	2.1	0	0.0	-	0.26

5.5.3 Product usage and effectiveness for disease management

A higher rate of use of mixed herbal formulas defined as a tablet or liquid preparations – for the management of endometriosis was reported by women who consulted with a naturopath for disease management compared to women who did not consult with a naturopath (73.3% vs 32.9%). Mixed herbal medicine formulations were reported as having a moderate association (Cramer’s $V=0.3275$, $p\leq 0.001$). Moderate associations were also noted for *Curcuma longa* (*C. longa*) (71.7%, Cramer’s $V=0.3908$, $p\leq 0.001$), followed by *Vitex agnus-castus* (*V. agnus-castus*) (60.0%, Cramer’s $V=0.3157$, $p\leq 0.001$) and *Silybum marianum* (*S. marianum*) (58.3%, Cramer’s $V=0.3159$, $p\leq 0.001$). Naturopathy users also reported a high rate of using clinical nutritional medicine including multivitamins (73.3%, Cramer’s $V=0.2983$, $p\leq 0.001$), fish oil supplements (91.5%, Cramer’s $V=0.1992$, $p=0.02$), vitamin B’s (70.0%, Cramer’s $V=0.3361$, $p\leq 0.001$), vitamin D (73.3%, Cramer’s $V=0.3744$, $p\leq 0.001$) homeopathic remedies (70.0%, Cramer’s $V=0.3401$, $p\leq 0.001$), acupuncture (71.7%, Cramer’s $V=0.3413$, $p\leq 0.001$) and yoga/meditation (73.3%, Cramer’s $V=0.3164$, $p\leq 0.001$) compared to those that did not

consult with a naturopath. All clinical nutritional medicines were indicated as a moderation association with naturopathy users except for fish oil supplementation which was identified as a weak association (Cramer's $V=0.1992$, $p=0.02$). Women who consulted with a naturopath and utilised pharmaceuticals for endometriosis reported no differences to those who did not consult with a naturopath in the previous 12 months.

Women with endometriosis utilising naturopathy for disease management reported that mixed herbal formulas were effective or sometimes effective in managing endometriosis compared to women who did not consult with a naturopath (75% vs 55%, $p=0.03$) and was indicated as a weak association from the analysis (Cramer's $V=0.1972$). Nearly half of the naturopathy users (67.4%, $p=0.01$) were also more likely than non-naturopathy users to describe acupuncture as being effective or sometimes effective. Women consulting with a naturopath reported that fish oil supplementation was reported as the most effective or sometimes effective nutritional supplement (48.8%, $p=0.01$) and *C. longa* (55.8%, $p=0.01$) was the most effective or sometimes effective herbal medicine. Acupuncture (Cramer's $V=0.2545$), fish oil supplementation (Cramer's $V=0.2539$), and *C. longa* (Cramer's $V=0.2640$) were indicated as moderate associations between naturopathy users. There were no reported differences between the effectiveness of pharmaceuticals for naturopathic users and those who did not seek care from a naturopath. Table 4 summarises the reported treatments used and the effectiveness of treatments for disease management.

Table 4: Reported use and self-reported effectiveness of CM products and pharmaceuticals used by women for the management of endometriosis over the last 12 months.

Treatment used	All respondents n=303		Consulted with a naturopath n=60		Cramer's V	P-value	Effectiveness* of treatment	All respondents n=303		Consulted with a naturopath n=60		Cramer's V	P-value
	n	%	n	%				n	%	n	%		
Complementary medicine treatments							Complementary medicine treatments						
Mixed herbal formulas	80	32.9	44	73.3	0.3275	<0.001	Mixed herbal formulas	44	55.0	33	75.0	0.1972	0.03
Multivitamins	88	36.2	44	73.3	0.2983	<0.001	Multivitamins	46	52.3	25	56.8	-	0.62
Homeopathic remedies	70	28.8	42	70.0	0.3401	<0.001	Homeopathic remedies	28	40.0	21	50.0	-	0.30
Acupuncture	73	30.0	43	71.7	0.3413	<0.001	Acupuncture	30	41.1	29	67.4	0.2545	0.01
Yoga/Meditation	83	34.2	44	73.3	0.3164	<0.001	Yoga/Meditation	53	63.9	31	70.5	-	0.45
Fish oil supplement	66	75.0	43	91.5	0.1992	0.02	Fish oil supplement	16	24.2	21	48.8	0.2539	0.01

Vitamin B's	71	29.2	42	70.0	0.3361	<0.001	Vitamin B's	41	57.8	22	52.4	-	0.58
Vitamin D	68	28.0	44	73.3	0.3744	<0.001	Vitamin D	30	44.1	20	45.5	-	0.89
<i>Curcuma longa</i> (Turmeric)	61	25.1	43	71.7	0.3908	<0.001	<i>Curcuma longa</i> (Turmeric)	18	29.5	24	55.8	0.2640	0.01
<i>Vitex agnus-</i> <i>castus</i> (Vitex)	57	23.5	36	60.0	0.3157	<0.001	<i>Vitex agnus-</i> <i>castus</i> (Vitex)	9	15.8	11	30.6	-	0.09
<i>Silybum</i> <i>marianum</i> (Milk thistle)	54	22.2	35	58.3	0.3159	<0.001	<i>Silybum</i> <i>marianum</i> (Milk thistle)	7	13.0	4	11.4	-	0.83
Pharmaceutical treatments							Pharmaceutical treatments						
Oral contraceptive pill	116	64.8	23	59.0	-	0.49	Oral contraceptive pill	73	62.9	16	69.6	-	0.54
Danazol	18	10.4	5	12.8	-	0.66	Danazol	37	86.1	6	75.0	-	0.43
Dienogest	56	32.2	11	29.0	-	0.70	Dienogest	37	66.1	6	54.6	-	0.47
Mirena	74	42.1	18	45.0	-	0.73	Mirena	51	68.9	10	55.6	-	0.28

Gonadotrophin-releasing hormone agonists	27	15.5	7	18.4	-	0.66	Gonadotrophin-releasing hormone agonists	21	77.8	3	42.9	-	0.07
Non-steroidal anti-inflammatories	174	96.1	41	97.6	-	0.64	Non-steroidal anti-inflammatories	118	67.8	31	75.6	-	0.33
Opioids	144	80.5	37	90.2	-	0.14	Opioids	133	92.4	33	89.2	-	0.53

**Reported as sometimes effective or effective for the relief of symptoms associated with endometriosis over the last 12 months.*

5.5.4 Characteristics of naturopathy users

The logistic regression analysis identified that women who consulted with a naturopath for management of endometriosis in the previous 12 months were more likely to report being bothered by episodes of dyspareunia (OR 2.9, CI 1.4-5.9, $p=0.002$) compared to those that did not consult with a naturopath. Women consulting with a naturopath for endometriosis were more likely to also consult with an acupuncturist for endometriosis treatment (OR 6.2, CI 3.0-12.7, $p\leq 0.001$) compared to naturopathy non-users. Naturopathy users also had a higher likelihood of reporting the use of vitamin D for endometriosis management compared to those who did not consult with a naturopath (OR 4.9, CI 2.5-9.9, $p\leq 0.001$). Table 5 displays the results from the logistic regression analysis of women who consulted with a naturopath for endometriosis management.

Table 5: Backward stepwise logistic regression of women who consulted with a naturopath over the last 12 months for the management of endometriosis.

Characteristics	Odds ratio	Confidence interval (CI)	P-value
Bothersome dyspareunia	2.984263	1.49 – 5.93	0.002
Consulted with an acupuncturist	6.217106	3.04 – 12.7	<0.001
Used vitamin D supplements	4.996545	2.51 – 9.91	<0.001

5.6 Discussion

This is the first empirical study examining consultations with a naturopath by women with diagnosed endometriosis in the Australian community. The findings described in this study provide interesting insights into the health care service and treatment utilisation of these women. Firstly, 20% of the women in this study reported consulting with a naturopath for the management of endometriosis. Evidence currently shows that women are more likely to utilise CM professions including naturopathy. Additionally, women who

utilise CM report a diagnosis of a chronic health disease and frequently report high use of health care services (Reid et al., 2016; Steel et al., 2018). This trend of high health care service utilisation by women with a chronic health disease is also presented in our results. Women with endometriosis regularly receive first-line treatments including non-steroidal anti-inflammatory medicines, the oral contraceptive pill, and progestins (As-Sanie et al., 2019). Secondary treatment involves laparoscopic surgery – deemed the gold standard for endometriosis treatment. However, repeated surgery is often required, leaving women with scarring, significant out-of-pocket costs, and reduced windows for optimal fertility (As-Sanie et al., 2019). Research in this area highlights that women often report that effective management and long-term relief is often unachievable and complex, causing repeated health care-seeking behaviour (Rowe et al., 2021). Furthermore, with limited treatments available women often implement self-care behaviours (Armour et al., 2019d) or use an array of health care services (As-Sanie et al., 2019; Cox et al., 2003b; Young et al., 2014). From the analysis presented in this study, it appears naturopathy may be among the health care options accessed by women with endometriosis. Previous negative experiences with conventional health services or unmet health needs including reports of being dismissed or overlooked (Department of Health, 2018 September-b) may act as a ‘push factor’ to seek care outside of the mainstream health system particularly, as identified through this analysis, concerning women presenting with severe cases of endometriosis. Conversely, women with endometriosis may be drawn to naturopathy due to the holistic and patient-centred framework embedded in the approach to health care (Reid et al., 2016). This approach, identified as a pull factor, has been reported as a much-needed aspect of primary health care to ensure positive health experiences and outcomes for women with endometriosis (Dancet et al., 2014).

Women with endometriosis who reported consulting with a naturopath also identified as experiencing regular episodes of diarrhoea more than non-naturopathic users. While

diarrhoea can often be self-managed, given the complexity of endometriosis as a disease, additional treatments may be required. Naturopaths in Australia have a wide range of treatments within their scope of practice including herbal medicine, clinical nutritional medicine, dietary recommendations, and lifestyle recommendations (Ooi et al., 2018). There is evidence that these treatments may be effective in managing gastrointestinal complaints (Alam et al., 2013; Goldenberg et al., 2019; Hawrelak et al., 2020). Supporting evidence has been identified that herbal medicine (including *Mentha piperita*, *Aloe vera*, and *asafoetida*) and dietary recommendations (including elimination diets, low Fermentable Oligosaccharides, Disaccharides, Monosaccharides And Polyols (FODMAP) diet, reducing processed foods, reducing sugar, dairy, and wheat) can provide relief in both acute and chronic experiences of bowel irregularities including diarrhoea and IBS (Goldenberg et al., 2019; Hawrelak et al., 2020), both of which have been frequently reported among women with endometriosis (Saidi et al., 2020). Additionally, dyspareunia has been reported by naturopathy users. While there is very little evidence of the use of naturopathic treatments in reducing dyspareunia in women of reproductive age (Porpora et al., 2013; Santanam et al., 2013), this aspect of endometriosis presentation should not be overlooked. Evidence indicates that while some women may feel comfortable approaching health care practitioners about dyspareunia, these women often report difficulties in receiving effective treatments (Witzeman et al., 2020). Within the scope of naturopathic medicine, this area of endometriosis presentation requires further research to adequately support women experiencing sexual dysfunction.

The findings in this study indicate that women with endometriosis commonly consult with a variety of health care professionals. Such wide consultation may indicate women's attempts to find a suitable treatment or health practitioner to assist in managing the disease. This occurrence, commonly referred to as 'doctor shopping' is evident in various studies on women's health-seeking behaviour for endometriosis treatment (Cox et al.,

2003a; Cox et al., 2003b; Young et al., 2014). Given the nature of the disease and its multifactorial presentation, women with endometriosis require a collaborative support team of health care practitioners to achieve the best health outcomes (Steele et al., 2019). However, naturopathy is not currently included in the statutory registration scheme overseeing most health professions in Australia (Wardle et al., 2013b). Due to this, there is often limited open communication and patient referrals between those within the conventional health care system and naturopaths (Steel et al., 2020a). Women with endometriosis require a multidisciplinary approach to care that involves referrals to professionals who can address areas of disease management and longevity of treatment, particularly in the case of women with severe endometriosis who report undergoing multiple laparoscopic surgeries to reduce symptoms (Steele et al., 2019). Ensuring that women with endometriosis are supported and have the coordination of care between their various health care professions can provide women with improved services of health care experience and delivery and also assist in reducing the excessive costs associated with treatments and surgical interventions (Ernst and Young, 2019). Given the importance of women experiencing positive health care, further evidence is required to assess the supportive role that naturopathy can play in endometriosis disease management and in improving the overall health outcomes of women with endometriosis.

5.6.1 Limitations

This study is not without limitations. Firstly, the sample was a convenience sample using social media recruitment. This sampling technique was deemed appropriate due to allowing ease of access to a large volume of participants with diagnosed endometriosis via social media. Additionally, while there are benefits to online survey research, this study recruited fewer participants than our calculated target sample size. While the sampling technique was appropriate to the study design, there are weaknesses with this sampling such as the low level of reliability and inability to generalise the findings to the greater population of women with endometriosis (Sousa et al., 2004). The inability to

reach the predetermined sample size may negatively impact the statistical power needed to determine the likelihood of a true representation of the characteristics of this sample. Therefore, caution is warranted in interpreting the findings of this study. From those who completed the survey, only a small portion of these women reported utilising a naturopath for the care of their endometriosis during the last 12 months. Additionally, participant recall bias of the previous 12 months for their endometriosis treatment is noted. As this study collected self-reported data from participants, self-report bias is a factor to be considered when analysing the findings. Despite the noted limitations, the strength of this study is evident in being Australia's first exploration of naturopathic utilisation in women with endometriosis.

5.6.2 Further research

While there are limitations to this study, the findings present Australia's first insights into naturopathy utilisation and treatments by women with diagnosed endometriosis. From this preliminary data, further research into the effectiveness, value, and experience of naturopathic care to these women is warranted to ascertain the level of health care support naturopaths can provide to these women. Equally important is the development of further research exploring the value of naturopathic care from the perspective of women with endometriosis to ensure relevant patient-led care within the naturopathic landscape.

5.7 Conclusion

Presently, women with endometriosis report several unmet health needs concerning disease management which may result in some women consulting with practitioners beyond conventional health care professions. With a holistic and patient-centred approach to care, naturopathy may have a role to play in supporting women with effective disease management with a multidisciplinary approach. A further detailed and rich examination of naturopathy use amongst women with endometriosis is warranted.

5.8 Chapter summary

The results presented in this chapter indicate that women with diagnosed endometriosis self-report a high rate of health care service use from conventional medicine and CM professions. As evident in the results presented in this chapter, one in five women with endometriosis report consulting with a naturopath for endometriosis care. Additionally, women who consult with a naturopath for endometriosis support appear to have specific health care needs relating to reports of a likelihood of experiencing bothersome episodes of dyspareunia and diarrhoea compared to non-naturopathy users. These symptomatic characteristics of women with endometriosis may present with bothersome symptoms that are not being addressed by other health care avenues. The use of naturopathy to address the bothersome symptoms experienced by women with endometriosis potentially provides a unique opportunity for naturopaths to be part of a multidisciplinary approach to endometriosis care. With the need for women with endometriosis to be supported through multidisciplinary levels of care, naturopaths may have a supportive role in addressing different areas of endometriosis pathophysiology and symptomology to support effective disease management. While naturopaths could have potential in this space, research into what types of modalities and treatments naturopaths may use in endometriosis is needed.

Chapter 6. Naturopathic medicine for endometriosis, dysmenorrhea, and menorrhagia: A textual analysis

6.1 Declaration of authorship

All authors contributed to the conceptualisation and design of the research protocol of this manuscript. RR conducted the data extraction, data analysis, and interpretation of data with guidance from AS. RR drafted the manuscript. All authors contributed to critically revising the final version to be submitted for publication.

6.1.1 Publication

The results of this chapter have been published in *The Journal of Alternative and Complementary Medicine*.

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The published version is attached in Appendix 6.1.1

6.2 Chapter introduction

The presented chapter has minor adaptations compared to the published article. These adaptations relate to the peer-review requirements and idiosyncrasies of journal styles and formatting requirements. Amendments have been made to ensure consistency in the thesis. At the time of data collection and analysis for Phase 2A, herbal medicine names were extracted verbatim; however, some herbal medicine names have changed since the completion of this phase of the thesis. Herbal medicine names throughout this chapter have been updated to their contemporary synonym.

The previous chapter detailed the Phase 1 study of this thesis which reported that women who sought care from naturopaths for the management of endometriosis used a variety of naturopathic treatments. Naturopaths approach clinical care through an individualised manner involving patient-centred care which can result in varying approaches and treatments for the patient's presenting disease state. Additionally, the diversity in naturopathic curricula, both nationally and internationally, can contribute to this individualised approach through the various naturopathic courses and degrees. An examination of the current naturopathic curricula and historical records was deemed suitable to further explore this topic. In direct light of the need to explore this underexplored area, this chapter details the first of two result chapters directly from the Phase 2A study for this thesis. The focus of the Phase 2A aspect of the sequential exploratory design project was to identify the naturopathic medicine recommendations for the management of endometriosis, dysmenorrhea, and menorrhagia by utilising traditional and contemporary naturopathic sources (i.e., traditional texts, traditional periodicals, contemporary texts, and contemporary periodicals). Naturopaths use an array of treatments that are within their scope of practice and training requirements. However, to identify naturopathic treatments and approaches to endometriosis care, an exploration of the naturopathic curricula is firstly needed. Using naturopathic sources over the last 200 years provides an exemplar of naturopathic knowledge and what treatments may be recommended for women with endometriosis, dysmenorrhea, and menorrhagia.

6.3 Introduction

Naturopathy is a traditional system of health care guided by philosophical principles that were codified during the 19th and 20th centuries and drawn from historical predecessors in European traditional medicine (Sarris & Wardle, 2014). Naturopathy as a distinct profession has traditional roots founded by the Nature Cure practice originating from Germany (Kirchfeld & Boyle, 1994) and the historical pioneers of eclectic medicine during

the 19th and 20th centuries (Sarris & Wardle, 2014), which led to incorporation of homeopathy, herbal medicines, hydrotherapy, and other disciplines into naturopathy (Kirchfeld & Boyle, 1994). The naturopathic approach to care involves the combination of traditional and contemporary evidence, while being guided by the philosophical principles (Fleming & Gutknecht, 2010). According to the WHO, naturopathy is recognised as one of the major global traditional systems of medicine (World Health Organisation, 2010). In the contemporary setting, naturopathy often falls under the term CM which includes a diverse collection of clinical practices that are not associated with conventional medicine (Zollman & Vickers, 1999). There has been increasing evidence that CM including naturopathy (Zollman & Vickers, 1999) is more commonly used by women (Reid et al., 2016), particularly by those with reproductive disorders being a common reason for naturopathy use (Fisher et al., 2016a).

Menstrual disorders including dysmenorrhea - known as painful menstruation, and menorrhagia - defined as excessive heavy menstrual bleeding (Smith, 2018), have varying prevalence rates. A WHO systematic review reported prevalence rates for dysmenorrhoea, ranging from 1.7% to 97% from 1887 to 2004. (Latthe et al., 2006), while an Australian study identified a prevalence rate of 80% (Hillen et al., 1999). In the case of menorrhagia, prevalence rates of 5% to 10% have been reported, however the WHO reported an estimated 18 million women worldwide are affected by menorrhagia (Kouides & Kadir, 2007). Currently, there has been increased attention on endometriosis and is topical within the Australian Government (Hunt, 2018 June), however, its prevalence remains unclear. Endometriosis is a chronic reproductive disease that presents with debilitating symptomology, including menorrhagia and dysmenorrhea (Bulletti et al., 2010), with many of its symptoms having a direct negative impact on women's QoL (Young et al., 2014). Despite this, there has been limited research conducted on accurate prevalence rates, with one article from 1997 reporting that one in 10 women are diagnosed with endometriosis (Eskenazi & Warner, 1997). However, this

figure may not reflect the general population as it was reported for women who had surgery for infertility (Eskenazi & Warner, 1997). Additionally, prevalence rates have been reported in an Australian longitudinal study which stated the rates for endometriosis and dysmenorrhea have remained stable between 2006 to 2012 (mean=4%), while menorrhagia has increased over seven years (mean=25.2%) (Fisher et al., 2018).

These menstrual disorders have significant negative impacts on women's lives such as decreased QoL (Gokyildiz et al., 2013; Young et al., 2014). Not only do women report negative implications, but they also face difficulties and dissatisfaction with care. A recent systematic review on endometriosis reported women felt dissatisfied with the care and treatments they received from conventional health professionals (Young et al., 2014). Dissatisfaction with care and treatments has also been reported by women with dysmenorrhea (Blödt et al., 2016) and menorrhagia, with the level of dissatisfaction dependant on the type of treatment prescribed (Coulter et al., 1994). Such factors, may lead women to seek care from outside of the conventional domain, such as naturopathy (Cox et al., 2003b).

There is emerging evidence of the use of naturopathy in the management of acute and chronic diseases (Fleming & Gutknecht, 2010), including female reproductive conditions such as pregnancy (Steel & Adams, 2011c), menopause (Greenlee et al., 2007), and polycystic ovarian syndrome (Arentz et al., 2014). While recent evidence suggests that naturopathy is used by women with these and other reproductive disorders (Fisher et al., 2016a; Fisher et al., 2018; Fisher et al., 2016b), there is limited evidence on the naturopathic treatments employed in clinical practice. Identifying the level of engagement from traditional and contemporary evidence in practice is important in order to understand current naturopathic practice and to provide a foundational base for assessing naturopathic treatment effectiveness and safety (Steel & Reid, 2017). In response to this gap, this article explores the traditional and contemporary naturopathic

approaches to managing endometriosis, dysmenorrhea, and menorrhagia, drawing on traditional and contemporary texts and periodicals.

6.4 Materials and methods

The contemporary texts were selected by identifying texts from naturopathic institutions in Australia, Canada and the USA (the three countries where most scholarly work is known to exist) (World Naturopathic Federation, 2015). The naturopathic institutions were limited to accredited (USA and Canada) and degree-granting (Australia) institutions including Endeavour College of Natural Health, Australia; Southern School of Natural Therapies, Australia; Australian College of Natural Therapies, Australia; National University of Natural Medicine (NUNM), USA; Southwest College of Naturopathic Medicine, USA; Canadian College of Naturopathic Medicine, Canada; and Bastyr University, USA. The contemporary texts were from the textbooks required for undertaking a naturopathic qualification with subjects in naturopathic clinical practicum, naturopathic therapeutics, naturopathic theory, and naturopathic gynaecology subjects. Contemporary texts were included if they reported naturopathic treatments for the management of endometriosis, dysmenorrhea, and menorrhagia.

Traditional texts were identified through the NUNM library catalogue which holds the largest repository of rare and traditional books on naturopathy in North America (the Friedhelm Kirchfeld Rare Book Collection). This collection was donated by collectors for the naturopathic profession and holds over 2,000 texts and periodicals (Naturopathic Doctor News & Review, 2011 June). The library catalogue search employed the terms: *women's health* AND *naturopath** OR *herbal medicine* OR *eclectic**. Women's health as a term was selected as it was indexed against many naturopathic sources including traditional texts. The search was refined by the English language and the years 1800 to 1941. This year range was selected on the basis of the 'three generations (75 years)' rule used by the Australian TGA (the only regulator of the three countries that establishes a time limit for evidence) as the minimum requirement for recognition of traditional claims

as a form of evidence (Therapeutic Goods Administration, 2021 October). A manual search of the NUNM library catalogue was also conducted. Individual searches were employed using the following search terms: *women's health*, *naturopath**; *herbal medicine* and *eclectic**. Each search was refined to the same parameters of the previous search. An additional hand search was conducted at the Friedhelm Kirchfeld Rare Book Collection. All identified texts were assessed in the same manner via title, table of contents, and chapter analysis for relevance to the topic. Traditional texts were included if they were published between 1800-1941, reported on naturopathic treatments for endometriosis dysmenorrhea, or menorrhagia, and were published in Australia, Canada, or USA. Traditional texts were excluded if there was not a clear reference to naturopathy or where the author's known biography did not include a clear link to the naturopathic profession. Additionally, traditional texts were accessed through a website database Archive.org, which holds digital collections on a wide range of texts.

Naturopathic periodicals published from 1800 to 2016 were also included. Identification of periodicals was conducted via a manual search through the Friedhelm Kirchfeld Rare Book Collection, the National Library of Australia, and the State Library of South Australia. These libraries were selected as they have a well-regarded collection of periodicals relating to naturopathy that were not duplicated in other major libraries. Periodicals were included if they reported on the naturopathic treatment for endometriosis, dysmenorrhea, and menorrhagia, were published in Australia, Canada, or USA, and published in English. As the project focused on Western naturopathy, English was the only language included.

6.4.1 Analysis

Data extraction involved reading sources and extracting data relevant to the topic. Extracted data was developed into Microsoft Word© files which were uploaded into the software program NVivo for thematic analysis. Thematic analysis was conducted via a textual analysis approach where coding in NVivo was derived directly from the data

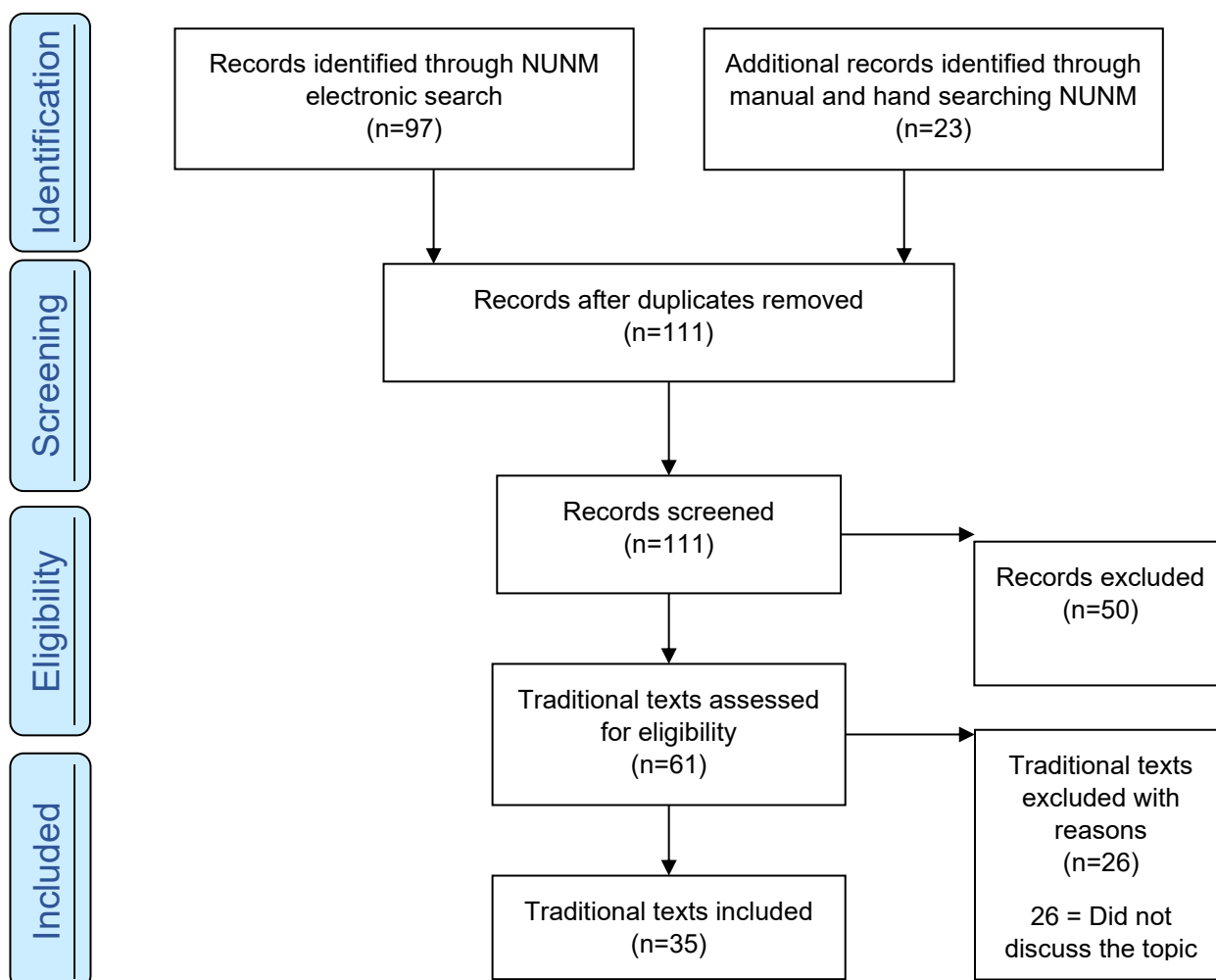
extracted. This approach allowed for recording themes that were highlighted in the included texts. RR conducted the data extraction and thematic analysis. AS and JW conducted cross checking of coding and thematic analysis. Reference to '*menstrual cramps*', '*painful menstruation*', '*uterine cramps*', and '*uterine pain*' within included sources was extracted and aggregated to the '*dysmenorrhea*' node. Likewise, '*excessive menstruation*' and '*profuse menstruation*' were coded to the '*menorrhagia*' node. Each individual treatment for the management of endometriosis, dysmenorrhea, or menorrhagia was allocated to an individual node and was cross-coded. Recommendations with combined treatments were assigned to each individual treatment node and were cross-coded with the disorder.

6.5 Results

6.5.1 Traditional texts

A total of 97 texts were identified from the NUNM electronic search. An additional 18 were identified from a manual search of the NUNM library catalogue and an additional 5 were identified from a hand search through the Friedhelm Kirchfeld Rare Book Collection, generating 120 for inclusion. From the 120 texts, nine were duplicates, 50 were excluded based on review of the title and/or chapter analysis, 26 were excluded for not mentioning the topic. A total of 35 traditional texts were included. Figure 4 reports the selection process for the traditional texts.

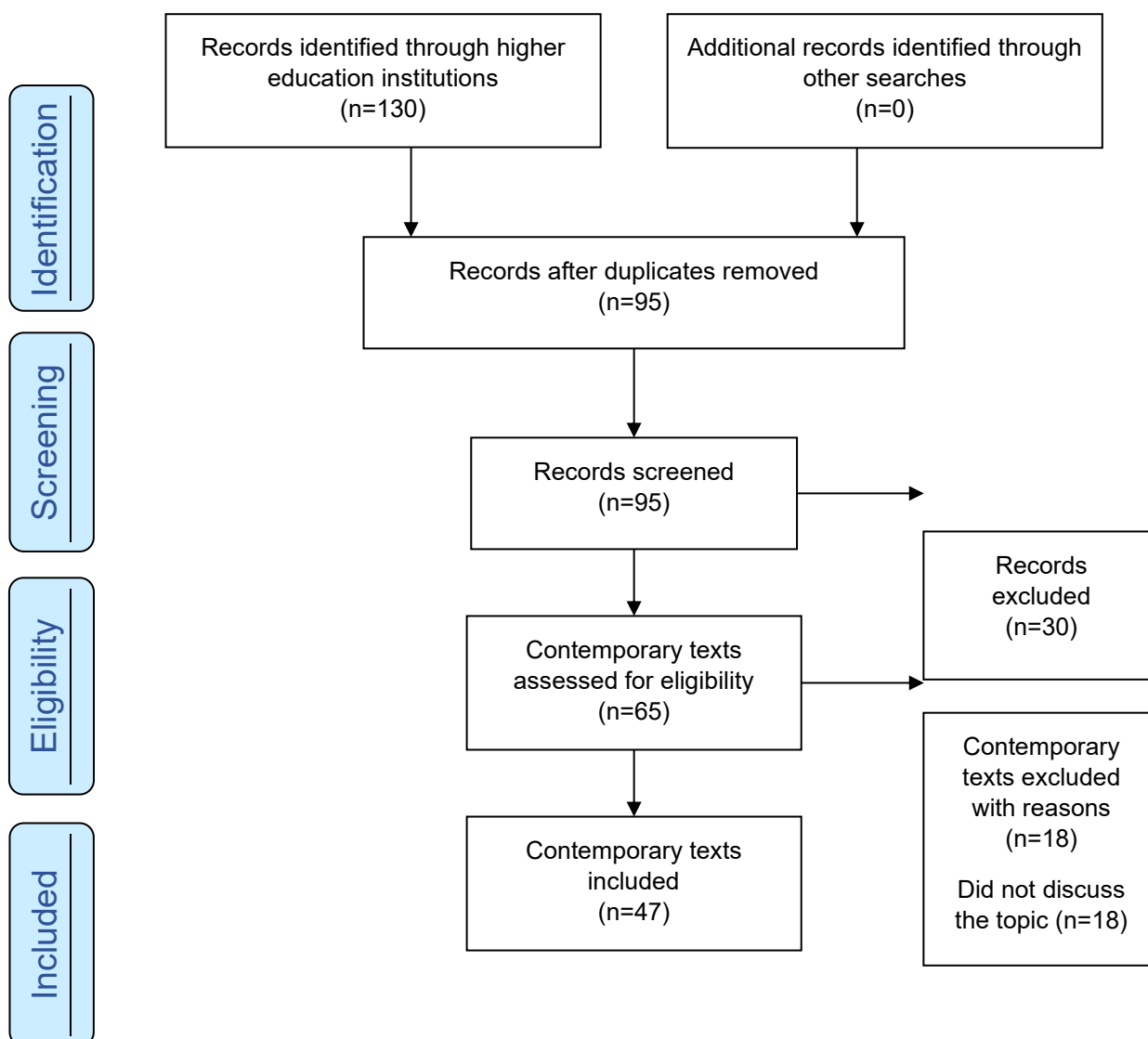
Figure 4: Selection process for the traditional texts from the National University of Natural Medicine.



6.5.2 Contemporary texts

A total of 130 contemporary texts were identified from the educational institutions. A total of 35 were duplicates, 30 were excluded based on review of the book's description, and 6 were excluded based on table of contents, leaving 59 for assessment. From review of the chapters, 12 were excluded for not being of relevance, leaving 47 for inclusion. Figure 5 reports the selection process for the contemporary texts.

Figure 5: Selection process for the contemporary naturopathic texts from the naturopathic higher education institutions.

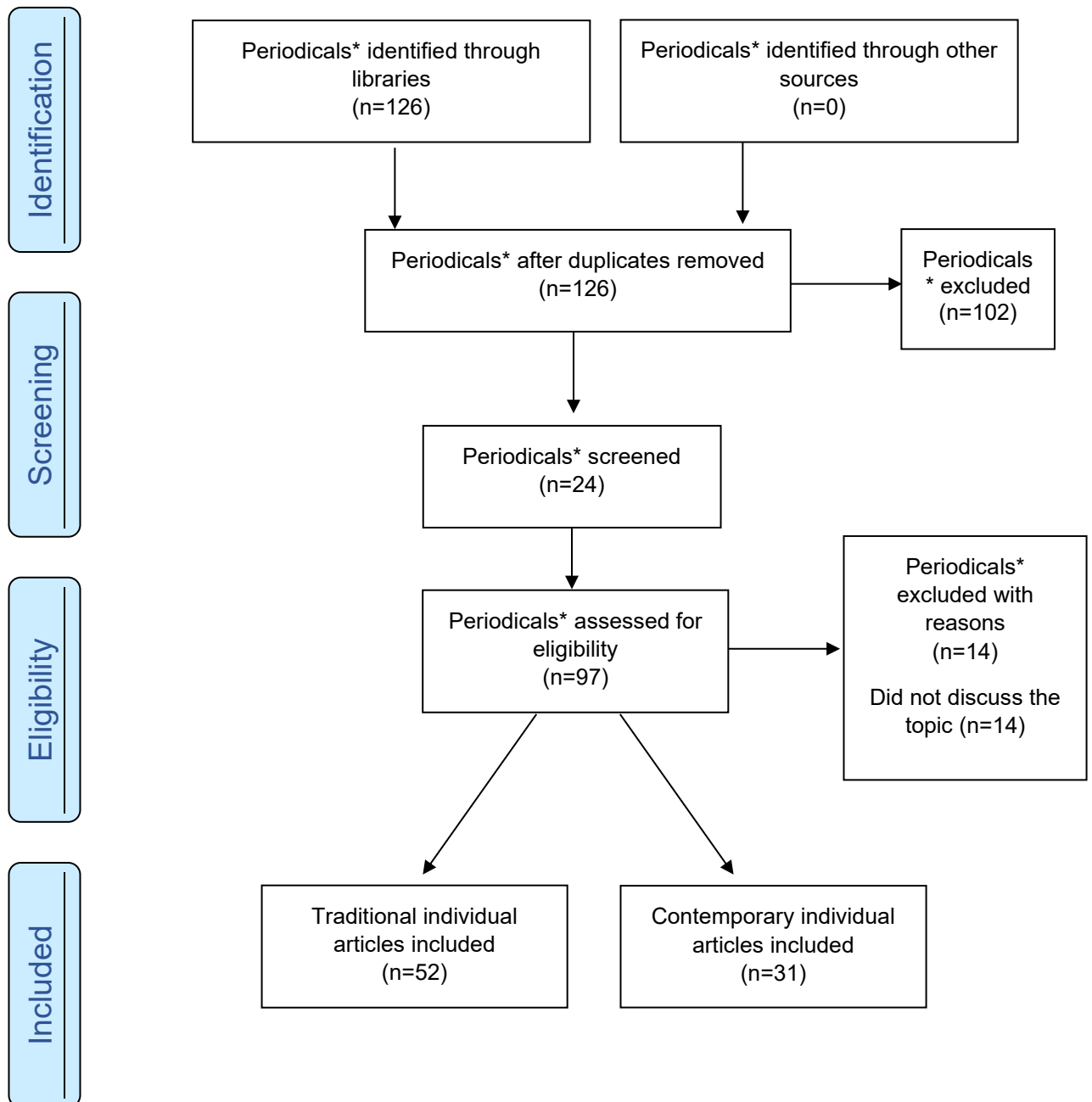


6.5.3 Traditional and contemporary periodicals

Based on title, 126 periodicals were assessed. From this figure, 102 were excluded for not being of relevance, leaving 24 periodicals for assessment. From assessment of the 24 periodicals (by title), 97 individual articles were assessed for inclusion with 14 being excluded. The remaining 83 articles were included. The final included periodicals were allocated into traditional (years 1800-1941) (n=52) or contemporary periodicals (years

1942-2016) (n=31). Figure 6 reports the selection process for the traditional and contemporary periodicals. In total, 167 naturopathic sources were included in the project.

Figure 6: Selection process for the traditional and contemporary naturopathic periodicals selected from the Friedhelm Kirchfeld Rare Book Collection, the National Library of Australia, and the State Library of South Australia.



**Periodicals refer to periodical title including all available volumes.*

6.5.4 Herbal medicine

Herbal medicine was the most reported treatment with 220 herbs for dysmenorrhea, 163 for menorrhagia, and 84 for endometriosis. Table 6 displays the herbal medicines for endometriosis, dysmenorrhea, and menorrhagia.

The most recommended herb for dysmenorrhea was *Actaea racemosa* (*A. racemosa*) with 69 recommendations, with a continuous history of use across 23 traditional texts (Blair, 1917; Brown, 1880; Coe, 1868; Dean, 1903; Ellingwood, 1915; Ellingwood & Lloyd, 1909; Felter, 1922a; Felter & Lloyd, 1905a, 1905b; Fyfe, 1903; Goss, 1885; King, 1856; Locke & Felter, 1895; Meyer, 1918; Phillips, 1879; Rexford, 1934; Scudder, 1881, 1883, 1893a, 1893b; Watkins, 1895; Webster et al., 1898; Wilson, 1935), five traditional periodicals (Felter, 1912, 1922b; Milton, 1941; Scudder, 1877; Webster, 1901), 22 contemporary texts (Barnes et al., 2007; Blumenthal, 1998; Bone, 2003; Bone & Mills, 2013; Bradley, 1992; Braun & Cohen, 2010; Fisher, 2009; Frances, 2014; Godfrey & Saunders, 2010; Hoffmann, 2003; Hudson, 2008; Kaur et al., 2005; Leach, 2010; Micozzi & Lowdog, 2004; Northrup, 2006; Ostrzenski, 2002; Romm, 2010; Sarris & Wardle, 2014; Tilgner, 2009; Trickey, 2011; Wood, 1997, 2011) and two contemporary periodicals (Bliss, 1950; Wharton, 1995a). Similarly, *Viburnum opulus* (*V. opulus*), *Caulophyllum Thalictroides* (*C. thalictroides*), and *Anemone pulsatilla* (*A. pulsatilla*) were mentioned across traditional and contemporary sources. These herbs were recommended from 1856 to 2014. *Packera aurea* (*P. aurea*) and *Atropa belladonna* (*A. belladonna*), while frequently listed, were only found in traditional sources with the most recent from 1935 (King, 1856; Wilson, 1935). *Gelsemium sempervirens* (*G. sempervirens*) was primarily reported in traditional sources and in one contemporary source. Herbal medicines only identified in contemporary texts included *Rubus idaeus* (*R. idaeus*) (n=15), *Zingiber officinale* (*Z. officinale*) (n=14), *Angelica sinensis* (*A. sinensis*) (n=14), *Achillea millefolium* (*A. millefolium*) (n=12), *Piscidia piscipula* (*P. piscipula*) (n=11), and *Valeriana officinalis* (*V. officinalis*) (n=10).

The herb most frequently identified for menorrhagia was *Achillea millefolium* (*A. millefolium*) with 34 recommendations (Alfs, 2003; Atkinson, 1979; Bone, 2003; Bone & Mills, 2013; Brown, 1880; Dean, 1903; Felter & Lloyd, 1905a; Fisher, 2009; Frances, 2014; Frawley & Lad, 1986; Fyfe, 1903; Gladstar, 1993, 2008; Hudson, 2008; Kaur et al., 2005; King, 1856; Lust, 1925; Lust, 1974; Mausert, 1932; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Riggs, 1937; Scudder, 1883, 1893b; Trickey, 2011; Wood, 1997, 2011), across 8 traditional texts (Brown, 1880; Dean, 1903; Felter & Lloyd, 1905a; Fyfe, 1903; King, 1856; Mausert, 1932; Scudder, 1883, 1893b), two traditional periodicals (Lust, 1925; Riggs, 1937), 17 contemporary texts (Alfs, 2003; Bone, 2003; Bone & Mills, 2013; Cook, 1896; Fisher, 2009; Frances, 2014; Frawley & Lad, 1986; Gladstar, 1993, 2008; Hudson, 2008; Kaur et al., 2005; Lust, 1974; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Trickey, 2011; Wood, 1997, 2011) and one contemporary periodical (Atkinson, 1979), during 1856 to 2016 (King, 1856; Pizzorno et al., 2016). *Claviceps purpurea* (*C. purpurea*) (n=12) (Ellingwood, 1915; Felter, 1922a; Felter & Lloyd, 1905a; Goss, 1885; Larsen, 1922; Locke & Felter, 1895; Meyer, 1918; Phillips, 1879; Scudder, 1881, 1922; Watkins, 1895; Wilson, 1935) was frequently identified in traditional sources with one contemporary (Blumenthal, 1998). Similarly, all reports of *Cephaelis ipecacuanha* (*C. ipecacuanha*) and *A. racemosa* were from traditional sources, with no recommendations from contemporary sources. *Packera aurea* (*P. aurea*) was listed traditional sources (n=10) (Coe, 1868; Ellingwood, 1915; Ellingwood & Lloyd, 1909; Felter, 1922a; Felter & Lloyd, 1905b; King, 1856; Scudder, 1883, 1893b; Watkins, 1893; Webster et al., 1898), and in five contemporary sources (Godfrey & Saunders, 2010; Hudson, 2008; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Wood, 2011). The most referenced herbs from contemporary sources were *A. millefolium* (n=17) (Alfs, 2003; Atkinson, 1979; Bone, 2003; Bone & Mills, 2013; Fisher, 2009; Frances, 2014; Frawley & Lad, 1986; Gladstar, 1993, 2008; Hudson, 2008; Kaur et al., 2005; Lust, 1974; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Trickey, 2011; Wood, 1997, 2011) and

Capsella bursa-pastoris (*C. bursa-pastoris*) (n=17) (Alfs, 2003; Blumenthal, 1998; Bone, 2003; Bone & Mills, 2013; Fisher, 2009; Frances, 2014; Gladstar, 1993; Howard, 1833a; Hudson, 2008; Kaur et al., 2005; Lust, 1974; Osiecki, 2006; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Trickey, 2011; Van Wyk & Wink, 2004; Wood, 1997). Recommendations for *R. idaeus* were reported more in contemporary sources (Alfs, 2003; Blackwell, 1976; Braun & Cohen, 2010; Frawley & Lad, 1986; Howard, 1833a; Hudson, 2008; Kaur et al., 2005; Ogilvie, 1995; Phyllis, 1975; Pizzorno & Murray, 2012; Tilgner, 2009) compared to traditional sources (Felter & Lloyd, 1905b). *V. agnus-castus* was only reported in contemporary sources (n=11) (Bone, 2003; Bone & Mills, 2013; Fisher, 2009; Gladstar, 1993, 2008; Godfrey & Saunders, 2010; Howard, 1833a; Hudson, 2008; Kaur et al., 2005; Pizzorno et al., 2016; Romm, 2010), with no recommendations from traditional sources.

Herbal treatments for endometriosis were few with 84 herbal medicines recommended. The top 20 herbs were recommended from contemporary texts during 1993 to 2016 (Gladstar, 1993; Pizzorno et al., 2016), with no recommendations from traditional sources. The most prominent herb recommendation across all sources was *V. agnus-castus* with 17 recommendations across 16 contemporary texts (Alfs, 2003; Bone, 2003; Bone & Mills, 2013; Gladstar, 1993; Godfrey & Saunders, 2010; Hoffmann, 2003; Hudson, 2008; Kaur et al., 2005; Micozzi & Lowdog, 2004; Murray & Pizzorno, 2012; Ostrzenski, 2002; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Romm, 2010; Tilgner, 2009; Trickey, 2011).

Table 6: Common herbal medicines recommended for endometriosis, dysmenorrhea, and menorrhagia as identified in traditional and contemporary naturopathic sources.

Herbal Medicine	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>Achillea millefolium</i> (Yarrow)	-	(n=5) (Wood, 1997); (Alfs, 2003); (Kaur et al., 2005); (Romm, 2010); (Wood, 2011)	-	(n=14) (Gladstar, 1993); (Wood, 1997); (Weiss, 2001); (Alfs, 2003); (Bliss, 1950); (Van Wyk & Wink, 2004); (Gladstar, 2008); (Fisher, 2009); (Romm, 2010); (Wood, 2011); (Bone & Mills, 2013); (Sarris & Wardle, 2014)	(n=10) (King, 1856); (Brown, 1880); (Scudder, 1883); (Scudder, 1893b); (Dean, 1903); (Fyfe, 1903); (Felter & Lloyd, 1905a); (Mausert, 1932); (Lust, 1925); (Riggs, 1937)	(n=24) (Atkinson, 1979); (Lust, 1974); (Frawley & Lad, 1986); (Gladstar, 1993); (Wood, 1997); (Alfs, 2003); (Bone, 2003); (Kaur et al., 2005); (Gladstar, 2008); (Hudson, 2008); (Fisher, 2009); (Trickey, 2011); (Wood, 2011); (Pizzorno et al., 2016); (Bone & Mills, 2013); (Frances, 2014); (Pizzorno & Murray, 2012)

<p>Actaea racemosa (Black cohosh)</p>	<p>-</p>	<p>(n=9) (Hoffmann, 2003); (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Ostrzenski, 2002); (Frances, 2014); (Tilgner, 2009); (Braun & Cohen, 2010); (Romm, 2010); (Kirschmann, 2007); (Hudson, 2008)</p>	<p>(n=42) (Scudder, 1877); (Webster, 1901); (Felter, 1912); (Felter, 1922b); (Milton, 1941); (King, 1856); , (Coe, 1868); (Phillips, 1879); (Brown, 1880); (Scudder, 1881); (Scudder, 1883); (Goss, 1885); (Scudder, 1893a); (Scudder, 1893b); (Locke & Felter, 1895); (Watkins, 1895); (Webster et al., 1898); (Dean, 1903); (Fyfe, 1903) (Felter & Lloyd, 1905a); (Felter & Lloyd, 1905b);</p>	<p>(n=27) (Bliss, 1950); (Wharton, 1995a); (Bradley, 1992); (Wood, 1997); (Blumenthal, 1998), (Ostrzenski, 2002); (Bone, 2003); (Hoffmann, 2003); (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Northrup, 2006); (Barnes et al., 2007); (Hudson, 2008); (Fisher, 2009); (Tilgner, 2009); (Braun & Cohen, 2010); (Godfrey & Saunders, 2010); (Leach, 2010); (Romm, 2010); (Trickey, 2011); (Wood, 2011); (Bone</p>	<p>(n=8) (Neal, 1941); (King, 1856); (Scudder, 1881); (Watkins, 1895); (Felter & Lloyd, 1905a); (Felter & Lloyd, 1905b); (Wilson, 1935)</p>	<p>-</p>
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			(Ellingwood & Lloyd, 1909); (Ellingwood, 1915); (Blair, 1917); (Meyer, 1918); (Felter, 1922b); (Rexford, 1934) (Wilson, 1935)	& Mills, 2013); (Frances, 2014); (Sarris & Wardle, 2014)		
<i>Alchemilla vulgaris</i> (Lady's mantle)	-	(n=4) (Alfs, 2003); (Godfrey & Saunders, 2010); (Romm, 2010); (Tobyn et al., 2011)	-	-	(n=2) (Unknown, 1926); (Milton, 1941)	(n=10) (Wood, 1997); (Gladstar, 2008); (Hudson, 2008); (Fisher, 2009); (Godfrey & Saunders, 2010); (Tobyn et al., 2011); (Trickey, 2011); (Pizzorno & Murray, 2012); (Frances, 2014)

<p><i>Aletris farinosa</i> (True unicorn root)</p>	<p>-</p>	<p>-</p>	<p>(n=9) (King, 1856); (Webster et al., 1898); (Felter & Lloyd, 1905b); (Ellingwood, 1915); (Meyer, 1918); (Larsen, 1922)</p>	<p>(n=4) (Fisher, 2009); (Godfrey & Saunders, 2010); (Trickey, 2011); (Sarris & Wardle, 2014)</p>	<p>(n=5) (Brown, 1880); (Watkins, 1895); (Felter & Lloyd, 1905b); (Meyer, 1918); (Mausert, 1932)</p>	<p>(n=4) (Atkinson, 1979); (Hudson, 2008); (Trickey, 2011); (Pizzorno & Murray, 2012)</p>
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<p>Angelica sinesis (Dong quai)</p>	<p>-</p>	<p>(n=6) (Gladstar, 1993); (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Kirschmann, 2007); (Romm, 2010); (Bone & Mills, 2013)</p>	<p>-</p>	<p>(n=17) (Gladstar, 1993); (Bone & Morgan, 1996); (Alfs, 2003); (Bone, 2003) (Micozzi & Lowdog, 2004); (Tilgner, 2009); (Braun & Cohen, 2010); (Godfrey & Saunders, 2010); (Leach, 2010); (Romm, 2010); (Trickey, 2011); (Bone & Mills, 2013); (Frances, 2014); (Sarris & Wardle, 2014)</p>	<p>-</p>	<p>-</p>
<p>Astragalus membranace us (Astragalus)</p>	<p>-</p>	<p>(n=4) (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Romm, 2010); (Bone & Mills, 2013)</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>-</p>

<p><i>Atropa belladonna</i> (Belladonna)</p>	-	-	<p>(n=10) (King, 1856); (Phillips, 1879); (Locke & Felter, 1895); (Felter & Lloyd, 1905a); (Felter & Lloyd, 1905b); (Felter, 1922a); (Wilson, 1935)</p>	<p>(n=3) (Weiss, 2001); (Frances, 2014)</p>	-	-
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<p><i>Capsella bursa-pastoris</i> (Shepherd's purse)</p>	-	-	-	-	<p>(n=8) (Lust, 1925); (Scudder, 1893b); (Watkins, 1895); (Fyfe, 1903); (Felter & Lloyd, 1905a); (Ellingwood & Lloyd, 1909); (Mausert, 1932); (Wilson, 1935)</p>	<p>(n=19) (Lust, 1974); (Gladstar, 1993); (Wood, 1997); (Blumenthal, 1998); (Alfs, 2003); (Bone, 2003); (Van Wyk & Wink, 2004); (Kaur et al., 2005); (Osiecki, 2006); (Hudson, 2008); (Fisher, 2009); (Trickey, 2011); (Pizzorno & Murray, 2012); (Bone & Mills, 2013); (Frances, 2014); (Pizzorno et al., 2016)</p>
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<i>Caulophyllum thalictroides</i> (Blue cohosh)	-	-	-	-	(n=7) (King, 1856); (Coe, 1868); (Adolphus, 1897); (Felter & Lloyd, 1905a); (Felter & Lloyd, 1905b)	(n=8) (Alfs, 2003); (Bone, 2003); (Hudson, 2008); (Tilgner, 2009); (Godfrey & Saunders, 2010); (Trickey, 2011); (Pizzorno & Murray, 2012); (Frances, 2014)
<i>Cephaelis ipecacuanha</i> (Ipecacuanha)	-	-	-	-	(n=9) (Phillips, 1879); (Scudder, 1881); (Goss, 1885); (Fyfe, 1903); (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Felter, 1922a)	-

<p><i>Chamaelirium luteum</i> (False unicorn root)</p>	<p>-</p>	<p>-</p>	<p>(n=16) (Scudder, 1898); (Felter, 1927) (Howard, 1833b); (King, 1856); (Coe, 1868); (Goss, 1885); (Locke & Felter, 1895); (Felter & Lloyd, 1905a); (Felter & Lloyd, 1905b); (Ellingwood, 1915); (Blair, 1917); (Meyer, 1918); (Wilson, 1935)</p>	<p>(n=10) (Bradley, 1992); (Bone, 2003); (Osiecki, 2006); (Barnes et al., 2007), (Hudson, 2008); (Fisher, 2009); (Godfrey & Saunders, 2010); (Leach, 2010); (Hechtman, 2013); (Sarris & Wardle, 2014)</p>	<p>(n=5) (Griffith, 1893); (King, 1856); (Watkins, 1895); (Fyfe, 1903); (Ellingwood, 1915)</p>	<p>(n=3) (Osiecki, 2006); (Trickey, 2011); (Wood, 2011)</p>
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<i>Cinnamomum cassia</i> (Cinnamon)	-	-	-	-	(n=9) (Scudder, 1881); (Watkins, 1895); (Dean, 1903); (Felter & Lloyd, 1905a); (Felter & Lloyd, 1905b); (Wilson, 1935)	(n=4) (Gladstar, 1993); (Alfs, 2003); (Hudson, 2008); (Pizzorno & Murray, 2012)
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<p><i>Claviceps purpurea</i> (Ergot)</p>	-	-	-	-	<p>(n=14) (Phillips, 1879); (Scudder, 1881); (Goss, 1885); (Locke & Felter, 1895); (Watkins, 1895); (Felter & Lloyd, 1905a); (Ellingwood, 1915); (Meyer, 1918); (Felter, 1922a);(Larsen, 1922); (Scudder, 1922); (Wilson, 1935)</p>	<p>(n=1) (Blumenthal, 1998)</p>
<p><i>Curcuma longa</i> (Turmeric)</p>	-	<p>(n=5) (Kaur et al., 2005); (Romm, 2010); (Trickey, 2011); (Bone & Mills, 2013)</p>	-	-	-	-

<p><i>Dioscorea villosa</i> (Wild yam)</p>	<p>-</p>	<p>(n=6) (Hoffmann, 2003); (Gladstar, 1993); (Ostrzenski, 2002); (Hudson, 2008); (Romm, 2010)</p>	<p>(n=11) (King, 1856); (Kost, 1858); (Coe, 1868); (Scudder, 1881); (Locke & Felter, 1895); (Ellingwood, 1909); (Ellingwood & Lloyd, 1909); (Felter, 1922a); (Felter, 1924); (Rexford, 1934); (Wilson, 1935)</p>	<p>(n=19) (Gladstar, 1993); (Wood, 1997); (Ostrzenski, 2002); (Alfs, 2003); (Bone, 2003); (Hoffmann, 2003); (Micozzi & Lowdog, 2004); (Hudson, 2008); (Fisher, 2009); (Braun & Cohen, 2010); (Godfrey & Saunders, 2010); (Romm, 2010); (Leach, 2010); (Trickey, 2011); (Bone & Mills, 2013); (Hechtman, 2013); (Sarris & Wardle, 2014)</p>	<p>-</p>	<p>-</p>
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<i>Echinacea angustifolia</i> (Echinacea)	-	(n=4) (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Romm, 2010); (Bone & Mills, 2013)	-	-	-	-
<i>Erigeron canadensis</i> (Horseweed)	-	-	-	-	(n=9) (King, 1856); (Coe, 1868); (Scudder, 1881); (Watkins, 1895); (Webster et al., 1898); (Ellingwood & Lloyd, 1909); (Wilson, 1935)	(n=2) (Hudson, 2008); (Pizzorno & Murray, 2012)

<p><i>Gelsemium sermpervirens</i> (Yellow jasmine)</p>	<p>-</p>	<p>-</p>	<p>(n=15) (King, 1856); (Coe, 1868); (Brown, 1880); (Scudder, 1881); (Goss, 1885); (Watkins, 1893); (Scudder, 1894); (Locke & Felter, 1895); (Watkins, 1895); (Webster et al., 1898); (W., 1901); (Felter & Lloyd, 1905b); (Jones, 1911); (Blair, 1917)</p>	<p>(n=1) (Fisher, 2009)</p>	<p>-</p>	<p>-</p>
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<i>Geranium maculatum</i> (Wild geranium)	-	-	-	-	(n=9) (King, 1856); (Brown, 1880); (Watkins, 1895); (Felter & Lloyd, 1905b); (Meyer, 1918); (Felter, 1922a); (Unknown, 1925b)	(n=10) (Atkinson, 1979); (Vasquez, 1980); (Vasquez, 1981); (Wood, 1997); (Alfs, 2003); (Bone, 2003); (Hudson, 2008); (Fisher, 2009); (Trickey, 2011); (Pizzorno & Murray, 2012)
<i>Glycyrrhiza glabra</i> (Licorice)	-	(n=4) (Micozzi & Lowdog, 2004); (Kirschmann, 2007); (Romm, 2010); (Bone & Mills, 2013)	-	-	-	-

<i>Gossypium herbaceum</i> (Cotton)	-	(n=3) (Micozzi & Lowdog, 2004); (Romm, 2010); (Godfrey & Saunders, 2010)	-	-	-	-
<i>Hydrastis canadensis</i> (Golden seal)	-	-	-	-	(n=9) (Brown, 1880); (Watkins, 1895); (Cook, 1896); (Adolphus, 1897); (Felter & Lloyd, 1905b); (Lloyd, 1908); (Ellingwood & Lloyd, 1909); (Felter, 1922a); (Wilson, 1935)	(n=8) (Hedges, 1951); (Frawley & Lad, 1986); (Bradley, 1992); (Bone, 2003); (Hudson, 2008); (Fisher, 2009); (Trickey, 2011); (Pizzorno & Murray, 2012)

<i>Juniperus sabina</i> (Savin juniper)	-	-	-	-	(n=8) (King, 1856); (Phillips, 1879); (Goss, 1885); (Scudder, 1893b); (Locke & Felter, 1895); (Fyfe, 1903); (Felter & Lloyd, 1905b); (Jones, 1911)	(n=2) (Hudson, 2008); (Pizzorno & Murray, 2012)
<i>Leonurus cardiaca</i> (Motherwort)	-	(n=5) (Ostrzenski, 2002); (Hudson, 2008); (Romm, 2010); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)	(n=4) (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Ellingwood, 1915); (Rexford, 1934)	(n=12) (Bone, 2003); (Gladstar, 1993); (Alfs, 2003); (Gladstar, 2008); (Fisher, 2009); (Leach, 2010); (Romm, 2010); (Frances, 2014)	-	-

<p><i>Matricaria chamomilla</i> (German chamomile)</p>	<p>-</p>	<p>-</p>	<p>(n=10) (King, 1856); (Brown, 1880); (Locke & Felter, 1895); (Webster et al., 1898); (Felter, 1900); (Felter & Lloyd, 1905b); (Blair, 1917); (Felter, 1922c); (Felter, 1922a); (Rexford, 1934)</p>	<p>(n=16) (Wharton, 1995a); (Wharton, 1996); (Wood, 1997); (Alfs, 2003); (Bone, 2003); (Hudson, 2008); (Fisher, 2009); (Leach, 2010); (Romm, 2010); (Trickey, 2011); (Bone & Mills, 2013); (Sarris & Wardle, 2014)</p>	<p>-</p>	<p>-</p>
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<p><i>Mitchella repens</i> (Partridge berry)</p>	<p>-</p>	<p>-</p>	<p>(n=11) (Howard, 1833b); (King, 1856); (Locke & Felter, 1895); (Fyfe, 1903); (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Ellingwood, 1915)</p>	<p>(n=13) (Milton, 1941); (Wharton, 1995b); (Wharton, 1996); (Boyle & Saine, 1988); (Alfs, 2003); (Micozzi & Lowdog, 2004); (Fisher, 2009); (Tilgner, 2009); (Godfrey & Saunders, 2010); (Leach, 2010); (Romm, 2010); (Wood, 2011); (Frances, 2014)</p>	<p>(n=5) (King, 1856); (Meyer, 1918); (Fyfe, 1903); (Felter & Lloyd, 1905b)</p>	<p>(n=5) (Alfs, 2003); (Godfrey & Saunders, 2010); (Trickey, 2011); (Frances, 2014); (Milton, 1941)</p>
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<i>Packera aurea</i> (Golden ragwort)	-	-	(n=17) (King, 1856); (Kost, 1858); (Coe, 1868); (Brown, 1880); (Scudder, 1883); (Goss, 1885); (Watkins, 1895); (Webster et al., 1898); (Dean, 1903); (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Ellingwood, 1915); (Felter, 1922a); (Mausert, 1932)	(n=2) (Godfrey & Saunders, 2010); (Wood, 2011)	(n=10) (King, 1856); (Coe, 1868); (Scudder, 1883); (Scudder, 1893b); (Watkins, 1895); (Webster et al., 1898); (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Ellingwood, 1915); (Felter, 1922a)	(n=5) (Hudson, 2008); (Godfrey & Saunders, 2010); (Wood, 2011); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)
<i>Paeonia lactiflora</i> (White peony)	-	(n=4) (Micozzi & Lowdog, 2004); (Romm, 2010); (Tobyn et al., 2011); (Trickey, 2011)	-	-	-	-

<i>Pinus pinaster</i> (Maritime pine)	-	(n=5) (Trickey, 2011); (Murray & Pizzorno, 2012); (Pizzorno & Murray, 2012); (Bone & Mills, 2013); (Pizzorno et al., 2016)	-	-	-	-
<i>Piscidia piscipula</i> (Jamaica dogwood)	-	-	(n=4) (Watkins, 1892); (Webster et al., 1898); (Fyfe, 1903); (Ellingwood & Lloyd, 1909)	(n=11) (Bradley, 1992); (Bone, 2003); (Barnes et al., 2007); (Fisher, 2009); (Tilgner, 2009); (Godfrey & Saunders, 2010); (Leach, 2010); (Romm, 2010); (Trickey, 2011); (Frances, 2014); (Sarris & Wardle, 2014)	-	-

<i>Pulsatilla vulgaris</i> (Pasque flower)	-	(n=4) (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Romm, 2010); (Frances, 2014)	-	-	-	-
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<p><i>Rubus idaeus</i> (Raspberry leaf)</p>	-	-	-	<p>(n=16) (Phyllis, 1975); (Blackwell, 1976); (Frawley & Lad, 1986); (Gladstar, 1993); (Wharton, 1995b); (Wharton, 1995a); (Wharton, 1996); (Gladstar, 2008); (Fisher, 2009); (Braun & Cohen, 2010); (Romm, 2010); (Trickey, 2011); (Bone & Mills, 2013); (Frances, 2014); (Sarris & Wardle, 2014)</p>	<p>(n=1) (Felter & Lloyd, 1905b)</p>	<p>(n=11) (Frawley & Lad, 1986); (Gladstar, 1993); (Ogilvie, 1995); (Alfs, 2003); (Kaur et al., 2005); (Hudson, 2008); (Pizzorno & Murray, 2012); (Tilgner, 2009); (Braun & Cohen, 2010); (Phyllis, 1975); (Blackwell, 1976)</p>
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<i>Senecio aureus</i> (Golden ragwort)	-	-	(n=17) (King, 1856); (Kost, 1858); (Coe, 1868); (Brown, 1880); (Scudder, 1883); (Goss, 1885); (Watkins, 1895); (Dean, 1903); (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Ellingwood, 1915); (Felter, 1922a); (Mausert, 1932)	(n=2) (Godfrey & Saunders, 2010); (Wood, 2011)	(n=10) (King, 1856); (Coe, 1868); (Scudder, 1883); (Scudder, 1893b); (Watkins, 1895); (Webster et al., 1898); (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Ellingwood, 1915); (Felter, 1922a)	(n=5) (Hudson, 2008); (Godfrey & Saunders, 2010); (Wood, 2011); (Pizzorno & Murray, 2012; Pizzorno et al., 2016)
<i>Silybum marianum</i> (Milk thistle)	-	(n=3) (Micozzi & Lowdog, 2004); (Romm, 2010); (Bone & Mills, 2013)	-	-	-	-

<p><i>Taraxacum officinale</i> (Dandelion)</p>	<p>-</p>	<p>(n=7) (Gladstar, 1993); (Ostrzenski, 2002); (Micozzi & Lowdog, 2004); (Hudson, 2008); (Romm, 2010); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>-</p>
<p><i>Trillium erectum</i> (Birthroot)</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>(n=11) (King, 1856); (Coe, 1868); (Brown, 1880); (Scudder, 1883); (Webster et al., 1898); (Felter & Lloyd, 1905b); (Meyer, 1918); (Larsen, 1922); (Unknown, 1925a)</p>	<p>(n=9) (Atkinson, 1979); (Hudson, 2008); (Fisher, 2009); (Tilgner, 2009); (Trickey, 2011); (Wood, 2011); (Pizzorno & Murray, 2012); (Bone & Mills, 2013)</p>

<i>Valeriana officinalis</i> (Valerian)	-	-	(n=3) (King, 1856); (Felter & Lloyd, 1905b); (Rexford, 1934)	(n=10) (Frawley & Lad, 1986); (Gladstar, 1993); (Weiss, 2001); (Barnes et al., 2007); (Hudson, 2008); (Tilgner, 2009); (Leach, 2010); (Trickey, 2011); (Frances, 2014); (Sarris & Wardle, 2014)	-	-
<i>Viburnum opulus</i> (Cramp bark)	-	(n=5) (Ostrzenski, 2002); (Kaur et al., 2005); (Hudson, 2008); (Romm, 2010); (Bone & Mills, 2013)	-	-	-	-

<p><i>Viburnum prunifolium</i> (Black haw)</p>	<p>-</p>	<p>-</p>	<p>(n=13) (Felter, 1927); (Webster, 1928); (Scudder, 1883); (Goss, 1885); (Cook, 1896); (Felter & Lloyd, 1905b); (Ellingwood & Lloyd, 1909); (Ellingwood, 1915); (Meyer, 1918); (Felter, 1922a); (Larsen, 1922); (Rexford, 1934); (Wilson, 1935)</p>	<p>(n=21) (Wharton, 1995a); (Wood, 1997); (Weiss, 2001); (Ostrzenski, 2002); (Bone, 2003); (Hoffmann, 2003); (Micozzi & Lowdog, 2004); (Van Wyk & Wink, 2004); (Gladstar, 2008); (Hudson, 2008); (Fisher, 2009); (Godfrey & Saunders, 2010); (Leach, 2010); (Romm, 2010); (Trickey, 2011); (Wood, 2011); (Bone & Mills, 2013); (Hechtman, 2013)</p>	<p>(n=9) (Felter, 1927); (Webster, 1928); (Scudder, 1881); (Scudder, 1883); (Wilson, 1935); (Felter & Lloyd, 1905b); (Meyer, 1918); (Cook, 1896)</p>	<p>(n=3) (Bliss, 1950); (Godfrey & Saunders, 2010); (Wood, 2011)</p>
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<p><i>Vitex-agnus castus (Vitex)</i></p>	<p>-</p>	<p>(n=17) (Gladstar, 1993); (Ostrzenski, 2002); (Alfs, 2003); (Bone, 2003); (Hoffmann, 2003); (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Hudson, 2008); (Tilgner, 2009); (Godfrey & Saunders, 2010); (Romm, 2010); (Trickey, 2011); (Murray & Pizzorno, 2012); (Pizzorno & Murray, 2012); (Bone & Mills, 2013); (Pizzorno et al., 2016)</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>(n=13) (Gladstar, 1993); (Bone, 2003); (Gladstar, 2008); (Kaur et al., 2005); (Hudson, 2008); (Fisher, 2009); (Godfrey & Saunders, 2010); (Romm, 2010); (Pizzorno & Murray, 2012); (Bone & Mills, 2013); (Pizzorno et al., 2016)</p>
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<i>Zanthoxylum americanum</i> (Prickly ash)	-	(n=4) (Ostrzenski, 2002); (Hudson, 2008); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)	-	-	-	-
<i>Zingiber officinale</i> (Ginger)	-	(n=5) (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Romm, 2010); (Trickey, 2011); (Bone & Mills, 2013)	(n=3) (Ellingwood & Lloyd, 1909); (Meyer, 1918); (Felter, 1922a)	(n=20) (Gladstar, 1993); (Ostrzenski, 2002); (Bone, 2003); (Kaur et al., 2005); (Gladstar, 2008); (Hudson, 2008); (Fisher, 2009); (Braun & Cohen, 2010); (Trickey, 2011); (Gladstar, 2012); (Bone & Mills, 2013); (Sarris & Wardle, 2014); (Leach, 2010); (Romm, 2010)	-	-

6.5.5 Mineral medicine

Table 7 displays the mineral medicines for endometriosis, dysmenorrhea, and menorrhagia. There were 12 minerals recommended for dysmenorrhea in eight traditional texts (Felter, 1922a; Felter & Lloyd, 1905b; Goss, 1885; Jones, 1911; King, 1856; Locke & Felter, 1895; Webster et al., 1898; Wilson, 1935), 14 contemporary texts (Braun & Cohen, 2010; Gladstar, 1993; Hechtman, 2013; Kaur et al., 2005; Leach, 2010; Micozzi & Lowdog, 2004; Murray, 1996; Northrup, 2006; Osiecki, 2006; Ostrzenski, 2002; Romm, 2010; Sarris & Wardle, 2014; Trickey, 2011; Werbach & Moss, 1999) and four contemporary periodicals (Dillon, 1991a; Wharton, 1995a, 1995b; Wharton, 1996) during 1856 to 2014. Magnesium was the most recommended mineral (n=20) followed by iron (n=13), calcium (n=12); phosphate (n=7); and iodine (n=6). A higher proportion of these recommendations were found in contemporary (texts: n=14; periodicals: n=4) compared to traditional sources (texts only: n=8).

For endometriosis management, ten minerals were identified. The most common were selenium (n=7), magnesium (n=6), zinc (n=5), and calcium (n=2). These recommendations were reported during 1991 to 2016 and were across eight contemporary texts (Hudson, 2008; Kaur et al., 2005; Kirschmann, 2007; Murray & Pizzorno, 2012; Northrup, 2006; Ostrzenski, 2002; Pizzorno & Murray, 2012; Pizzorno et al., 2016) and one contemporary periodical (Dillon, 1991b). There were no recommendations for minerals from traditional sources.

For menorrhagia, there were eight reported minerals across three traditional texts (Felter & Lloyd, 1905b; Melendy, 1926; Webster et al., 1898), one traditional periodical (Stockdale, 1936), seven contemporary texts (Gladstar, 1993, 2008; Kaur et al., 2005; Osiecki, 2006; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Werbach & Moss, 1999) and two contemporary periodicals (Atkinson, 1982; Dillon, 1991b). The most common was iron (n=11) across ten sources (Dillon, 1991b; Felter & Lloyd, 1905b; Gladstar, 1993, 2008; Kaur et al., 2005; Melendy, 1926; Osiecki, 2006; Pizzorno & Murray, 2012;

Pizzorno et al., 2016; Werbach & Moss, 1999). Other common minerals included calcium (n=3), phosphate (n=3), potassium (n=3), and zinc (n=2). These minerals were reported in three traditional texts (Felter & Lloyd, 1905b; Melendy, 1926; Webster et al., 1898), seven contemporary texts (Gladstar, 1993, 2008; Kaur et al., 2005; Osiecki, 2006; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Werbach & Moss, 1999) and two contemporary periodicals (Atkinson, 1982; Dillon, 1991b) between 1905 to 2016 (Felter & Lloyd, 1905b; Pizzorno et al., 2016).

Table 7: Top five minerals and number of recommendations across the contemporary and traditional naturopathic sources recommended in endometriosis and associated symptoms including dysmenorrhea and menorrhagia.

Minerals	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
Calcium (phosphate)	-	(n=2) (Kaur et al., 2005); (Kirschmann, 2007)	-	(n=12) (Dillon, 1991a); (Wharton, 1995b); (Wharton, 1995a); (Wharton, 1996); (Ostrzenski, 2002); (Kaur et al., 2005); (Leach, 2010) ; (Romm, 2010); (Hechtman, 2013); (Sarris & Wardle, 2014)	(n=1) (Webster et al., 1898)	(n=2) (Dillon, 1991b); (Atkinson, 1982)

Iodine (alone, kelp, or with other minerals)	-	(n=1) (Kaur et al., 2005)	(n=6) (King, 1856); (Goss, 1885); (Locke & Felter, 1895); (Felter & Lloyd, 1905b); (Felter, 1922a)	-	-	-
Iron (chloride, phosphate, sulphate, gluconate, or Lloyd's Iron)	-	-	(n=7) (Goss, 1885); (Locke & Felter, 1895); (Webster et al., 1898); (Felter & Lloyd, 1905b); (Felter, 1922a); (Wilson, 1935)	(n=6) (Dillon, 1991a); (Gladstar, 1993); (Werbach & Moss, 1999); (Osiecki, 2006); (Leach, 2010); (Hechtman, 2013)	(n=2) (Felter & Lloyd, 1905b); (Melendy, 1926)	(n=9) (Dillon, 1991b); (Gladstar, 1993); (Werbach & Moss, 1999); (Kaur et al., 2005); (Osiecki, 2006); (Gladstar, 2008); (Pizzorno & Murray, 2012);

						(Pizzorno et al., 2016)
Magnesium (orotate, chelate, or phosphate)	-	(n=6) (Kaur et al., 2005); (Northrup, 2006); (Kirschmann, 2007); (Murray & Pizzorno, 2012)	(n=1) (Jones, 1911)	(n=19) (Dillon, 1991a); (Wharton, 1995b); (Wharton, 1996); (Murray, 1996); (Werbach & Moss, 1999); (Ostrzenski, 2002); (Micozzi & Lowdog, 2004); (Osiecki, 2006); (Braun & Cohen, 2010); (Leach, 2010); (Romm, 2010); (Trickey, 2011);	-	-

				(Hechtman, 2013); (Sarris & Wardle, 2014)		
Phosphate (alone or with other minerals)	-	-	(n=5) (Locke & Felter, 1895); (Webster et al., 1898); (Felter & Lloyd, 1905b); (Jones, 1911)	(n=2) (Dillon, 1991a)	(n=1) (Webster et al., 1898)	(n=2) (Dillon, 1991b); (Atkinson, 1982)
Potassium (chloride or phosphate)	-	-	-	-	(n=1) (Webster et al., 1898)	(n=2) (Dillon, 1991b); (Atkinson, 1982)
Selenium (form not specified)	-	(n=7) (Ostrzenski, 2002); (Kaur et al., 2005); (Northrup, 2006); (Hudson, 2008);	-	-	-	-

		(Murray & Pizzorno, 2012); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)				
Zinc (form not specified)	-	(n=5) (Dillon, 1991b); (Kaur et al., 2005); (Northrup, 2006); (Kirschmann, 2007); (Murray & Pizzorno, 2012)	-	-	-	(n=2) (Dillon, 1991b); (Kaur et al., 2005)

6.5.6 Clinical nutrition

Table 8 displays the nutritional treatments for endometriosis, dysmenorrhea, and menorrhagia. Across all three menstrual disorders, more clinical nutritional medicine (n=29) treatments were listed for the management of endometriosis compared to dysmenorrhea and menorrhagia, although all of these recommendations were only reported in the contemporary sources (Atkinson, 1982; Bone & Mills, 2013; Dillon, 1991b; Gladstar, 1993; Hudson, 2008; Kaur et al., 2005; Kirschmann, 2007; Murray & Pizzorno, 2012; Northrup, 2006; Osiecki, 2006; Ostrzenski, 2002; Pizzorno & Murray, 2012; Pizzorno et al., 2016; Prousky, 2008; Prousky, 2012; Romm, 2010; Trickey, 2011). The earliest nutritional treatment for endometriosis was vitamin E which was found in two contemporary periodicals from 1982 (Atkinson, 1982) and 1991 (Dillon, 1991b). Vitamin E was also reported the largest number of recommendations (n=13). Other popular nutrients were eicosapentaenoic acid (EPA)/docosahexaenoic acid (DHA) (n=11), vitamin C (n=9), vitamin B complex (n=7), beta-carotene (n=6), *Lactobacillus acidophilus* (n=4), choline (n=3), cysteine (n=3), gamma-linolenic acid (n=3), and grape seed extract (n=3).

The nutritional management of dysmenorrhea was reported across 28 clinical nutritional medicines, with the most prominent recommendation being vitamin E (n=17) (Braun & Cohen, 2010; Dillon, 1991a; Hechtman, 2013; Hudson, 2008; Kaur et al., 2005; Leach, 2010; Micozzi & Lowdog, 2004; Northrup, 2006; Osiecki, 2006; Romm, 2010; Sarris & Wardle, 2014; Werbach & Moss, 1999; Wharton, 1995b; Wharton, 1996). Vitamin E was reported across 11 contemporary texts (Braun & Cohen, 2010; Hechtman, 2013; Hudson, 2008; Kaur et al., 2005; Leach, 2010; Micozzi & Lowdog, 2004; Northrup, 2006; Osiecki, 2006; Romm, 2010; Sarris & Wardle, 2014; Werbach & Moss, 1999) and three periodicals (Dillon, 1991a; Wharton, 1995b; Wharton, 1996) during 1991 and 2014. Other frequently reported treatments were EPA/DHA (n=12), gamma-linolenic acid (n=9), vitamin B6 (n=8), vitamin B3 (n=7), vitamin B1 (n=6), vitamin C (n=5), bromelain (n=3),

folic acid (n=2), and probiotics (n=2, strain not specified). These recommendations were only reported in contemporary sources with no recommendations from traditional sources and the earliest source being from 1991 (Dillon, 1991a).

Clinical nutritional medicines for menorrhagia were less commonly reported, with a total of 14 clinical nutritional medicines. The most frequently identified treatments were vitamin A (n=7) and vitamin C (n=7), followed by vitamin K (n=6), bioflavonoids (n=5), vitamin E (n=4), and EPA/DHA (n=3). Other less common recommendations included chlorophyll tablets (n=2), flaxseed oil (n=1), gamma-linolenic acid (n=1), and kelp (n=1). All the recommendations for clinical nutritional medicines for menorrhagia were identified in the contemporary sources (texts: n=11; periodicals: n=2) from 1982 to 2016.

Table 8: Top 10 Clinical nutritional medicines and the number of recommendations across the contemporary naturopathic sources for endometriosis and associated symptoms including dysmenorrhea and menorrhagia.

Clinical nutritional medicines	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
Beta-carotene	-	(n=6) (Ostrzenski, 2002); (Kaur et al., 2005); (Kirschmann, 2007); (Hudson, 2008); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)	-	-	-	-
Bioflavonoids	-	-	-	-	-	(n=5) (Kaur et al., 2005); (Hudson, 2008);

						(Trickey, 2011); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)
Bromelain	-	-	-	(n=3) (Kaur et al., 2005); (Hendler & Rorvik, 2008); (Romm, 2010)	-	-
Chlorophyll tablets	-	-	-	-	-	(n=2) (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)
Choline	-	(n=3)	-	-	-	-

		(Hudson, 2008); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)				
Cysteine	-	(n=3) (Hudson, 2008); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)	-	-	-	-
Essential fatty acids	-	(n=11) (Kaur et al., 2005); (Northrup, 2006); (Osiecki, 2006); (Kirschmann, 2007); (Hudson,	-	(n=12) (Wharton, 1995b); (Werbach & Moss, 1999); (Ostrzenski, 2002); (Micozzi & Lowdog, 2004);	-	(n=3) (Kaur et al., 2005); (Osiecki, 2006); (Romm, 2010)

		2008); (Romm, 2010); (Trickey, 2011); (Murray & Pizzorno, 2012); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)		(Kaur et al., 2005); (Northrup, 2006); (Osiecki, 2006); (Hudson, 2008); (Romm, 2010); (Leach, 2010); (Trickey, 2011); (Hechtman, 2013)		
Flaxseed oil	-	-	-	-	-	(n=1) (Kaur et al., 2005)
Folic acid	-	-	-	(n=2) (Dillon, 1991a); (Hechtman, 2013)	-	-
Gamma-linolenic acid	-	(n=3) (Gladstar, 1993); (Ostrzenski, 2002);	-	(n=9) (Dillon, 1991a);	-	(n=1) (Kaur et al., 2005)

		(Hudson, 2008)		(Gladstar, 1993); (Wharton, 1995b), (Wharton, 1996); (Osiecki, 2006); (Braun & Cohen, 2010); (Leach, 2010); (Romm, 2010); (Hechtman, 2013)		
Grape seed extract	-	(n=3) (Trickey, 2011); (Murray & Pizzorno, 2012); (Bone & Mills, 2013)	-	-	-	-
Kelp	-	-	-	-	-	(n=1) (Atkinson, 1982)

Lactobacillus acidophilus	-	(n=4) (Kaur et al., 2005); (Osiecki, 2006); (Prousky, 2008); (Prousky, 2012)	-	-	-	-
Probiotics (strain not specified)	-	-	-	(n=2) (Kaur et al., 2005); (Hechtman, 2013)	-	-
Vitamin A	-	-	-	-	-	(n=7) (Dillon, 1991b); (Werbach & Moss, 1999); (Kaur et al., 2005); (Northrup, 2006); (Hudson, 2008); (Romm, 2010); (Trickey, 2011)

Vitamin B complex	-	(n=7) (Ostrzenski, 2002); (Kaur et al., 2005); (Kirschmann, 2007); (Hudson, 2008); (Romm, 2010); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)	-	-	-	-
Vitamin B1	-	-	-	(n=6) (Dillon, 1991a); (Werbach & Moss, 1999); (Micozzi & Lowdog, 2004); (Hudson, 2008);	-	-

				(Leach, 2010); (Trickey, 2011)		
Vitamin B3	-	-	-	(n=7) (Dillon, 1991a); (Werbach & Moss, 1999); (Ostrzenski, 2002); (Kaur et al., 2005); (Osiecki, 2006); (Hudson, 2008); (Leach, 2010)	-	-
Vitamin B6	-	-	-	(n=8) (Dillon, 1991a); (Wharton, 1996); (Ostrzenski, 2002); (Kaur et al., 2005); (Northrup, 2006);	-	-

				(Osiecki, 2006); (Leach, 2010); (Trickey, 2011)		
Vitamin C	-	(n=9) (Ostrzenski, 2002); (Kaur et al., 2005); (Osiecki, 2006); (Kirschmann, 2007); (Hudson, 2008); (Murray & Pizzorno, 2012); (Pizzorno & Murray, 2012); (Hechtman, 2013); (Pizzorno et al., 2016)	-	(n=5) (Ostrzenski, 2002); (Kaur et al., 2005); (Osiecki, 2006); (Hudson, 2008); (Hechtman, 2013)	-	(n=7) (Dillon, 1991b); (Werbach & Moss, 1999); (Kaur et al., 2005); (Osiecki, 2006); (Hudson, 2008); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)
Vitamin E	-	(n=13)	-	(n=17)	-	(n=4)

		(Atkinson, 1982); (Dillon, 1991b); (Gladstar, 1993); (Ostrzenski, 2002); (Kaur et al., 2005); (Northrup, 2006); (Osiecki, 2006); (Kirschmann, 2007); (Hudson, 2008); (Trickey, 2011); (Murray & Pizzorno, 2012); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)		(Dillon, 1991b); (Wharton, 1995b); (Wharton, 1996); (Werbach & Moss, 1999); (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Northrup, 2006); (Osiecki, 2006); (Hudson, 2008); (Braun & Cohen, 2010); (Leach, 2010); (Romm, 2010); (Hechtman, 2013); (Sarris & Wardle, 2014)		(Dillon, 1991b); (Kaur et al., 2005); (Northrup, 2006); (Osiecki, 2006)
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Vitamin K	-	-	-	-	-	(n=6) (Murray, 1996); (Kaur et al., 2005); (Hudson, 2008); (Trickey, 2011); (Pizzorno & Murray, 2012); (Pizzorno et al., 2016)
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6.5.7 Homeopathic remedies

Table 9 displays the homeopathic remedies for dysmenorrhea, menorrhagia, and endometriosis. There was a total of 39 remedies recommended for dysmenorrhea. The most common was *Nux vomica* (nux-v.) primarily seen in traditional sources (Felter, 1922a; Locke & Felter, 1895; Melendy, 1926; Watkins, 1895), with one occurrence in a contemporary periodical from 1995 (Wharton, 1995b). *Sepia officinalis* (sep.) was also more likely to be reported in the traditional sources with three between 1885 to 1898 (Goss, 1885; Watkins, 1895; Webster et al., 1898) and one contemporary source from 2002 (Ostrzenski, 2002). *Belladonna* (bell.) and *Chamomilla* (cham.) were reported during 1926 to 1995 (Melendy, 1926; Minton, 1968; Wharton, 1995b).

Like dysmenorrhea, there were 40 homeopathic remedies for menorrhagia. The most common were *Apis mellifica* (apis.) (Felter & Lloyd, 1905a; Koegler, 1961; Locke & Felter, 1895), *Ipecacuanha* (ip.) (Melendy, 1926; Minton, 1968; Watkins, 1895), *Alteris farinosa* (alet.) (Kaur et al., 2005; Wood, 2011), *Carbo vegetabilis* (carbo-v) (Scudder, 1881), *Crocus sativus* (croc.) (Melendy, 1926; Minton, 1968), *Apis mellifica* (apis.) (Felter & Lloyd, 1905a; Koegler, 1961; Locke & Felter, 1895), and *Ipecacuanha* (ip.) (Melendy, 1926; Minton, 1968; Watkins, 1895) and were identified across the same sources (traditional texts: n=2; contemporary text: n=1). *Alteris farinosa* (alet.) was the only remedy without recommendations from the traditional sources (Kaur et al., 2005; Wood, 2011), while *Carbo vegetabilis* (carbo-v) had two recommendations from one traditional text (Scudder, 1881) and no recommendations from contemporary sources.

Seven homeopathic remedies were identified across two contemporary texts (Kaur et al., 2005; Kirschmann, 2007) for the management of endometriosis. There were no recommendations of homeopathic remedies from traditional sources.

Table 9: Top five homeopathic remedies and the number of recommendations across the contemporary and traditional naturopathic sources for use in endometriosis and associated symptoms including dysmenorrhea and menorrhagia.

Homeopathy	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>Actaea racemosa</i> (cimic.)	-	(n=1) (Kaur et al., 2005)	-	-	-	-
<i>Alteris farinosa</i> (alet.)	-	-	-	-	-	(n=2) (Kaur et al., 2005); (Wood, 2011)
<i>Apis mellifica</i> (apis.)	-	-	-	-	(n=2) (Locke & Felter, 1895); (Felter & Lloyd, 1905a)	(n=1) (Koegler, 1961)
<i>Belladonna</i> (bell.)	-	-	(n=1) (Melendy, 1926)	(n=2) (Minton, 1968);	-	-

				(Wharton, 1995b)		
Carbo vegetabilis (carbo-v)	-	-	-	-	(n=2) (Scudder, 1881)	-
Chamomilla (cham.)	-	-	(n=1) (Melendy, 1926)	(n=2) (Minton, 1968); (Wharton, 1995b)	-	-
Crocus sativus (croc.)	-	-	-	-	(n=1) (Melendy, 1926)	(n=1) (Minton, 1968)
Folliculinum (foll.)	-	(n=1) (Kaur et al., 2005)	-	-	-	-
Ipecacuanha (ip.)	-	-	-	-	(n=2) (Watkins, 1895); (Melendy, 1926)	(n=1) (Minton, 1968)
Kalium phosphoricum (kali-p.)	-	(n=1) (Kirschmann, 2007)	-	-	-	-

Luteinum (lutin.)	-	(n=1) (Kaur et al., 2005)	-	-	-	-
Magnesium phosphoricum (mag-p.)	-	(n=1) (Kirschmann, 2007)	-	-	-	-
Nux vomica (nux-v.)	-	-	(n=4) (Locke & Felter, 1895); (Watkins, 1895); (Felter, 1922a); (Melendy, 1926)	(n=1) (Wharton, 1995b)	-	-
Rhus toxicodendron (rhus-t.)	-	-	(n=2) (Scudder, 1881); (Watkins, 1895)	(n=1) (Minton, 1968)	-	-
Sepia officinalis (sep.)	-	-	(n=3) (Goss, 1885); (Watkins, 1895);	(n=1) (Ostrzenski, 2002)	-	-

			(Webster et al., 1898)			
Silicea terra (sil.)	-	(n=1) (Kirschmann, 2007)	-	-	-	-
Thiosinaminum (thiosin.)	-	(n=1) (Kaur et al., 2005)	-	-	-	-

6.5.8 Hydrotherapy

Table 10 displays the recommendations for hydrotherapy for dysmenorrhea and menorrhagia. The recommendation of hydrotherapy for dysmenorrhea was found in ten sources including one contemporary text (Romm, 2010); three contemporary periodicals (Byle, 1960; Lust, 1955; Wharton, 1995a); three traditional texts (Goss, 1885; Juettner, 1916; Schilling, 1931), and three traditional periodicals (Lust, 1939; Stretch, 1916b; Tilden, 1912). From these ten sources, there were seven hydrotherapy treatments for dysmenorrhea. The most common treatments included a hot bath (Romm, 2010; Tilden, 1912; Wharton, 1995a), a hot sitz bath (Lust, 1955; Schilling, 1931; Wharton, 1995a), and a warm bath (Goss, 1885; Juettner, 1916; Schilling, 1931). Also identified were enemas (Stretch, 1916b) and hot water compresses (Romm, 2010). Hydrotherapy treatments were found in sources published between 1885 and 2010 during which time, the main treatments recommended in both traditional and contemporary resources were hot baths (Romm, 2010; Tilden, 1912; Wharton, 1995a) and the hot hip/sitz baths (Lust, 1955; Schilling, 1931; Wharton, 1995a), whilst the warm baths were no longer recommended within the contemporary sources.

Eight hydrotherapy treatments were identified for menorrhagia in one contemporary text (Boyle & Saine, 1988), one contemporary periodical (Dixon, 1977), five traditional texts (Howard, 1833a; Juettner, 1916, 1919; Kuhne, 1917; Scudder, 1881), and two traditional periodicals (Lust B, 1905; Tilden, 1912). From these sources, treatments included a vaginal douche (Juettner, 1919; Scudder, 1881), a cold compress (Juettner, 1916, 1919), a cold sitz bath (Boyle & Saine, 1988; Dixon, 1977), a cold bath (Kuhne, 1917), and a hot enema (Lust B, 1905). These recommendations were found in sources published between 1881 and 1988. The use of the cold bath was used during the earlier part of the 20th century (Kuhne, 1917) while a cold sitz bath was recommended in the later part of the 20th century (Boyle & Saine, 1988; Dixon, 1977). There were no recommendations of hydrotherapy for endometriosis.

Table 10: Top five hydrotherapy treatments and the number of recommendations across the contemporary and traditional naturopathic sources for use in endometriosis and associated symptoms including dysmenorrhea and menorrhagia.

Hydrotherapy	Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
Cold bath	-	-	(n=1) (Kuhne, 1917)	-
Cold compress	-	-	(n=3) (Juettner, 1916); (Juettner, 1919)	-
Cold sitz bath	-	-	(n=2) (Dixon, 1977); (Boyle & Saine, 1988)	-
Enema	(n=1) (Stretch, 1916b)	-	(n=1) (Unknown, 1905)	-

Hot bath	(n=1) (Tilden, 1912)	(n=2) (Wharton, 1995a); (Romm, 2010)	-	-
Hot compress	-	(n=1) (Romm, 2010)	-	-
Hot sitz bath	(n=1) (Schilling, 1931)	(n=2) (Lust, 1955); (Wharton, 1995a)	-	-
Vaginal douche	-	-	(n=3) (Scudder, 1881); (Juettner, 1919)	-
Warm bath	(n=3) (Goss, 1885); (Juettner, 1916); (Schilling, 1931)	-	-	-

6.5.9 Chemical-based medicines

Table 11 displays commonly identified chemical-based medicines for dysmenorrhea and menorrhagia. In the context of this article, chemical-based medicines refer to chemical substances and compounds that were used as treatments in these menstrual disorders. A total of 15 chemical-based medicines were found for dysmenorrhea. The most common were quinine sulphate (Felter & Lloyd, 1905b; King, 1856), ammonium acetate (Felter & Lloyd, 1905b; Locke & Felter, 1895), borax (Felter, 1922a; Webster et al., 1898), cerium oxalate (Felter, 1922a; Webster et al., 1898), and ether (Felter, 1922a; Locke & Felter, 1895). These recommendations come from five traditional texts (Felter, 1922a; Felter & Lloyd, 1905b; King, 1856; Locke & Felter, 1895; Webster et al., 1898) from 1856 to 1922.

Chemical-based medicines for menorrhagia were reported across six traditional texts (Brown, 1880; Felter, 1922a; Felter & Lloyd, 1905b; King, 1856; Locke & Felter, 1895; Scudder, 1881) and one traditional periodical (Unknown, 1878). These included nine chemical-based medicines such as gallic acid (Locke & Felter, 1895; Scudder, 1881), acidum tannicum (Felter, 1922a), ammonia (King, 1856), berberine sulphate (Unknown, 1878), and hydrastininae hydrochloras (Felter & Lloyd, 1905b). These medicines were recommended in traditional sources during 1856 to 1922 (Felter, 1922a; King, 1856). There were no recommendations for the treatment of endometriosis with chemical-based medicines.

Table 11: Top five chemical-based medicines and the number of recommendations across traditional naturopathic sources for use in dysmenorrhea and menorrhagia.

Chemical-based medicines	Dysmenorrhea	Menorrhagia
	Traditional recommendations	Traditional recommendations
Acidum tannicm	-	(n=1) (Felter, 1922a)
Ammonia	-	(n=1) (King, 1856)
Ammonium acetate	(n=2) (Locke & Felter, 1895); (Felter & Lloyd, 1905b)	-
Berberine sulphate	-	(n=1) (Unknown, 1878)
Borax	(n=2) (Webster et al., 1898); (Felter, 1922a)	-
Cerium oxalate	(n=2) (Webster et al., 1898); (Felter, 1922a)	-

Ether	(n=2) (Locke & Felter, 1895); (Felter, 1922a)	-
Gallic acid	-	(n=2) (Scudder, 1881); (Locke & Felter, 1895)
Hydrastininae hydrochloras	-	(n=1) (Felter & Lloyd, 1905b)
Quinine sulphate	(n=4) (King, 1856); (Felter & Lloyd, 1905b)	-

6.6 Discussion

This study identified a variety of traditional and contemporary naturopathic treatments to support the management of endometriosis and associated menstrual conditions. The findings indicate that herbal medicine was the most reported naturopathic treatment across all three conditions. Clinical nutritional medicine was frequently recommended for the management of endometriosis compared to dysmenorrhea and menorrhagia. However, clinical nutritional medicine recommendations for endometriosis were only identified in contemporary sources. In comparison, mineral medicines were recommended across all three conditions, but primarily for dysmenorrhea. The recommendations of a range of homeopathic remedies were frequently reported for dysmenorrhea and menorrhagia, with more recommendations in traditional sources compared to contemporary texts. Hydrotherapy was the least reported naturopathic modality, with recommendations for dysmenorrhea and menorrhagia. There were no traditional or contemporary recommendations for hydrotherapy for endometriosis. Finally, the findings relating to chemical-based medicines were during the traditional period (1800 – 1941). Chemical-based medicines were not recommended in any contemporary sources. The following section will align the research findings to some areas that relate to the evolution of naturopathic medicine across the last 200 years.

6.6.1 Evolution of naturopathy

This is the first article to describe naturopathic treatments for the management of endometriosis, dysmenorrhea, and menorrhagia, drawing on traditional and contemporary sources. The results suggest that naturopathic practice has a rich history of multiple modality treatments used to manage these conditions but changes in treatments over time provides evidence that naturopathic practice is continually evolving. Upon its formation, naturopathy incorporated the Nature Cure practice, defined as a system of health care which treated disease with hydrotherapy, fresh air, and wholesome food (Henry Lindlahr, 1913), as well as the incorporation of other 'natural' therapies such

as herbal medicine and homeopathy (Kirchfeld & Boyle, 1994). Although based on pre-existing European traditional medicine systems, during the earliest part of the 20th century, naturopathy became formalised as Benedict Lust began to modernise the profession through the establishment of qualifications that continued to expand its curricula to include science, physiotherapy, herbal medicine, a broad range of therapies that were considered amenable to naturopathic philosophy of healing (Kirchfeld & Boyle, 1994), particularly *vis medicatrix naturae* (healing power of nature) (Whorton, 2004). Naturopathy, particularly in America, continued to absorb such treatments (Czeranko, 2013; Evans, 2000; Whorton, 2004), with some influences from eclectic medicine (Kirchfeld & Boyle, 1994; Tippens et al., 2012), as well as Lindlahr's theories on the practice of using food as medicine (Kirchfeld & Boyle, 1994). The influence of naturopathic predecessors continues even in the absorption of modern therapies (such as clinical nutrition) and suggests elements of naturopathy is a living system of health care through its continued adaption and sharing of cultural medicine (Tovey & Adams, 2001). Differences in treatments suggest that naturopathy appears to be continually evolving, as it appears the boundaries of the profession are not fixed. This can be reflected in the contested boundaries of knowledge of the profession (Tovey & Adams, 2001) which are constantly debated and redefined within the profession of what it means to be a naturopath and what disciplines are considered to be naturopathic. This could also be defined by the influence of professional elites or groups within naturopathy that steer or influence practice, as similarly has occurred in other CM professions (Brosnan, 2017). One of the common criticisms of traditional medicine systems is their fixed systems and that they do not evolve when faced with new evidence (Friends of Science in Medicine, 2018 June), whereas our research suggests significant differences in common treatments over time have occurred, however, further scholarly work is needed to examine the evolution and factors that influence such changes.

6.6.2 Continuity in the use of herbal medicine

Herbal medicine was the only treatment which displayed a long history and continued inclusion in contemporary sources. This supports the view from leading international organisations such as the WNF that herbal medicine is a popular therapeutic tool for naturopathic practice (World Naturopathic Federation, 2017a). However, specific herbs prescribed for these conditions have changed over time and there may be multiple varying reasons for this. Some variations may indicate that herbal medicine use is highly influenced by cultural setting, for example, *V. agnus-castus* has been used in European practice for menstrual irregularities (Odenthal, 1998), however it was not identified in the traditional sources from Australia and North America, yet it is included in most modern texts. This suggests it is possible that contemporary naturopathic practice is being influenced by increased naturopathic global collaboration and research (Schellenberg et al., 2012; van Die et al., 2013). Additional reasons for changes in herbal prescribing can also include that some herbs are known to have safety issues such in the case of *C. ipecacuanha* (Fisher, 1973) and *A. belladonna* (Almubayedh et al., 2018; Frances, 2014) and have since been superseded by other herbs with a more favourable safety profile. Again, these developments suggest naturopathic medicine is not a static profession, but one that is continually progressing.

6.6.3 Adoption of clinical nutrition medicines

Whilst herbal medicine has had a long-standing position in naturopathic practice, clinical nutrition medicine has been adopted into naturopathy more recently. Clinical nutrition medicine is a universal term that is used by primary health care professions including those described as CM (Vickers & Zollman, 1999), referring to the principle that micronutrients are required for biochemical metabolism (Meldrum, 1993), which can be sourced from food and supplementation to optimise health or correct pathologies (Vickers & Zollman, 1999). The concept of clinical nutritional medicine was not well recognised and until the mid-18th century where science began to investigate nutrition

(McDowell, 2013). Over the past half a century, clinical nutrition has evolved rapidly, however it wasn't until 1985 when the Institute of Medicine recommended the integration of nutrition into medical school curricula (Adams et al., 2006). Despite these recommendations, there has been some resistance by medical schools to meet the recommended minimum curricula requirements, which has led to a need to advocate its importance in conventional practice (Kris-Etherton et al., 2014). While clinical nutrition has faced this difficulty, it has been embraced by the naturopathic profession, with recommendations for treatments for endometriosis, dysmenorrhea, and menorrhagia over the contemporary period forming a major element of naturopathic practice, even where it was relatively absent in traditional texts. Whilst clinical nutritional medicine was not one of the founding practices for naturopathy, it appears it has been incorporated as an important aspect of treatment within contemporary naturopathic education and practice as part of the evolution of the profession (Evans, 2000).

6.6.4 Evolution of other naturopathic treatments

In contrast to the increased scope of herbal and clinical nutritional medicine, several once-dominant disciplines have since decreased or become non-existent in contemporary naturopathic medicine. Chemical based-medicines was originally incorporated into naturopathy through eclectic medicine influences and largely ceased to exist in modern naturopathic treatments, most likely due to the advancement in research and clinical knowledge that many of these substances are poisonous or have safety concerns (such as the substance Ether (Bovill, 2008)). Hydrotherapy was historically an important treatment in naturopathy yet based on this research its contemporary recommendation appears to be significantly reduced. This may be due to several factors. In the Australian context, changes in the course delivery models in the 1980s are thought to be largely responsible (Wardle et al., 2012), with hydrotherapy gradually being removed from the curricula in favour of ingestive medicines (Wardle, 2013). Similarly, homeopathy was once a dominant treatment in naturopathic practice

(Kirchfeld & Boyle, 1994), however, its recommendation in these conditions in contemporary texts is limited in comparison to other treatments. Additional factors outside of the profession – for example the controversy surrounding the scientific validity of homeopathy – may also have an influence on the limited contemporary use of homeopathy (Levy et al., 2015).

6.6.5 Endometriosis as a contemporary health condition

Endometriosis is a complex disease that has a nebulous historical diagnosis and continues to face challenges relating to diagnosis and scientific understanding (Nezhat et al., 2012). Additional challenges relate to current diagnostic processes (Nezhat et al., 2012), social stigmatisation of menstruation, delay in diagnosis, and most notably the difficulties women face in receiving care, often due to limited medical understanding from primary health care practitioners (Nezhat et al., 2012; Young et al., 2014). In the context of this research, the ambiguous history of the disease may be reflected in the absence of recommendations across traditional sources. While many herbal medicines were identified for the treatment of dysmenorrhea and menorrhagia, there was a notable absence of herbal medicines – or any other treatment – listed for endometriosis from traditional sources. Absence of treatments for endometriosis may not reflect naturopathy ignoring this condition but may highlight its ambiguous nature and the historical observations of misdiagnosis noted in history (Nezhat et al., 2012), or may reflect a traditional diagnostic pattern that does not align with conventional diagnosis. Endometriosis is considered to be a relevantly new disease, which is commonly overlooked by conventional health care practitioners (Young et al., 2014) and issues with diagnosis continue to exist. Exploring traditional treatment patterns around symptoms consistent with endometriosis may provide insights into the traditional concept of endometriosis in naturopathic practice and may provide insights into modern endometriosis management.

6.6.6 Limitations

This project is not without limitations. Firstly, the study design has its own disadvantages in terms of its subjective nature and lack of representativeness (Walter, 2006). Some of the included texts and periodicals may have been subject to bias due to the student's educational background in naturopathy. However, there is potential that selective bias may have strengthened the study due to competency in identifying appropriate texts and periodicals for potential inclusion during data collection. As the student is also an Australian trained naturopath, there may have been North American texts or periodicals that were overlooked. However, in instances where this may have occurred, the student collaborated with an American trained naturopath and researcher for guidance in ensuring alignment of the North American text or periodical to the inclusion criteria, where relevant. In addition, this list of naturopathic sources may not be considered an exhaustive list, as some sources may have been missed due to lack of availability at the time of data extraction and many of the traditional periodicals were incomplete volumes or were missing pages. Due to this limitation, the findings may not represent a fully comprehensive list of naturopathic treatments. However, to date, there has been limited exploration and identification of information sources of naturopathic treatments for endometriosis. Whilst this project identifies a robust history of treatments used in dysmenorrhea, menorrhagia, and some cases for endometriosis, it does not provide the details on how this was translated to practice and what occurs in naturopathic practice. As such additional research in this area is warranted. Doing so may identify additional complementary treatments that may be beneficial to women suffering with these reproductive conditions. In addition, as this article describes the treatments recommended for the discussed conditions over a specific time-period, further research investigating the evolution of treatments of these treatments may be warranted to highlight potential new treatments for deeper research examination for dysmenorrhea, menorrhagia, and endometriosis. This research also has implications for education and

practice. For example, some of the treatments may not have been considered as a potential treatment in these reproductive conditions and could be explored from an educational perspective. Additionally, the evidence described in the results of this article may support the implementation or de-implementation of specific treatments due to their diminished presence in contemporary curriculum, and therefore limited potential of being used in clinical practice.

6.6.7 Further research

The findings of this study may prove valuable to naturopathic educators involved in naturopathic curricula as they respond to the demands for naturopaths to engage with EBP. Equally, clinicians may benefit from the deeper understanding of the changing treatment approach over the last 200 years. Our findings may also assist researchers examining the conditions encompassed in the study, by highlighting treatments that warrant closer empirical investigation.

6.7 Conclusion

The findings of this article provide insights into the documented historical and contemporary naturopathic treatments for endometriosis, dysmenorrhea, and menorrhagia. While philosophical principles remain the core of naturopathic practice, the therapeutic armamentarium appears to have changed and several of the original naturopathic treatments appear to have been retained as key elements of treatment for these conditions. Such insights into naturopathic treatments will be of interest to clinicians providing care to women, educators delivering naturopathic training and researchers conducting clinical and health services naturopathic research.

6.8 Chapter summary

The findings of this chapter provide foundational insights into the documented historical and contemporary naturopathic treatments for endometriosis, dysmenorrhea, and menorrhagia. This chapter highlights a wide range of naturopathic treatments that have

been recommended and utilised in both historical and contemporary settings for endometriosis and endometriosis-associated symptom management for the past 200 years. Additionally, the findings indicate that naturopathic treatments are evolving and are influenced by various factors within naturopathy. Further exploration is needed to identify other recommendations from the naturopathic perspective that may be of benefit to women with endometriosis in the contemporary setting. Additional research in this area may uncover and support the continued research evidence-base in identifying novel treatments and collaborative approaches to endometriosis care.

Chapter 7. Multidisciplinary, self-care and dietary recommendations for women with endometriosis: A naturopathic textual analysis

7.1.1 Declaration of authorship

All authors contributed to the conceptualisation and design of the research protocol of this manuscript. RR conducted the data cleaning, data analysis, and interpretation of data with guidance from AS. RR drafted the manuscript. All authors contributed to critically revising the final version to be included in this thesis.

7.2 Chapter introduction

The previous chapter reported on the naturopathic treatments recommended in naturopathic traditional and contemporary information sources. Within the data set of the Phase 2A study, recommendations were also noted for multidisciplinary care, self-care, and dietary approaches in managing endometriosis and endometriosis-associated symptoms. These broad naturopathic recommendations are of particular interest in contemporary settings due to the increase in Australian research that has explored self-care management approaches and the impact of diet on endometriosis (Armour et al., 2021; Armour et al., 2019d). As dietary and lifestyle recommendations are often the first-line of treatment in contemporary naturopathic practice when addressing chronic diseases, there is a need to further explore clinical recommendations in this topic. Further, as some of these recommendations (especially multidisciplinary care and dietary modifications in endometriosis care) also align with the Guideline recommendations in the Australian clinical practice guideline for the diagnosis and management of endometriosis, examination of the traditional and contemporary naturopathic approaches is warranted. To further examine which naturopathic approaches may be used to support women with endometriosis, this chapter details the

additional results of Phase 2A and examines the self-care recommendations for women with endometriosis and endometriosis-associated menstrual symptoms. Additionally, considering the multidisciplinary approach that is being called for in clinical practice guidelines for endometriosis, this chapter details the multidisciplinary recommendations for women with endometriosis through the lens of historical and contemporary naturopathic practice.

7.3 Introduction

Recently, endometriosis has been recognised as a chronic inflammatory reproductive disease that presents with tissue similar to the endometrial lining growing outside of the uterus (Sourial et al., 2014). This disease has comparable prevalence and complexities similar to other chronic diseases known within the community (Horne et al., 2017). Women with endometriosis report experiencing varying symptomology including dysmenorrhea, menorrhagia, chronic pelvic pain, dyspareunia, dyschezia, dysuria, and infertility, which results in negative impacts on women's health and wellbeing (Smolarz et al., 2021). Additionally, stigmatisation of menstrual diseases in general can cause medical dismissal of symptoms and their severity, thus, contributing to the inability to gain a timely diagnosis and appropriate medical care and treatment (Agarwal et al., 2021).

Currently, the single-provider model of care (identified as one health care professional providing exclusive care) faces many challenges in optimising care for women with endometriosis (Agarwal et al., 2019b). The single-provider model is hindered by a lack of coordination, potentially resulting in ineffective treatments, delayed diagnosis and referrals, and a limited patient-centred care approach. These barriers can contribute to women with endometriosis who may use less formal health care services and manage symptomology through self-care practices and dietary modifications (Armour et al., 2019d; Cox et al., 2003b). Given the limitations faced by women in conventional health care for endometriosis management, women are seeking a more holistic approach to

care. Health care-seeking behaviour is a driving force for recommendations for multidisciplinary care in endometriosis management (Agarwal et al., 2021; Agarwal et al., 2019b; Armour et al., 2019d; Grundström et al., 2016). However, there are limited guidelines on how this approach to endometriosis care is to be managed (Allaire et al., 2020) and the long-term effectiveness of multidisciplinary care on patient outcomes remains unknown (Agarwal et al., 2021). While the current model of care for women with endometriosis is provided by a GP or gynecologist, multidisciplinary referrals have many challenges including referrals to CM health care practitioners (Agarwal et al., 2021; Agarwal et al., 2019b).

Naturopathy is a system of traditional medicine practised worldwide and is considered to be one of the largest CM workforces (Leach, 2013) with over 110,000 practising naturopaths in over 108 countries (Lloyd, 2021b). Naturopathy is founded on a patient-centric philosophical framework that encompasses seven naturopathic principles (World Naturopathic Federation, 2017a). Naturopaths apply these philosophical principles in clinical care through naturopathic treatments such as herbal medicine, clinical nutritional medicine, lifestyle and dietary recommendations, mind-body practices, and other treatments that vary across jurisdictions of naturopathic practice (World Naturopathic Federation, 2016). Naturopathic care has a core focus on disease prevention and enhancing self-care capacity, in both acute and chronic disease management, including non-communicable diseases (Steel & Lloyd, 2021) such as reproductive and menstrual disorders and diseases.

Women with reproductive disorders and diseases including endometriosis are known to consult a naturopath to manage endometriosis-associated pain and bothersome symptoms (Fisher et al., 2016a; Fisher et al., 2018; Fisher et al., 2016b; O'Hara et al., 2020; Redmond et al., 2022a). Current research has begun to explore self-care regimes to manage endometriosis, including dietary modifications that may empower women to gain control over their disease through supportive dietary and self-care interventions

(Armour et al., 2019d). Currently, the Australian Endometriosis Clinical Practice Guideline recommends lifestyle and dietary modifications for women with endometriosis, as supported through a gynecologist-led multidisciplinary approach (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). However, collaboration with naturopaths in a multidisciplinary team received minimal attention in the Australian clinical practice guideline for the diagnosis and management of endometriosis. As naturopaths are trained in the delivery of self-care strategies such as lifestyle and dietary recommendations for patients with chronic diseases, and provide multidisciplinary care, exploring what type of multidisciplinary, self-care, and dietary recommendations naturopaths may provide to these women is warranted. In direct response, this study aims to explore the naturopathic knowledge obtained in traditional and contemporary naturopathic texts and periodicals to identify the multidisciplinary, self-care, and dietary recommendations for the management of endometriosis and associated menstrual complaints.

7.4 Materials and methods

A textual analysis was undertaken in 2016 to assess traditional and contemporary naturopathic texts and periodicals (i.e., information sources) identified from naturopathic institutions that are recognised as degree-granting (Australia) and accredited (USA and Canada) institutions. Naturopathic institutions included Endeavour College of Natural Health, Australia; Southern School of Natural Therapies, Australia; Australian College of Natural Therapies, Australia; National University of Natural Medicine, USA; Southwest College of Naturopathic Medicine, USA; Canadian College of Naturopathic Medicine, Canada; and Bastyr University, USA. The methodology in this study has been reported elsewhere (Reid et al., 2019a).

Contemporary texts were identified by assessing the recommended texts at naturopathic institutions in Australia, Canada, and the USA. These texts were sourced from the recommended texts associated with the naturopathic theory, naturopathic clinical

practicum, naturopathic therapeutics, and naturopathic gynaecology subjects from the aforementioned higher education institutions. Contemporary texts were included if they described any naturopathic treatments for the management of endometriosis or endometriosis-associated menstrual complaints including menorrhagia and dysmenorrhea.

Traditional texts were identified from an extensive search of the NUNM library which holds the Friedhelm Kirshfeld Rare Book Collection – the largest repository of rare and traditional texts on naturopathy in North America. A library catalogue search was conducted using the following terms: *women's health* AND *naturopath** OR *herbal medicine* OR *eclectic**. The search employed restrictions to the English language and a year range of 1800 to 1941. The rationale for the year range is based on the 'three generations (75 years)' rule used by the Australian TGA, which is the only regulating body of the included three countries that have a time frame for traditional evidence (Therapeutic Goods Administration, 2021 October). An additional individual search was undertaken at NUNM, using the terms *naturopath**, *herbal medicine*, *eclectic**, and *women's health*. Each search was limited to the same descriptive restrictions. An additional hand search of the Friedhelm Kirshfeld Rare Book Collection was conducted to ensure no relevant texts were overlooked. Traditional texts were included if they were published in one of the three countries, published in 1800 to 1941, and reported on the naturopathic treatments for endometriosis, dysmenorrhea, or menorrhagia. Texts were excluded if there was no clear link between the author's biography and naturopathy, or if the text was not relevant to naturopathy.

Periodicals were identified by conducting a manual search of the Friedhelm Kirshfeld Rare Book Collection, the National Library of Australia, and the State Library of South Australia. These libraries were incorporated due to having a well-regarded collection of naturopathic periodicals that are not accessible in other libraries as well as being statutory deposit reference libraries (National Library of Australia, 2022 February; State

Library of South Australia, 2022 February). Periodicals were included if they reported on the topic, were published in Australia, Canada, or the USA, were published in English, and were published from 1800 to 2016. Periodicals were allocated to either of two categories, traditional if they were published from 1800 to 1941, or contemporary from 1942 to 2016.

7.4.1 Data extraction

All sources were assessed via the title, table of contents (if described), and review of the relevant chapters and articles to ensure relevance to the topic. Data was extracted by reading the included sources and extracting data. The primary data that was extracted involved any reference to naturopathic multidisciplinary care, self-care, or dietary descriptions for the management of endometriosis and endometriosis-associated menstrual symptoms (including dysmenorrhea and menorrhagia). The extracted data was uploaded into the software program NVivo© for textual analysis.

7.4.2 Analysis of text

The texts were analysed through a textual analysis framework (Kuckartz et al., 2014) which extracted data directly from the included sources for coding into NVivo©. The extracted data was coded into categorical parent codes with specific areas of relevance to the topic developed into child nodes in NVivo©. This textual analysis approach allowed for recording themes that were highlighted in the included texts. RR conducted the data extraction and thematic analysis. AS and JW conducted cross checking of coding and textual analysis.

Due to the various descriptions of menstrual complaints, references to '*uterine pain*', '*uterine cramps*', '*menstrual cramps*', and '*painful menstruation*' were extracted and aggregated to the '*dysmenorrhea*' parent node in NVivo©. Descriptions of '*excessive menstruation*' and '*profuse menstruation*' were coded to the '*menorrhagia*' parent node. Any reference to '*endometriosis*' was coded to its parent node.

Multidisciplinary care was coded based on descriptions of suggested recommendations to another health care professional for the purpose of extended care. Self-care practices were identified as any type of care (as described) that could be solely conducted by a woman with endometriosis with minimal health care professional support. Naturopathic dietary recommendations were directly coded from the descriptions. References to a specific dietary recommendation were broadly coded, with child nodes for specific dietary interventions, for example, recommendations for '*vegetable intake*' consisted of multiple child nodes such as '*cruciferous vegetables*'.

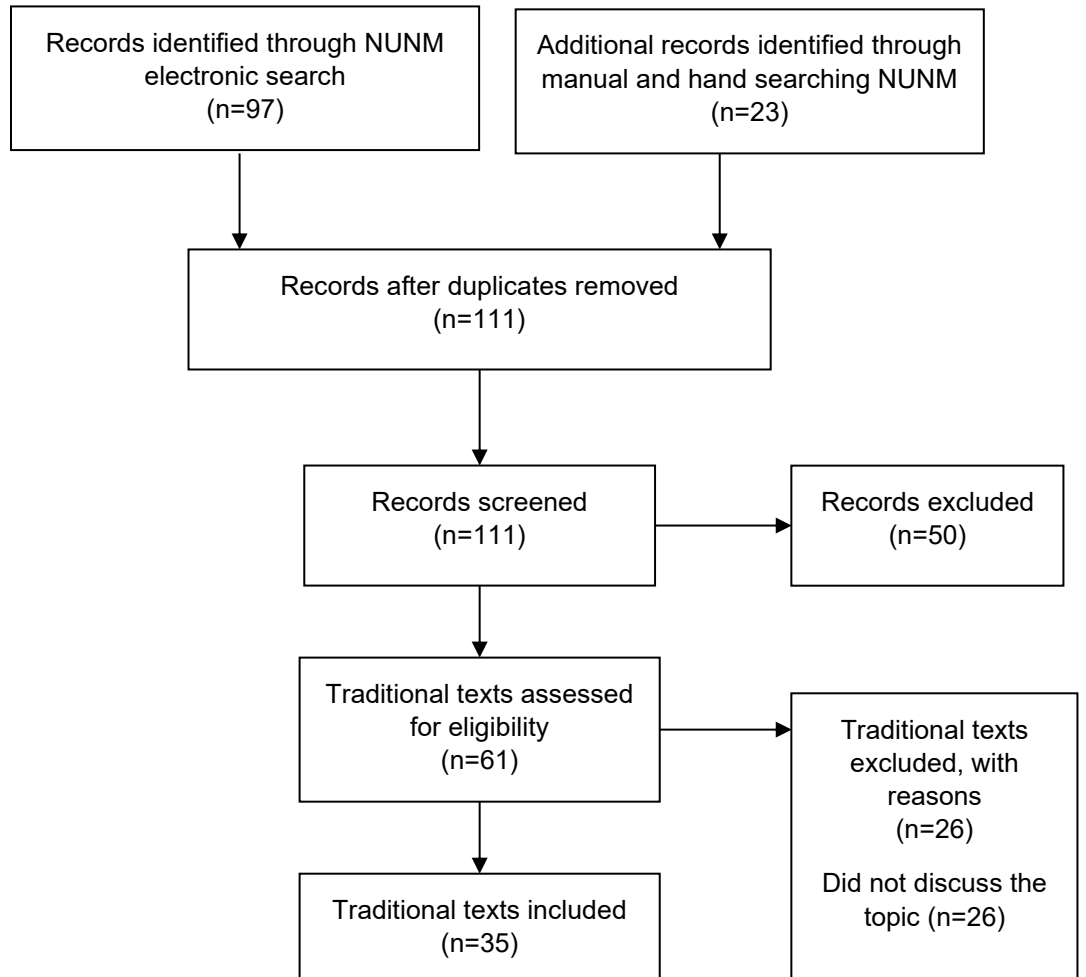
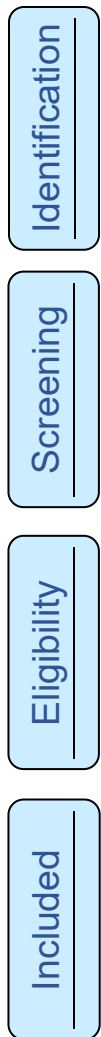
Cross-coding occurred between the menstrual complaints and dietary, self-care and multidisciplinary recommendations were coded for textual analysis.

7.5 Results

7.5.1 Description of sources

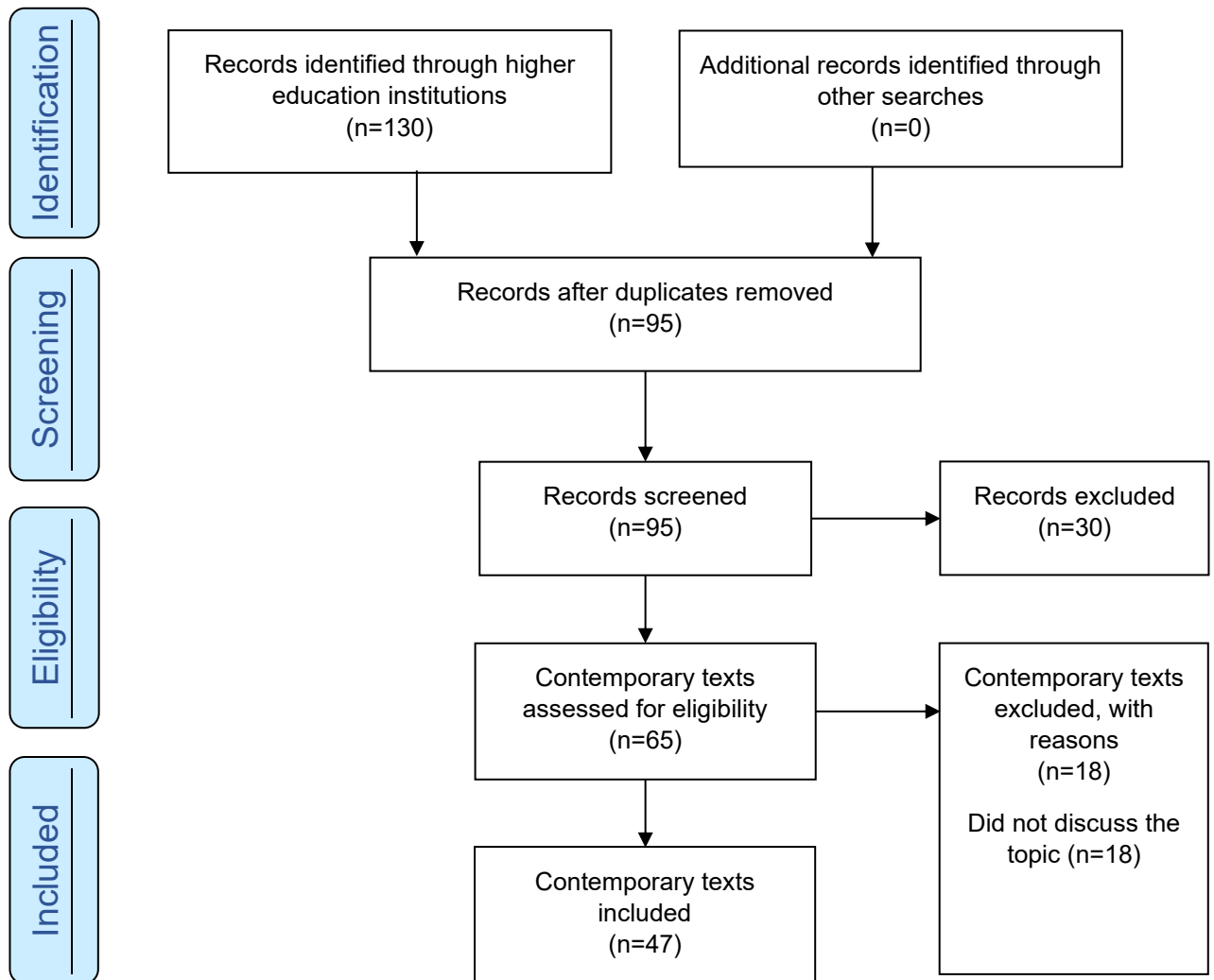
From the NUNM electronic search, a total of n=97 texts were identified with an additional manual search identifying n=18 from the NUNM library catalogue and an additional n=5 from a hand search of the Friedhelm Kirchfeld Rare Book Collection. A total of n=120 traditional texts were assessed for inclusion. Out of the n=120, n=9 were duplicates, n=50 were excluded based on a review of title and/or chapter analysis, and n=25 were excluded for not mentioning any of the three menstrual conditions, leaving n=36 for inclusion. Only n=1 text from the remaining n=36 was excluded due to not providing naturopathic treatments for the included menstrual conditions (i.e., endometriosis and endometriosis-associated symptoms of dysmenorrhea and menorrhagia). A total of n=35 traditional texts were included. Figure 7 reports the selection process for the traditional texts.

Figure 7: Selection process of traditional naturopathic texts reporting multidisciplinary, self-care, and dietary recommendations for the management of endometriosis and endometriosis-associated menstrual complaints.



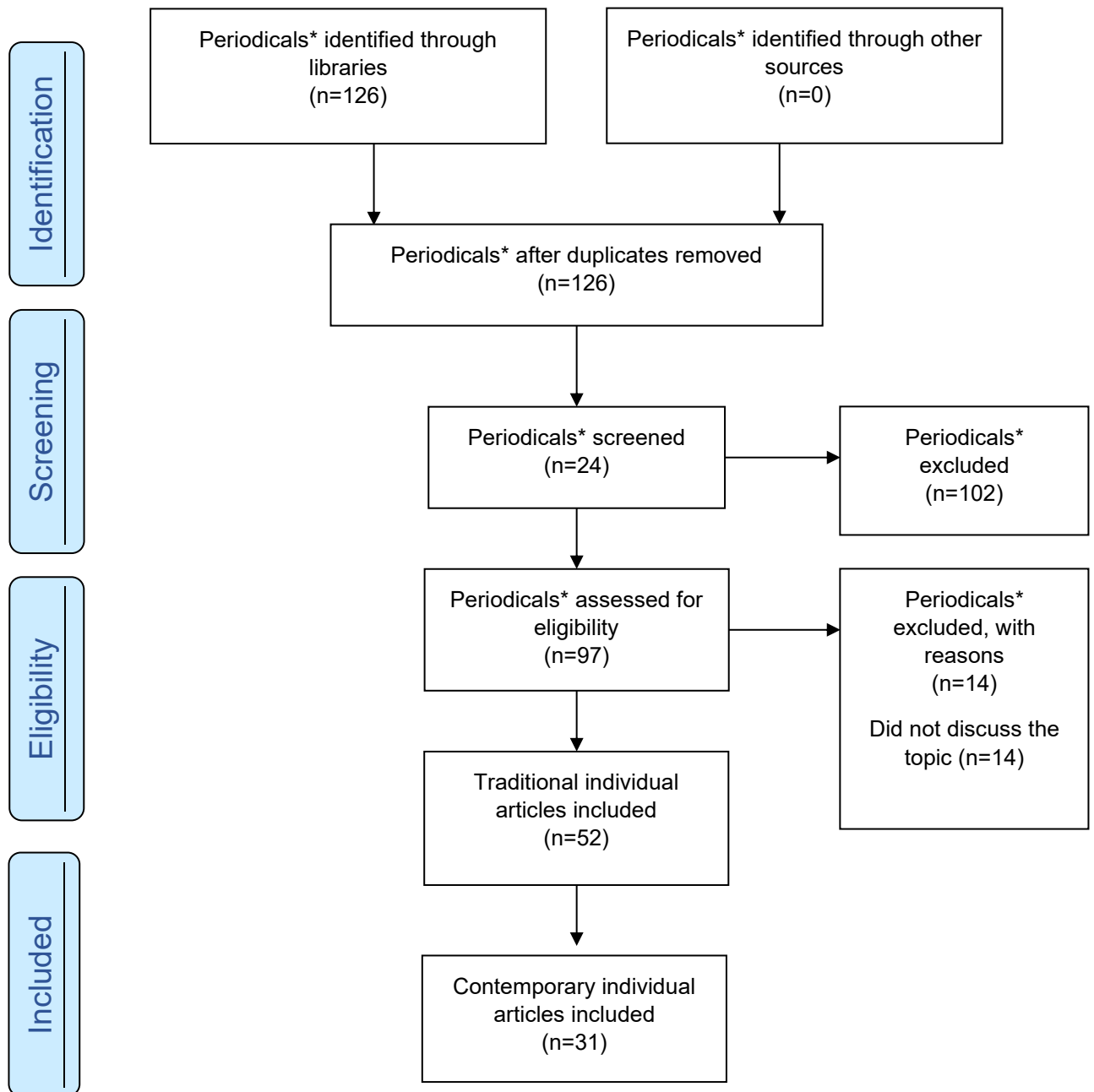
From the educational institutions, a total of n=130 contemporary texts were identified. Thirty-five were duplicates, n=30 were excluded based on a review of the book's description, and n=6 were excluded based on the table of contents, leaving n=59 for assessment. From a review of the chapters, n=12 were excluded for not being relevant to the topic, leaving n=47 for inclusion. Figure 8 reports the selection process for the contemporary texts.

Figure 8: Selection process of contemporary naturopathic texts reporting multidisciplinary, self-care, and dietary recommendations for the management of endometriosis and endometriosis-associated menstrual complaints.



Of the n=126 periodicals assessed by title, n=102 were excluded for not being relevant to naturopathy. The remaining periodicals (n=24) were assessed, which yielded n=97 individual articles for consideration and n=14 were excluded. The remaining n=83 articles were included. The final included periodicals were categorised as 'traditional periodicals' (years 1800-1941) (n=52) or 'contemporary periodicals' (years 1942-2016) (n=31). Figure 9 displays the selection process for the periodicals. In total, n=165 naturopathic sources were included in this study.

Figure 9: Selection process of traditional and contemporary naturopathic periodicals reporting multidisciplinary, self-care, and dietary recommendations for the management of endometriosis and associated menstrual complaints.



*Periodicals refer to periodical title including all available volume and articles.

7.6 Endometriosis

7.6.1 Multidisciplinary care referrals

There were nine multidisciplinary care recommendations for the management of endometriosis and these were only identified in the included contemporary texts. The most common multidisciplinary care referral for endometriosis was acupuncture (n=4) and massage therapy (n=3). The recommendations for multidisciplinary care did not stipulate if a referral was for sole or collaborative care for the management of endometriosis. There were no multidisciplinary care referrals for endometriosis from traditional naturopathic sources from 1800 to 1941.

7.6.2 Self-care practices

There were nine self-care practice recommendations for endometriosis across the included contemporary sources. The most reported self-care recommendations in the contemporary sources were exercise (e.g., stretching, regular exercise) (n=7), avoiding environmental toxins (e.g., plastics, pesticides, chemicals, toxic metals) (n=4), and using abdominal castor oil packs (n=3). There were no recommendations for any self-care practices from the included naturopathic traditional sources.

7.6.3 Dietary recommendations

There were 35 dietary recommendations for endometriosis, all of which were found in contemporary sources. The most frequently reported dietary recommendation for endometriosis was to regularly consume vegetables (e.g., cauliflower, brussels sprouts, carrots, kale, spinach, broccoli, beets, artichoke, *Brassicaceae* family vegetables) (n=17). Additional dietary recommendations for endometriosis also included consuming nuts and seeds (n=12) (e.g., hemp seeds, flaxseed, macadamias, psyllium), increasing dietary fibre (n=11), avoiding caffeine intake (n=10), and avoiding sugar (n=9).

Table 12: Self-care and multidisciplinary recommendations for endometriosis management based on traditional and contemporary naturopathic sources.

Endometriosis	
Recommended treatments	Contemporary recommendations²
Multidisciplinary recommendations	
Acupuncture	(n=4) (Roxon, 1984); (Micozzi & Lowdog, 2004); (Northrup, 2006); (Sarris & Wardle, 2014)
Chiropractor	(n=1) (Micozzi & Lowdog, 2004)
Counselling	(n=2) (Roxon, 1984); (Romm, 2010)
Homeopathy	(n=1) (Roxon, 1984)
Massage therapy	(n=3) (Roxon, 1984); (Micozzi & Lowdog, 2004); (Northrup, 2006)
Osteopathy	(n=1) (Micozzi & Lowdog, 2004)
Qi Gong/Tai Chi	(n=2)

² Self-care and multidisciplinary recommendations for endometriosis management based on traditional and contemporary naturopathic sources only demonstrated evidence in contemporary sources.

	(Micozzi & Lowdog, 2004); (Sarris & Wardle, 2014)
Traditional Chinese Medicine	(n=1) (Sarris & Wardle, 2014)
Yoga	(n=1) (Micozzi & Lowdog, 2004)
Self-care practices	
Avoid environmental toxins (e.g., plastics, pesticides, chemicals, toxic metals)	(n=4) (Ostrzenski, 2002); (Kaur et al., 2005)
Castor oil packs	(n=3) (Kaur et al., 2005); (Northrup, 2006); (Marchese, 2011)
Colonics	(n=1) (Marchese, 2011)
Emotional support	(n=1) (Trickey, 2011)
Exercise (e.g., stretching, regular exercise)	(n=7) (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Kirschmann, 2007); (Romm, 2010); (Trickey, 2011); (Sarris & Wardle, 2014)
Meditation	(n=2) (Kaur et al., 2005)

Pregnancy	(n=1) (Atkinson, 1982)
Sauna for detoxification	(n=1) (Kaur et al., 2005)
Weight management	(n=1) (Trickey, 2011)
Dietary recommendations	
Avoid alcohol	(n=6) (Gladstar, 1993); (Ostrzenski, 2002); (Kaur et al., 2005); (Hudson, 2008); (Marchese, 2011); (Murray & Pizzorno, 2012)
Avoid animal products (e.g., red meat, eggs)	(n=8) (Kaur et al., 2005); (Northrup, 2006); (Kirschmann, 2007); (Hudson, 2008); (Marchese, 2011); (Murray & Pizzorno, 2012); (Pizzorno et al., 2016)
Avoid caffeine	(n=10) (Gladstar, 1993); (Ostrzenski, 2002); (Kaur et al., 2005); (Northrup, 2006);

	<p>(Kirschmann, 2007);</p> <p>(Hudson, 2008);</p> <p>(Trickey, 2011);</p> <p>(Murray & Pizzorno, 2012);</p> <p>(Pizzorno et al., 2016)</p>
Avoid dairy	<p>(n=6)</p> <p>(Northrup, 2006);</p> <p>(Kirschmann, 2007);</p> <p>(Hudson, 2008);</p> <p>(Marchese, 2011);</p> <p>(Murray & Pizzorno, 2012)</p>
Avoid fats (e.g., trans-saturated fats, saturated fats)	<p>(n=5)</p> <p>(Ostrzenski, 2002);</p> <p>(Northrup, 2006);</p> <p>(Trickey, 2011);</p> <p>(Murray & Pizzorno, 2012)</p>
Avoid salt	<p>(n=1)</p> <p>(Kirschmann, 2007)</p>
Avoid sugar	<p>(n=9)</p> <p>(Gladstar, 1993);</p> <p>(Ostrzenski, 2002);</p> <p>(Kaur et al., 2005);</p> <p>(Kirschmann, 2007);</p> <p>(Hudson, 2008);</p> <p>(Prousky, 2008);</p> <p>(Marchese, 2011);</p> <p>(Murray & Pizzorno, 2012);</p>

	(Prousky, 2012)
Consume culinary herbs and spices (e.g., turmeric, ginger)	(n=3) (Kaur et al., 2005); (Hudson, 2008)
Consume dairy	(n=1) (Kirschmann, 2007)
Consume fruit (e.g., apricots, cantaloupes, citrus fruits)	(n=5) (Kirschmann, 2007); (Trickey, 2011); (Pizzorno et al., 2016)
Consume herbal teas (e.g., dandelion, green tea, rooibos)	(n=2) (Atkinson, 1982); (Marchese, 2011)
Consume juice (e.g., carrot, pomegranate)	(n=2) (Kirschmann, 2007); (Marchese, 2011)
Consume legumes (e.g., beans, peas)	(n=3) (Ostrzenski, 2002); (Kirschmann, 2007)
Consume meat products (e.g., turkey, chicken, liver)	(n=5) (Ostrzenski, 2002); (Kirschmann, 2007); (Marchese, 2011)
Consume nuts and seeds (e.g., hemp seeds, flaxseed, macadamias, psyllium)	(n=12) (Ostrzenski, 2002); (Kaur et al., 2005); (Northrup, 2006);

	<p>(Hudson, 2008);</p> <p>(Marchese, 2011);</p> <p>(Trickey, 2011);</p> <p>(Murray & Pizzorno, 2012);</p> <p>(Sarris & Wardle, 2014)</p>
Consume oils (e.g., grain oils, seed oils)	<p>(n=1)</p> <p>(Kirschmann, 2007)</p>
Consume organic foods	<p>(n=1)</p> <p>(Hudson, 2008)</p>
Consume phyto-oestrogens (e.g., soy, lentils, flaxseed)	<p>(n=1)</p> <p>(Sarris & Wardle, 2014)</p>
Consume seafood (e.g., salmon, cold water fish)	<p>(n=8)</p> <p>(Ostrzenski, 2002);</p> <p>(Micozzi & Lowdog, 2004);</p> <p>(Kaur et al., 2005);</p> <p>(Northrup, 2006);</p> <p>(Kirschmann, 2007);</p> <p>(Hudson, 2008);</p> <p>(Marchese, 2011);</p> <p>(Pizzorno et al., 2016)</p>
Consume soy-based foods (e.g., tofu)	<p>(n=5)</p> <p>(Ostrzenski, 2002);</p> <p>(Kirschmann, 2007);</p> <p>(Murray & Pizzorno, 2012);</p> <p>(Sarris & Wardle, 2014)</p>
Consume vegetables (e.g., cauliflower, brussels)	<p>(n=17)</p> <p>(Ostrzenski, 2002);</p>

sprouts, carrots, kale, spinach, broccoli, beets, artichoke, <i>Brassicaceae</i> family vegetables)	(Micozzi & Lowdog, 2004); (Kirschmann, 2007); (Hudson, 2008); (Marchese, 2011); (Trickey, 2011); (Murray & Pizzorno, 2012); (Sarris & Wardle, 2014); (Pizzorno et al., 2016)
Consume water	(n=1) (Ostrzenski, 2002)
Consume whole foods	(n=1) (Gladstar, 1993)
Consume whole grains	(n=4) (Ostrzenski, 2002); (Kirschmann, 2007); (Marchese, 2011); (Murray & Pizzorno, 2012)
Decrease caloric intake	(n=1) (Marchese, 2011)
Decrease chocolate intake	(n=1) (Ostrzenski, 2002)
Decrease inflammatory foods	(n=1) (Pizzorno & Murray, 2012)
Decrease processed foods	(n=1) (Gladstar, 1993)
Diet specific – Antioxidant diet	(n=1) (Prousky, 2012)

Diet specific – FODMAP diet	(n=1) (Sarris & Wardle, 2014)
Diet specific – High essential fatty acid diet (e.g., high omega 3 foods)	(n=4) (Micozzi & Lowdog, 2004); (Trickey, 2011); (Pizzorno & Murray, 2012)
Diet specific – Low fat diet	(n=4) (Prousky, 2008); (Trickey, 2011); (Murray & Pizzorno, 2012); (Prousky, 2012)
Diet specific – Oligoantigenic diet	(n=2) (Prousky, 2008); (Prousky, 2012)
Diet specific – Vegetarian	(n=2) (Hudson, 2008); (Kirschmann, 2007)
Increase dietary fibre	(n=11) (Micozzi & Lowdog, 2004); (Kaur et al., 2005); (Osiecki, 2006); (Kirschmann, 2007); (Hudson, 2008); (Prousky, 2008); (Trickey, 2011); (Murray & Pizzorno, 2012); (Pizzorno & Murray, 2012);

	(Prousky, 2012); (Pizzorno et al., 2016)
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7.7 Dysmenorrhea

7.7.1 Multidisciplinary care referrals

Multidisciplinary care referrals for the management of dysmenorrhea were described across 11 contemporary recommendations and three traditional recommendations. Multidisciplinary care referrals for dysmenorrhea were primarily reported for referrals to a massage therapist (n=11), an acupuncturist (n=6), a chiropractor (n=4), and an osteopath (n=4) in the contemporary sources. Multidisciplinary care referrals for dysmenorrhea reported in the traditional sources were only for referrals to osteopaths (n=2).

7.7.2 Self-care practices

A total of 31 self-care practices for the management of dysmenorrhea were described across all sources. The most common were exercise (e.g., stretching, yoga, walking) (n=11), aromatherapy (e.g., chamomile, clary sage, rose, lavender, cypress, jasmine, juniper, marjoram, lemon balm, lemongrass, fennel, caraway, peppermint) (n=7), heat packs (e.g., for lower back area, pelvic area, and abdominal area) (n=5), meditation (n=5), and poultices (n=5); all of which were reported within the contemporary sources. The most reported traditional self-care practices for dysmenorrhea were exercise (e.g., stretching, yoga, walking) (n=4) and emotional health adjustments (e.g., reducing strong negative emotions, encouraging happiness) (n=3).

7.7.3 Dietary recommendations

Dietary recommendations were reported for dysmenorrhea from contemporary (n=31) and traditional (n=9) sources. The most common dietary recommendations for

dysmenorrhea from contemporary sources included consuming seafood (e.g., oily fish, bony fish, cold water fish) (n=4), consuming vegetables (e.g., green leafy vegetables) (n=4), avoiding caffeine (n=3), avoiding dietary fats (e.g., trans-saturated fats, saturated fats) (n=3), consuming fruits (n=3), and increasing calcium-rich foods (n=3). Traditional dietary recommendations for dysmenorrhea included avoiding stimulating foods (e.g., eating a plain, bland diet) (n=2) and consuming fruit (e.g., apricots, cantaloupes, citrus fruits) (n=2).

Table 13: Self-care and multidisciplinary recommendations for dysmenorrhea management based on traditional and contemporary naturopathic sources.

Dysmenorrhea		
Recommended treatments	Traditional recommendations	Contemporary recommendations
Multidisciplinary recommendations		
Acupuncture	-	(n=6) (Wharton, 1995a); (Ostrzenski, 2002); (Micozzi & Lowdog, 2004); (Northrup, 2006); (Leach, 2010); (Trickey, 2011)
Chiropractor	-	(n=4) (Wharton, 1995a); (Micozzi & Lowdog, 2004); (Leach, 2010); (Trickey, 2011)
Counselling	(n=1)	-

	(Tilden, 1912)	
Homeopathy	-	(n=2) (Northrup, 2006); (Leach, 2010)
Hypnosis	-	(n=1) (Ostrzenski, 2002)
Manipulative therapy	(n=1) (Milton, 1941)	(n=1) (Ostrzenski, 2002)
Massage therapy	-	(n=11) (Byle, 1960); (Unknown, 1981a); (Ostrzenski, 2002); (Kaur et al., 2005); (Northrup, 2006); (Braun & Cohen, 2010); (Leach, 2010); (Romm, 2010); (Trickey, 2011)
Maya traditional medicine	-	(n=1) (Northrup, 2006)
Osteopathy	(n=2) (Stretch, 1916b); (Stretch, 1916a)	(n=5) (Wharton, 1995a); (Ostrzenski, 2002); (Leach, 2010); (Trickey, 2011)
Qi Gong/Tai Chi	-	(n=1) (Wharton, 1995a)

Reflexology	-	(n=1) (Leach, 2010)
Yoga	-	(n=3) (Wharton, 1995a); (Kaur et al., 2005); (Romm, 2010)
Self-care practices		
Aromatherapy (e.g., chamomile, clary sage, rose, lavender, cypress, jasmine, juniper, marjoram, lemon balm, lemongrass, fennel, caraway, peppermint)	-	(n=7) (Unknown, 1981a); (Wharton, 1996); (Weiss, 2001); (Braun & Cohen, 2010); (Leach, 2010); (Trickey, 2011); (Bone & Mills, 2013)
Avoid environmental toxins (e.g., endocrine disruptors)	-	(n=1) (Hechtman, 2013)
Avoid excitement (e.g., strong emotions, sexual arousal, sexual intercourse, sudden changes, chills, fevers, fatigue)	(n=2) (Goss, 1885); (Lust, 1939)	-
Avoid pharmaceutical drugs	(n=1) (Lust, 1939)	-

Avoid sexual intercourse when menstruating	-	(n=1) (Hechtman, 2013)
Avoid social activities	(n=1) (Tilden, 1912)	-
Avoid tight clothing (e.g., corsets)	(n=2) (Tilden, 1912); (Stretch, 1916b)	-
Avoid the use of tampons	-	(n=1) (Hechtman, 2013)
Breathing exercises	-	(n=1) (Kaur et al., 2005)
Castor oil packs (e.g., to the abdominal area)	-	(n=1) (Northrup, 2006)
Cold pack (e.g., on bladder)	(n=2) (Lust, 1939); (Milton, 1941)	-
Colonics	(n=2) (Howard, 1833b); (Stretch, 1916b)	-
Electrical stimulation (e.g., faradism -- alternating electrical currents)	(n=2) (Webster et al., 1898); (Juettner, 1916)	(n=1) (Ostrzenski, 2002)
Emotional health adjustments (e.g., reduce strong negative	(n=3) (Tilden, 1912); (Stretch, 1916b);	-

emotions, encourage happiness)	(Lust, 1939)	
Exercise (e.g., stretching, yoga, walking)	(n=4) (Brown, 1880); (Tilden, 1912); (Stretch, 1916b); (Lust, 1939)	(n=11) (Rowland, 1986); (Wharton, 1996); (Ostrzenski, 2002); (Kaur et al., 2005); (Northrup, 2006); (Osiecki, 2006); (Hudson, 2008); (Romm, 2010); (Hechtman, 2013)
Exposure to fresh air	(n=2) (Stretch, 1916b); (Lust, 1939)	-
Heat packs (e.g., for lower back area, pelvic area, and abdominal area)	(n=2) (Lust, 1939); (Milton, 1941)	(n=5) (Gladstar, 1993); (Ostrzenski, 2002); (Kaur et al., 2005); (Gladstar, 2008); (Trickey, 2011)
Keep feet dry	(n=1) (Goss, 1885)	-
Marriage	(n=1) (Lust, 1939)	-
Meditation	-	(n=5) (Wharton, 1995a);

		(Ostrzenski, 2002); (Leach, 2010); (Romm, 2010)
Orgasm	-	(n=1) (Trickey, 2011)
Poultices	-	(n=5) (Frawley & Lad, 1986); (Boyle & Saine, 1988); (Gladstar, 2008); (Romm, 2010); (Gladstar, 2012)
Pregnancy	(n=1) (Lust, 1939)	-
Quit smoking	(n=1) (Lust, 1939)	(n=2) (Trickey, 2011); (Hechtman, 2013)
Reduce stress	-	(n=3) (Northrup, 2006); (Romm, 2010); (Trickey, 2011)
Rest	(n=1) (Lust, 1939)	-
Room temperature foods	-	(n=1) (Trickey, 2011)
Skin brushing	(n=1) (Melendy, 1926)	-

Sleep hygiene practices	(n=1) (Melendy, 1926)	-
Small meal portions	-	(n=1) (Wharton, 1996)
Sunshine	(n=1) (Lust, 1939)	-
Dietary recommendations		
Avoid alcohol	(n=1) (Lust, 1939)	(n=2) (Ostrzenski, 2002); (Hechtman, 2013)
Avoid animal products (e.g., red meat, egg yolks)	-	(n=1) (Northrup, 2006)
Avoid caffeine	(n=1) (Lust, 1939)	(n=3) (Wharton, 1996); (Ostrzenski, 2002); (Hechtman, 2013)
Avoid cold temperature foods and beverages	(n=1) (Melendy, 1926)	(n=1) (Gladstar, 2008)
Avoid dairy	-	(n=2) (Ostrzenski, 2002); (Northrup, 2006)
Avoid dietary fats (e.g., trans-saturated fats, saturated fats)	-	(n=3) (Ostrzenski, 2002); (Northrup, 2006); (Hechtman, 2013)

Avoid grains (e.g., wheat)	-	(n=2) (Ostrzenski, 2002); (Northrup, 2006)
Avoid salt	-	(n=2) (Wharton, 1996); (Ostrzenski, 2002)
Avoid soy-based foods	-	(n=1) (Hechtman, 2013)
Avoid stimulating foods	(n=2) (Melendy, 1926); (Lust, 1939)	-
Avoid sugar	-	(n=2) (Ostrzenski, 2002); (Hechtman, 2013)
Avoid white foods	-	(n=1) (Northrup, 2006)
Consume dairy	(n=1) (Lust, 1939)	(n=1) (Wharton, 1995a)
Consume fruit (e.g., apricots, cantaloupes, citrus fruits)	(n=2) (Stretch, 1916a); (Lust, 1939)	(n=3) (Unknown, 1981b); (Ostrzenski, 2002); (Northrup, 2006)
Consume herbal teas (e.g., dandelion)	-	(n=1) (Atkinson, 1982)
Consume juice (e.g., blueberry, orange)	(n=1) (Lust, 1939)	(n=1) (Ostrzenski, 2002)

Consume legumes	-	(n=1) (Ostrzenski, 2002)
Consume meat products (e.g., lean meats)	-	(n=1) (Northrup, 2006)
Consume nuts and seeds (e.g., almonds, sesame, psyllium)	-	(n=3) (Frawley & Lad, 1986); (Wharton, 1995a); (Kaur et al., 2005)
Consume seafood (e.g., oily fish, bony fish, cold water fish)	-	(n=4) (Wharton, 1995a); (Ostrzenski, 2002); (Romm, 2010); (Sarris & Wardle, 2014)
Consume starchy foods	-	(n=1) (Wharton, 1996)
Consume vegetables (e.g., green leafy vegetables)	(n=1) (Lust, 1939)	(n=4) (Wharton, 1995a); (Ostrzenski, 2002); (Northrup, 2006)
Consume water	(n=1) (Stretch, 1916a)	-
Consume whole grains	-	(n=1) (Ostrzenski, 2002)
Decrease caloric intake	-	(n=1) (Sarris & Wardle, 2014)

Decrease processed foods	-	(n=1) (Northrup, 2006)
Diet specific – Anti-inflammatory diet	-	(n=2) (Romm, 2010); (Hechtman, 2013)
Diet specific – Antioxidant diet	-	(n=1) (Hechtman, 2013)
Diet specific – High essential fatty acid diet (e.g., high omega 3 foods)	-	(n=1) (Hechtman, 2013)
Diet specific – Low fat diet	-	(n=1) (Leach, 2010)
Diet specific – Vegetarian	-	(n=1) (Sarris & Wardle, 2014)
Increase calcium rich foods	-	(n=3) (Gladstar, 1993); (Gladstar, 2008); (Hudson, 2008)
Increase dietary fibre	-	(n=1) (Hechtman, 2013)

7.8 Menorrhagia

7.8.1 Multidisciplinary care referrals

Across all three menstrual complaints, menorrhagia had the least reported multidisciplinary care referrals with only four recommendations across all sources.

Massage therapists (n=3) were the most reported multidisciplinary care referrals for menorrhagia. The recommendations for massage therapy for menorrhagia were only reported in traditional sources and did not stipulate if a multidisciplinary care referral was for sole or collaborative care for the management of menorrhagia. Multidisciplinary care referrals recommended in the contemporary texts were for acupuncture (n=1), Qi Gong/Tai Chi (n=1), and TCM (n=1).

7.8.2 Self-care practices

There were 13 self-care practice recommendations for menorrhagia described in the traditional and contemporary sources. The most common self-care practice recommendation drawn from contemporary sources was exercise (e.g., stretching) (n=3). Self-care practice recommendations from traditional sources included rest (e.g., recumbent posture in a cold quiet room) (n=3), avoiding excitement (e.g., strong emotions, sexual arousal, sexual intercourse, sudden changes, chills, fevers, fatigue) (n=2), electrical stimulation (e.g., faradism – alternating electrical currents) (n=2), and exercise (e.g., stretching) (n=2) to manage menorrhagia.

7.8.3 Dietary recommendations

There were 22 dietary recommendations for the management of menorrhagia across the traditional (n=9) and contemporary sources (n=16). The most common dietary recommendations from the traditional sources for menorrhagia were avoiding stimulating foods (e.g., eating a plain, bland diet) (n=4) and consuming whole grains (n=2). Commonly reported contemporary dietary recommendations for menorrhagia included consuming vegetables (e.g., lettuce, onions, seaweed, green leafy vegetables) (n=10), consuming fruit (e.g., pineapples, citrus fruits) (n=4), and consuming culinary herbs and spices (e.g., turmeric, garlic, cumin) (n=4).

Table 14: Self-care and multidisciplinary recommendations for menorrhagia management evident in traditional and contemporary naturopathic sources.

Menorrhagia		
Recommended treatments	Traditional recommendations	Contemporary recommendations
Multidisciplinary recommendations		
Acupuncture	-	(n=1) (Sarris & Wardle, 2014)
Massage therapy (e.g., abdominal massage, vaginal massage, uterine compression massage)	(n=3) (Juettner, 1916); (Juettner, 1919)	-
Qi Gong/Tai Chi	-	(n=1) (Sarris & Wardle, 2014)
Traditional Chinese Medicine	-	(n=1) (Sarris & Wardle, 2014)
Self-care practices		
Aromatherapy (e.g., cinnamon)	-	(n=1) (Pizzorno et al., 2016)
Avoid excitement (e.g., strong emotions, sexual arousal, sexual intercourse, sudden changes, chills, fevers, fatigue)	(n=2) (Scudder, 1881); (Watkins, 1895)	-
Avoid the use of tampons	-	(n=1)

		(Kaur et al., 2005)
Electrical stimulation (e.g., faradism - alternating electrical currents)	(n=2) (Juettner, 1916); (Juettner, 1919)	-
Emotional health adjustments (e.g., reduce strong negative emotions, encourage happiness)	-	(n=1) (Kaur et al., 2005)
Exercise (e.g., stretching)	(n=2) (Scudder, 1881); (Riggs, 1937)	(n=3) (Ostrzenski, 2002); (Trickey, 2011); (Sarris & Wardle, 2014)
Exposure to open fresh air	(n=1) (Scudder, 1881)	-
Quit smoking	-	(n=1) (Kaur et al., 2005)
Rest (e.g., recumbent posture in a cold quiet room)	(n=3) (Scudder, 1881); (Watkins, 1895); (Tilden, 1912)	-
Slant iron board therapy	(n=1) (Riggs, 1937)	-
Use gauze tampons	(n=1) (Juettner, 1919)	-

Use saunas (e.g., for detoxification)	-	(n=1) (Kaur et al., 2005)
Wear cotton underwear	(n=1) (Tilden, 1912)	-
Dietary recommendations		
Avoid fats (e.g., saturated fats)	-	(n=2) (Trickey, 2011); (Pizzorno et al., 2016)
Avoid stimulating foods (e.g., plain bland foods)	(n=4) (Scudder, 1881); (Tilden, 1912); (Kuhne, 1917)	-
Consume animal products (e.g., eggs, beef)	(n=1) (Stockdale, 1936)	-
Consume culinary herbs and spices (e.g., turmeric, garlic, cumin)	-	(n=4) (Kaur et al., 2005); (Pizzorno et al., 2016)
Consume dairy (e.g., cheese, milk)	(n=1) (Riggs, 1937)	-
Consume fruit (e.g., pineapples, citrus fruits)	(n=1) (Stockdale, 1936)	(n=4) (Gladstar, 1993); (Pizzorno et al., 2016)
Consume herbal teas (e.g., dandelion)	-	(n=1) (Atkinson, 1982)
Consume jelly	(n=1) (Riggs, 1937)	-

Consume juice (e.g., orange juice, tomato juice)	(n=1) (Riggs, 1937)	-
Consume molasses	-	(n=1) (Kaur et al., 2005)
Consume nuts and seeds (e.g., flaxseeds)	-	(n=1) (Sarris & Wardle, 2014)
Consume phyto-oestrogens (e.g., soy)	-	(n=2) (Trickey, 2011); (Sarris & Wardle, 2014)
Consume seafood (e.g., clams, oysters, shrimp, halibut, mackerel, trout)	(n=1) (Stockdale, 1936)	(n=1) (Pizzorno et al., 2016)
Consume vegetables (e.g., lettuce, onions, seaweed, green leafy vegetables)	(n=1) (Stockdale, 1936)	(n=10) (Gladstar, 1993); (Kaur et al., 2005); (Gladstar, 2008); (Sarris & Wardle, 2014); (Pizzorno et al., 2016)
Consume whole grains	(n=2) (Stockdale, 1936)	-
Decrease inflammatory foods	-	(n=1) (Pizzorno & Murray, 2012)
Decrease processed foods	-	(n=1) (Gladstar, 1993)
Diet specific – Anti-inflammatory diet	-	(n=1) (Pizzorno & Murray, 2012)

Diet specific – FODMAP diet	-	(n=1) (Sarris & Wardle, 2014)
Diet specific – High essential fatty acid diet (e.g., high omega 3 foods)	-	(n=1) (Pizzorno et al., 2016)
Diet specific – Low fat diet	-	(n=1) (Trickey, 2011)
Increase dietary fibre	-	(n=1) (Trickey, 2011)

7.9 Discussion

This study presents empirical evidence of the traditional and contemporary naturopathic multidisciplinary, self-care, and dietary recommendations for the management of endometriosis, dysmenorrhea, and menorrhagia through the exploration of naturopathic information sources. Firstly, this study identified that naturopathic sources recommend a variety of self-care practices to support women with endometriosis, dysmenorrhea, and menorrhagia. Consistent evidence indicates that there is a need to provide self-management strategies including dietary and lifestyle recommendations to patients who are diagnosed with a chronic disease and this aspect of care is a vital component of contemporary health care delivery that can be overlooked (Allegrante et al., 2019; Lawless et al., 2023; Rees & Williams, 2009). Research in self-care practices is particularly relevant for individuals with chronic diseases for whom lifelong disease management can have a direct impact on their health outcomes (Eller et al., 2018). Self-care management strategies for women’s menstrual disorders are gaining research attention, which includes supporting women to feel empowered and provide a sense of control in managing their symptoms (Armour et al., 2016; Armour et al., 2019d; Armour

et al., 2019e). Some of the self-care strategies identified in our study may have a supportive role in reducing experiences of dysmenorrhea, especially exercise (Armour et al., 2019a) which can reduce the intensity of menstrual pain (Armour et al., 2019a) and improve QoL (Armour et al., 2019c; Daley, 2008). In our study, exercise was consistently reported for all three menstrual complaints. The impact of exercise as a therapeutic strategy in dysmenorrhea has been evaluated to increase protective effects in reducing elevated inflammatory processes that may contribute to menstrual pain and endometriosis disease progression (Hansen et al., 2021). Some studies have identified that exercise may be beneficial in decreasing menstrual pain associated with endometriosis as well as related comorbidities including anxiety, depression, and pharmaceutical side effects (Armour et al., 2019e; Hansen et al., 2021; Mira et al., 2018). However, while these results are promising, the methodological limitations of these reported studies need to be considered such as low sample size, insufficient information to determine bias risk, and varying outcome measures (Hansen et al., 2021; Mira et al., 2018).

Our study acknowledges that some of the self-care practices recommended for endometriosis, dysmenorrhea, and menorrhagia are outdated approaches and reflect the prevailing views at the time the texts were written. For example, recommending pregnancy for women with endometriosis was identified in a source published in 1982 (Atkinson, 1982). Although historically a common recommendation in conventional medicine, this recommendation is now recognised in contemporary literature as misaligning with patient-centred care and pushes women into pregnancy in the hope of a cure for endometriosis (Young et al., 2016). Additionally, there are no clinical guidelines for pregnancy as a treatment option for women with endometriosis nor evidence of its effectiveness in disease management (Young et al., 2016). Similarly, the recommendations of avoiding excitement (e.g., strong emotions, sexual arousal, sexual intercourse, sudden changes, chills, fevers, fatigue) for the management of

dysmenorrhea and menorrhagia may be attributed to outdated practices that involved isolating women during their menstrual cycle (Nezhat et al., 2012). Recommendations of 'avoiding excitement' may align with the early nature cure movement and hygienists that focus on moral hygiene as well as physical hygiene (Whorton, 2000; Whorton, 2004). Nevertheless, some of the self-care recommendations identified in our study including exercise, yoga, and meditation have received further research attention to support women with menstrual complaints (Evans et al., 2019; Mira et al., 2018). As such examining historical applications may offer insights into identifying therapies and practices that warrant future research.

In our study, dietary recommendations such as high consumption of fruits, vegetables, and seafood products were the most prominent recommendations for all three of the included menstrual complaints. Therapeutic dietary strategies have been shown to influence the menstruation cycle by modulating metabolism pathways in steroidogenesis which has implications for the functioning of the menstrual cycle and the exacerbation of abnormal menstrual complaints (Draper et al., 2018). The importance of nutrition through dietary intake has gained recent attention due to the potential for a healthy diet to positively impact metabolic pathways implicated in endometriosis such as inflammation, oestrogen activity, prostaglandin activity, and menstrual cycle regulation (Parazzini et al., 2013). For instance, certain dietary habits such as regular consumption of fruits and vegetables may support the reduction of oestrogen activity (Fernández-Martínez et al., 2018) which may be beneficial in endometriosis disease progression by altering pathways related to the proliferation, vascularisation, and development of endometrial lesions (Parazzini et al., 2013). Other research has identified the activity of fruits and vegetables in reducing free circulating oestrogens, thus decreasing the reabsorption of free oestrogen in the colon due to the presence of dietary fibre (Gaskins et al., 2009).

As evident in our study, consuming fruit and vegetables and increasing dietary fibre were recommended for the management of all three menstrual complaints. Increasing fibre

through fruit and vegetable intake may be indicative of naturopaths targeting pathophysiology to support known mechanisms implicated in disease presentation (Hansen & Knudsen, 2013). Increasing seafood products in cases of dysmenorrhea and consuming nuts and seeds for endometriosis management were also evident in our study. As inflammatory processes are regarded as an inducer and progressive factor associated with endometriosis risk and pathophysiology, using modifiable dietary factors such as consuming foods high in omega-3 fatty acids (e.g., seafood, nuts, seeds) (Saini & Keum, 2018) may potentially have an anti-inflammatory effect on endometriosis and dysmenorrhoea. Consequently, there is hypothetical reasoning that such modifiable dietary factors may contribute to a reduction in dysmenorrhoea due to the decrease in prostaglandin activity (Fernández-Martínez et al., 2018; Fjerbæk & Knudsen, 2007; Hansen & Knudsen, 2013). It has been hypothesised that omega-3 fatty acids found in food products such as seafood, nuts, and seeds may be beneficial in cases of dysmenorrhea and endometriosis-associated pain (Hansen & Knudsen, 2013). While other studies report inconclusive evidence or methodological design inconsistencies that do not demonstrate promising results in endometriosis (Fjerbæk & Knudsen, 2007; Parazzini et al., 2013). As such, more robust research is needed to assess the efficacy of omega-3 fatty acids in endometriosis-associated pain and pain management.

Naturopathic sources also appear to be proponents of multidisciplinary care, with multidisciplinary recommendations reported for the management of all three of the aforementioned menstrual conditions. In all three of the menstrual disorders examined in this study, massage therapists were the most frequently reported profession identified for a referral. Massage therapy has a long-standing history of supporting individuals experiencing pain and discomfort including those with chronic diseases and conditions (Field, 2016; Tsao, 2007). Massage therapy is known to improve blood and lymph flow and reduce tense and contracted muscles (Azima et al., 2015). In cases of women experiencing menstrual-related pain, regular massage therapy sessions have been

found to reduce uterine and pelvic pain, improve blood circulation, and increase the secretion of endorphins that modulate pain (Azima et al., 2015; Valiani et al., 2010). Massage therapy for dysmenorrhea in conjunction with aromatherapy, has been shown to reduce inflammatory markers (e.g., prostaglandins) and may inhibit menstrual pain as evident in a preliminary randomised clinical trial (Marzouk et al., 2013). The naturopathic sources presented in this study also recommend referrals to acupuncturists for the management of endometriosis and dysmenorrhea. Acupuncture has been found to have a specific activity in pain alleviation through several pathophysiological processes including reducing pain, inhibitory activity, and reducing pain signals and reflexes (Xu et al., 2017). Thus, acupuncture may have benefits in reducing the overactivity of pain cycles that are evident in cases of dysmenorrhea (Woo et al., 2018) and endometriosis-associated pain (Xu et al., 2017). In addition, research has explored the effectiveness of acupuncture in reducing endometriosis-associated pain via modulation of neurohumoral factors that increase pain thresholds, suppress excessive oestrogen secretion, and enhance immunological activity by mediating cytokines, anti-inflammatory. and analgesic activity (Xu et al., 2017). The activity of acupuncture in these studies reports pathophysiological activities giving speculation as to the role acupuncture may play in reducing menstrual pain for women with dysmenorrhea and endometriosis-associated pain.

Interestingly, multidisciplinary referrals to conventional practitioners for the management of endometriosis, dysmenorrhea, and menorrhagia were not identified in our study. The reason for this omission is unclear. The omission of referrals to conventional practitioners may reflect the likelihood that women have already consulted with a conventional practitioner before accessing naturopathic care (Denny & Mann, 2008; O'Hara et al., 2020). In addition, the role of naturopaths as primary care practitioners in the countries from which the source documents were drawn may also be indicative of the omission of referrals to conventional practitioners (Fleming & Gutknecht, 2010; Wardle et al., 2014)

or that the treating naturopath or woman with endometriosis did not feel a conventional practitioner was needed in the patient's care. This does, however, highlight the need for explicit documentation and research on multidisciplinary care involving naturopaths, especially considering non-disclosure that occurs at the patient level for both health care practitioners (Foley et al., 2021; Ng et al., 2020).

7.9.1 Limitations

There are limitations noted in this study. The subjective nature of data collection and analysis has its limitations and interpretations (Walter, 2006). The included traditional and contemporary naturopathic sources are not an exhaustive list as some volumes may have been missed due to lack of access or incomplete volumes at the time of data collection. There is potential that selective bias occurred due to the researcher's educational background in naturopathy. However, this may also be a strength in the selection process by identifying relevant texts and periodicals for inclusion. Additionally, this study does not represent a complete collection of naturopathic sources from other institutions that may hold naturopathic sources, specifically traditional sources. Nevertheless, if not complete, it was comprehensive, as most major influential sources were used with evidence of strong connections to the naturopathic profession over the last 200 years. Finally, while this study highlights preliminary findings of the recommendations of multidisciplinary, self-care, and dietary recommendations from both a traditional and contemporary lens, it does not explore how these recommendations were transferred into clinical practice or if recommendations more specifically for dysmenorrhea were noted for reports of primary or secondary dysmenorrhea. It is also difficult to determine what information from the traditional texts is interpreted and translated to contemporary practice settings. Nonetheless, the findings of this study may provide preliminary insights into historical and contemporary recommendations for multidisciplinary, self-care and dietary recommendations for the management of endometriosis, dysmenorrhoea, and menorrhagia.

7.9.2 Future research

While this study reports the traditional and contemporary multidisciplinary care referrals and self-care recommendations for managing endometriosis, dysmenorrhea, and menorrhagia, this study did not explore the effectiveness of self-care treatments. While the volume of research investigating self-care for endometriosis and dysmenorrhea has increased in recent years (Armour et al., 2016; Armour et al., 2019c; Armour et al., 2019d; Armour et al., 2019e; De Sanctis et al., 2020; Youseflu et al., 2020), further research is needed to examine the benefits of specific self-care and dietary recommendations in managing menstrual symptomatology and improving women's QoL. Also, while this study uncovered self-care and dietary recommendations in naturopathic practice, whether these align with broader or naturopathic-specific practices is not known. It is also unclear how effective naturopathic care is from the application of self-care strategies and multidisciplinary care for endometriosis and whether the implementation of a naturopath into a multidisciplinary team provides beneficial patient outcomes compared to other health care professionals that may also use dietary and lifestyle approaches in clinical care. There appears to be limited research exploring self-care strategies and multidisciplinary care for the management of menorrhagia, as such further research into this under explored area is warranted. Additionally, examining a multidisciplinary approach to endometriosis and endometriosis-associated menstrual complaints requires investigation given the need for a multidisciplinary approach in these conditions.

7.10 Conclusion

The findings of this research indicate that naturopathic sources have a significant history of recommending a variety of self-care, dietary, and multidisciplinary recommendations that may have a plausible role in supporting menstrual health and reducing negative health outcomes associated with menstrual disorders and diseases such as endometriosis. While some of the naturopathic recommendations involving self-care and

dietary treatments are gaining further research attention, more research is needed to identify appropriate multidisciplinary care recommendations for women experiencing menstrual conditions.

7.11 Chapter summary

This chapter explored the traditional and contemporary knowledge relating to the multidisciplinary and self-care recommendations for women with endometriosis and endometriosis-associated symptoms. As elements of self-care are a key concept in the naturopathic approach to clinical care, there is a need to examine the self-care recommendations for women with endometriosis. By exploring naturopathic self-care recommendations, the identification of possible self-management strategies can be realised for women with endometriosis. Likewise, identifying multidisciplinary collaborations in naturopathic care could potentially assist in supporting naturopathy users as well as increasing infrastructure for naturopaths to be involved in multidisciplinary endometriosis care.

Both the findings in this chapter and Chapter 6 highlight a large variety of naturopathic treatments and approaches that may be employed in clinical care, although an examination of the naturopathic approaches has yet to be fully established in the literature. The next chapter will detail the final phase (Phase 2B) of the mixed-methods exploratory sequential aspect of this thesis by describing the naturopathic treatments and approaches utilised in Australian naturopathic clinical practice. The results final chapter (Chapter 9) will further explore the naturopathic knowledge and clinical case management of endometriosis by naturopaths in clinical practice in Australia.

Chapter 8. Perceived effectiveness and use of naturopathic treatments for endometriosis: A cross-sectional survey of Australian naturopaths experienced in endometriosis management.

8.1 Declaration of authorship

All authors contributed to the conceptualisation and design of the research protocol of this manuscript. RR and AS conducted the data cleaning, data analysis and interpretation of data. RR drafted the manuscript. All authors contributed to critically revising the final version to be submitted for publication.

8.1.1 Publication

The results of this chapter have been published in the Journal of Complementary and Integrative Medicine.

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The published version is attached in Appendix 8.1.1

8.2 Chapter introduction

The presented chapter has minor adaptations compared to the published article. These adaptations relate to the peer-review requirements and idiosyncrasies of journal styles and formatting requirements. Amendments have been made to ensure consistency in the thesis. At the time of data collection and analysis for Phase 2B, herbal medicine names were extracted verbatim; however, some herbal medicine names have changed since

the completion of this phase of the thesis. Herbal medicine names throughout this chapter have been updated to their contemporary synonym.

The previous chapters (Chapters 5, 6, and 7) highlight a plethora of naturopathic treatments and self-care recommendations that may be supportive in endometriosis management. As women with endometriosis often report areas of unmet health care needs in addition to frequent utilisation of health care services from both conventional and CM professions, an examination of the naturopathic treatments and approaches to endometriosis clinical care is needed. However, to date, a contemporary examination of what naturopaths are using in clinical practice to manage endometriosis has yet to be fully established. As such, this chapter provides Australia's first preliminary examination of the naturopathic treatments utilised in clinical practice by Australian naturopaths. This chapter will describe the naturopathic treatments used in contemporary naturopathic practice by naturopaths who self-identify as specialising in women's menstrual disorders. The findings of this research will bridge Phase 2A (Chapters 6 and 7) of the mixed-methods exploratory sequential elements of this thesis. Several of the results from Phase 2A (Chapters 6 and 7) naturopathic treatments and approaches to endometriosis care including herbal medicines, clinical nutritional medicine, homeopathic medicine, hydrotherapy, multidisciplinary care, dietary advice, and self-care recommendations were used to develop the Phase 2B project included the survey used for data collection. However, given the volume of results obtained for Phase 2B, the results have been split across two chapters. Chapter 8 will describe the naturopathic treatments for endometriosis care, followed by Chapter 9 which details the naturopathic clinical approach to contemporary endometriosis care.

8.3 Introduction

Naturopathy is a traditional medicine system guided by a distinct philosophical framework accepted and codified by the global naturopathic profession (Snider & Zeff, 2019). This framework involves a patient-centred care approach to clinical case

management and is the guiding force in the application of naturopathic treatments in clinical practice (Lloyd, 2021a). Naturopaths employ a range of treatments which can include ingested medicines – most commonly herbal medicine and clinical nutritional supplementation – as well as dietary and lifestyle recommendations (World Naturopathic Federation, 2016). These treatments can vary depending on the country, the socio-political context of practice (Dunn et al., 2021), and the diverse training qualifications in naturopathy. In Australia, naturopaths undertake a four-year degree that incorporates health sciences (e.g., physiology, anatomy, chemistry, biochemistry, differential diagnoses, and clinical examination), social sciences (e.g., psychology and counselling), naturopathic theory, and naturopathic clinical disciplines (e.g., including herbal medicine, clinical nutritional medicine, lifestyle recommendations, and dietary recommendations) (Wardle et al., 2019). However, changes in the Australian qualifications framework for educational standards in naturopathy have created diversity in qualifications with some naturopaths holding vocational qualifications such as diplomas or advanced diplomas in naturopathy (Ooi et al., 2018). As a health care profession, naturopathy is commonly utilised by the Australian population (McIntyre et al., 2019). However, naturopathic use appears to have a notable prevalence rate among women who may experience chronic and complex diseases such as endometriosis (Fisher et al., 2018; Reid et al., 2016).

Endometriosis is a complex hormone-dependent inflammatory reproductive disease that is associated with cyclic and non-cyclic pelvic pain with menstruation as well as varying symptomatology that can include dyspareunia, dysuria, and infertility (Nezhat et al., 2019). The cause of endometriosis has yet to be fully determined, but retrograde menstruation is a commonly accepted theory (Nezhat et al., 2019). An estimated 10% of women worldwide (Rowlands et al., 2021), and 11% of women of reproductive age in Australia (Australian Institute of Health Welfare, 2019 April), are diagnosed with endometriosis. Contemporary endometriosis treatment employs pharmaceutical treatments and surgical interventions that aim to suppress symptomatology; however,

these treatments can often be costly, invasive, and include side effects that may contribute to reduced QoL (As-Sanie et al., 2019). The current gold standard of endometriosis care is not curative and can result in polypharmacy or repeated surgical measures due to the recurrence of lesions and symptoms (Nezhat et al., 2019). Due to the multifactorial and complex characteristics of the disease, women with endometriosis are known to experience various unmet health care needs (As-Sanie et al., 2019) and access a wide variety of health care services as well as employ various self-care treatments to manage the disease (O'Hara et al., 2020; O'Hara et al., 2019). Unmet health care needs pertaining to access to various health care services can be related to delay in diagnosis, dissatisfaction with standard care including side effects and ineffectiveness of pharmaceutical treatments (Burla et al., 2021; Rowe et al., 2021), and the need for repeated laparoscopic surgeries (Nezhat et al., 2019). For these reasons, among others, women with endometriosis may seek care from health care services outside of conventional care to reduce symptomology and disease recurrence. Therefore, there is an increasing need to identify other novel and effective treatments that, at a minimum, may provide women with symptomatic relief and/or improve their QoL.

Current research indicates that naturopaths employ an array of treatments within their scope of practice that may provide novel or complementary treatment options to women who are experiencing symptomatic endometriosis (Hartmann & McEwen, 2018; Reid et al., 2019a). This previous research provides some insight into the treatments which may be utilised by naturopaths based on traditional naturopathic knowledge and contemporary information sources (Reid et al., 2019a), however, there is limited evidence on the specific treatments naturopaths use in clinical practice to support women with endometriosis. Identifying what types of naturopathic treatments are used in clinical cases of endometriosis may be supportive in identifying future areas of research to better support women with endometriosis who seek care from naturopaths and for wider clinical

implementation that supports the multidisciplinary and collaborative approach needed in endometriosis care. Therefore, this exploratory study aims to describe the naturopathic treatments employed by naturopaths who have experience in providing care to women for the management of endometriosis and the perceived effectiveness of naturopathic treatments employed in clinical practice.

8.4 Materials and methods

8.4.1 Study design

This study was conducted as a cross-sectional survey as a sub-study from the PRACI, a PBRN of CM practitioners in Australia.

8.4.2 Setting

This study involved data collection in the form of an online self-administered survey through the SurveyGizmo® platform. The survey was open for participation in June 2019 and closed in September 2019. Data collection occurred for 10 weeks with two reminder invitations (July and August) sent to participants via email.

8.4.3 Participants

Participants were sampled from the PRACI PBRN who were identified in the PRACI workforce survey as being a naturopath in clinical practice in Australia (n=317). Members of PRACI self-opted for membership to the PRACI PBRN to support advancements in naturopathic research. From the PRACI PBRN sample, n=109 (34.4%) naturopaths identified as specifically having clinical experience in managing menstrual disorders. Utilising a confidence level of 95%, and a margin of error of 5%, the sample size was calculated at 86 participants. Naturopaths were eligible for inclusion in the study if they were in clinical practice in Australia, were listed as a member of PRACI, specialise in women's menstrual disorders, reported providing care to women for the management of endometriosis in the previous 12 months, and could read English. Naturopaths who

indicated that they were not in clinical practice at the time of data collection were excluded.

8.4.4 Instrument

The survey was conducted as a self-administered survey that covered the following core domains: *naturopath demographics*; *practitioner knowledge of endometriosis*; *treatments for endometriosis*; *naturopathic case management*; and *multidisciplinary case management*. The results presented in this manuscript report on the survey domains including *naturopath demographics* and *treatments for endometriosis*. The other domains included in the survey have been reported elsewhere (Redmond et al., 2023). The questionnaire was developed based on key aspects of previous research conducted in this area (Reid et al., 2019a). Each domain involved several questions that were multiple-choice (binary and categorical multiple-choice questions) and open-text responses. The survey took approximately 15 – 20 minutes to complete, and responses were completely anonymous. Survey logics were used to open consecutive questions depending on the participant's responses, as such some surveys may have taken longer to complete. Upon opening the survey link, practitioners were required to read the participant information sheet and confirm consent on the initial page of the survey before beginning the survey. Participants who did not provide consent were automatically taken to an exit page of the survey. Before data collection, the survey underwent pilot testing for face validity by a sample of degree-trained naturopaths (n=5) in Australian clinical practice to determine the useability, readability, survey function and logic, and appropriateness of the survey for naturopaths in clinical practice. The final self-administered questionnaire was a 62-item online survey.

8.4.5 Statistical analysis

Raw data was extracted from the SurveyGizmo© platform via Microsoft Excel© for data cleaning. Responses linked to naturopaths outside of the inclusion criteria were removed

from the data set. Incomplete responses were also removed from the data set before being imported into the statistical software program STATA 14© for analysis. Based on the survey questions, categorical and binary variables were developed. Additional binary variables were created based on responses to categorical variables for analysis. Statistical analysis was conducted using descriptive statistics with the use of frequencies and percentages. Any open-text responses from the participants were not analysed for this presented study.

8.4.6 Ethics approval

Approval to conduct this project through PRACI was obtained in February 2019 (#20190218). Ethical clearance was granted from the HREC at the University of Technology Sydney (approval #ETH18-2913) and the HREC at Endeavour College of Natural Health (approval #20190417-RR-1). Both aforementioned institutions granted ethical approval due to requirements at the student's place of employment. PRACI was administrated by Endeavour College of Natural Health which required HREC approval and the University of Technology Sydney where the student was enrolled in their Doctor of Philosophy (Public Health) required reciprocal HREC approval to conduct this study.

8.5 Results

8.5.1 Naturopathic demographics

Of the 109 naturopaths recognised as having experience in women's menstrual disorders, 37 naturopaths started the survey. Six partially completed survey responses were removed during data cleaning. An additional two responses were also removed for not meeting the inclusion criteria of practising naturopathy in Australia. A total of 29 met the inclusion criteria and completed the survey (26.6% response rate). Naturopaths were predominantly female (n=27, 93.1%) and practicing in New South Wales (n=14, 48.2%). Naturopaths who consulted with women for endometriosis management more commonly held a bachelor's degree (n=10, 34.4%) or an advanced diploma (n=8, 27.5%) and

reported having between one and five years (n=7, 24.1%) or 16 and 20 years' (n=7, 24.1%) experience in clinical practice. Participants most frequently worked between 16 and 20 hours per week (n=10, 34.4%) in naturopathic clinical practice and practised in a solo clinical practice (n=18, 62%). One-third of the participants (n=9, 31%) reported providing care to between 11 and 15 women with endometriosis in the previous 12 months (see Table 15).

Table 15: Sociodemographics of Australian naturopaths from the PRACI PBRN who have consulted with women for the management of endometriosis.

Demographics	n (%)
Sex	
Female	27 (93.1)
Male	2 (6.9)
State	
ACT/NT/TAS	0 (0.0)
NSW	14 (48.2)
QLD	5 (17.2)
SA	2 (6.9)
VIC	5 (17.2)
WA	3 (10.3)
Qualification	
Certificate IV	1 (3.4)
Diploma	4 (13.7)
Advanced diploma	8 (27.5)
Bachelor's degree	10 (34.4)
Graduate certificate	1 (3.4)
Graduate diploma	0 (0.0)

Master's degree	5 (17.2)
Professional doctorate/Doctor of Philosophy	0 (0.0)
Years in practice	
1 – 5 years	7 (24.1)
6 – 10 years	4 (13.7)
11 – 15 years	4 (13.7)
16 – 20 years	7 (24.1)
21 – 25 years	2 (6.9)
26 – 30 years	2 (6.9)
31 years or more	2 (6.9)
Hours per week in practice	
1 – 5 hours	3 (10.3)
6 – 10 hours	1 (3.4)
11 – 15 hours	5 (17.2)
16 – 20 hours	10 (34.4)
21 – 25 hours	3 (10.3)
26 – 30 hours	2 (6.9)
31 hours or more	5 (17.2)
Clinical setting	
Sole practitioner	18 (62.0)
Multidisciplinary clinic with complementary medicine (CM) practitioners	8 (27.5)
Multidisciplinary clinic with conventional medicine and CM practitioners	1 (3.4)
Health food shop	0 (0.0)
Pharmacy	2 (6.9)

Number of women*	
1 – 5 women	6 (20.6)
6 – 10 women	6 (20.6)
11 – 15 women	9 (31.0)
16 – 20 women	1 (3.4)
21 – 25 women	1 (3.4)
26 – 30 women	3 (10.3)
31 women or more	3 (10.3)

**Number of women with endometriosis consulted over the previous 12-month period.*

8.5.2 Naturopathic treatments

The most prevalent treatments utilised by participating naturopaths for endometriosis management include lifestyle recommendations (n=22, 75.8%), herbal medicine (n=21, 72.4%), clinical nutritional medicines (n=21, 72.4%), and dietary recommendations (n=20 68.9%). The least frequently reported disciplines included acupressure (n=1, 3.4%), aromatherapy (n=1, 3.4%), and hydrotherapy (n=1, 3.4%) (see Table 16).

Table 16: Prevalence of naturopathic treatments utilised in the clinical management of endometriosis by Australian naturopaths.

Naturopathic treatments	n (%)
Lifestyle recommendations	22 (75.8)
Herbal medicine	21 (72.4)
Clinical nutritional medicines	21 (72.4)
Dietary recommendations	20 (68.9)
Mindfulness	12 (41.3)
Meditation/Imagery	10 (34.4)
Acupuncture	6 (20.6)

Flower essences	5 (17.2)
Homeopathy	5 (17.2)
Massage therapy	3 (10.3)
Acupressure	1 (3.4)
Aromatherapy	1 (3.4)
Hydrotherapy	1 (3.4)
Kinesiology	0 (0.0)
Moxa	0 (0.0)

8.5.3 Herbal medicine

The most common herbal medicines frequently prescribed for endometriosis by participating naturopaths were *C. longa* (n=14, 48.2%), *V. opulus* (n=10, 34.4%), *V. agnus-castus* (n=9, 31%), and *A. sinensis* (n=5, 17.2%). Most of the participating naturopaths that reported prescribing *C. longa* reported perceiving it to be either 'very effective' or 'effective' (n=14, 48.2%) at reducing endometriosis symptoms. *V. opulus* was reported to be 'very effective' or 'effective' by 31% (n=9) by the prescribing naturopaths. Practitioner perceived effectiveness was also reported as 'very effective' or 'effective' for the utilisation of *V. angus-castus* (n=9, 31%) and *A. sinensis* (n=6, 20.6%) in the management of endometriosis (see Table 17).

8.5.4 Clinical nutritional medicine

The most frequently reported clinical nutritional medicines prescribed for endometriosis by participating naturopaths were magnesium (n=16, 55.1%), essential fatty acids (n=15, 51.7%), cruciferous indoles (n=12, 41.3%), probiotics (n=12, 41.3%), and zinc (n=12, 41.3%). Many of the naturopaths prescribed magnesium (n=13, 44.8%), essential fatty acids (n=12, 41.3%), cruciferous indoles (n=10, 34.4%), and probiotics (n=9, 31%) and perceived these treatments to be 'very effective' or 'effective' for managing endometriosis and its associated symptoms (see Table 17).

Table 17: Frequency and perceived practitioner effectiveness of herbal medicine and clinical nutritional medicine prescribed by naturopaths for endometriosis management.

Treatment	Frequency of use			Perceived effectiveness		
	Very frequently/Frequently	Occasionally/Rarely	Never	Very effective/Effective	Somewhat effective	Not effective
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Herbal medicine						
<i>Curcuma longa</i> (Turmeric)	14 (48.2)	5 (17.2)	0 (0.0)	14 (48.2)	4 (13.7)	0 (0.0)
<i>Viburnum opulus</i> (Cramp bark)	10 (34.4)	7 (24.1)	1 (3.45)	9 (31.0)	6 (20.6)	0 (0.0)
<i>Vitex agnus-castus</i> (Vitex)	9 (31.0)	10 (34.4)	0 (0.0)	9 (31.0)	7 (24.1)	1 (3.4)
<i>Angelica sinensis</i> (Dong quai)	5 (17.2)	13 (44.8)	1 (3.4)	6 (20.6)	6 (20.6)	0 (0.0)
<i>Taraxacum officinale</i> (Dandelion)	4 (13.7)	13 (44.8)	1 (3.4)	2 (15.3)	3 (23.0)	7 (53.8)

<i>Actaea racemosa</i> (Black cohosh)	3 (10.3)	13 (44.8)	1 (3.45)	3 (10.3)	8 (27.5)	1 (3.4)
<i>Pinus pinaster</i> (French pine bark)	3 (10.3)	6 (20.6)	8 (27.5)	2 (6.9)	4 (13.7)	1 (3.4)
<i>Achillea millefolium</i> (Yarrow)	2 (6.9)	15 (51.7)	0 (0.0)	3 (10.3)	8 (27.5)	4 (13.7)
<i>Dioscorea villosa</i> (Wild yam)	2 (6.9)	13 (44.83)	2 (6.9)	4 (13.7)	6 (20.6)	0 (0.0)
<i>Leonurus cardiaca</i> (Motherwort)	2 (6.9)	12 (41.3)	3 (10.3)	2 (6.9)	5 (17.2)	0 (0.0)
Clinical Nutritional Medicine						
Magnesium	16 (55.1)	2 (6.9)	0 (0.0)	13 (44.8)	3 (10.3)	0 (0.0)
Essential fatty acids	15 (51.7)	3 (10.3)	0 (0.0)	12 (41.3)	4 (13.7)	0 (0.0)
Cruciferous indoles	12 (41.3)	4 (13.7)	2 (6.9)	10 (34.4)	5 (17.2)	0 (0.0)
Probiotics	12 (41.3)	6 (20.6)	0 (0.0)	9 (31.0)	6 (20.6)	0 (0.0)
Zinc	12 (41.3)	6 (20.6)	0 (0.0)	7 (24.1)	6 (20.6)	1 (3.4)
Prebiotics	11 (37.9)	6 (20.6)	1 (3.4)	9 (31.0)	5 (17.2)	1 (3.4)

Iodine	6 (20.6)	10 (34.4)	1 (3.4)	6 (20.6)	6 (20.6)	2 (6.9)
Vitamin E	5 (17.2)	12 (41.3)	0 (0.0)	6 (20.6)	2 (6.9)	2 (6.9)
Vitamin B Complex	5 (17.2)	13 (44.8)	0 (0.0)	8 (27.5)	6 (20.6)	1 (3.4)
Selenium	3 (10.3)	13 (44.8)	1 (3.4)	4 (13.7)	5 (17.2)	3 (10.3)
Vitamin C	2 (6.9)	14 (48.2)	1 (3.4)	5 (17.2)	4 (13.7)	1 (3.4)
Calcium	1 (3.4)	14 (48.2)	2 (6.9)	3 (10.3)	4 (13.7)	1 (3.4)
Beta-carotene	0 (0.0)	13 (44.8)	4 (13.7)	3 (10.3)	2 (6.9)	2 (6.9)

8.5.5 Dietary recommendations

The most frequently reported prescribed dietary recommendation by naturopaths for the management of endometriosis was to increase dietary intake of essential fatty acids (n=19, 65.5%) and dietary fibre intake (n=19, 65.5%) (see Table 18). Other popular dietary recommendations were anti-inflammatory diets (heterogeneously defined but aims at increasing consumption of foods that reduce inflammation) (n=17, 58.6%) and avoidance of dairy intake (n=17, 58.6%) and sugar (n=15, 51.7%). The naturopaths recommending these dietary changes commonly perceived following an anti-inflammatory diet (n=16, 55.1%), increasing dietary intake of essential fatty acids (n=12, 41.3%), increasing dietary fibre intake (n=13, 44.8%), and avoiding sugar intake (n=11, 37.9%) to be 'very effective' or 'effective' for managing endometriosis and its symptoms. Avoiding dairy was also perceived to be 'effective' or 'very effective' by those practitioners who prescribed it (n=13, 44.8%).

8.5.6 Lifestyle recommendations

Table 18 presents the most frequent lifestyle recommendations prescribed by naturopaths for endometriosis management. The most common lifestyle recommendations included regular exercise (n=18, 62%), eliminating environmental toxins (n=14, 48.2%), referral for emotional therapy in the form of professional counselling (n=14, 48.2%), sleep hygiene practices (n=13, 44.8%), and heat packs (n=13, 44.8%). Prescribing naturopaths who reported frequently utilising these lifestyle recommendations reported that regular exercise (n=11, 37.9%), referral for emotional therapy in the form of professional counselling (n=9, 31%), and use of heat packs (n=9, 31%) were 'very effective' or 'effective' in endometriosis management.

Table 18: Dietary and lifestyle recommendations used by naturopaths in endometriosis management and their perceived practitioner effectiveness.

Treatment	Frequency of use			Perceived effectiveness		
	Very frequently/Frequently	Occasionally/Rarely	Never	Very effective/Effective	Somewhat effective	Not effective
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Dietary recommendations						
Increase essential fatty acids (i.e., nuts and fish)	19 (65.5)	0 (0.0)	0 (0.0)	12 (41.3)	4 (13.7)	0 (0.0)
Increase fibre intake (i.e., fruit and vegetables)	19 (65.5)	0 (0.0)	0 (0.0)	13 (44.8)	4 (13.7)	0 (0.0)
Anti-inflammatory diet	17 (58.6)	2 (6.9)	0 (0.0)	16 (55.1)	1 (3.4)	0 (0.0)
Avoid dairy	17 (58.6)	2 (6.9)	0 (0.0)	13 (44.8)	4 (13.7)	0 (0.0)
Avoid sugar	15 (51.7)	4 (13.7)	0 (0.0)	11 (37.9)	5 (17.2)	1 (3.4)
Increase cruciferous vegetables (e.g., broccoli)	14 (48.2)	5 (17.2)	0 (0.0)	11 (39.2)	5 (17.8)	1 (3.4)
Avoid alcohol	14 (48.2)	5 (17.2)	0 (0.0)	8 (27.5)	8 (27.5)	1 (3.4)

Avoid caffeine	10 (34.4)	9 (31.0)	0 (0.0)	5 (27.5)	9 (31.0)	0 (0.0)
Gluten-free diet	8 (27.5)	11 (37.9)	0 (0.0)	8 (27.5)	7 (24.1)	2 (6.9)
FODMAP diet	3 (10.3)	14 (48.2)	2 (6.9)	6 (20.6)	6 (20.6)	2 (6.9)
Avoid red meat	2 (6.9)	16 (55.1)	1 (3.4)	5 (29.4)	7 (41.1)	2 (11.7)
Lifestyle recommendations						
Regular exercise	18 (62.0)	1 (3.4)	0 (0.0)	11 (37.9)	4 (13.7)	0 (0.0)
Remove environmental toxins	14 (48.2)	5 (17.2)	0 (0.0)	5 (17.2)	10 (34.4)	0 (0.0)
Emotional therapy (i.e., counselling)	14 (48.2)	5 (17.2)	0 (0.0)	9 (31.0)	5 (17.2)	0 (0.0)
Sleep hygiene practices	13 (44.8)	5 (17.2)	1 (3.4)	7 (24.1)	7 (24.1)	0 (0.0)
Heat packs	13 (44.8)	6 (20.6)	0 (0.0)	9 (31.0)	6 (20.6)	0 (0.0)
Avoid use of plastic containers	12 (41.3)	7 (24.1)	0 (0.0)	2 (6.9)	12 (41.3)	0 (0.0)
Breathing exercises	12 (41.3)	5 (17.2)	2 (6.9)	8 (27.5)	5 (17.2)	0 (0.0)
Avoid pesticides	11 (37.9)	8 (27.5)	0 (0.0)	2 (6.9)	13 (44.8)	0 (0.0)
Avoid use of tampons	9 (31.0)	9 (31.0)	0 (0.0)	5 (17.2)	6 (20.6)	1 (3.4)
Yoga	9 (31.0)	9 (31.0)	1 (3.4)	7 (24.1)	5 (17.2)	0 (0.0)

Meditation/Imagery	9 (31.0)	9 (31.0)	1 (3.4)	7 (24.1)	6 (20.6)	0 (0.0)
Weight management	8 (27.5)	9 (31.0)	2 (6.9)	6 (20.6)	8 (27.5)	0 (0.0)
Avoid intercourse while menstruating	3 (10.3)	6 (20.6)	8 (27.5)	1 (3.4)	2 (6.9)	3 (10.3)
Transcutaneous electrical nerve stimulation (TENS Machine)	1 (3.4)	8 (27.5)	9 (31.0)	2 (6.9)	3 (10.3)	0 (0.0)
Try to fall pregnant	1 (3.4)	4 (13.7)	13 (44.8)	1 (3.45)	3 (10.3)	1 (3.4)
Tai Chi	0 (0.0)	7 (24.1)	11 (37.9)	2 (6.9)	2 (6.9)	1 (3.4)

8.5.7 Other treatments

A small number of naturopaths also prescribed other treatments such as homeopathy or hydrotherapy. The most reported homeopathic remedies prescribed by naturopaths for endometriosis were Magnesium phosphoricum (Mag-p.) (n=2) and *Actaea racemosa* (cimic.) (n=1). Both homeopathic remedies were perceived to be 'very effective' or 'effective' in endometriosis management by the prescribing naturopaths. One naturopath reported very frequently prescribing a hot (n=1) or warm bath (n=1) for endometriosis management which was perceived by the naturopath to be 'somewhat effective' in endometriosis management.

A summary list of the most frequently used naturopathic treatments with the highest rating of perceived effectiveness is displayed in Figure 10.

Figure 10: Most frequently reported naturopathic treatments and practitioner perceived effectiveness in endometriosis care.

Treatments
Herbal medicine
<i>Curcuma longa</i> (Turmeric)
<i>Viburnum opulus</i> (Cramp bark)
<i>Vitex agnus-castus</i> (Vitex)
Clinical nutritional medicine
Essential fatty acids
Magnesium
Dietary recommendations
Anti-inflammatory diet
Avoid dairy

Increase essential fatty acids
Increase fibre intake
Lifestyle recommendations
Emotional therapy (i.e., counselling)
Regular exercise
Eliminating environmental toxins

8.6 Discussion

This article provides preliminary evidence of the types of treatments for the management of endometriosis utilised by Australian naturopaths in clinical practice. Firstly, the analysis indicates consistency in the disciplines used by Australian naturopaths compared to naturopaths internationally (Steel et al., 2020b; World Naturopathic Federation, 2016), namely, herbal medicine, clinical nutritional medicine, lifestyle, and dietary recommendations. Of the therapeutic disciplines used for the management of endometriosis in this study, lifestyle recommendations were reported more frequently than ingested medicines (i.e., herbal medicine, clinical nutritional medicine, homeopathy). The limited use of other types of treatments for endometriosis may represent the changes in the therapeutic armamentarium in contemporary naturopathic practice and education in Australia where treatments such as homeopathy are less common (Evans, 2000; Reid et al., 2019a). Changes in naturopathic disciplines may be attributed to the changes in naturopathic curricula and internal and external stakeholders who influence the naturopathic profession (Evans, 2000). Additionally, prescribing lifestyle recommendations for endometriosis management may encourage women to utilise self-management practices that may have a supportive role in reducing debilitating symptomatology (Armour et al., 2019d). Addressing lifestyle implications of endometriosis management can support women to influence their experiences of bothersome symptoms while also encouraging a sense of health and wellbeing through

the adaption of positive health behaviours including lifestyle and dietary changes (Vennberg Karlsson et al., 2020).

In this study, the most common applications of dietary recommendations by naturopaths for endometriosis included an anti-inflammatory diet, avoiding dairy intake, and increasing essential fatty acids, and dietary fibre. Inflammation is considered to be the main factor in endometriosis pathophysiology (Wang et al., 2020). The chronic inflammatory nature of the disease is associated with elevated concentration levels of interleukin markers (IL-1 β , IL-6, and IL-8), active immune cells, and prostaglandins present in endometriotic lesions (Wei et al., 2020). Additionally, elevated levels of biological inflammatory processes are associated with exacerbation of endometriosis symptomology resulting in chronic pain (Huijs & Nap, 2020) and dysregulation between hormonal and inflammatory pathways (Wang et al., 2020). Naturopaths prescribing dietary recommendations that have anti-inflammatory potential may be targeting the inflammatory aspect of endometriosis which may be supportive in modulating disease activity. Both the anti-inflammatory diet and increasing consumption of essential fatty acids have activity in down-regulating the inflammatory activity of prostaglandins. Addressing the inflammatory processes involved in endometriosis by prescribing an anti-inflammatory diet and the consumption of essential fatty acids may have a role in amelioration pain generation (Huijs & Nap, 2020; Saguyod et al., 2018). In a similar context, naturopaths prescribing an avoidance of dairy may be trying to reduce modifiable dietary habits that are known to contribute to the inflammation process. In this case, the consumption of dairy products has been linked to the dysregulation of inflammatory and immune factors that contribute to the risk of endometriosis development, concurrent infertility, and chronic pelvic pain (Harris et al., 2013). Likewise, increasing consumption of dietary fibre may reduce the inflammatory process but can also regulate the reabsorption of bioavailable oestrogen that may contribute to endometriosis activity (Samaneh et al., 2019). Additionally, dietary fibre may play a

supportive role in microbiome management given recent research evidence that indicates a complex relationship between the microbiome and endometriosis pathophysiology (Leonardi et al., 2020a), while also exhibiting anti-inflammatory properties within the gastrointestinal system (Kuo, 2013) which is often implicated in endometriosis (Svensson et al., 2021). The clinical decision-making of prescribing an anti-inflammatory diet, avoiding dairy intake, and increasing essential fatty acid, and dietary fibre identified in our study suggests naturopaths may be targeting inflammation associated with endometriosis to manage the disease and symptomology.

Naturopaths in our study also reported prescribing lifestyle changes including regular exercise, professional counselling, and reducing exposure to environmental hazards to women with diagnosed endometriosis. Regular exercise was the most frequently prescribed lifestyle recommendation by prescribing naturopaths for women with endometriosis. Regular exercise is protective against the exacerbation of inflammatory pathways as well as a cumulative beneficial effect in reducing menstrual flow and oestrogen activity within the reproductive organs (Bonocher et al., 2014; Warren & Perloth, 2001). Women with endometriosis can have increased reactive oxygen species in the peritoneal fluid that contributes to the inflammatory picture of endometriosis (Bonocher et al., 2014). Likewise, elevated levels of mental stress can also exacerbate inflammatory pathways due to elevated levels of corticotropin-releasing hormone (Evans et al., 2019; Tariverdian et al., 2010). This activity may contribute to peritoneal inflammation that is associated with chronic pain with endometriosis (Evans et al., 2019). Therefore, prescribing regular exercise in cases of endometriosis may be beneficial for women with endometriosis. Recommendations for referrals for emotional therapy in the form of professional counselling were also a frequently prescribed lifestyle recommendation for endometriosis management. There is strong evidence that women with endometriosis often experience psychological comorbidities (Pope et al., 2015). Research also suggests mental health support emphasises a holistic approach involving

beneficial outcomes in pain management, pain perception, and development of coping mechanisms, and provides a supportive network for women to manage endometriosis (Evans et al., 2019; Pope et al., 2015). While the pathogenesis of endometriosis is still unclear, some research has identified a possible association between environmental toxins (e.g., dioxin and dioxin-like compounds) in endometriosis activity and disease progression (Giampaolino et al., 2020; Soave et al., 2015). Recent reviews have examined the biological plausibility of environmental toxins (e.g., dioxin, polychlorinated biphenyls, diethylstilbestrol) and endometriosis, reporting that there are some strong correlations between exposure and endometriosis development via endocrine disruptor activity (Coiplet et al., 2022; Wieczorek et al., 2022). However, methodological issues may limit generalisation of these results (Coiplet et al., 2022). Many of the lifestyle recommendations prescribed by naturopaths for women with endometriosis in our study encourage patient self-care or the concept of self-efficacy in endometriosis management as some of these lifestyle recommendations can be self-managed by women. Self-management in women with endometriosis has been observed to be associated with a perceived capability to cope and control disease activity and symptomatology (O'Hara et al., 2020).

The ingested medicines that naturopaths report commonly prescribing to women with endometriosis in our study have varied levels of direct and indirect evidence supporting their use. Herbal medicines such as *C. Longa* have documented anti-inflammatory, antioxidant, and anti-angiogenic properties, with current *in vitro* and *in vivo* evidence indicating the potential therapeutic value in endometriosis prevention and disease management (Vallée & Lecarpentier, 2020). While other frequently prescribed herbal medicines including *V. opulus* may be beneficial in the presentation of dysmenorrhea (Reid et al., 2019a), such treatments in endometriosis have only attracted animal models to date. These animal studies have demonstrated a reduction in endometriotic lesion volumes and a reduction in inflammatory and angiogenic levels (Bina et al., 2019; Saltan

et al., 2016). Preparations of *V. agnus-castus* have been used to treat various gynaecological conditions with contemporary evidence observing clinical efficacy in PMS through hormonal regulation and neurotransmitter modulation (He et al., 2009; Schellenberg et al., 2012), which may be beneficial in women experiencing PMS alongside endometriosis (Ilhan et al., 2019). While these herbal medicines hypothetically show promise in the pathophysiology of endometriosis and appear to have long-standing historical use in naturopathic practice (Reid et al., 2019a), clinical research involving women with diagnosed endometriosis has yet to fully explore this area (Hartmann & McEwen, 2018). Research investigating the potential of the mechanism involved in endometriosis disease management is needed to explore the potential and effective nature of these herbal medicines in endometriosis. Additionally, further research into understanding how these herbal medicines may be beneficial in endometriosis is warranted.

The naturopaths participating in this study also reported using several clinical nutritional medicines that may target various aspects of endometriosis pathophysiology and be supportive in disease management. Participating naturopaths reported frequently prescribing magnesium for the management of endometriosis. Magnesium is a commonly recommended nutritional intervention in cases of reproductive function including PMS and dysmenorrhea (Harris et al., 2013). Endometriosis presents with spasmodic activity in the uterus which may contribute to pelvic pain (Harris et al., 2013). In our study, naturopaths may be prescribing magnesium due to the potential anti-spasmodic activity of magnesium in smooth muscles such as in the uterus (Harris et al., 2013; Parazzini et al., 2017).

Naturopaths also commonly reported regularly prescribing essential fatty acid supplementation. Essential fatty acid supplementation has many biological factors that modulate inflammatory pathways and may reduce the exacerbation of endometriosis symptoms. Studies have demonstrated that essential fatty acid supplementation, such

as EPA and DHA may reduce endometriotic lesions and modulate pain by reducing prostaglandin (PGE2) activity that is associated with endometriosis-associated pain (Khanaki et al., 2012), cellular proliferation, and angiogenesis in endometriosis (Wu et al., 2010). These prescriptions by participating naturopaths in this study appear to potentially target the inflammatory characteristics of endometriosis. As many of these treatments have therapeutic actions and hypothetical actions in endometriosis, it is plausible that participating naturopaths in our study may be employing diverse treatments in response to the multifactorial nature of endometriosis.

8.6.1 Future research

There is emerging scientific evidence suggesting biological plausibility for several of the treatments used by naturopaths. Many of the commonly reported naturopathic treatments hypothetically show promise in the pathophysiology of endometriosis and many of the herbal and nutritional therapies used by naturopaths in this study have been used in naturopathic practice for over a century (Reid et al., 2019a). However, clinical research involving women with diagnosed endometriosis has yet to fully explore this area. Additionally, research exploring how naturopaths view and understand endometriosis pathophysiology and how naturopaths apply these treatments within the clinical setting also warrants investigation. Examination of the types of exercise beneficial to endometriosis management requires further study given its perceived benefits in inflammatory modulation. Likewise, investigating the naturopathic environmental prescription behaviours in endometriosis management also warrants research attention to assess the efficacy of this approach. Further research in these areas could explore each specific naturopathic treatment to identify the specific biological mechanism in endometriosis through intervention studies but also consider naturopathic whole systems individualised approach to care in women with endometriosis. Naturopathic perceptions of unmet health care needs for women with endometriosis and the perceptions of key symptomology for naturopathic care are also valuable areas of research that have yet to

be explored. Doing so may highlight the importance of naturopathic care in multidisciplinary endometriosis management. Future research could build on this preliminary study, through exploring naturopathy in endometriosis care through consensus methodology such as a Delphi study. Lastly, future research on naturopathy and endometriosis could extend to global practice to better understand naturopathic care for women with endometriosis and to support the generalisation of the research findings.

8.6.2 Limitations

The findings from this study are preliminary, however, they offer valuable insights into what naturopaths prescribe in the clinical case management of endometriosis. This study sought to examine naturopathic treatments by naturopaths who have experience in endometriosis and the perceived effectiveness of treatments they employ in clinical practice. Due to the specific criteria of the naturopaths, it was expected that there would be low participation numbers. Additionally, given the sample was drawn from a self-opted PBRN, the findings may not be generalisable to the greater naturopathic community. The number of PRACI reminders is also a limitation which may have contributed to the small sample size and non-response bias. The impacts on the low sample size may have affected the collection of other naturopathic treatments that are used in clinical practice due to non-response rate. Therefore, the findings are unable to be generalised to the larger naturopathic community. Potential bias from practitioners on the reported effectiveness of their treatments for endometriosis is also a limitation of the findings as this is reported from the naturopath's perspective and not based on measurable data within the study itself. Finally, participation bias is another noted limitation of this study due to the self-administered design of the survey which may have generated social desirability bias in some participants. Notwithstanding, this is the first examination of naturopathic therapies applied in endometriosis which may be a foundational base for further research within real-world clinical practice. This research provides descriptive information regarding naturopathic treatments that may have a plausible effect in

endometriosis care. However, further research is needed for a deeper examination of the effectiveness and safety of these treatments. Despite this, the results of this study may be useful for expanding further research on naturopathic care in endometriosis in the general population.

8.7 Conclusion

Naturopaths appear to employ various naturopathic treatments that have direct or indirect activity in the pathophysiology of endometriosis that may have a supportive role in conjunction with standard treatment in providing women with symptomatic relief of the disease as well as improving their overall health. Given the complexity and need for a multidisciplinary approach to endometriosis management, further research is needed to explore the naturopathic approach to endometriosis care.

8.8 Chapter summary

The results of this chapter describe the naturopathic treatments that are prescribed in naturopathic clinical practice for the management of endometriosis. Naturopaths appear to use a variety of naturopathic modalities and treatments that potentially have altering and beneficial effects on the pathophysiology of endometriosis. This chapter highlights that lifestyle recommendations were the most reported naturopathic modality in endometriosis care. Lifestyle recommendations have the possibility to provide women with self-management strategies to assist in endometriosis care. For women who consult with a naturopath for endometriosis management, naturopaths may support women with a sense of empowerment and capability to manage their symptoms, particularly symptoms that are modifiable. While the results of naturopathic treatments described in this chapter are preliminary, they are foundational in building further research in the naturopathic landscape at both a national and international level. Additionally, to fully comprehend the use of naturopathic care in endometriosis management, a further examination is needed to identify naturopathic knowledge of endometriosis and the approach to contemporary naturopathic clinical care for women with endometriosis.

Chapter 9. Naturopathic knowledge and approaches to managing endometriosis: A cross-sectional survey of naturopaths with experience in endometriosis care

9.1 Declaration of authorship

All authors contributed to the conceptualisation and design of the research protocol of this manuscript. RR and AS conducted the data cleaning, data analysis and interpretation of data. RR drafted the manuscript. All authors contributed to critically revising the final version to be submitted for publication.

9.1.1 Publication

The results of this chapter have been published in the *Journal of Complementary and Integrative Medicine*.

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The published version is attached in Appendix 9.1.1

9.2 Chapter introduction

The presented chapter has minor adaptations compared to the published article. These adaptations relate to the peer-review requirements and idiosyncrasies of journal styles and formatting requirements. Amendments have been made to ensure consistency in the thesis.

This chapter explores the naturopathic knowledge and clinical approach to managing endometriosis in contemporary clinical practice and details the final results of Phase 2B. At the time of conceptualising this thesis, limited research had explored naturopathic

care for the management of endometriosis, despite women utilising naturopathy as a health care service for disease management. As discussed in the previous chapter (Chapter 8), naturopaths employ a variety of treatments in endometriosis care, as detailed in the Phase 2A study of this thesis. Yet, the depth of how naturopaths understand and apply their clinical knowledge in cases of endometriosis has not been examined. Exploring naturopathic care for endometriosis may identify an integrative and multidisciplinary approach that could be supportive for naturopathy users. Additionally, understanding the naturopathic approach to endometriosis may be indicative of establishing multidisciplinary approaches for women with endometriosis who could benefit from naturopathic care. The following chapter (Chapter 9) will highlight areas of this under-reported aspect of naturopathic care for women with endometriosis.

9.3 Introduction

Globally, endometriosis is estimated to affect 10% of reproductive-age women with symptoms presenting differently among individuals (Zondervan et al., 2020). Endometriosis is a chronic inflammatory gynaecological disease that has multifactorial pathophysiology (Samimi et al., 2019). Although the pathogenesis for endometriosis is unclear, there are several dominant theories involving retrograde menstruation, coelomic metaplasia, genetics, inflammation, stem cells, and immune dysfunction (Sourial et al., 2014; Taylor et al., 2021). Symptoms of endometriosis can include dysmenorrhea, menorrhagia, dyspareunia, dysuria, chronic pelvic pain, and infertility (Parasar et al., 2017). However, some women can be asymptomatic and disease severity (i.e., the extent of endometrial lesions) does not correlate to the presence or severity of symptoms (O'Hara et al., 2020). The varying impacts of endometriosis can result in substantial negative implications on a woman's QoL involving their social life, relationships, employment, financial burden, education, and overall health and wellbeing (Moradi et al., 2014). The cost of illness of endometriosis in Australia alone is estimated to be \$9.7 billion annually (Armour et al., 2019b). Women with endometriosis often receive health

care management through pharmaceutical interventions and laparoscopic surgery (Nezhat et al., 2019; Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). The effectiveness of pharmaceutical interventions can vary depending on the type of treatment and presentation of endometriosis. Some pharmaceutical treatments (e.g., oral contraceptive pill, GnRH analogues) show promise in providing endometriosis-associated pain relief and are well tolerated in symptomatic women (Taylor et al., 2021). After diagnosis, women can still experience disease progression (Nezhat et al., 2019) with reports of recurrence between 6% to 67% post laparoscopic surgery within an average of two to five years (Selçuk & Bozdağ, 2013).

Women with endometriosis are known to seek care from various health care professions within conventional medicine (Grundström et al., 2020; O'Hara et al., 2020), allied health, and traditional and complementary medicine (T&CM) (Cox et al., 2003b; Fisher et al., 2016a; O'Hara et al., 2020). Research suggests that women with endometriosis need to have access to a multidisciplinary team for ongoing management (O'Hara et al., 2020) to improve long-term clinical outcomes (Agarwal et al., 2019b), and for access to pain management services (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). As a health care service, T&CM professions such as naturopathy are utilised by reproductive-age women, particularly those with chronic diseases (Fisher et al., 2016a; Fisher et al., 2018; McIntyre et al., 2019; Reid et al., 2016). Reasons for T&CM by women with endometriosis can be due to medical dismissal, taking control of their symptoms and disease, dissatisfaction with standard care (Cox et al., 2003b) or that some T&CM treatments provide better effectiveness compared to hormonal interventions (Schwartz et al., 2019). Naturopathy, defined as a traditional medicine system is one T&CM profession (World Health Organisation, 2010; World Naturopathic Federation, 2016), that is utilised by women with endometriosis (Fisher et al., 2016a; Fisher et al., 2018; Malik et al., 2022; Redmond et al., 2022a). Australian research suggests that naturopaths are one of the most common T&CM

professions utilised by women with endometriosis, who are 1.5 times more likely to seek naturopathic care than those without endometriosis (Fisher et al., 2016a). Australian prevalence data reports that 0.7% – 19.8% of women with endometriosis seek care from a naturopath (Fisher et al., 2016a; Fisher et al., 2018; Malik et al., 2022; Redmond et al., 2022a).

Reports of naturopathic treatments for endometriosis (Reid et al., 2019a) and the effectiveness of those naturopathic treatments are in their infancy, however, one study reported various naturopathic treatments and the perceived effectiveness by naturopathy users who sought care for endometriosis management (Redmond et al., 2022a). The naturopathic approach to care is underpinned by a philosophical framework emphasising the treatment, prevention, and promotion of health through the application of therapeutic practices (such as herbal medicine, clinical nutritional medicine, dietary counselling, and lifestyle recommendations) (World Health Organisation, 2010; World Naturopathic Federation, 2016). This approach provides individualised care that is suitable in chronic and complex diseases where a holistic approach is needed (Graham et al., 2022b). The utilisation of naturopathic therapeutic practices is applied to a patient-centred care framework involving an integrative and multidisciplinary approach (Litchy, 2011; Steel et al., 2020c) in conjunction with various forms of naturopathic knowledge sources.

The patient-centred care framework delivered by naturopaths has potential to address areas of endometriosis care that are of importance to women. These areas could be addressed through naturopathy by using a hierarchy of therapeutics (Bradley et al., 2019) that aligns with reducing endometriosis-associated pain, symptom management (particularly bothersome symptoms), improving QoL, and supporting women's satisfaction with treatment (Duffy et al., 2020) through patient empowerment and self-management strategies, where appropriate. Further, this approach utilises naturopathic knowledge involving the application of traditional knowledge, scientific research, clinical

intuition, and expertise delivered through EBP and adherence to the philosophical frameworks of the profession.

Currently, the Australian Endometriosis Clinical Practice Guideline recommends a multidisciplinary approach to ensure comprehensive care (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). Research into multidisciplinary care and clinical management programs for endometriosis has investigated the role of conventional and allied health care (Agarwal et al., 2021; Agarwal et al., 2019b) in managing endometriosis. However, there has been little research exploring the naturopathic knowledge and approaches to endometriosis, despite the use of this profession by women with endometriosis (Malik et al., 2022; Redmond et al., 2022a) and the acknowledgment of naturopathy as a health care service for women (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). In direct response to these gaps, this study aims to explore the naturopathic knowledge and clinical approach for endometriosis management including multidisciplinary care by naturopaths with experience in menstrual disorders.

9.4 Materials and Methods

9.4.1 Study design

This study employed a cross-sectional survey design as a sub-study of the PRACI - a PBRN of CM practitioners in Australia (Steel et al., 2017).

9.4.2 Setting

The survey was a self-administered questionnaire that was accessible on the SurveyGizmo© platform. Data collection was open in June 2019 and closed in September 2019. Participation reminder invitations were sent to registered PRACI members in July and August 2019 by email.

9.4.3 Participants

Participants were recruited through the PRACI PBRN. Members of PRACI self-opted to enter the PBRN to support naturopathic advancements in Australia. Registered PRACI members who were in clinical practice as a naturopath (n=317) and who self-identified as having experience in women's menstrual disorders (n=109) were invited to participate in the study. From this sample n=109 (34.4%) of naturopaths in PRACI received an invitation to participate in this study. Naturopaths were included if they were practicing as a naturopath in clinical practice at the time of data collection, had consulted with a woman for endometriosis in the previous 12 months, and could read English. Naturopaths who were PRACI members who were not currently in clinical practice and/or did not reside in Australia at the time of data collection were excluded from the survey.

9.4.4 Data instrument

The self-administered survey domains included *naturopath practitioner sociodemographics*, *naturopathic treatments for endometriosis*, *naturopathic disease knowledge of endometriosis*, *naturopath clinical management for endometriosis* and *multidisciplinary approach to endometriosis care*. The survey was developed based on previous research (Reid et al., 2019a). The results presented in this study report on the survey domains including *naturopath sociodemographics*, *naturopathic disease knowledge of endometriosis*, *naturopath clinical management for endometriosis*, and *multidisciplinary approach to endometriosis care*. The other domains included in the survey have been reported elsewhere (Redmond et al., 2022b). In the context of this study, the domain 'naturopathic disease knowledge of endometriosis' refers to the alignment of traditional knowledge, naturopathic philosophical frameworks, and medical science (Graham et al., 2022b) in understanding endometriosis from the perspective of naturopathy. The questionnaire involved both multiple-choice (binary and categorical multiple-choice questions) and open-response questions and took approximately 15 – 20 minutes to complete. Survey logic was used to open consecutive questions

depending on the participant's responses; therefore, some surveys may have taken 20 – 30 minutes to complete. Participation was anonymous and survey responses were unable to be edited after submission. The questionnaire was pilot tested for face validity by five qualified (degree granted) naturopaths in Australian clinical practice. Pilot testing involved selecting all questions that may be selected from participants to gauge an accurate time to complete the survey and to ensure all survey logic was functional. The final self-administered questionnaire was a 62-item online survey.

9.4.5 Sample size

The PRACI database had 317 naturopaths in clinical practice in Australia within their membership. From this sample, recruitment invitations were emailed to 109 naturopaths who self-identified as having experience in menstrual disorders. Using a margin of error of 5%, CI of 95%, and 50% response distribution, the sample size was calculated at n=86. The invitations were sent by the PRACI administrators on behalf of the research team.

9.4.6 Statistical analysis

Raw data was collected through SurveyGizmo© and extracted to Microsoft Excel© for data cleaning. Participants were required to respond to the eligibility criteria at the start of the survey. Participants who did not meet the eligibility were directed to exit the survey. Those that were eligible were invited to proceed with the survey. Incomplete surveys were also removed from the data set during the cleaning stage. Cleaned data was imported into STATA 14© for analysis. Variables were developed in accordance with the participant responses to the survey questions. Statistical analysis was conducted as descriptive statistics using categorical and binary variables represented as frequencies and percentages. Additional analysis was conducted using the Chi-squared test to determine the main reasons for referrals from naturopaths and to naturopaths from other

health care professions. Any open-text responses from the participants were not analysed for this presented study.

9.4.7 Ethics approval

Approval to conduct this project through PRACI was obtained in February 2019 (#20190218). Ethical clearance was granted from the HREC at the University of Technology Sydney (approval #ETH18-2913) and the HREC at Endeavour College of Natural Health (approval #20190417-RR-1). Both aforementioned institutions granted ethical approval due to requirements at the student's place of employment. PRACI was administrated by Endeavour College of Natural Health which required HREC approval and the University of Technology Sydney where the student was enrolled in their Doctor of Philosophy (Public Health) required reciprocal HREC approval to conduct this study.

9.5 Results

9.5.1 Practitioner sociodemographics

A total of n=29 naturopaths met the inclusion criteria and completed the survey (26.6% response rate). Of the naturopaths that were invited to participate (n=109), n=72 participants did not respond to the recruitment invitations and begin the survey, leaving n=37 naturopaths who commenced the survey. During data cleaning, six responses were removed as they were incomplete and an additional two responses were also removed for not meeting the inclusion criteria of being a naturopath in Australia at the time of data collection. Most of the naturopaths reported being female (n=27, 93.1%) and practising in New South Wales (n=14, 48.2%). Respondents reported holding a bachelor's degree (n=10, 34.4%) or an advanced diploma (n=8, 27.5%) in naturopathy. Most respondents reported having either between one and five years (n=7, 24.1%) or 16 and 20 years (n=7, 24.1%) experience in clinical practice as a naturopath. More than half of those who responded were working in solo clinical practice (n=18, 62%) and most frequently working between 16 and 20 hours per week (n=10, 34.4%). One-third of respondents

(n=9, 31%) reported providing naturopathic care to between 11 and 15 women with diagnosed endometriosis in the previous 12 months (see Table 19).

Table 19: Sociodemographics of participant naturopaths who consult with women for the management of endometriosis.

Sociodemographics	n (%)
Sex	
Female	27 (93.1)
Male	2 (6.9)
State	
ACT/NT/TAS	0 (0.0)
NSW	14 (48.2)
QLD	5 (17.2)
SA	2 (6.9)
VIC	5 (17.2)
WA	3 (10.3)
Qualification	
Certificate IV	1 (3.4)
Diploma	4 (13.7)
Advanced diploma	8 (27.5)
Bachelor's degree	10 (34.4)
Graduate certificate	1 (3.4)
Graduate diploma	0 (0.0)
Master's degree	5 (17.2)
Professional doctorate/Doctor of Philosophy	0 (0.0)
Years in practice	
1 – 5 yrs.	7 (24.1)

6 – 10 yrs.	4 (13.7)
11 – 15 yrs.	4 (13.7)
16 – 20 yrs.	7 (24.1)
21 – 25 yrs.	2 (6.9)
26 – 30 yrs.	2 (6.9)
31 yrs. or more	2 (6.9)
Hours per week in practice	
1 – 5 hr	3 (10.3)
6 – 10 hr	1 (3.4)
11 – 15 hr	5 (17.2)
16 – 20 hr	10 (34.4)
21 – 25 hr	3 (10.3)
26 – 30 hr	2 (6.9)
31 hr or more	5 (17.2)
Clinical setting	
Sole practitioner	18 (62.0)
Multidisciplinary clinic with CM practitioners	8 (27.5)
Multidisciplinary clinic with conventional medicine and CM practitioners	1 (3.4)
Health food shop	0 (0.0)
Pharmacy	2 (6.9)
Number of women*	
1 – 5 women	6 (20.6)
6 – 10 women	6 (20.6)
11 – 15 women	9 (31.0)
16 – 20 women	1 (3.4)

21 – 25 women	1 (3.4)
26 – 30 women	3 (10.3)
31 women or more	3 (10.3)

* Number of women with endometriosis consulted over the previous 12-month period.

9.5.2 Clinical knowledge of the causes and risks of endometriosis

Naturopaths who had consulted with women with endometriosis in the previous 12 months reported that inflammation (n=28, 96.5%) was the main cause of endometriosis pathogenesis. Other reported causes of endometriosis perceived by naturopaths were genetics (n=24, 82.7%), excessive oestrogen levels (n=20, 68.9%), microbiome dysbiosis (n=20, 68.9%), and excessive exposure to toxins (n=19, 65.5%). The risks that respondents most frequently perceived as associated with endometriosis were a familial history of endometriosis (n=26, 89.6%) and environmental exposures (n=25, 86.2%). Other frequently reported risks were poor liver detoxification (n=21, 72.4%) and poor dietary intake and behaviours (n=20, 68.9%) (see Table 20).

Table 20: Clinical knowledge and opinion of causes and risks associated with endometriosis as reported by naturopaths in clinical practice.

	Frequency of clinical disease beliefs		
	Strongly agree/Agree	Undecided	Disagree/Strongly disagree
	n (%)	n (%)	n (%)
Causes of endometriosis			
Autoimmunity	12 (41.3)	10 (34.4)	7 (24.1)
Environmental toxins	19 (65.5)	7 (24.1)	3 (10.3)

Microbiome dysbiosis	20 (68.9)	8 (27.5)	1 (3.4)
Excessive oestrogen	20 (68.9)	6 (20.6)	3 (10.3)
Genetics	24 (82.7)	3 (10.3)	0 (0.0)
Inflammation	28 (96.5)	1 (3.45)	0 (0.0)
Retrograde menstruation	15 (51.7)	6 (20.6)	8 (27.5)
Intercourse while menstruating	0 (0.0)	11 (37.9)	16 (55.1)
Imbalance of oestrogen/progesterone ratio	19 (65.5)	5 (17.2)	4 (13.7)
Poor liver detoxification	19 (65.5)	6 (20.6)	4 (13.7)
Poor dietary intake/habits	19 (65.5)	4 (13.7)	6 (20.6)
Risk of endometriosis			
Early menarche	10 (34.4)	15 (51.7)	2 (6.9)
Environmental exposures	25 (86.2)	3 (10.3)	1 (3.4)
Excessive consumption of alcohol	12 (41.3)	11 (37.9)	5 (17.2)
Family history of endometriosis	26 (89.6)	2 (6.9)	1 (3.4)
Irregular menstrual cycle	12 (41.3)	8 (27.5)	8 (27.5)
Lack of exercise	10 (34.4)	7 (24.1)	11 (37.9)
Low body weight	4 (13.7)	8 (27.5)	16 (55.1)

Multiple sexual partners	2 (6.9)	3 (10.3)	22 (75.8)
Tampon usage	5 (17.2)	12 (41.3)	12 (41.3)
Poor liver detoxification	21 (72.4)	5 (17.2)	3 (10.3)
Poor dietary intake/habits	20 (68.9)	4 (13.7)	5 (17.2)

9.5.3 Naturopathic treatment aims

Most naturopaths indicated that their main aim for endometriosis management was to reduce inflammation (n=27, 93.1%). Other frequently reported treatment aims were supporting gastrointestinal function (n=25, 86.2%), promoting oestrogen detoxification (n=25, 86.2%), and reducing exposure to environmental toxins (n=24, 82.7%) (see Table 21).

Table 21: Frequently reported naturopathic treatment aims for women with endometriosis as reported by participating naturopaths in clinical practice.

	Naturopathic treatment aims		
	Always/Very often	Sometimes/Rarely	Never
	n (%)	n (%)	n (%)
Primary naturopathic treatment aim			
Reducing inflammation	27 (93.1)	1 (3.4)	0 (0.0)
Addressing autoimmune factors	14 (48.2)	12 (41.3)	1 (3.4)
Addressing immune dysregulation	20 (68.9)	8 (27.5)	0 (0.0)
Balancing oestrogen and progesterone ratios	19 (65.5)	9 (31.0)	0 (0.0)
Promoting oestrogen clearance	25 (86.2)	3 (10.3)	0 (0.0)
Reducing environmental toxins	24 (82.7)	4 (13.7)	0 (0.0)

Microbiome modulation	21 (72.4)	7 (24.1)	0 (0.0)
Supporting gastrointestinal function	25 (86.2)	1 (3.4)	1 (3.4)
Modulating the hypothalamic pituitary ovarian axis (HPO axis)	21 (72.4)	7 (24.1)	0 (0.0)

9.5.4 Frequent presenting patient complaints and outcomes

Participants frequently reported that dysmenorrhea was the most common presenting complaint by women with endometriosis identified in their clinical practice (n=27, 93.1%), followed by menorrhagia (n=24, 82.7%), chronic pelvic pain (n=23, 79.3%), and abdominal bloating (n=23, 79.3%). Naturopaths indicated that women most regularly experienced an improvement in general wellbeing (n=23, 79.3%), QoL (n=23, 79.3%), a reduction in dysmenorrhea (n=22, 75.8%), and use of pharmaceutical pain medication (n=21, 72.4%) after receiving naturopathic care for endometriosis management (see Table 22).

Table 22: Presenting complaints of women with endometriosis who sought care from a naturopath as reported by study participants naturopaths in clinical practice.

	Presenting complaints by women with endometriosis		
	Always/Very often	Sometimes/Rarely	Never
	n (%)	n (%)	n (%)
Presenting complaint			
Dysmenorrhea	27 (93.1)	1 (3.4)	0 (0.0)
Menorrhagia	24 (82.7)	4 (13.7)	0 (0.0)
Chronic pelvic pain	23 (79.3)	4 (13.7)	0 (0.0)
Infertility	20 (68.9)	8 (27.5)	0 (0.0)

Preconception care	16 (55.1)	11 (37.9)	0 (0.0)
Dyspareunia	9 (31.0)	18 (62.0)	0 (0.0)
Abdominal bloating	23 (79.3)	5 (17.2)	0 (0.0)
Constipation	18 (62.0)	10 (34.4)	0 (0.0)
Diarrhoea	11 (37.9)	17 (58.6)	0 (0.0)
Lower abdominal pain without menstruation	15 (51.7)	12 (41.3)	1 (3.4)
Musculoskeletal pain	16 (55.1)	11 (37.9)	1 (3.4)
Fatigue	21 (72.4)	7 (24.1)	0 (0.0)
Primary treatment patient outcomes			
Improved fertility	18 (62.0)	3 (10.3)	0 (0.0)
Improved general wellbeing	23 (79.3)	0 (0.0)	0 (0.0)
Improved quality of life	23 (79.3)	0 (0.0)	0 (0.0)
Pregnancy	13 (44.8)	7 (24.1)	0 (0.0)
Reduced episodes of dyspareunia	13 (44.8)	9 (31.0)	0 (0.0)
Reduced episodes of menorrhagia	18 (62.0)	4 (13.7)	0 (0.0)
Reduced episodes of dysmenorrhea	22 (75.8)	1 (3.4)	0 (0.0)
Reduced episodes pelvic pain	19 (65.5)	4 (13.7)	0 (0.0)
Reduced pharmaceutical usage	21 (72.4)	2 (6.90)	0 (0.0)

9.5.5 Multidisciplinary care and referrals

The most common referral from a naturopath was to a GP (n=12, 41.3%), acupuncturists/TCM practitioners (n=11, 37.9%), and gynaecologists (n=9, 31%). Their main reasons

for referral were that they had identified a need for multidisciplinary team care (GPs: n=10, acupuncturists/TCM practitioners: n=10, gynaecologists: n=8), the women's symptoms had not improved after naturopathic care (GPs: n=7, acupuncturists/TCM practitioners: n=8), and the naturopath felt the case was outside of their scope of practice (GPs: n=7, acupuncturists/TCM practitioners: n=7, gynaecologists: n=5) (see Table 23).

Table 23: Referrals and multidisciplinary care management by participating naturopaths in clinical practice who consult with women for endometriosis care.

Referrals from naturopaths to other health care professionals*	n (%)	Reasons for referrals to other health care professionals							
		Outside of scope of practice	Advanced endometriosis	Diagnosed with another reproductive disease	Patient requested referral	Symptoms not improved aftercare	Referral for specialist care	Needs a multidisciplinary team	Transfer of care
		n	n	n	n	n	n	n	n
Acupuncturist/T CM	11 (37.9)	7	4	3	6	8	1	10	3
Chiropractor	2 (6.9)	2	2	1	1	2	1	2	0
Fertility Specialist	2 (6.9)	2	2	3	2	2	0	2	2
General Practitioner	12 (41.3)	7	4	4	4	7	3	10	3
Gynaecologist	9 (31.0)	5	3	3	5	5	2	8	2

Laparoscopic surgeon	7 (24.1)	4	2	2	4	4	1	7	2
Massage therapist	3 (10.3)	2	1	1	1	2	1	3	2
Osteopath	6 (20.6)	5	4	3	4	6	0	6	2
Pain Specialist	3 (10.3)	2	2	2	3	2	0	3	2
Physiotherapist	4 (13.7)	2	1	1	2	1	1	4	1
Psychologist	8 (27.5)	6	5	4	5	5	2	8	2

**Only frequencies are reported due to the low responses to the survey item.*

Participants reported commonly receiving referrals from GPs (n=8, 27.5%), psychologists (n=6, 20.6%), acupuncturists/TCM practitioners (n=5, 17.2%), nutritionists/dietitians (n=5, 17.2%), and osteopaths (n=5, 17.2%). Naturopaths reported that the main referral reason from these professions was the need for a multidisciplinary team (GPs: n=8, psychologists: n=6, acupuncturists/TCM practitioners: n=5, nutritionists/dietitians: n=5, osteopaths: n=6) (see Table 24).

Table 24: Referrals from other health care practitioners to participating naturopaths in clinical practice who consult with women for endometriosis management.

Referrals from other health care practitioners to naturopaths*	n (%)	Referrals received from naturopaths from other health care professionals			
		Patient requested referral	Symptoms not improved aftercare	Needs a multidisciplinary team	Transfer of care
		n	n	n	n
Acupuncturist/TCM practitioner	5 (17.2)	1	1	5	2
Chiropractor	2 (6.9)	2	2	1	1
Fertility Specialist	2 (6.9)	0	1	2	1
General Practitioner	8 (27.5)	3	2	8	3
Gynaecologist	1 (3.4)	0	0	1	0
Homeopath	1 (3.4)	0	0	1	0
Laparoscopic surgeon	1 (3.4)	0	0	1	0
Massage therapist	4 (13.7)	3	2	4	2
Nutritionist/Dietitian	5 (17.2)	2	3	5	4

Osteopath	5 (17.2)	2	1	5	1
Pain Specialist	1 (3.4)	0	1	1	1
Pharmacist	2 (6.9)	1	1	2	1
Physiotherapist	3 (10.3)	1	2	3	2
Psychologist	6 (20.6)	2	2	6	3

*Only frequencies are reported due to the low responses to the survey item.

9.6 Discussion

An important aspect to consider for this research is the different perspectives in health care from naturopaths compared to conventional practitioners. In the context of this study, some results may not align with contemporary medical knowledge of endometriosis. This relates to the differences in terminologies, definitions, and approaches between the two aforementioned health care professions (Graham et al., 2022b; Lloyd, 2021a; Zollman & Vickers, 1999). While differing viewpoints between naturopathy and conventional health care are known and documented (Wardle et al., 2014), this study adds to previous work by enhancing the understanding of the value and potential role and application of naturopathy in a complex disease like endometriosis.

The majority of naturopaths involved in this study identified inflammation and genetics as the causes of endometriosis. While the pathogenesis of endometriosis is unclear, (Koninckx et al., 2019; Taylor et al., 2021), both inflammation and genetics are involved in the proposed pathogenesis theories commonly accepted by contemporary clinicians and researchers (Taylor et al., 2021). Whether inflammation is the factor that perpetuates the disease is not yet known (Samimi et al., 2019; Taylor et al., 2021). However, increasing evidence suggests that endometriosis may be a systemic inflammatory disease due to notable increases in activated macrophages and inflammatory cytokines (Burney & Giudice, 2012; Taylor et al., 2021). The self-reported focus on inflammation in naturopathic practice by naturopathic participants in this study differs slightly from current contemporary clinical perceptions. Medical knowledge does not define endometriosis to be caused by inflammation, however, inflammation is acknowledged as an essential aspect of its pathogenesis and symptomatology (Samimi et al., 2019; Taylor et al., 2021). Some study participants from a primary care practice study have also stated their patient's primary concern was symptoms that can be caused by inflammation, such as dysmenorrhea and chronic pelvic pain (Gruber & Mechsner, 2021). To address these concerns, participants in this study described aiming to reduce inflammation, as well as

supporting gastrointestinal function and promoting oestrogen clearance. These three aspects of naturopathic care for endometriosis demonstrate that naturopaths may be addressing the philosophical principles *Tolle causam* (treat the cause) and *Tolle totum* (treat the whole person) by focusing on multiple factors in endometriosis pathophysiology. While the clinical naturopathic approach to endometriosis has complexities (Graham et al., 2022b), the approach identified through our study highlights that naturopaths are targeting a key area of endometriosis pathophysiology in an attempt to achieve positive patient outcomes such as QoL and reducing dysmenorrhea. While this approach to care is important in endometriosis management, the efficacy and impact of the naturopathic approach in modulating inflammation-related symptoms remain unclear and warrant further detailed examination.

Genetics was also considered a cause and risk of endometriosis by participants in our study. The inheritable nature of endometriosis has gained research attention as part of the potential cause of the disease (Montgomery et al., 2020; Rahmioglu et al., 2015). However, clear identification of genetic variations and inheritance patterns has yet to be fully established (Rahmioglu et al., 2015; Taylor et al., 2021), although familial aggregation is known to be a high-risk factor for endometriosis (Sourial et al., 2014). Familial aggregation and linkage analysis studies have identified endometriosis in first-degree family members with continued prevalence in second- and third-degree family members (Vassilopoulou et al., 2019). In Australia, naturopathic curricula do not include in-depth training in genetics but do include the role of genetics in disease processes to understand an individual's metabolic and physiologic risk (Lloyd, 2021a). Identifying genetics as a cause and risk factor in endometriosis may be indicative of the naturopathic philosophy holism, the naturopathic principle treat the whole person (*Tolle totum*), and the determinants of health. All of which are focal points in naturopathic philosophies and principles. This holistic approach may present in clinical practice by addressing risk factors that may increase the likelihood of endometriosis such as environmental

exposures (e.g., dioxin, polychlorinated biphenyls, diethylstilbestrol) (Wieczorek et al., 2022).

Additionally, this approach may draw on features of precision medicine whereby naturopaths employ individualised treatments supported by the philosophical underpinnings of their clinical care (Schloss et al., 2019). The approach to using features of precision medicine may be through the understanding of individual genetics and lifestyle factors that impact disease. Precision medicine is considered a transformational approach to health care by understanding genetic material that impacts disease development and takes into consideration differences in genes to ensure a therapeutic and individualised treatment approach is applied (König et al., 2017). While consideration of genetics is important, naturopaths drawing on features of precision medicine may be demonstrating innovative care within naturopathy. However, it could lead to the potential use or overuse of complex or ineffective treatments as an indiscriminate approach rather than resulting in a more conservative approach to endometriosis care. As this study did not collect data on genetic treatments or tests recommended by naturopaths, research focused on this topic is warranted.

Findings in this study suggest that naturopaths aim to support gastrointestinal function and the promotion of oestrogen clearance in endometriosis care presenting more 'traditional' approaches to management in naturopathy. Interestingly, both abdominal bloating and menorrhagia were reported as frequent presenting concerns by women with endometriosis. The gastrointestinal system is an important aspect of naturopathic care for reasons relating to its bi-directional function in endocrine, neural, and immunological bio-mechanisms (Skonieczna-Żydecka et al., 2018). Naturopaths have historically targeted the gastrointestinal system to improve immunological functioning, reduce systemic inflammatory processes, balance regulatory systems, and optimise metabolic functioning (Sarris & Wardle, 2014). Based on these long-standing practices, it can be hypothesised that participants in this study may potentially be targeting this biological

system for several reasons. The rationale for addressing gastrointestinal involvement in endometriosis may relate to the immunomodulation and inflammatory process known within the microbiome (Leonardi et al., 2020a) and addressing abdominal symptoms (such as bloating and IBS) (Ek et al., 2015; Viganò et al., 2018). From a naturopathic perspective supporting the gastrointestinal system may also promote oestrogen clearance by reducing the reabsorption of deconjugated oestrogen (Trickey, 2011). However, despite the significant historic focus of gastrointestinal links to reproductive disease management in naturopathic practice – confirmed as still prevalent in contemporary naturopathic practice by the findings from this study – the effectiveness of this approach in endometriosis and symptom management is currently unknown and warrants further examination.

Naturopaths in our study appear to attempt multidisciplinary care by referring women with endometriosis to and receiving referrals from both practitioners within conventional medicine and T&CM professions. Naturopaths reported referring to GPs primarily for a multidisciplinary approach to endometriosis care. GPs are well-positioned to provide collaborative support for women with endometriosis with the use of prescribed pharmaceuticals and additional referrals, both of which are commonplace in endometriosis care (Taylor et al., 2021; Young et al., 2016). Referrals to T&CM practitioners – acupuncturists/TCM practitioners – may be indicative of the supportive evidence for these practitioners in treating endometriosis, particularly pelvic pain, and dysmenorrhea (Lund & Lundeberg, 2016; Mira et al., 2018; Xu et al., 2017). Likewise, the reported referrals from health care practitioners (such as GPs and psychologists), indicate that these referrals to naturopaths were conducted to establish a multidisciplinary team approach for endometriosis care. This suggests that naturopaths may be a profession to consider for endometriosis multidisciplinary management.

Multidisciplinary care is an essential factor in ensuring adequate evaluation of endometriosis and improvement in patient outcomes (Agarwal et al., 2019b; O'Hara et

al., 2020). While the findings of referrals in our study are important, there is some evidence of poor communication between naturopaths and other health care professionals based on previous evidence (Wardle et al., 2014). Poor communication between naturopaths and other health care professionals is a barrier to supporting effective and patient-led multidisciplinary care, which is deeply needed for women with endometriosis. Reasons for poor multidisciplinary collaboration between naturopaths and conventional health care practitioners are often attributed to the differences between philosophical frameworks, negative professional perception of naturopathy, professional competition, and questionable validity of naturopathic care (Wardle et al., 2013a; Wardle et al., 2014). The limited cross-communication between naturopathy and conventional health care professions often relies on the patient to pass knowledge between both health care practitioners (Foley et al., 2019; Ng et al., 2020). Ensuring open and respectful communication between health care practitioners is important in providing optimal care for individuals using these professions (McIntyre et al., 2019; Reid et al., 2016). Therefore, infrastructure improvement is needed to encourage cross-health care collaborations to deliver safe and effective multidisciplinary care involving naturopaths for women with endometriosis.

9.6.1 Limitations

Limitations regarding the low response rate in this study are noted. As low response rates are common within health care professions (Cho et al., 2013), this study attempted to counter this by recruiting through a PBRN as evidence indicates that health care practitioners who are members of a PBRN may exhibit greater research participation (Calmbach et al., 2012). However, given the sample was drawn from a PBRN, the results may not be generalisable and there were administrative limitations on the number of PBRN email reminders enforced by the PBRN Sub-study Guidelines that may have contributed to the small sample size. The design of the survey may have been implicated with researcher bias, as the student developed the domains covered in this chapter

based on a variety of knowledge and information sources such as naturopathic understanding of endometriosis and contemporary scientific evidence regarding medical information of endometriosis. However, this approach may have also strengthened the survey design as the student is a clinically trained naturopath. Additionally, the pilot testing was conducted with clinical naturopaths. Additional limitations are noted regarding participation bias and non-responders bias due to the self-administered design of the survey. The survey instrument was designed and pilot tested to ensure alignment to the naturopathic philosophical principles and perspective in clinical care. As such, the results are from a naturopathic perspective which may differ from standard conventional approaches. For example, participants in this study indicated inflammation as a cause of endometriosis. While the direct cause of endometriosis has yet to be identified, inflammation is an essential component of endometriosis pathophysiology (Taylor et al., 2021). An additional limitation to take into consideration relates to the perspective of the effectiveness of naturopathic treatments by the participants in this study and that these participants self-reported having clinical expertise in endometriosis care. As such, naturopaths with insufficient endometriosis knowledge may pose a risk to women seeking care. Nevertheless, this is the first time to our knowledge that research has examined the naturopathic knowledge and clinical approach to endometriosis care from experienced naturopaths with clinical expertise in managing menstrual disorders. The findings present important insights into the naturopathic approach to care for women with endometriosis in the Australian community. These findings may help to understand the naturopathic approach to managing endometriosis for medical doctors, integrative doctors, and allied health care practitioners who may consider a collaborative care approach with a naturopath either at their discretion or if a woman with endometriosis is also seeking care from a naturopath. This study provides foundational information that can inform the design and implementation of specific naturopathic research for endometriosis that can be evaluated in more rigorous designs.

9.6.2 Further research

This study provides a preliminary exploration of naturopathic care for the management of endometriosis. However, further research is needed to examine this topic in greater detail. Given the context and methodology used in this study, the ability to capture the depth of the naturopathic patient-centred care approach and the naturopathic perspective to care is a missed opportunity. Research reporting on naturopathic perspectives in care is in its infancy with some research conducted on cardiovascular disease (Harnett et al., 2022; Steel et al., 2020d). However, the naturopathic perspective on endometriosis care has yet to be explored. As the naturopathic approach to endometriosis appears to align with emerging scientific evidence of disease pathophysiology in some areas, additional research is needed to explore the effectiveness of naturopathic care in endometriosis management. Exploring how naturopaths understand and apply new technological advances such as genetic tests and advancements in the clinical setting and how technological advances may be able to link to naturopathic philosophical approaches also warrants investigation as there may be clinical opportunities or pitfalls in applying scientific advancements within a philosophically based profession. To effectively capture naturopathic understanding and conceptual philosophical approaches to endometriosis further research is needed in line with research frameworks that support naturopathic philosophy. As such, additional research utilising complexity science could be developed to capture rich data on the contemporary holistic approach to endometriosis care (Graham et al., 2022b). Additionally, the investigation of patient outcomes from naturopathic care for endometriosis management also requires attention. The naturopathic approach of targeting gastrointestinal support for women with endometriosis also requires a richer investigation to ascertain the benefit of managing the gastrointestinal system and presenting symptoms that are common with the presentation of endometriosis. Further research is also needed to provide a deeper examination of the role and value

naturopaths may play in the multidisciplinary team approach to endometriosis care, to inform evidence-based incorporation of naturopathic services in endometriosis management, if and when appropriate.

9.7 Conclusion

Naturopathic knowledge and management of endometriosis targets known problematic areas of endometriosis that can have debilitating effects on women's QoL. Naturopathic care has the potential to align with important health outcomes for women with endometriosis. However, further attention is needed to assess the effectiveness and continue to establish a multidisciplinary approach involving naturopathic care.

9.8 Chapter summary

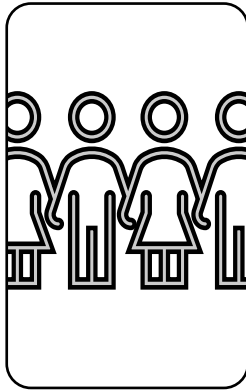
In summary, the results in this chapter have explored the naturopathic knowledge and clinical approach to managing endometriosis in naturopathic clinical care. The findings indicate that naturopaths who regularly consult with women for endometriosis management apply their naturopathic and medical knowledge in targeting key areas of endometriosis pathophysiology. This approach in naturopathic clinical care is established through a holistic framework whereby naturopaths are not only targeting singular biological systems but multiple biological systems where endometriosis symptoms and disease impacts may be involved. In addition, the findings also report that naturopaths are openly referring to other health care practitioners for endometriosis care, which was primarily due to the identification of women with endometriosis needing multidisciplinary care. To fully adopt these results into clinical practice for the benefit of women with endometriosis, other health care practitioners that consult with women for endometriosis who may benefit from naturopathic care, need to ensure open communication between naturopaths who have clinical experience and knowledge in endometriosis. Doing so may be supportive in establishing a multidisciplinary and coordinated approach for women with endometriosis.

Chapter 10. Discussion

10.1 Chapter Introduction

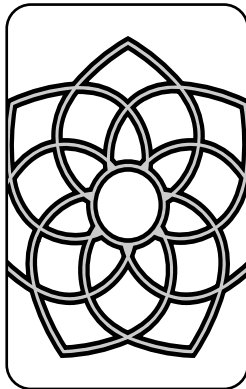
The results reported in this thesis by compilation detail preliminary evidence into the treatments and approaches of managing endometriosis in Australian naturopathic clinical practice. The thesis examined the health care utilisation of women with endometriosis who seek care from naturopaths and described the naturopathic treatments used by naturopathy users. This thesis provides an account of the clinical aspects of naturopathic treatments, including historical and contemporary treatments drawing from traditional naturopathic and biomedical paradigms, and outlines the knowledge of naturopaths for the management of endometriosis in contemporary clinical settings. The collective findings of this thesis (described in Appendix 10.1) suggest some alignment between the naturopaths' historical and philosophically-informed knowledge and treatments of endometriosis and contemporary medical understanding of endometriosis and its pathophysiology. This perspective is primarily discussed in Chapter 9, but some overarching concepts are explored in Chapter 10.2. The naturopathic treatments described in the results of this study suggest that some specific naturopathic treatments may have plausible activity in endometriosis pathophysiology. The naturopathic treatments are drawn on traditional and contemporary knowledge and are further examined from a scientific perspective based on the mechanism of action and association in endometriosis pathophysiology in this chapter. Despite the potential in this area, little remains known of such naturopathic treatments and their plausibility and effectiveness in endometriosis care. While women with endometriosis may already be using some of the naturopathic treatments detailed in this thesis, further research is warranted to determine suitable utilisation in endometriosis care. The final following chapter explores the thesis findings within the framework of the Australian Endometriosis Clinical Practice Guideline (outlined in Chapter 1.7.2). The thesis results will be

described as they relate to three key recommendations of the Australian Endometriosis Clinical Practice Guideline (see Figure 11) pertaining to multidisciplinary and interdisciplinary care to manage endometriosis (Guideline recommendation 3.6), factors that can guide treatment of endometriosis (Guideline recommendation 3.9), and non-pharmacological and non-surgical management for pain associated with endometriosis (Guideline recommendation 3.15) (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August).



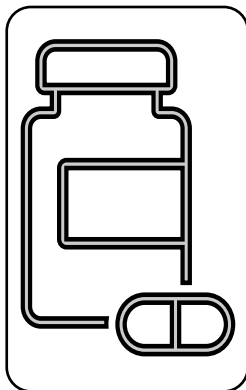
Guideline recommendation 3.6: Interdisciplinary care to manage endometriosis

- Gynaecologists may consider multidisciplinary input to manage people with endometriosis, for example, where:
 - bladder, bowel, ureter involvement is suspected based on history, examination or investigations,
 - medical or surgical treatments have failed to improve symptoms,
 - musculoskeletal or neuropathic contributions to pain are suspected,
 - pain affects daily functioning,
 - there are diet and bowel related issues,
 - there are mental health and social impacts.



Guideline recommendation 3.9: Factors that can guide treatment of endometriosis

- Offer treatment according to the person's symptoms, preferences and priorities, rather than the stage of the endometriosis. Treatment should be patient focused, considering the person's physical, psychological, sexual, social, spiritual and cultural needs and preferences.



Guideline recommendation 3.15: Non-pharmacological and non-surgical managements for pain associated with endometriosis

- Advise people that there is no evidence to support the use of Chinese herbal medicines or supplements for treating endometriosis, and that there are concerns relating to potential harms associated with their use
- Advise people that there is limited evidence on the effectiveness of acupuncture for the management of endometriosis pain.

Figure 11: Key clinical care recommendations of contemporary endometriosis management based on the Australian Endometriosis Clinical Practice Guideline that are mapped to the findings of this study.

10.2 Interdisciplinary care to manage endometriosis

The following section discusses the results of this thesis as related to the Australian Endometriosis Clinical Practice Guideline recommendation 3.6 - *Interdisciplinary care to manage endometriosis*. In reference to the Australian Endometriosis Clinical Practice Guideline, this section will explore the health care utilisation of women with endometriosis and women's self-selected approach to utilising multidisciplinary endometriosis care. Additional mention of the naturopathic approach to endometriosis from naturopath-led multidisciplinary care is also described. The following section also acknowledges the potential opportunities and challenges of multidisciplinary care involving naturopaths. Lastly, women's experiences of endometriosis by women who self-report naturopathy use are further explored.

10.2.1 Women with endometriosis self-select multidisciplinary care

The results of the patient survey (detailed in Chapter 5) identified that one in five women with endometriosis use naturopathy as a primary health care approach or in addition to consultations with their primary health care practitioner. The multidisciplinary approach to care by naturopathy users highlights women are utilising both CM and conventional health care practitioners for endometriosis management. Health care-seeking behaviour that includes multiple health care professions demonstrates that women with endometriosis are self-selecting multidisciplinary endometriosis care. The self-selected multidisciplinary approach that is led by women with endometriosis evidenced in this thesis, appears to align with current recommendations that multidisciplinary care is central in endometriosis management and such an approach could incorporate both CM and conventional health care (Agarwal et al., 2019b). As women with endometriosis are known to be frequent health care users (Eisenberg et al., 2022; Fuldeore et al., 2015) it is possible that various unmet health care needs including dissatisfaction with care and negative health outcomes (As-Sanie et al., 2019; Steele et al., 2019) are contributing to the self-selected multidisciplinary approach described in the patient survey of this thesis.

Importantly, despite receiving gold standard endometriosis treatment (i.e., laparoscopic excision surgery), some women still report negative experiences and health outcomes from standard endometriosis approaches and treatments (As-Sanie et al., 2019; Steele et al., 2019). For some women with endometriosis, standard care including laparoscopic surgery may not meet women's individual needs which can further contribute to complementary health care seeking avenues such as naturopathy (Schwartz et al., 2019). Other previous studies have identified that self-selected naturopathy use could be the result of dissatisfaction with the current standards of endometriosis care or the woman's belief that non-pharmaceutical treatments may have better efficacy than standard endometriosis treatments (Adamietz et al., 2021; Márki et al., 2022; Schwartz et al., 2019). Given the potential rationale for naturopathy use by women with endometriosis in the aforementioned studies, further research is needed to explore naturopathic care for endometriosis, particularly involving potential benefits and risks.

As suggested by the findings presented in the patient survey (detailed in Chapter 5), women with endometriosis may be self-selecting multidisciplinary care, yet there are potential risks if this is not managed appropriately. For example, there is the possibility that women could have a longer delay in diagnosis if appropriate medical care is not sought (Wardle et al., 2017), particularly for women with suspected endometriosis. As women with endometriosis are often prescribed first-line treatments including the oral contraceptive pill and pain relieving medications (Mechsner, 2022; Nezhat et al., 2019), there may also be potential interactions between herbal or clinical nutritional medicines and pharmaceuticals prescribed in endometriosis management. Without proper oversight of care, women may unknowingly put themselves at risk of such adverse events. Additionally, naturopathic care may further pose concerns for women with endometriosis, specifically in relation to inconsistent standards of care and treatments, which may further incur out-of-pocket costs. However, given the frequent use of self-selected CM use by women with endometriosis, naturopaths (where appropriately

trained) may also potentially be a resource to help women with endometriosis navigate their use of CM treatments, especially if women with endometriosis are unlikely to trust or disclose their CM use to their primary health care practitioner (Wardle & Adams, 2014). Additional caution is also required due to the unregistered status of naturopathy in Australia (Lloyd, 2021b) and as a consequence, individuals without adequate training may practise using the title '*naturopath*', which is a large factor behind variable standards of practice and training in Australia (Wardle & Adams, 2014). Thus, where naturopathic care is integrated into multidisciplinary care, it should be conducted by a qualified and experienced naturopath who has clinical experience in managing endometriosis and awareness of treatment approaches that may potentially combat any theoretical risks between poorly integrated care. There is also potential for women with endometriosis to seek care from a naturopath who does not apply the most evidence-based approaches in managing endometriosis, which could pose a risk to effective and safe health care utilisation. Although, if naturopaths are involved within a multidisciplinary approach there is a possibility that such risks are minimised across the health care team. For example, research suggests that a multidisciplinary approach to endometriosis care can have health care practitioner benefits such as improved clinical decision-making which could contribute to a reduction in potential patient risks and improvement in positive patient outcomes (Ugwumadu et al., 2017). While it is currently unknown as to why women with endometriosis consult with naturopaths, women with endometriosis are evidently leading their own multidisciplinary care that includes naturopathy, and the potential benefits and risks of further integration of naturopathic care in endometriosis management warrants further examination.

10.2.2 Opportunities, challenges, and issues associated with naturopaths' inclusion in multidisciplinary endometriosis care

The results outlined in the textual analysis and practitioner survey (Chapters 7 and 9, respectively) suggest that naturopaths often lead a multidisciplinary care approach to the

management of endometriosis. The long history of traditional naturopathic evidence sources supporting a multidisciplinary approach includes allied and CM professions as described in the results of this study. Recommendations based on traditional naturopathic evidence advocating for multidisciplinary care for endometriosis appear to have influenced contemporary naturopathic practice as described in Chapter 9. In addition, the practitioner survey also highlights that naturopaths recognise the need for women with endometriosis to receive multidisciplinary care for endometriosis management. In comparison, the recommendations for multidisciplinary referrals mentioned in the textual analysis (detailed in Chapter 7) describe limited multidisciplinary approaches which primarily focus on referrals to other CM practitioners such as acupuncturists and massage therapists rather than biomedical or allied health practitioners. The referrals noted in the practitioner survey identified both conventional and CM practitioners such as acupuncturists, gynaecologists, psychologists, and laparoscopic surgeons as being common in contemporary Australian naturopathic referral networking. The thesis findings suggest that naturopaths in Australia are aware of the need to incorporate multidisciplinary care into clinical endometriosis care. Health care practitioners who may collaborate with naturopaths for endometriosis care may provide additional benefits to women who seek care from naturopaths. As a primary health care service that is utilised by women with endometriosis (see Chapters 5 and 8), naturopaths may enhance their clinical care by reducing potential and known risk factors through health promotion advice (Seely et al., 2013), providing preventive measures through scientifically validated dietary and lifestyle recommendations (Stanbrook, 2013), supporting an integrative approach through educational health resources (Bradley et al., 2019), and the potential to provide up-to-date advice on interactions between CM and other treatments and pharmaceuticals. A study by Omtvedt et al. (2022) demonstrated nearly all participants who were women with diagnosed endometriosis and/or adenomyosis, desired a multidisciplinary approach involving health care practitioners

who were trained in supporting the lifestyle implications of endometriosis (Omtvedt et al., 2022). While this study did not explicitly identify naturopaths, it is worthwhile to consider the appropriateness of naturopathic care in the delivery of lifestyle recommendations for endometriosis given the reported scope of practice of naturopaths in this modality (World Naturopathic Federation, 2016). While the above-mentioned points appear promising for naturopaths to be involved in multidisciplinary endometriosis care, naturopaths received fewer referrals from other health care practitioners, compared to the frequency of naturopaths referring to other health care practitioners for endometriosis management as detailed in the practitioner survey. The discrepancy in fewer referrals to naturopaths may be attributed to the challenges that naturopathy faces with multidisciplinary and interdisciplinary care (Wardle et al., 2017). The evidence of multidisciplinary care in primary naturopathic practice is scant at best, with one study highlighting significant barriers that may contribute to limiting naturopathy involvement in multidisciplinary care (Wardle et al., 2014). Emerging evidence emphasises that health care practitioners in primary practice such as GPs have low referral rates to naturopaths (Lin et al., 2009; Wardle et al., 2014). There are acknowledged barriers to the inclusion of naturopathy in multidisciplinary collaborations with other health care practitioners (Leach et al., 2021; Wardle et al., 2017) which impact naturopaths contributing to multidisciplinary care for women with endometriosis. Such barriers may include professional tensions between naturopathy and conventional health care (Dunn et al., 2021), including conflicts between naturopaths and GPs (Lin et al., 2009; Wardle et al., 2014), opposing philosophical frameworks, the perception of competition between health care practitioners (Wardle et al., 2017), the limited evidence of safety and efficacy of naturopathic care (Ooi et al., 2018), that naturopathy is an unregistered profession in Australia (Leach & Steel, 2018), and a perception that naturopathy is a pseudoscience, as described amongst some health care professions (Atwood, 2004; Kaufman & Kaufman, 2018). Additionally, healthcare systems have created a pragmatic barrier whereby naturopaths are often not

included in public services or subsidised services (Leach & Steel, 2018), therefore making it more difficult to generate cross referrals for multidisciplinary and interdisciplinary care. Acknowledging that naturopaths are driving multidisciplinary care for women with endometriosis, assessment of the barriers and facilitators for multidisciplinary care involving naturopaths could be a priority in an attempt to establish multidisciplinary frameworks in endometriosis care. Doing so, may support women who seek naturopaths for endometriosis care and ensure that cross communications are established amongst health care practitioners in order to provide optimal and personalised comprehensive care.

10.2.3 Characteristics of naturopathy users to support multidisciplinary care

This study's findings (see Chapter 5) suggest that women who use naturopathy experience diarrhoea and dyspareunia more frequently than non-naturopathy users. In addition to these experiences by naturopathy users, naturopaths in the practitioner survey (as described in Chapter 9) reported that women with endometriosis who sought care commonly experienced menorrhagia, chronic pelvic pain, and abdominal bloating. While these symptoms are not uncommon in endometriosis more generally (Moradi et al., 2020), these findings indicate some of the experiences of endometriosis by women who use naturopathy are more complex than those who do not use naturopathy. Some evidence suggests that naturopathy users are more likely to have poorer health compared to non-naturopathy users (Adams et al., 2007; Steel et al., 2019b) with speculation that this may be due to the end of a treatment journey that has been unsuccessful and naturopathy users exhausting other health care options prior to accessing naturopathic care.

Other studies highlight that women's health concerns such as endometriosis are a major focus of Australian naturopathic practice. An Australian study recently identified naturopaths having a clinical interest in digestive complaints (84%) and women's health

concerns (79.4%) in their clinical practice, of which 83.7% reported 'often' consulting with patients for digestive complaints, 66.9% for IBS, and 61% for menstrual disorders (Steel et al., 2020e). Such findings suggest that naturopaths are aware of these complaints in clinical practice, but an exploration of these conditions to detail the representativeness of naturopathy users with endometriosis specifically has yet to be explored. Given the frequent level of utilisation of naturopaths by women with endometriosis as described in this study, and the significant level of endometriosis-associated symptoms observed by naturopaths in their clinical practice, gynaecologists have the opportunity to consider referrals to a naturopath for endometriosis multidisciplinary care. However, gynaecologists need to consider the benefits and risks of naturopathic care for women with endometriosis who present with these symptoms (i.e., IBS, digestive complaints, menstrual disorders) due to the limited research evidence describing the benefits of such an approach.

10.3 Factors that can guide treatment of endometriosis

This subsequent section details the thesis findings as they relate to the Australian Endometriosis Clinical Practice Guideline recommendation 3.9 – *Factors that can guide treatment of endometriosis*. Within this section, the exploration will examine naturopathy as a health care option for women with endometriosis, highlighting the patient-focused approach to care by naturopaths in managing endometriosis. The below section concludes with a discussion on the need for evidence-based endometriosis care as an aim of the Australian Endometriosis Clinical Practice Guideline and concerns about naturopathy use based on scientific evidence.

10.3.1 Naturopathy as a health care option for women with endometriosis

While this study has recognised that naturopathy is a health care option used by women with endometriosis (detailed in the patient and practitioner surveys in Chapters 5 and 8), currently, the Australian Endometriosis Clinical Practice Guideline does not recognise

naturopathy as a health care option for women with endometriosis and has only recently included naturopathy in an updated literature search to explore non-pharmacological and non-surgical treatment options for endometriosis (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). Although the Australian Endometriosis Clinical Practice Guideline suggests that, regardless of the health care service, health care practitioners need to recognise complementary health care options for women with endometriosis that align with women's needs and preferences (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). Similarly, Endometriosis Australia acknowledges that CM may be an option for some women with endometriosis, however, the current consensus supports examination with a health care practitioner on the best suitable treatment approach for individual women (Endometriosis Australia, 2021). In comparison, the National Action Plan for Endometriosis suggests the consideration of CM practitioners for endometriosis management whereby effective treatments have been demonstrated (Department of Health, 2018 September-b). While the above organisations and groups may acknowledge CM options for women with endometriosis, this study has identified that women are using both CM and naturopathy for endometriosis management. Given the complexity of the disease and the desire for long-term symptom relief, women with endometriosis are frequent health care users of both conventional and CM professions (Agarwal et al., 2019b). Research indicates that women with endometriosis often feel dissatisfied with their care which may contribute to a sense of disempowerment (Bullo, 2018) which could further influence health care-seeking behaviours. Women with endometriosis are known to seek alternative avenues of care due to unmet health care needs as a primary rationale (As-Sanie et al., 2019; Steele et al., 2019). Other reasons for women to seek care from naturopaths for endometriosis may pertain to a specific belief in the efficacy of naturopathy, some women with endometriosis may view naturopathy as a suitable health care service for endometriosis care (Tangkiatkumjai et

al., 2020), or aligned with their desire to feel empowered in successfully managing endometriosis (Malik et al., 2022). Health care practitioners need to recognise that naturopathy is a health care option readily taken up by some women with endometriosis as evidenced in this thesis, regardless of women's rationale for using naturopathy.

Irrespective of health care utilisation, the findings of this thesis suggest that endometriosis health care service use is complex, and as such health care practitioner awareness of potential naturopathy use is warranted for various reasons. Such rationale may include supporting positive health outcomes, appropriate utilisation of health care resources, and reducing often repeated health care seeking behaviours that may be futile for some women (Rowe et al., 2021). While speculation can be made about why naturopathy is being used as a health care option for women with endometriosis, justification for such use is outside of the research objectives of this thesis. Further research is needed to scrutinise the factors behind the use of naturopathy as an alternative or complementary approach to endometriosis care and the rationale for naturopathy health care-seeking behaviour by women with endometriosis.

10.3.2 Patient-focused endometriosis care

A vital factor that guides endometriosis treatment that is gaining research attention is the need for a patient-focused approach to clinical care (Geukens et al., 2018). Currently, a patient-focused approach to endometriosis management is a main component of the Australian Endometriosis Clinical Practice Guideline. The recommendation in the Australian Endometriosis Clinical Practice Guideline pertains to supporting women with personalised clinical care that focuses on women's needs and preferences while also addressing the physical, sexual, psychological, social, cultural and spiritual elements of health (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). In recent years, research has focused on the recommendation for comprehensive patient-focused care for endometriosis management which is in line with similar calls across the wider public health sector (World Health Organisation, 2018). The

increased emphasis on the quality of care for women with endometriosis can contribute to better patient outcomes and improve women's QoL (Schreurs et al., 2020). One systematic review reported that women with endometriosis who received patient-focused care reported finding value in the patient-focused care as well as the effectiveness and safety aspects of their clinical care (Dancet et al., 2014). As a health care service, naturopathy may have an opportunity to support the patient-focused approach recommended in the Australian Endometriosis Clinical Practice Guideline recommendation 3.9. According to an Australian CM study, the rationale for naturopathy use may be due to patients' preferences for a more patient-focused approach to care (Foley & Steel, 2017). Research indicates that patient-centred care models are not fully established in primary conventional health care (Delaney, 2018) which may be a missing element in endometriosis health care (Dancet et al., 2014) that may be due to implementation challenges (Ramlakhan et al., 2019).

The practitioner survey results, detailed in Chapter 9, suggest that naturopathy as a health care profession exhibits characteristics of care associated with a patient-centred approach which may be supportive for women with endometriosis. The patient-centred approach to care by naturopaths is further supported in the results of the textual analysis in Chapter 7 and practitioner survey results in Chapter 8. These findings also detail some relevance of patient-centred care through the lens of employing various clinical approaches and treatments that may have benefits for other aspects of women's health outside of direct endometriosis management (e.g., encouraging regular exercise, sleep hygiene practices, avoidance of environmental toxins). While the findings in this thesis demonstrate a theoretical framework of patient-centred care in naturopathic endometriosis management through multidisciplinary approaches and individualised treatments, further empirical exploration is required to fully comprehend the naturopathic patient-centred approach in endometriosis care, including its effectiveness on patient outcomes. An Australian study highlighted that naturopaths reported a patient-centred

care approach in a range of chronic disease conditions including some women with endometriosis (Foley et al., 2020) with evidence suggesting that participants desired a patient-centred approach to overcome unmet health care needs (Foley et al., 2020). The patient-centred approach within naturopathy has also been described in another Australian study by participants with cardiovascular disease where the patient-centred approach is an evident practitioner behaviour that supports patient care (Harnett et al., 2022; Steel et al., 2020d). Despite some evidence of naturopathy using patient-centred care in the Australian context, it is difficult to convey the value of naturopathy in endometriosis care from a patient-centred care perspective without clear evidence that demonstrates the efficacy of naturopathic patient-centred care on patient outcomes. Despite these gaps in the research evidence, acknowledgment that women are seeking care from naturopaths for endometriosis management is needed and further research attention is required to explore whether the patient-centric approach is a factor in women's health care-seeking behaviour involving naturopaths. Therefore, in direct support of the Australian Endometriosis Clinical Practice Guideline recommendation 3.9, health care practitioners such as gynaecologists are well-positioned to consider naturopathic care for women with endometriosis who desire to use naturopathy as a health care service. Within the single-provider model for endometriosis care, women with endometriosis often consult with gynaecologists to address their endometriosis needs including diagnosis, pharmaceutical, and surgical treatment needs. However, some women may not have their needs for a more patient-centred approach met due to the constrained consultation setting. Additionally, women with suspected or diagnosed endometriosis who consult with other health care practitioners such as GPs, often receive referrals to gynaecologists for surgical management and further treatment exploration (Agarwal et al., 2019b). In this instance, gynaecologists could consider the appropriateness of naturopathic care for women with endometriosis who disclose

interest in or use of naturopathy for endometriosis management, where more patient-centred forms of care are actively desired.

10.3.3 Evidence-informed clinical endometriosis care

An important point in the Australian Endometriosis Clinical Practice Guideline pertains to the need for evidence-based clinical care (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). As previously mentioned, the Australian Endometriosis Clinical Practice Guideline does not recommend naturopathic treatments as an approach to managing endometriosis (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). Comparison of other endometriosis clinical guidelines also do not recommend the use of CM or naturopathy, or specific treatments within a naturopathic scope of practice for endometriosis care (Kalaitzopoulos et al., 2021). The lack of recognition and recommendation of naturopathy use in endometriosis management pertains to the level of insufficient research in areas within the naturopathic scope of practice demonstrating efficacy in endometriosis care. For example, the Australian Endometriosis Clinical Practice Guideline states that women with endometriosis should not be discouraged from trying alternative treatments, but “should be cautioned about particular diets and herbal medicines because of uncertainty about interactions and concerns regarding side effects and lack of supporting evidence” (Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). Recent evidence suggests some promise in dietary approaches including clinical nutritional medicines outlined in this thesis, for managing endometriosis-associated symptoms, although, the reported level of bias in some studies restricts the successful application of the results to clinical practice (Nirgianakis et al., 2022).

An important component of a patient-focused approach to endometriosis care is that the clinical approach and treatments are based on evidence. While this thesis presents empirical evidence of naturopathy use for women with endometriosis (outlined in

Chapters 5, 6, 7, 8, and 9), as well as perceived effectiveness by these women and naturopaths who consult with women with endometriosis, evidence of clinical effectiveness is needed to support naturopathy use in endometriosis care. The lack of evidence for naturopathy use in this context creates tension between upholding patient-focused care and evidence-informed care, specifically as results from this thesis suggest that women are utilising naturopaths for clinical care and self-reporting effectiveness. The lack of evidence-informed care from a naturopathic perspective also creates concerns with the possible risk of naturopathic care and treatments that may be provided by a practitioner with limited knowledge and competence in delivering safe and effective endometriosis care as well as awareness of the potential polypharmacy of women with endometriosis and those that use regular pain-relieving pharmaceuticals. While this thesis has attempted to capture three main evidence sources (i.e., patient knowledge, traditional knowledge, and practitioner knowledge), that provide evidence of naturopathy use in endometriosis management, the study's findings suggest that naturopaths could be adequately informed to deliver safe and effective care (described in Chapters 8 and 9). Yet, appropriate research designs are needed to assess the effectiveness and safety of naturopathic treatments in endometriosis management. Currently, research that appears to be about naturopathy may not be associated with naturopathy and as such creates a false impression of the naturopathic evidence-base or a disassociation of the naturopathic scope of practice (Steel et al., 2019a). Until further naturopathic-specific research is generated, or research associated with naturopathic practice is appropriately identified, health care practitioners must be aware of any potential overlap and risks in delivering patient care to women with endometriosis who may use naturopathy.

10.4 Non-pharmacological and non-surgical management for pain associated with endometriosis

The following section discusses the relevance of the findings of this thesis to the Australian Endometriosis Clinical Practice Guideline recommendations 3.15 – *non-*

pharmacological and non-surgical management for pain associated with endometriosis.

Based on the findings of this thesis and the need to identify non-pharmaceutical pain treatments for endometriosis, the following section will describe the plausibility of naturopathic treatments identified in this thesis that may support the Guideline recommendation 3.15.

10.4.1 Herbal medicine use in endometriosis care

This thesis results highlight a range of naturopathic treatments that are being used by women with endometriosis as described in the patient survey (detailed in Chapter 5), recommendations from naturopathic traditional evidence and contemporary curricula described in the textual analysis (see Chapters 6 and 7), and in the practitioner survey by naturopaths who consult with women for endometriosis management in clinical practice (outlined in Chapter 8).

Identifying non-pharmaceutical treatments for endometriosis is gaining research attention with some evidence exploring treatments in the naturopathic scope of practice and hypothesising the plausibility in endometriosis pathophysiology (Balan et al., 2021; Gonçalves & Girol, 2022; Hartmann & McEwen, 2018; Rocha et al., 2012). Current evidence supports the suggestion that novel treatments need to address specific biological pathways such as apoptosis, chronic inflammation, oxidative stress, and proliferation (Balan et al., 2021; Rocha et al., 2012). Targeting known areas in endometriosis pathophysiology that are not well supported by current gold standard treatments, such as attention to women's QoL, symptom reduction, and modulation of endometriosis-associated pain, is required. As described in this thesis, inflammation was identified as a primary treatment aim applied in naturopathic endometriosis care by naturopaths in the practitioner survey (see Chapter 9). While research evidence on the mechanism of action for naturopathic treatments in endometriosis is still ongoing (Kong et al., 2014), some biological-based treatments such as herbal medicine and clinical

nutritional medicine have shown potential benefits in other research studies (Rocha et al., 2012).

With regards to aligning with the Australian Endometriosis Clinical Practice Guideline, the results from this thesis described in the patient and practitioner cross-sectional surveys and the textual analysis of naturopathic evidence sources (Chapters 5, 6, 7 and 8), some naturopathic treatments may reduce contributing factors to endometriosis-associated pain (see Table 25). Firstly, naturopaths in the practitioner survey (see Chapter 9) appear to approach endometriosis predominantly from an inflammatory perspective and utilise known herbal medicines that have some evidence of anti-inflammatory activity such as *C. longa*, *V. opulus*, and *V. agnus castus*, all of which appear to have anti-inflammatory activity that may be suitable for endometriosis management in alignment with contemporary biomedical approaches (Arablou & Kolaoudouz-Mohammadi, 2018; Bahat et al., 2022; Ibrahim et al., 2021; Kajszcak et al., 2020). *C. longa* is gaining research attention for its effects in modulating inflammatory processes due to its anti-inflammatory and anti-proliferative benefits in endometriosis (Arablou & Kolaoudouz-Mohammadi, 2018; Kong et al., 2014). The effects of *C. longa* have been shown in animal and *in vitro* studies to downregulate inflammatory and oxidative stress pathways in endometriosis (Vallée & Lecarpentier, 2020). The anti-inflammatory activity of *C. longa* suggests there may be a benefit in reducing inflammation and its contribution to endometriosis-associated pain, although human studies are needed to confirm this hypothesis.

In comparison, *V. opulus* has a long historical use in managing dysmenorrhea (Felter, 1927; Felter & Lloyd, 1905b; Scudder, 1883), however, examination of *V. opulus* in contemporary research in endometriosis has been limited (Kajszcak et al., 2020; Saltan et al., 2016). One animal study identified that *V. opulus* had significantly reduced endometriosis lesions in rats with induced abdominal endometriosis (Saltan et al., 2016). Despite strong traditional evidence for *V. opulus* in dysmenorrhoea as evidenced in this

thesis (see Chapter 6), there is very little scientific research to support the use of *V. opulus* in endometriosis, but findings from this thesis suggest that it may be a suitable target for further research in endometriosis.

V. agnus-castus was also frequently reported for endometriosis management in this study (described in Chapters 5 and 8). Most other research focuses on *V. agnus-castus* as it pertains to its use in PMS and premenstrual dysphoric disorder (Cerqueira et al., 2017) for its dopaminergic action (Kenda et al., 2021), with limited research evidence supporting its use in endometriosis management. *V. agnus-castus* has demonstrated potential positive effects in both *in vivo* and *in vitro* studies in areas that may be beneficial in endometriosis such as anti-proliferative, anti-inflammatory, antioxidant, and analgesic activity (Niroumand et al., 2018). The potential for *V. agnus-castus* to influence endometriosis pathophysiology is currently unknown in human studies and speculation can be made whether *V. agnus-castus* is a suitable option for women with endometriosis based on the aforementioned activities. In addition, while women with endometriosis may experience PMS or premenstrual dysphoric disorder, examination of the use and efficacy of *V. agnus-castus* in endometriosis is warranted.

Table 25: Displays the three commonly reported herbal medicines from across the cross-sectional surveys of women with endometriosis and naturopathic practitioners and textual analysis of naturopathic evidence sources reported in Chapters 5, 6 and 8 and the potential benefits in managing endometriosis-associated symptoms including pain.

Herbal medicines	Potential benefits
<i>Curcuma longa</i> (Turmeric)	<ul style="list-style-type: none"> • Reduces inflammation • Reduces proliferation of lesions • Decreases pain • Antioxidant activity
<i>Viburnum opulus</i> (Cramp bark)	<ul style="list-style-type: none"> • Decreases uterine spasms

	<ul style="list-style-type: none"> • Reduces inflammation • Antioxidant activity • Decreases pain
<i>Vitex-agnus castus</i> (Chaste tree)	<ul style="list-style-type: none"> • Reduces inflammation • Decreases PMS symptoms

10.4.2 Clinical nutritional medicines in endometriosis care

Clinical nutritional medicines have also gained recent research interest in modulating endometriosis pathophysiology (Balan et al., 2021; Ciebiera et al., 2021; Sukan et al., 2022), and results from this thesis (described in Chapters 5, 6, and 8) suggest that naturopathic use of clinical nutritional medicines does appear to align with emerging evidence and biomedical pathophysiology of endometriosis. Modulation of inflammatory pathways through clinical nutritional medicines such as selenium, vitamin E, vitamin D, and essential fatty acids (see Table 26) may decrease the growth of endometrial lesions and reduce the production of inflammatory factors that contribute to painful symptoms including chronic pelvic pain, dyspareunia, and dysmenorrhea (Bahat et al., 2022). Firstly, the use of selenium and vitamin E has been studied through their application in severe cases of endometriosis where a chronic inflammatory state is present. While selenium has demonstrated positive benefits in its application in endometriosis (Bahat et al., 2022), the approach to their use is often in combination with other antioxidants that have a combined effect in reducing inflammation and chronic pelvic pain in women with endometriosis (Santanam et al., 2013). Secondly, positive outcomes have been studied with the use of vitamin D and essential fatty acids (i.e., omega 3 - alpha-linolenic acid) which demonstrate an anti-inflammatory activity (Ciebiera et al., 2021). A thorough investigation of vitamin D benefits in endometriosis-associated pain has yet to be established, although other research suggests vitamin D may have a supportive role in chronic inflammatory pathways exhibited in endometriosis pathophysiology (Bahat et al., 2022). Yet, study methodological inconsistencies make it difficult to determine the benefit

of vitamin D in reducing endometriosis-associated pain (Bahat et al., 2022). In comparison, essential fatty acids have been the most studied clinical nutritional medicine for endometriosis emphasising several benefits in decreasing endometriosis-associated pain and reduction of endometrial lesions (Bahat et al., 2022; Sverrisdóttir et al., 2022). Conversely, inconsistencies in some experimental studies have resulted in opposing outcomes, demonstrating a need for further research, particularly concerning dosage (Ciebiera et al., 2021). Substantial research is needed to explore the use of clinical nutritional medicine in endometriosis (Helbig et al., 2021), including assessment of safety profiles and dosage parameters in this individualised and complex disease.

The use of magnesium was also reported in this study (described in Chapters 6 and 8), where other research evidence suggests that magnesium may be suitable for reducing uterine contractions (Bahat et al., 2022; Harris et al., 2013). Modulating uterine contractions may be of benefit for women with endometriosis as other studies have identified that women with endometriosis have greater uterine contractions during the early and mid-menstrual phase compared to women without endometriosis (Huang et al., 2017). While reducing uterine contractions using magnesium has been supported by some evidence in cases of primary dysmenorrhea (Naz et al., 2020), further studies are needed to detail the role of magnesium in endometriosis and if this clinical nutritional medicine may be efficacious in endometriosis-associated pain modulation. The use of clinical nutritional medicines described in this study can be interpreted in a number of ways as it relates to the greater naturopathic approach to endometriosis care. Firstly, it could be speculated that the use of clinical nutritional medicines by naturopaths is being used without a clear biomedical rationale that is consistent with EBP or that naturopaths are being innovative in their clinical approach by using clinical nutritional medicines to target endometriosis pathophysiology. Additionally, the applications of clinical nutrition by naturopaths could be the outcome of naturopathic traditional approaches or systems theory that is embedded in naturopathic practice (Graham et al., 2022b). Regardless,

additional research is warranted to explore the use, mechanism of action, and effectiveness of clinical nutritional medicines in managing endometriosis.

Table 26: The potential benefits of commonly used clinical nutritional medicines in endometriosis care as described in this thesis across the two phases incorporating naturopathic evidence sources reported in Chapters 5, 6 and 8.

Clinical Nutritional Medicines	Potential benefits
Essential fatty acids	<ul style="list-style-type: none"> • Reduces inflammation • Decreases pain • Reduces proliferation of lesions
Magnesium	<ul style="list-style-type: none"> • Decreases uterine spasms
Selenium	<ul style="list-style-type: none"> • Reduces inflammation • Antioxidant activity
Vitamin D	<ul style="list-style-type: none"> • Reduces inflammation
Vitamin E	<ul style="list-style-type: none"> • Antioxidant activity • Decreases pain

10.4.3 Dietary and lifestyle recommendations in endometriosis care

Findings from this study describe various dietary and lifestyle recommendations for the management of endometriosis. Dietary and lifestyle recommendations are reported by women with endometriosis in the patient survey (described in Chapter 5), naturopathic texts and curricula in the textual analysis (Chapter 7), and naturopaths who consult with women for endometriosis management in the practitioner survey (Chapter 8) and are detailed in Table 27. Notably, dietary and lifestyle recommendations have some suggested benefits in modulating endometriosis-associated pain as reported in this study. The frequent dietary recommendations reported in the naturopathic texts and by naturopaths in this thesis included increasing dietary fibre through vegetable intake and

dietary essential fatty acids through the consumption of nuts and seeds. The impact of dietary approaches and endometriosis-associated pain has received some research attention, although, some results have been inconsistent. For example, the use of dietary fibre has been explored from the lens of reducing dysmenorrhea severity (Nagata et al., 2005), with one study demonstrating that a lifestyle modification approach inclusive of dietary fibre provided relief of endometriosis-associated pain (Baker et al., 2022). Dietary fibre for reducing endometriosis-associated pain including dysmenorrhea has yet to be fully explored. However, one systematic literature review reported that some research indicating dietary fibre intake may increase the secretion of excessive oestrogen, therefore inversely reducing the risk of endometriosis pathogenesis (Fjerbæk & Knudsen, 2007) rather than modulating endometriosis-associated pain. In contrast, the dietary consumption of essential fatty acids has received research investigation for its ability to down regulate pro-inflammatory cytokines and reduce inflammation which may assist in decreasing endometriosis-associated symptoms including pain (Marcinkowska & Górnicka, 2023). While several studies have demonstrated efficacy with essential fatty acids and primary dysmenorrhea, many of these studies are through supplementation of essential fatty acids (Marcinkowska & Górnicka, 2023), which may not be transferable to the use of essential fatty acids from dietary consumption in endometriosis. Additionally, a recent systematic review explored the effectiveness of dietary recommendations in endometriosis, yet the findings primarily focused on the use of clinical nutritional supplementations rather than dietary consumption (Nirgianakis et al., 2022). Due to the lack of relevant findings related to the dietary intake of essential fatty acids and endometriosis, the topic remains controversial or continues to focus on the risk of developing endometriosis due to low dietary intake of essential fatty acids (Osmanlioğlu & Sanlier, 2021) rather than from a treatment perspective. Speculation can further be made if a diet high in essential fatty acids can lower the risk of endometriosis or has beneficial effects in modifying the microbiome (Jiang et al., 2021), which has only

recently been explored in endometriosis pathophysiology (Leonardi et al., 2020a). The bidirectional link between endometriosis and the microbiome was also reported in this thesis where naturopaths in the practitioner survey aim to address the microbiome in endometriosis clinical care.

Yoga and regular exercise were the most reported lifestyle recommendations in this thesis (outlined in Chapters 5 and 8). Yoga, as a practice, has both physical and mental health benefits that may be of benefit to women with endometriosis. A recent systematic review stated that women with endometriosis reported lower scores on the pain related domains of the EHP-30 after an eight week yoga course consisting of two 90 minute yoga sessions a week. Important to consider is whether the reduction of pain observed during yoga in this study is due to the meditation aspects of yoga or whether the physical movement of yoga practice is due to the reduction in pain and improving QoL (Tennfjord et al., 2021). A clinical trial demonstrated that regular yoga practice can significantly reduce endometriosis-associated pain and improve QoL (Gonçalves et al., 2017; Gonçalves et al., 2016). The results of the clinical trial by Gonçalves et al. (2016) support qualitative data that described women's experience of using yoga to reduce endometriosis-associated pain, with women reporting a reduction in pelvic pain through yogic breathing practices as well as a reduction in pain from the physical movements of yoga (Gonçalves et al., 2016). Noteworthy, is that women in the qualitative study reported a reduction in pain medications (Gonçalves et al., 2016). While these findings of the previously mentioned yoga studies are promising, the results of this thesis did not detail whether the recommendation of yoga for endometriosis care was self-selected by women with endometriosis as a self-management strategy or if the recommendations were from a naturopath or other health care practitioner.

As described in both the textual analysis and practitioner survey, exercise was the most reported lifestyle recommendation for endometriosis with naturopaths self-reporting effectiveness in endometriosis management. The recommendation of regular exercise

for endometriosis is not unknown in the literature with several reviews reporting inconsistencies on the benefits of exercise and endometriosis (Bonoche et al., 2014; Mira et al., 2018; Tennfjord et al., 2021). The National Institute for Health and Care Excellence (NICE) guidelines recommend regular exercise for endometriosis management (National Institute for Health and Care Excellence, 2017 December). While some research indicates that regular exercise may be supportive in reducing inflammation in chronic diseases (Beavers et al., 2010; Cerqueira et al., 2019), a recent systematic review on the benefits of exercise and endometriosis-associated pain resulted in a lack of evidence in efficacy in pain management for women with endometriosis (Hansen et al., 2021). The lack of efficacy in pain management from exercise in cases of endometriosis may stem from other research that indicates the contribution of low-grade inflammation that occurs during exercise (Beavers et al., 2010; Cerqueira et al., 2019). It could be hypothesised that the level of inflammation may further contribute to pain in women with endometriosis, as demonstrated in one Australian study where women reported an increase in endometriosis-associated pain from physical exercise (Armour et al., 2019d). Importantly, the NICE guidelines recommend exercise as a critical lifestyle behaviour for improving QoL which may thereby assist women in managing painful endometriosis symptoms (National Institute for Health and Care Excellence, 2017 December). With various results from recent studies on the recommendation of exercise in endometriosis management, it is difficult to endorse exercise as a lifestyle recommendation for managing endometriosis-associated pain until further high-quality research studies are conducted to ensure positive health outcomes for women with endometriosis (Tennfjord et al., 2021).

Table 27: Displays the main dietary and lifestyle recommendations in this thesis across the cross-sectional surveys of women with endometriosis and naturopathic practitioners and the textual analysis of naturopathic evidence sources reported in Chapters 5, 6 and 8 and their relevant potential benefits for endometriosis management.

Dietary Recommendations	Potential benefits
Fibre	<ul style="list-style-type: none"> • Increase secretion of oestrogen • Decrease pain
Essential fatty acids	<ul style="list-style-type: none"> • Reduces inflammation • Decreases pain
Lifestyle Recommendations	
Yoga/Meditation	<ul style="list-style-type: none"> • Reduction in pelvic pain • Improve the quality of life • Reduction in pain pharmaceuticals
Exercise	<ul style="list-style-type: none"> • Improve the quality of life • May reduce inflammation

The aforementioned (i.e., fibre, essential fatty acids, yoga/meditation, and exercise) naturopathic treatments may have potential in endometriosis-associated pain, however, there is limited research to support their efficacy in managing dyspareunia. As described in the patient survey, this study did not examine which naturopathic treatments were used for managing dyspareunia, but it is important to note that women with endometriosis are experiencing this painful symptom and seeking care from a naturopath more readily compared to women who do not seek care from naturopaths (outlined in Chapter 5). There is little evidence for the use of naturopathic treatments in managing dyspareunia for women with endometriosis with much of the research focus on use in menopause (Bosak et al., 2020; Dizavandi et al., 2019). Nevertheless, an examination of how naturopaths may approach dyspareunia as a problematic and painful aspect of endometriosis care is needed in future research.

Despite the plausibility of naturopathic treatments in endometriosis pathophysiology, there is inadequate research investigating the clinical effectiveness of naturopathic treatments in endometriosis care and positive patient outcomes. The lack of research to support the use of naturopathy for endometriosis care creates a conflict with the previous emphasis on patient-focused care (outlined in Chapter 10, 10.3.2) whereby patients' preferences of health care services and treatments need to be met (Dancet et al., 2014). Currently, generating scientific evidence for naturopathic treatments in endometriosis has not been prioritised, despite women opting to use them and their potential plausibility as it relates to endometriosis pathophysiology, as discussed in this chapter. The lack of supportive research evidence for naturopathy use in endometriosis care places the responsibility not only on the naturopathic profession and associated industry groups (e.g., the manufacturers of herbal medicine or clinical nutritional medicines) but also on public research funders to support research initiatives that examine naturopathic treatments to ensure naturopathy users are receiving safe and effective care. To confirm the potential benefits of naturopathic care are maximised while minimising any potential risks, there is a need for further research to specifically investigate the effectiveness and safety profiles of commonly used naturopathic treatments in the management of endometriosis.

10.4.4 Risk of naturopathic treatments in endometriosis

Despite the findings of this thesis which demonstrate the use and self-reported perceived effectiveness of naturopathic treatments in endometriosis care, as discussed in the cross-sectional surveys reported in Chapters 5 and 8, it is crucial to acknowledge the potential risks associated with naturopathic treatment use. Although women with endometriosis are using several naturopathic treatments described in this thesis, there is limited evidence of their plausibility and efficacy in endometriosis management. The use of ineffective treatments could lead to significant out-of-pocket costs for women who not only already incur substantial costs in endometriosis care, but women may also need

to seek alternative avenues of care and treatments again in an attempt to find appropriate care that meets their needs. Without evidence to confirm the mechanism of action and ability to assess changes in QoL based on the potential effectiveness of naturopathic treatments, the possibility of incurring further costs in care is noteworthy (Armour et al., 2019b). As endometriosis can negatively impact QoL, using naturopathic treatments with inadequate effectiveness in managing pain could lead to additional health care-seeking behaviour by women with endometriosis or the increase or otherwise potentially avoidable use of potent analgesics such as opioids.

Current research on clinical guidelines in endometriosis treatment does not recommend naturopathic treatments for endometriosis management due to the low levels of evidence in effectiveness (Kalaitzopoulos et al., 2021; Royal Australian and New Zealand College of Obstetricians and Gynaecologists, 2021 August). While some studies have reported on the efficacy and safety parameters of some naturopathic treatments such as herbal medicines (Malfertheiner, 2017; Masullo et al., 2015; Wieser et al., 2007), clinical studies are needed to assess the effectiveness and safety profile of such treatments in endometriosis specifically (Rocha et al., 2012). While a patient-focused approach is needed as previously described in Section 10.3.2 of this chapter, assessment of the potential risks of naturopathic treatments that are deemed low grade evidence is concerning due to the potential polypharmacy of women with endometriosis and those that use regular pain pharmaceuticals (Nezhat et al., 2019). Without a clear understanding of the mechanisms of some herbal medicines that are used by women with endometriosis, the potential for herb-drug interactions that may occur could potentially put women at risk of adverse events (Wieser et al., 2007). Considering the limited evidence regarding safety profiles and potential drug interactions, combining naturopathic treatments with pharmaceutical medications could pose a possible risk. Although this raises concerns, health care practitioners could still consider including a health care practitioner – potentially a naturopath – who is knowledgeable about these

matters and clinically capable of managing any potential risks to women in their multidisciplinary team planning and collaboration.

10.4.5 Adverse events of naturopathic treatments

In addition to the above mentioned risks with naturopathic treatments, awareness of reported adverse events of the naturopathic treatments discussed in this thesis is warranted. For example, *C. Longa* has been deemed safe with low to no toxicity in various studies, both *in vitro* and in some human studies in a range of chronic diseases (Soleimani et al., 2018). However, some adverse events particularly gastrointestinal discomfort has been reported (Soleimani et al., 2018). *V. agnus-castus* has reported some adverse events in the literature with most being mild and reversible. Evidence of headaches, nausea, gastrointestinal discomfort, acne, pruritus and rash have been described (Daniele et al., 2005). Adverse events for *V. opulus* have yet to be explored and stipulated in the literature.

Essential fatty acids have a perception of being safe with positive tolerability as demonstrated in other studies (Chang et al., 2018), however, potential adverse events including hypersensitivity to seafood products (i.e., allergic and anaphylactic reactions), increase in hepatic enzymes (specifically alanine transaminase ALT) or aspartate transaminase (AST), and proposed risk in recurrent atrial fibrillation or flutters have been noted in the literature (Chang et al., 2018). Additional concerns of risk of bleeding have also been noted as a potential adverse event from essential fatty acid use. However, in many cases, research deems the above essential fatty acid use risks hypothetical rather than citing real-world examples (Chang et al., 2018; Khan et al., 2021). In comparison, several conventional treatments for endometriosis have higher and known adverse events or side effects (Hartner et al., 2023). Therefore, the use of clinical nutritional medicines such as essential fatty acids questions the risk-to-benefit ratio, where the risks are considerably lower compared to conventional treatments, but the benefits of essential fatty acids remain questionable.

Vitamin D also has reported adverse events worthy of consideration in endometriosis management. Long term and high vitamin D dosages have yet to be fully established, however, risks of hypercalcemia and hypercalciuria have been noted in some research studies (Malihi et al., 2019). Vitamin E is considered relatively safe and non-toxic; although, some studies suggest plausible serious adverse events (i.e., increased risk of haemorrhagic stroke, bleeding, and increased risk of mortality) when exceeding the tolerable level. Other concerns are noted regarding disruption to antioxidant systems and an increase in oxidative damage with vitamin E supplementation and the plausibility that vitamin E detoxifies specific pharmaceuticals and endogenous toxins (Miller et al., 2005).

It is important to acknowledge the potential risks associated with naturopathic treatments mentioned above when considering their use for endometriosis management. Although there is some evidence suggesting the possibility of adverse events, it is worth noting that certain treatments may have limited evidence reported for adverse events in women with endometriosis. Therefore, it is crucial to be aware of both hypothetical risks to women's health when considering the use of naturopathy for endometriosis management.

10.5 Significance of thesis findings to health services research

10.5.1 Methodological framework

This thesis holds relevance to numerous stakeholders, including public health professionals, naturopaths and other clinicians and researchers who seek to explore novel CM approaches and treatments for endometriosis. Firstly, the methodological approach of this study (detailed in Chapter 4) describes the use of naturopathic traditional knowledge as an information source for naturopathic treatments. In naturopathy, traditional knowledge not only holds value to the profession but is also used in clinical decision-making and applied in clinical settings (Steel et al., 2019c). Despite the acceptance of traditional knowledge in naturopathy, the gap between research and

traditional naturopathic knowledge continues to be present. The overall framework applied in this thesis demonstrates that an exploration of traditional knowledge is achievable with the use of appropriate research designs. Most important is the relevance and capability of the methodological framework adopted in this thesis to explore an area of research that had yet to receive any empirical scientific interest. Other health areas in naturopathy, such as other menstrual irregularities and chronic reproductive infections, as an example, may also benefit from applying the methodological framework of this thesis, particularly where there is a need to explore alternative avenues of treatments.

By first exploring naturopathic traditional knowledge in a qualitative manner, as demonstrated in this thesis, researchers have the potential to further examine traditional knowledge in various methodological designs. For example, through examining commonly reported naturopathic treatments in endometriosis and their efficacy and plausibility profiles in pragmatic clinical trials. To date, there has been limited clinical trial evidence of specific naturopathic treatments such as the frequently reported herbal medicine described in this thesis and their use in endometriosis (see Table 25), with much of the research evidence exploring *in vitro* and animal studies or from the perspective TCM. As stated in Kamal et al. (2021) *C. longa*, shows promise in endometriosis due to modulation of the inflammatory pathways. However, the studies included in this 2021 non-systematic review only pertain to *in vitro* and animal studies (Kamal et al., 2021). In this example, the methodological framework in this thesis can be realised and may be supportive in generating new knowledge in the application of traditional naturopathic treatment in contemporary settings such as a pragmatic clinical trial of *C. longa* in endometriosis pain management. Therefore, the methodological framework of this study could provide structure for obtaining and utilising traditional naturopathic knowledge in various scientific methods for deeper examination. For instance, other researchers have demonstrated the value of other aspects of naturopathy through a complexity science framework and examining traditional philosophies that are

still embedded into the naturopathic profession (Graham et al., 2022a; Graham et al., 2022b). Using appropriate research methodologies, such as the methodological framework detailed in this thesis and other methodologies appropriate for naturopathy (Redmond et al., 2021), could provide an avenue for traditional knowledge to be explored within scientific research designs.

10.5.2 Researching traditional naturopathic knowledge

While the recent call for non-pharmaceutical treatments for endometriosis-associated pain has been noted in the Australian Endometriosis Clinical Practice Guideline, the call for non-pharmaceutical treatments for endometriosis received attention since the late 1970s (Wieser et al., 2007). Although the recommendation for non-pharmaceutical treatments for endometriosis has been made in the last fifty years, it is only within the last two decades that research has focused on herbal medicines in women's reproductive disorders and diseases (Wieser et al., 2007). Based on the evidence and findings of this thesis, traditional naturopathic knowledge contains a plethora of treatments that may have benefits in supporting women with endometriosis that have not been previously examined scientifically. Researching traditional naturopathic knowledge to identify plausible treatments in endometriosis-associated pain management requires recognition and acknowledgement of traditional knowledge within naturopathy and the need to employ appropriate research designs that capture traditional evidence (Adams, 2019) as an information source. Equally important is recognising that traditional knowledge is being utilised in naturopathic clinical practice (Steel et al., 2021a). Specifically, attention should be drawn to traditional knowledge employed in clinical practice that has unknown or little evidence to identify the mechanism of action, examine safety and dosage profiles, and assess the efficacy and positive patient outcomes of specific naturopathic treatments in endometriosis management. Research on naturopathy should be appropriately informed using treatments in traditional practice to ensure that they appropriately and adequately reflect practice and patient priorities.

Additionally, researching naturopathic treatments based on traditional knowledge may support the implementation of beneficial treatments into clinical practice or the de-implementation of treatments that may have low efficacy or high safety concerns (Redmond et al., 2021). While this thesis highlights various naturopathic treatments that are based on traditional knowledge as described in the textual analysis, not all traditional treatments described in the textual analysis were evident in the contemporary cross-sectional surveys of this thesis. Therefore, further comprehensive exploration of the use of traditional naturopathic knowledge in endometriosis care warrants attention, particularly from a clinical perspective.

10.6 Limitations

While this thesis provides foundational clinical insights into the naturopathic treatments and approaches to managing endometriosis, some limitations need to be taken into consideration when interpreting the results. Phase 1 acknowledges the limitations of the survey cross-sectional design resulting in a singular data collection and interpretations and the inability to extrapolate the results to causations and associations. Sampling bias is evident due to the employed recruitment strategy resulting in limited reliability and generalisations of the findings to the greater population of women with diagnosed endometriosis. The recruitment strategy also resulted in difficulties in determining a true sample size calculation as women with endometriosis may have been social media members of both not-for-profit endometriosis organisations which may have resulted in a skewed sample size calculation. The recruitment strategy may have also missed women with endometriosis who do not have access to social media, which may skew the findings to align more closely with women who are using social media and are technology literate. These limitations therefore contribute to an inability to generalise the research findings to the broader population. Acknowledgement that the sample size was not reached is also a warranted limitation which may have impacted the statistical power needed to identify associations. However, the sample size was calculated based on the

estimated member numbers of the included not-for-profit endometriosis organisations. The self-administrative nature of the survey and recall bias is also noted given the inclusion of many questions in the survey related to the previous 12 months of participants' endometriosis care. The self-administered survey may have contributed to social desirability bias and response rate bias. Despite these limitations, the CHERRIES reporting guidelines were utilised to strengthen the reporting of the sample and the responses collected (Eysenbach, 2004).

Phase 2A had limitations including the subjective nature of data selection, collection, and interpretation for the textual analysis. Geographical locations were selected based on the level of contribution to scholarly activities in naturopathic research and knowledge generation as reported by the WNF (World Naturopathic Federation, 2015). Selecting the geographical locations reported by the WNF resulted in a specific selection of higher education institutions that were limited to being either accredited or degree-granting in naturopathy. Additionally, specific institutions were also selected based on known sources that were influential in providing evidence of the naturopathic profession over the last 200 years. The selected sources were not a full representation of the sources given the limited access or incomplete volumes during data collection. Data interpretation may also be hindered by limitations relating to the rationale for including specific sources such as identifying the relevance of the author to the naturopathic profession. Despite this, care was taken to research the known authors to identify their involvement in the naturopathic profession to ensure a clear link to the profession. In cases where a clear link between an author and their involvement in naturopathy was difficult to determine, further consultation with researchers and academics in the field was undertaken, specifically for the sources selected from the Friedhelm Kirshfeld Rare Book Collection. Further, references to the included menstrual disorders were interpreted based on their descriptions of the symptoms and characteristics described in the sources as well as identifying and interpreting menstrual disorders that were referred to in a less

contemporary manner or without a formal diagnostic description. This resulted in the interpretation that described the experiences of the included menstrual disorders as being one of the conditions included in this phase (Phase 2A) of the thesis. While these limitations are evident and hinder the generalisation of the research findings for Phase 2A, the selected sources are the most major sources of naturopathic knowledge used in contemporary naturopathic curricula or the most prominent sources that have a strong connection with the naturopathic profession during the time of its conception in the Western world.

There are limitations in Phase 2B regarding sampling bias. Participants were recruited from the PRACI PBRN which may create concerns about the representativeness of the findings to the greater naturopathic community that also consults with women for endometriosis management. Evidence of the low response rate is a limitation to the generalisation of the findings; however, it was expected that a low response rate would occur given the recruitment of health care practitioners who are often time-poor to support and participate in research. An attempt to reduce this limitation was conducted by recruiting through the PRACI PBRN given that participants in PBRN's are more willing to participate in research compared to non-PBRN members (Calmbach et al., 2012). Additionally, as Phase 2B specifically recruited participants with experience and expertise in managing menstrual disorders in clinical practice, a low response rate was anticipated. However, the contribution of only two participant email invitations by the PRACI administrative team may have also contributed to the low response rate. Participants' recall bias and the self-administrated nature of Phase 2B are also unavoidable limitations for this thesis given the nature of the survey and data collection design. While the limitations of this thesis are evident, the results are the first known examination of naturopathic treatment and approach to endometriosis in Australia and as such provide a foundation upon which deeper and more robust exploration can be conducted.

10.7 Recommendations for further research

The findings in this thesis present preliminary research on naturopathic treatments and approaches to endometriosis care through various evidence sources including naturopathic texts, naturopathy users, and naturopaths. As this area of research is in its infancy in the Australian naturopathic landscape, further research directions have been highlighted in this thesis to support the ongoing development of this important field of research. Firstly, exploring naturopathy within research warrants specific research designs to capture the philosophical aspects of clinical naturopathic care. While it is outside of the scope of this thesis, future research directions involving naturopathic care and endometriosis could be explored from a whole systems research or complexity science approach to align with the design needs of naturopathic research (Redmond et al., 2021).

As presented in the narrative review of this thesis (Chapter 3), women with menstrual disorders and diseases including endometriosis are utilising CM and naturopathy health care services. However, due to the limitations of the narrative review and currently limited evidence of health care utilisation for women with reproductive diseases and conditions, a thorough examination of health care utilisation by women with endometriosis is warranted. Identifying the prevalence of health care utilisation for women with endometriosis, especially in the CM landscape may provide insights into supporting the multidisciplinary approach for frequent health care users as well as highlighting important public health areas for policymakers. Further studies examining CM and naturopathy health care services for managing endometriosis may support women who prefer to use these health care professions as well as the potential to identify novel and complementary treatments in endometriosis care. As women with endometriosis report various areas of unmet health care needs, assessing the use and role naturopathy may play in supporting women with endometriosis is also warranted. Addressing the use and role of naturopathic care for women with endometriosis may also support ongoing

research and clinical recommendations or guidelines in providing a multidisciplinary approach to endometriosis care (Agarwal et al., 2019b). Examining the effectiveness and plausibility of naturopathic treatments also warrants investigations and could be conducted through clinical research designs that support the underlying naturopathic philosophies (Schloss et al., 2019). Given the importance of this thesis topic and the similar approaches and training of naturopathy in the included Western countries, additional research is needed to explore naturopathic care for endometriosis from an international perspective. As emerging international CM research including naturopathy in endometriosis aims at identifying alternative treatment avenues (Kong et al., 2014), the foundational research presented in this thesis could provide a supportive framework for further research developments given the similarities in the naturopathic scope of practice.

While this thesis did not examine the reasons or attitudes behind naturopathic care for endometriosis, examining this topic from a qualitative perspective may highlight the push and pull factors that are influencing women to seek care outside of conventional practice. In supporting the recommendations for multidisciplinary care for women with endometriosis, further studies examining the prevalence of multidisciplinary care for women with endometriosis also require attention. Furthermore, research exploring the barriers and enablers to multidisciplinary care for women with endometriosis also requires consideration to improve patient experiences and outcomes (Ugwumadu et al., 2017).

Equally important is evaluating naturopathic treatments and approaches to endometriosis within clinical practice and education curricula. As a health care profession, naturopathy aligns with an EBP approach as detailed in Chapter 1.8.4. However, given the variety of naturopathic treatments that are recommended in naturopathic texts, the examination of how these treatments are applied and taught in the curricula and implemented into clinical practice also needs research attention. As an

example, future research could draw on the Delphi methodology to reach a consensus on the naturopathic treatment approach to endometriosis care. A Delphi study could be developed from the findings of this thesis to explore potential consensus on common naturopathic treatments suitable for endometriosis management. However, caution is warranted given the potential for the Delphi to be treatment-focused rather than patient-centred which may generate a barrier to utilisation and implementation into naturopathic care.

Naturopathy values its origins and traditional evidence of clinical care, and as such may benefit from a deeper examination of the influences in the therapeutic armamentarium to inform curricula and to generate new research hypotheses. As described in Chapters 6 and 7, there appear to be specific naturopathic treatments and approaches that have trends at specific time points. Although it was outside of the scope of this thesis to fully explore the influences on the evolution of naturopathic treatments and approaches, exploration could be suitable. In addition, examining traditional evidence may also support the scientific enquiry of implementation or de-implementation of treatments that are appropriate or inappropriate to clinical care in terms of effectiveness and plausibility in endometriosis management.

As described in Chapters 8 and 9, naturopathic treatments and approaches appear to have plausibility in endometriosis pathophysiology. Some of the treatments presented in this thesis such as *C. longa* have gained research attention for its possible molecular interactions with known areas of endometriosis pathophysiology. Still, further examination of the prevalence of treatments employed in clinical care for endometriosis management warrants investigation. Examining the mechanism of naturopathic treatments through bench science models or clinical research designs may provide an understanding of the mechanisms of naturopathic treatments in endometriosis care in addition to their plausible effectiveness in reducing symptomology or improving QoL.

10.8 Conclusion

This thesis provides foundational evidence of clinical insights into naturopathic treatments and approaches in endometriosis care by Australian naturopaths. Using a two-phase mixed-methods framework, this study identified key empirical evidence of naturopathy use in endometriosis care that may warrant further research evidence to support recommendations in the Australian Endometriosis Clinical Practice Guideline.

Firstly, this study identified various naturopathic treatments and approaches over the last 200 years of historical and contemporary knowledge that may have theoretical benefits for women with endometriosis care (Research objective 1). While the therapeutic approach to naturopathic care has undergone an evolution of modalities during the last two centuries, frequent naturopathic treatments and approaches were consistently reported across both phases of this study. The plausibility of naturopathic treatments and approaches targeting problematic endometriosis pathophysiology and symptoms (such as dysmenorrhea and menorrhagia) is demonstrated in over 200 years of traditional knowledge with supportive evidence drawn from contemporary curricula (Research objective 1). Likewise, the evidence of naturopathic treatments and approaches is demonstrated from a contemporary clinical perspective to offer insight into how naturopaths treat and approach endometriosis in clinical practice (Research Objectives 4 and 5). The most reported naturopathic treatments described in this study such as *C. longa* and essential fatty acids, may have plausible mechanisms of action that could help target areas of endometriosis pathophysiology. However, some naturopathic treatments described in this study lack clear evidence for their use in endometriosis care and warrant caution. The naturopathic approach to care encompasses a multidisciplinary and patient-focused approach to care that is historically embedded in the profession and has continued to be at the forefront of clinical practice (Research Objective 4). As such, there is theoretical potential that the naturopathic profession may be suitable in collaborative and integrative care methods at the individual level, however further integration towards

specific Guideline recommendations in the Australian Endometriosis Clinical Practice Guideline warrants further research to ensure a clear demonstration of EBP. This thesis identified that women with menstrual disorders and diseases are using naturopathy which has had a substantial increase in use over the last decade for endometriosis management. In support of this finding, one in five women with diagnosed endometriosis reported frequent health-seeking utilisation resulting in self-selecting multidisciplinary care that encompasses both CM and conventional health care professions (Research objective 3). Naturopathy users also present with significant bothersome symptoms including diarrhoea and dyspareunia (Research objective 2). In their self-selecting multidisciplinary approach, women with endometriosis used numerous naturopathic treatments to manage their disease which may have plausibility in modulating endometriosis pathophysiology and symptomology (Research objective 3).

The significance of this thesis is based on the described results as a foundational description of naturopathic treatments and approaches utilised by Australian naturopaths in the clinical care of endometriosis. Some of the findings described in this study suggest alignment to core areas of the Australian Endometriosis Clinical Practice Guideline, whereby naturopaths may be viewed as a potential collaborative profession in endometriosis care. The methodological approach may be considered a suitable tool to replicate in other research designs that may support the exploration of traditional naturopathic knowledge in contemporary settings. As such, this thesis provides a base for future research where the appropriate role, value, and clinical applications of naturopathic care can fully be realised for women who utilise this profession for endometriosis management.

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Chapter 5: Naturopathy utilisation by Australian women with diagnosed endometriosis: A cross-sectional survey.

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Naturopathy utilisation by Australian women with diagnosed endometriosis: A cross-sectional survey

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ABSTRACT

Background and purpose: Endometriosis is a painful female reproductive disease resulting in unmet health needs. Women with endometriosis frequently access different types of health care, yet little is known about naturopathic use. The purpose of this study is to explore the naturopathic utilisation by women with endometriosis in Australia.

Materials and methods: This study reports a cross-sectional survey of Australian women with endometriosis. Participants were recruited through the not-for-profit organisations Endometriosis Australia and EndoActive social media platforms. Data was collected through a self-administered questionnaire by those eligible to participate. Participants were included if they self-reported a diagnosis of endometriosis via laparoscopic surgery and were an Australian resident.

Results: Of the recruited 303 women with endometriosis, 60 women reported consulting with a naturopath for endometriosis care. Women consulting with a naturopath, reported also consulting with a laparoscopic surgeon (66.7%, $p = 0.01$), acupuncturist (53.3%, $p \leq 0.01$), physiotherapist (41.7%, $p = 0.01$), nutritionists/dietitians ($n = 22$, 36.7%, $p = 0.01$) or homeopath (15.0%, $p \leq 0.001$), in addition to their naturopath in the previous 12 months for endometriosis management. Compared to non-naturopathic users, women reported frequently experiencing dyspareunia (OR 2.9, CI 1.4–5.9, $p = 0.002$) and reported a higher use of vitamin D supplementation for endometriosis management (OR 4.9, CI 2.5–9.9, $p \leq 0.001$).

Conclusion: Women who use naturopathy for endometriosis appear to be high users of health care services, both within complementary medicine and conventional medicine. The efficacy and role of naturopathic treatments and care for women with endometriosis requires further investigation.

1. Introduction

Women with endometriosis – known as a chronic and painful female reproductive disease – experience many difficulties when seeking care or obtaining adequate treatment [1]. In addition to direct impacts on the menstrual cycle such as dysmenorrhea and menorrhagia, women with endometriosis can also present with urinary and bowel irregularities, dyspareunia, chronic pelvic pain, and physiological difficulties with fertility. While less frequent, women can also experience nausea, and fatigue and some women can be asymptomatic [2]. Unfortunately, due to various reasons such as limited medical education and menstruation

stigmatisation, women with suspected endometriosis often face a delay in diagnosis, barriers to early intervention, and limited or delayed access to specialist care [3].

Current evidence indicates that 1 in 10 women are diagnosed with endometriosis with approximately 176 million women and young girls diagnosed with the disease across the globe [4]. Within Australia, recent research estimates that 3.4% of women of reproductive age are diagnosed with endometriosis, however, due to the potentially asymptomatic nature of the disease, an accurate prevalence rate is difficult to determine [5]. Both at the individual and population level, women with endometriosis report a substantial burden of disease, which impacts all

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areas of life including social and economic areas such as absenteeism and excessive health care costs [4]. These reasons, among others, led women to seek care from various avenues.

Women with endometriosis, are known to seek care from multiple health care professionals and use self-care treatments for symptom relief [6,7] but also report high levels of dissatisfaction with their care and the available treatments for both symptom management and disease cure [6]. The degree of dissatisfaction is subject to the woman's experience of care but can be influenced by the perception of insufficient treatment options, dismissal of women's concerns by health care professionals, inadequate improvement in outcomes, and the need for repeated surgeries particularly for those with severe endometriosis [8]. Partly because of this dissatisfaction, some women explore treatment options beyond mainstream health care.

Women are increasingly stepping out of the conventional health care domain in search of treatments that can assist in reducing symptoms associated with menstrual irregularities including endometriosis [9–11]. There is some evidence to suggest that women are now looking to holistic and patient-centric forms of health care [12].

Naturopathy is a traditional system of health care defined by a set of philosophical principles classified in the late 19th and 20th centuries with succinct roots from European traditional medicine and later codified by key founders of the Germanic Nature Cure movement and eclectic medicine pioneers [13,14]. As a profession, naturopathy is practised across the globe [15] and is considered one of the main complementary medicine (CM) professions [16]. The approach to care is defined by philosophical principles and frameworks that focus on elements of patient-focused care [17]. However, research has yet to fully explore naturopathy and its role in providing care for women with endometriosis. Recent Australian research has highlighted that women experiencing common menstrual complaints are consulting with naturopaths [9–11]. This body of research suggests women exhibiting known symptoms of endometriosis or with a diagnosis of endometriosis are consulting with naturopaths to manage the disease [10]. However, the extent of naturopathy use by women with endometriosis has yet to be fully examined. As such, this study aims to identify the prevalence of consultations with a naturopath by Australian women with endometriosis for managing their disease, and the characteristics of these women.

2. Materials and methods

2.1. Design

The study presents a cross-sectional survey design of data collected from women with diagnosed endometriosis in the Australian community.

2.2. Setting

Data were collected from participants in the form of a self-administered questionnaire through the online platform Survey Gizmo.

2.3. Participants

Participants were recruited through the major Australian not-for-profit endometriosis support organisations, Endometriosis Australia [18] and EndoActive [19] via social media platforms between June 2017 to December 2017. Participants were eligible for inclusion in the study if they self-reported that they had received a formal diagnosis of endometriosis via laparoscopic surgery and were an Australian resident. Participants were excluded if they were over 54 years old.

2.4. Sample size

A convenience sample of women with diagnosed endometriosis was recruited through the Endometriosis Australia (n = 10,500 online

members) [18] and EndoActive (n = 8,500 online members) [19] social media platforms. In line with sample size calculations for descriptive survey studies (confidence level of 95%, error of margin 5%) and a power level of 80% [20], a sample size was calculated at n = 377. Using the reporting guidelines CHERRIES to ensure best practice and transparent reporting of the sample size, various rates of participation were determined to identify the sample size [21]. Survey visitor rates were determined by the number of unique IP (Internet Protocol) addresses linked to opening the survey and a view rate of the number of individuals who responded to the first survey page [21]. Recruitment rates were identified by those that provided informed consent. Completion rates were determined as participants who provided informed consent to complete the survey and provided data for the first five domains of the survey compared with the number of participants who provided informed consent but did not provide any data to the survey items [21]. The five survey domains included participant sociodemographic, the experience of endometriosis, health services utilisation, cost of health care, use of pharmaceutical medications, and use of complementary practice and products.

2.5. Data instrument

The survey was a self-administered questionnaire via the online survey platform SurveyGizmo. The survey underwent pilot testing for face validity by a sample (n = 5) of women with endometriosis before active recruitment began. This study examined participant sociodemographics, the experience of endometriosis, health services utilisation, cost of health care, use of pharmaceutical medications, use of CM practice and products, disclosure of CM, and pharmaceutical use, and experience of primary practitioner care. Additionally, within the survey were two validated instruments, the ENDOCARE Questionnaire (ECQ) [22] and the Endometriosis Health Profile (EPH-5) [23]. This article presents the findings of naturopathy users among women with endometriosis, their experiences of endometriosis, and aspects of associated care including treatment utilised and the effectiveness of treatments.

2.6. Statistical analysis

Raw data was extracted from the SurveyGizmo platform via Microsoft Excel which was imported into the statistical software program STATA 14.2. During the data cleaning process, incomplete or missing data were removed from the data set prior to statistical analysis. Categorical and binary variables were developed as per the design of the survey questions and relevant analysis. Statistical analysis was conducted using descriptive statistics with the use of frequencies and percentages; cross-tabulation using Chi-squared test was also conducted to determine the characteristics of women with endometriosis who consulted with a naturopath for the management of their endometriosis in the last 12 months compared to women with endometriosis who did not consult with a naturopath. Further analysis of effect size was also conducted to assess the strength of associations using Cramer's V. The effect size was determined as a negligible association (0.00 and under 0.10); weak association (0.10 and under 0.20); moderate association (0.20 and under 0.40); relatively strong association (0.40 and under 0.60); strong association (0.60 and under 0.80) and very strong association (0.80 and under 1.00) [24]. Backward stepwise logistic regression was conducted to identify the associations of naturopathy users and aspects of their endometriosis presentation and health care management of the disease. The binary variable of those who reported consulting with a naturopath over the last 12 months for the management of their endometriosis, was the predictor variable within the regression model. Binaries used within the regression model were selected based on a P-value of <0.25 as tabulated within the results. The model was revised and verified via a likelihood ratio test at each relevant step of the analysis. Upon completing the statistical analysis, significance was set to $p < 0.05$.

3. Results

The survey was opened and visited by 387 potential participants. All of the potential participants (n = 387) read the first survey page pertaining to the study information and consent. Only one potential participant declined consent to participate in the study (n = 386). A view rate was thus calculated at 0.99% [21] and a recruitment rate of 386 participants. During data cleaning, 15 survey responses were removed due to: duplicate entries based on IP addresses (n = 5); reported not being an Australian resident (n = 8); and did not provide consent (n = 1). The remaining responses (n = 372) were further cleaned for completion rates. Thirty-five participants did not provide sociodemographic information, and another 34 did not respond to the five survey domains. The remaining 303 participants completed the survey (completion rate: 78.4%). The confidence level was calculated based on the completed surveys because the completion rate did not meet the power level. Of the 303 participants, n = 60 (19.8%, CI 95%) participants reported consulting with a qualified naturopath for the management of their endometriosis in the previous 12 months.

3.1. Sociodemographic of naturopathy users

The 60 participants (19.8%) that reported consulting with a qualified naturopath for the management of their endometriosis in the previous 12 months, reported no significant difference in age, marital status, level of education, employment, income, or stage of endometriosis compared to those that did not consult with a naturopath for disease management. Women who reported consulting with a naturopath (19.8%, p = 0.02), reported experiencing unbearable or severe levels of pain associated with the disease and regularly experience episodes of diarrhoea (66.7%, p = 0.04) compared to women who did not seek care from a naturopath in the previous 12 months. Naturopathy users also reported regularly experiencing diarrhoea (40%, p = 0.04) and bothersome episodes of dyspareunia (53.3%, p = 0.01) more frequently than women who did not consult with a naturopath. Statistical analysis identified a negligible association between consultations with a naturopath and unbearable or severe endometriosis pain (Cramer's V 0.0159, p = 0.02). Weak associations were found between consulting with a naturopath and regularly experiencing diarrhoea (Cramer's V 0.1186, p = 0.04), bothered by diarrhoea (Cramer's V 0.1199, p = 0.04), and bothered by dyspareunia (Cramer's V 0.1575, p = 0.15). Table 1 summarises the sociodemographic characteristics of women with endometriosis who sought care from a naturopath in the previous 12 months.

3.2. Health care service utilisation

Women consulting with a naturopath for endometriosis, report visiting numerous other types of health professionals. During the previous 12 months, more than half of these women reported consulting with a laparoscopic surgeon (66.7%, p = 0.01), or an acupuncturist in addition to their naturopath (53.3%, p ≤ 0.01) compared to women who did not consult with a naturopath for endometriosis management. Consultations with a physiotherapist (41.7%, p = 0.01), nutritionists/dietitians (n = 22, 36.7%, p = 0.01) or homeopath (15.0%, p ≤ 0.001) were reported more frequently among users of naturopathy than in women who did not consult with a naturopath. The bivariate analysis reported weak associations for women consulting with a naturopath and laparoscopic surgeon (Cramer's V = 0.1805), physiotherapist (Cramer's V 0.1633), and nutritionist/dietitian (Cramer's V = 0.1694) in the previous 12 months. Moderate associations were identified for women consulting with a naturopath and an acupuncturist (Cramer's V = 0.3921) or homeopath (Cramer's V = 0.2626) in the last 12 months. Women with endometriosis who sought care from a naturopath reported that a gynaecologist (40.0%, p = 0.05) or acupuncturist (8.3%, p = 0.03) were their primary practitioner for their endometriosis management more frequently than women who did not consult with a naturopath. A

Table 1 Sociodemographic characteristics of women with diagnosed endometriosis.

Characteristic	Did not consult with a naturopath		Consulted with a naturopath		Cramer's V	P-value
	n	%	n	%		
Age (years)						
<18	4	1.7	0	0.0	-	0.89
18-24	39	16.3	9	15.0	-	
25-34	108	45.0	28	46.7	-	
35-44	75	31.3	19	31.7	-	
44-54	14	5.8	4	6.7	-	
Marital Status						
Single	82	33.7	18	30.0	-	0.5
De facto	63	25.9	18	30.0	-	
Married	84	34.6	24	40.0	-	
Separated	12	4.9	0	0.0	-	
Divorced	1	0.4	0	0.0	-	
Widowed	1	0.4	0	0.0	-	
Qualification						
No school certificate	2	0.8	0	0.0	-	0.40
Primary school certificate	2	0.8	1	1.7	-	
High school or equivalence certificate	42	17.3	4	6.7	-	
Trade or apprenticeship	8	3.3	2	3.3	-	
Certificate or diploma	65	26.8	18	30.0	-	
University degree or higher	124	51.1	35	58.3	-	
Working hours per week						
0 h	32	13.2	7	11.7	-	0.10
1-15 h	20	8.2	7	11.7	-	
16-29 h	32	13.2	8	13.3	-	
30-34 h	38	15.6	10	16.7	-	
35-40 h	82	33.7	18	30.0	-	
41-49 h	34	14.0	8	13.3	-	
50 or more hours	5	2.1	2	3.3	-	
Household income						
No income	7	2.9	3	5.4	-	0.55
\$1-\$6,239	9	3.7	1	1.8	-	
\$6,240-\$15,599	6	2.5	0	0.0	-	
\$15,600-\$25,999	12	4.9	4	7.1	-	
\$26,000-\$36,399	16	6.6	2	3.6	-	
\$36,400-\$51,999	21	8.7	3	5.4	-	
\$52,000-\$77,999	35	14.5	10	17.9	-	
\$78,000-\$103,999	40	16.6	12	21.4	-	
\$104,000-\$129,999	31	12.9	4	7.1	-	
\$130,000-\$155,999	20	8.3	7	12.5	-	
\$156,000 or more	36	14.9	6	10.7	-	
I do not know	8	3.3	4	7.1	-	
Stage of endometriosis						
Stage 1	11	4.6	5	8.3	-	0.70
Stage 2	29	12.0	5	8.3	-	
Stage 3	35	14.5	11	18.3	-	
Stage 4	85	35.1	19	31.7	-	
I was not told by my GP	69	28.5	18	30.0	-	
I do not know if I was assessed	13	5.4	2	3.3	-	
Severity						
Unbearable/Severe	124	51.0	41	68.3	0.0159	0.02
Moderate	85	35.1	15	25.0	-	0.14
Mild/Unnoticeable	33	13.6	4	6.7	-	0.14
Symptoms experience regularly						
Dysmenorrhea	209	86.0	53	88.3	-	0.63
Menorrhagia	142	58.4	40	66.7	-	0.24
Bloating	199	81.9	54	90.0	-	0.13
Constipation	147	60.5	36	60.0	-	0.94
Diarrhoea	126	51.9	40	66.7	0.1186	0.04
Fatigue	208	85.6	54	90.0	-	0.37
Lower abdominal pain while not menstruating	200	82.3	49	81.7	-	0.90
Pelvic pain	203	83.5	50	83.3	-	0.10
Dyspareunia	148	60.9	43	71.7	-	0.12
Most bothersome symptoms						
Dysmenorrhea	107	44.0	33	55.0	-	0.13
Menorrhagia	60	24.7	16	26.7	-	0.75
Bloating	112	46.1	35	58.3	-	0.09

(continued on next page)

Table 1 (continued)

Characteristic	Did not consult with a naturopath		Consulted with a naturopath		Cramer's V	p-value
	n	%	n	%		
Constipation	68	27.0	22	36.7	–	0.19
Diarrhoea	64	26.3	24	40.0	0.1199	0.04
Fatigue	166	68.3	45	75.0	–	0.31
Lower abdominal pain while not menstruating	165	67.9	41	68.3	–	0.95
Pelvic pain	153	63.0	36	60.0	–	0.70
Dyspareunia	83	34.2	32	53.3	0.1575	0.01

*GP = General Practitioner.

moderate association was identified from naturopathy users who reported that a naturopath was their primary practitioner (15%, $p \leq 0.001$) compared to non-naturopathic users. A weak association was evident from the analysis of naturopathy users and women reporting an acupuncturist as their primary health care provider (Cramer's $V = 0.1249$). Table 2 displays health professionals consulted with for the previous 12 months and women's main consulting practitioner for endometriosis management.

3.3. Product usage and effectiveness for disease management

A higher rate of use of mixed herbal formulas defined as tablet or liquid preparations – for the management of endometriosis was reported by women that consulted with a naturopath for disease management compared to women who did not consult with a naturopath (73.3% vs 32.9%). Mixed herbal medicine formulations were reported as a moderate association (Cramer's $V = 0.3275$, $p \leq 0.001$). Moderate associations were also noted for *Curcuma longa* (71.7%, Cramer's $V = 0.3908$, p

≤ 0.001), followed by *Vitex agnus-castus* (60.0%, Cramer's $V = 0.3157$, $p \leq 0.001$) and *Silybum marianum* (58.3%, Cramer's $V = 0.3159$, $p \leq 0.001$). Naturopathy users also reported a high rate of using clinical nutritional medicine including multivitamins (73.3%, Cramer's $V = 0.2983$, $p \leq 0.001$), fish oil supplements (91.5%, Cramer's $V = 0.1992$, $p = 0.02$), vitamin B's (70.0%, Cramer's $V = 0.3361$, $p \leq 0.001$), vitamin D (73.3%, Cramer's $V = 0.3744$, $p \leq 0.001$) homeopathic remedies (70.0%, Cramer's $V = 0.3401$, $p \leq 0.001$), acupuncture (71.7%, Cramer's $V = 0.3413$, $p \leq 0.001$) and yoga/meditation (73.3%, Cramer's $V = 0.3164$, $p \leq 0.001$) compared to those that did not consult with a naturopath. All clinical nutritional medicines were indicated as a moderation association with naturopathy users except for fish oil supplementation which was identified as a weak association (Cramer's $V = 0.1992$, $p = 0.02$). Women who consulted with a naturopath and utilised pharmaceuticals for endometriosis reported no differences to those that did not consult with a naturopath in the previous 12 months.

Women with endometriosis utilising naturopathy for disease management reported that mixed herbal formulas were effective or sometimes effective in managing endometriosis compared to women who did not consult with a naturopath (75% vs 55%, $p = 0.03$) and was indicated as a weak association from the analysis (Cramer's $V = 0.1972$). Nearly half of the naturopathy users (67.4%, $p = 0.01$) were also more likely than non-naturopathy users to describe acupuncture as being effective or sometimes effective. Women consulting with a naturopath reported that fish oil supplementation was reported as the most effective or sometimes effective nutritional supplement (48.8%, $p = 0.01$) and *Curcuma longa* (55.8%, $p = 0.01$) was the most effective or sometimes effective herbal medicine. Acupuncture (Cramer's $V = 0.2545$), fish oil supplementation (Cramer's $V = 0.2539$), and *Curcuma longa* (Cramer's $V = 0.2640$) were indicated as moderate associations between naturopathy users. There were no reported differences between the effectiveness of pharmaceuticals for naturopathy users and those that did not seek care from a naturopath. Table 3 summarises the reported treatments used and the effectiveness of treatments for disease management.

3.4. Characteristics of naturopathy users

The logistic regression analysis identified that women who consulted with a naturopath for management of endometriosis in the previous 12 months were more likely to report being bothered by episodes of dyspareunia (OR 2.9, CI 1.4–5.9, $p = 0.002$) compared to those that did not consult with a naturopath. Women consulting with a naturopath for endometriosis were more likely to also consult with an acupuncturist for endometriosis treatment (OR 6.2, CI 3.0–12.7, $p \leq 0.001$) compared to naturopathy non-users. Naturopathy users also had a higher likelihood of reporting the use of vitamin D for endometriosis management compared to those that did not consult with a naturopath (OR 4.9, CI 2.5–9.9, $p \leq 0.001$). Table 4 displays the results from the logistic regression analysis of women who consulted with a naturopath for endometriosis management.

4. Discussion

This is the first empirical study examining consultations with a naturopath by women with diagnosed endometriosis in the Australian community. The findings provide interesting insights into the health care service and treatment utilisation of these women. Firstly, 20% of the women in this study reported consulting with a naturopath for the management of endometriosis. Evidence currently shows that women are more likely to utilise CM professions including naturopathy. Additionally, women who utilise CM also report a diagnosis of a chronic health disease and frequently report high use of health care services [25, 26]. This trend of high health care service utilisation by women with a chronic health condition is also presented in our results. Women with endometriosis regularly receive first-line treatments including non-steroidal anti-inflammatory medicines, the oral contraceptive pill,

Table 2
Use of health care services by women with endometriosis.

Health care service utilisation	Did not consult with a naturopath		Consulted with a naturopath		Cramer's V	P-value
	n	%	n	%		
Professionals consults over 12 months						
General practitioner	196	80.7	52	86.7	–	0.28
Gynaecologist	173	71.2	48	80.0	–	0.17
Laparoscopic surgeon	107	44.0	40	66.7	0.1805	0.01
Physiotherapist	57	23.5	25	41.7	0.1633	0.01
Acupuncturist	32	13.2	32	53.3	0.3921	<0.001
Homeopath	4	1.7	9	15.0	0.2626	<0.001
Nutritionist/Dietitian	46	18.9	22	36.7	0.1694	0.01
Other conventional practitioners	8	3.3	1	1.7	–	0.50
Other allied health practitioners	35	14.4	8	13.3	–	0.83
Other CM practitioners	4	1.7	2	3.3	–	0.40
Did not see any practitioners	3	1.2	0	0.0	–	0.39
Main consulting practitioner						
General practitioner	66	27.2	17	28.3	–	0.85
Gynaecologist	131	53.9	24	40.0	0.1109	0.05
Laparoscopic surgeon	23	9.5	4	6.7	–	0.50
Physiotherapist	2	0.8	1	1.7	–	0.55
Acupuncturist	6	2.5	5	8.3	0.1249	0.03
Naturopath	0	0.0	9	15.0	0.3521	<0.001
Nutritionist/Dietitian	1	0.4	0	0.0	–	0.62
Other allied health practitioners	2	0.8	0	0.0	–	0.48
Other CM practitioners	2	0.8	0	0.0	–	0.48
Did not have a main practitioner	5	2.1	0	0.0	–	0.26

*CM = Complementary Medicine.

Table 3
Reported use and effectiveness of products used by women for the management of endometriosis over the last 12 months.

Treatment used	All respondents n = 303		Consulted with a naturopath n = 60		Cramer's V	P-value	Effectiveness ^a of treatment	All respondents n = 303		Consulted with a naturopath n = 60		Cramer's V	P-value
	n	%	n	%				n	%	n	%		
	Complementary medicine treatments												
Mixed herbal formulas	80	32.9	44	73.3	0.3275	<0.001	Mixed herbal formulas	44	55.0	33	75.0	0.1972	0.03
Multivitamins	88	36.2	44	73.3	0.2983	<0.001	Multivitamins	46	52.3	25	56.8	–	0.62
Homeopathic remedies	70	28.8	42	70.0	0.3401	<0.001	Homeopathic remedies	28	40.0	21	50.0	–	0.30
Acupuncture	73	30.0	43	71.7	0.3413	<0.001	Acupuncture	30	41.1	29	67.4	0.2545	0.01
Yoga/Meditation	83	34.2	44	73.3	0.3164	<0.001	Yoga/Meditation	53	63.9	31	70.5	–	0.45
Fish oil supplement	66	75.0	43	91.5	0.1992	0.02	Fish oil supplement	16	24.2	21	48.8	0.2539	0.01
Vitamin B's	71	29.2	42	70.0	0.3361	<0.001	Vitamin B's	41	57.8	22	52.4	–	0.58
Vitamin D	68	28.0	44	73.3	0.3744	<0.001	Vitamin D	30	44.1	20	45.5	–	0.89
<i>Curcuma longa</i>	61	25.1	43	71.7	0.3908	<0.001	<i>Curcuma longa</i>	18	29.5	24	55.8	0.2640	0.01
<i>Vitex agnus-castus</i>	57	23.5	36	60.0	0.3157	<0.001	<i>Vitex agnus-castus</i>	9	15.8	11	30.6	–	0.09
<i>Silybum marianum</i>	54	22.2	35	58.3	0.3159	<0.001	<i>Silybum marianum</i>	7	13.0	4	11.4	–	0.83
Pharmaceutical treatments													
Oral contraceptive pill	116	64.8	23	59.0	–	0.49	Oral contraceptive pill	73	62.9	16	69.6	–	0.54
Danazol	18	10.4	5	12.8	–	0.66	Danazol	37	86.1	6	75.0	–	0.43
Dienogest	56	32.2	11	29.0	–	0.70	Dienogest	37	66.1	6	54.6	–	0.47
Mirena	74	42.1	18	45.0	–	0.73	Mirena	51	68.9	10	55.6	–	0.28
Gonadotrophin-releasing hormone agonists	27	15.5	7	18.4	–	0.66	Gonadotrophin-releasing hormone agonists	21	77.8	3	42.9	–	0.07
Non-steroidal anti-inflammatory	174	96.1	41	97.6	–	0.64	Non-steroidal anti-inflammatory	118	67.8	31	75.6	–	0.33
Opioids	144	80.5	37	90.2	–	0.14	Opioids	133	92.4	33	89.2	–	0.53

^a Reported as sometimes effective or effective for the relief of symptoms associated with endometriosis over the last 12 months.

Table 4
Backward stepwise logistic regression of women who consulted with a naturopath over the last 12 months for the management of endometriosis.

Characteristics	Odds ratio	Confidence interval	P-value
Bothersome dyspareunia	2.984263	1.49–5.93	0.002
Consulted with an acupuncturist	6.217106	3.04–12.7	<0.001
Used vitamin D supplements	4.996545	2.51–9.91	<0.001

and progestins [8]. Secondary treatment involves laparoscopic surgery – deemed the gold standard for endometriosis treatment. However, repeated surgery is often required, leaving women with scarring, significant out-of-pocket costs, and reduced windows for optimal fertility [8]. Research in this area highlights that women often report that effective management and long-term relief is often unachievable and complex, causing repeated health care-seeking behaviour [27]. Furthermore, with limited treatments available women often implement self-care behaviours [7] or use an array of health care services [1,6,8]. From the analysis presented in this study, it appears naturopathy may be among the health care options accessed by women with endometriosis. Previous negative experiences with conventional health services or unmet health needs including reports of being dismissed or overlooked [4] may act as a “push factor” to seek care outside of the mainstream health system [25] particularly, as identified through this analysis, concerning women presenting with severe cases of endometriosis. Conversely, women with endometriosis may be drawn to naturopathy due to the holistic and patient-centered framework embedded in the approach to health care. This approach, identified as a pull factor, has been reported as a much-needed aspect of primary health care to ensure positive health experiences and outcomes for women with endometriosis [12].

Women with endometriosis who reported consulting with a naturopath also identified as experiencing regular episodes of diarrhoea more than non-naturopathic users. While diarrhoea can often be self-managed, given the complexity of endometriosis as a disease, additional treatments may be required. Naturopaths in Australia have a wide range of treatments within their scope of practice including clinical

nutritional medicine, herbal medicine, dietary interventions, and lifestyle recommendations [28]. Within the context of gastrointestinal complaints, there is evidence that these treatments, may be effective in managing gastrointestinal complaints [29–31]. Supporting evidence has been identified that herbal medicine (including *Mentha piperita*, *Aloe vera*, and *asafoetida*) and dietary interventions (including elimination diets, low FODMAP diet, reducing processed foods, reducing sugar, dairy, and wheat) can provide relief in both acute and chronic experiences of bowel irregularities including diarrhoea and irritable bowel syndrome [29,31], both of which have been frequently reported among women with endometriosis [32]. Additionally, dyspareunia has also been reported by naturopathy users. While there is very little evidence of the use of naturopathy treatments in reducing dyspareunia in women of reproductive age [33,34], this aspect of endometriosis presentation should not be overlooked. Evidence indicates that while some women may feel comfortable approaching health care providers about dyspareunia, these women often report difficulties in receiving effective treatments [35]. Within the scope of naturopathic medicine, this area of endometriosis presentation requires further research to adequately support women experiencing sexual dysfunction.

The findings in this study indicate that women with endometriosis commonly consult with a variety of health care professionals. Such wide consultation may indicate women's attempts to find a suitable treatment or health practitioner to assist in managing the disease. This occurrence, commonly referred to as “doctor shopping” is evident in various studies on women's health-seeking behaviour for endometriosis treatment [1,6,36]. Given the nature of the disease and its multifactorial presentation, women with endometriosis require a collaborative support team of health care providers to achieve the best health outcomes [37]. However, naturopathy is not currently included in the statutory registration scheme overseeing most health professions in Australia [38]. Due to this, there is often limited open communication and patient referrals between those within the conventional health care system and naturopaths [39]. Women with endometriosis require a multidisciplinary approach to care that involves referrals to professionals that can address areas of disease management and longevity of treatment particularly in the case of women with severe endometriosis who report undergoing multiple laparoscopic surgeries to reduce symptoms [37]. Ensuring that women

with endometriosis are supported and have the coordination of care between their various health care professions can provide women with improved services of health care experience and delivery and also assist in reducing the excessive costs associated with treatments and surgical interventions [40]. Given the importance of women to experience positive health care, further evidence is required to assess the supportive role that naturopathy can play in endometriosis disease management and in improving the overall health outcomes of women with endometriosis.

This study is not without limitations. Firstly, the sample was a convenience sample using social media recruitment. This sampling technique was deemed appropriate due to allowing ease of access to a large volume of participants with diagnosed endometriosis via social media. Additionally, while there are benefits to online survey research, this study recruited less participants than our calculated target sample size. While the sampling technique was appropriate to the study design, there are weaknesses with this sampling such as the low level of reliability and inability to generalise the findings to the greater population of women with endometriosis [41]. From those that completed the survey, only a small portion of these women reported utilising a naturopath for the care of their endometriosis during the last 12 months. Additionally, participant recall bias of the previous 12 months for their endometriosis treatment is noted. As this study collected self-reported data from participants, self-report bias is a factor to be considered when analysing the findings. While there are limitations to this study, the findings present Australia's first insights into the naturopathy utilisation and treatments by women with diagnosed endometriosis. From this preliminary data, further research into the effectiveness, value, and experience of naturopathic care to these women is warranted to ascertain the level of health care support naturopaths can provide to these women. Equally important is the development of further research exploring the value of naturopathic care from the perspective of women with endometriosis to ensure relevant patient-led care within the naturopathic landscape.

5. Conclusion

Presently, women with endometriosis report several unmet health needs concerning disease management which may result in some women consulting with practitioners beyond conventional health care professions. With a holistic and patient-centered approach to care, naturopathy may have a role to play in supporting women with effective disease management with an interdisciplinary team of providers. A further detailed and rich examination of naturopathy use amongst women with endometriosis is warranted.

Ethics approval

This study was granted ethics approval by the Human Research Ethics Committee (HREC) at Endeavour College of Natural Health (approval number 20161131) and the HREC at the University of Technology Sydney (approval number ETH-16-0616).

Author contribution

All authors contributed to the conceptualisation of the study. RR conducted data cleaning. RR and AS conducted statistical analysis. RR drafted the manuscript. All authors have reviewed and contributed to the final manuscript.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Chapter 6: Naturopathic medicine for the management of endometriosis, dysmenorrhea, and menorrhagia: a content analysis.

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Naturopathic Medicine for the Management of Endometriosis, Dysmenorrhea, and Menorrhagia: A Content Analysis

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Abstract

Objectives: To explore the recommendations of naturopathic medicine for the management of endometriosis, dysmenorrhea, and menorrhagia, drawing on traditional and contemporary sources.

Design: Content analysis.

Setting: Australia, Canada, and the United States of America (USA).

Subjects: Contemporary sources were identified from reviewing naturopathic higher education institutions' recommended texts, while traditional sources were identified from libraries which hold collections of naturopathic sources. Sources were included if they were published from 1800 to 2016, were in English, published in Australia, Canada, or the USA, and reported on the topic. Included sources were as follows: 37 traditional texts; 47 contemporary texts; and 83 articles from naturopathic periodicals.

Results: Across included sources, the most reported disciplines were herbal medicine, clinical nutrition, mineral medicines, homeopathy, hydrotherapy, and chemical-based medicines. Herbal medicines were extensively reported from all sources for the management of endometriosis, dysmenorrhea, and menorrhagia. Clinical nutrition was only recommended from contemporary sources for all three conditions. Mineral medicines were mentioned in both traditional and contemporary sources, but were only recommended for dysmenorrhea and menorrhagia. There were limited recommendations for homeopathy and hydrotherapy treatments in all conditions across all sources. Chemical-based medicines were only mentioned for dysmenorrhea and menorrhagia, and recommendations ceased after 1922. Recommendations for endometriosis were not present in any of the traditional sources, across all reported disciplines.

Conclusions: The findings of this article provide insights into the documented historical and contemporary treatments within naturopathic medicine for endometriosis, dysmenorrhea, and menorrhagia. While philosophical principles remain the core of naturopathic practice, the therapeutic armamentarium appears to have changed over time, and a number of the original naturopathic treatments appear to have been retained as key elements of treatment for these conditions. Such insights into naturopathic treatments will be of particular interest to clinicians providing care to women, educators designing and delivering naturopathic training, and researchers conducting clinical and health service naturopathic research.

Keywords: endometriosis, dysmenorrhea, menorrhagia, naturopathy, traditional evidence, content analysis

Introduction

NATUROPATHY IS A TRADITIONAL SYSTEM of health care guided by philosophical principles which were codified during the 19th and 20th centuries and drawn from historical

predecessors in European traditional medicine.¹ Naturopathy as a distinct profession has traditional roots founded by the Nature Cure practice originating from Germany² and the historical pioneers of eclectic medicine during the 19th and 20th centuries,¹ which led to incorporation of homeopathy,

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herbal medicines, hydrotherapy, and other disciplines into naturopathy.² The naturopathic approach to care involves the combination of traditional and contemporary evidence, while being guided by the philosophical principles.³ According to the World Health Organization (WHO), naturopathy is recognized as one of the major global traditional systems of medicine.⁴ In the contemporary setting, naturopathy often falls under the term complementary medicine (CM), which includes a diverse collection of clinical practices that are not associated with conventional medicine.⁵ There has been increasing evidence that CM, including naturopathy,⁵ is more commonly used by women,⁶ particularly by those with reproductive conditions being a common reason for naturopathy use.⁷

Menstrual irregularities, including dysmenorrhea, known as painful menstruation, and menorrhagia, defined as excessive heavy menstrual bleeding,⁸ have varying prevalence rates. A WHO systematic review reported prevalence rates for dysmenorrhea, ranging from 1.7% to 97%,⁹ while an Australian study identified a prevalence rate of 80%.¹⁰ In the case of menorrhagia, prevalence rates of 5%–10% have been reported; however, the WHO reported that an estimated 18 million women worldwide are affected by menorrhagia.¹¹ Currently, there has been increased attention on endometriosis and is topical within the Australian Government¹²; however, its prevalence remains unclear.

Endometriosis is a chronic reproductive condition that presents with debility symptomatology, including menorrhagia and dysmenorrhea,¹³ with many of its symptoms having direct negative impact on women's quality of life.¹⁴ Despite this, there has been limited research conducted on accurate prevalence rates, with one article from 1997 reporting that 1 in 10 women are diagnosed with endometriosis.¹⁵ However, this figure may not reflect the general population as it was reported on women who had surgery for infertility.¹⁵ In addition, prevalence rates have been reported in an Australian longitudinal study, which stated that the rates for endometriosis and dysmenorrhea have remained stable, while menorrhagia has increased over 7 years.¹⁶

These conditions have significant negative impacts on women's lives such as decreased quality of life.^{14,17} Not only do women report negative implications but also they face difficulties and dissatisfaction with care. A recent systematic review on endometriosis reported that women felt dissatisfied with the care and treatments they received from convention health professionals.¹⁴ Dissatisfaction with care and treatments has also been reported by women with dysmenorrhea¹⁸ and menorrhagia, with the level of dissatisfaction dependent on the type of treatment prescribed.¹⁹ Such factors may lead women to seek care from outside of the conventional domain, such as naturopathy.²⁰

There is emerging evidence of the use of naturopathy in the management of acute and chronic diseases,³ including female reproductive conditions such as pregnancy,²¹ menopause,²² and polycystic ovarian syndrome.²³ While recent evidence suggests that naturopathy is used by women with these and other reproductive conditions,^{7,16,24} there is limited evidence on the naturopathic treatments used in clinical practice. Identifying the level of engagement from traditional and contemporary evidence in practice is important to understand current naturopathic practice and to provide a foundational base for assessing naturopathic treatment ef-

fectiveness and safety.²⁵ In response to this gap, this article explores the traditional and contemporary naturopathic approaches to managing endometriosis, dysmenorrhea, and menorrhagia, drawing on traditional and contemporary texts and periodicals.

Materials and Methods

The contemporary texts were selected by identifying texts from naturopathic institutions in Australia, Canada, and the United States of America (USA) (the three countries where most scholarly work is known to exist²⁶). The naturopathic institutions were limited to accredited (USA and Canada) and degree-granting (Australia) institutions, including Endeavour College of Natural Health, Australia; Southern School of Natural Therapies, Australia; Australian College of Natural Therapies, Australia; National University of Natural Medicine (NUNM), USA; Southwest College of Naturopathic Medicine, USA; Canadian College of Naturopathic Medicine, Canada; and Bastyr University, USA.

The contemporary texts were from the textbooks required for undertaking a naturopathic qualification with subjects in naturopathic clinical practicum, naturopathic therapeutics, naturopathic theory, and naturopathic gynecology subjects. Contemporary texts were included if they reported naturopathic treatments for the management of endometriosis, dysmenorrhea, and menorrhagia.

Traditional texts were identified through the NUNM library catalog, which holds the largest repository of rare and traditional books on naturopathy in North America (the Friedhelm Kirshfeld Rare Book Collection). This collection was donated by collectors for the naturopathic profession and holds over 2000 texts and periodicals.²⁷ The library catalog search used the terms: *women's health AND naturopath** OR *herbal medicine OR eclectic**. Women's health as a term was selected as it was indexed against a large number of naturopathic sources, including traditional texts. The search was refined by English language and years 1800–1941. This year range was selected on the basis of the “three generations (75 years)” rule used by the Australian Therapeutic Goods Administration (the only regulator of the three countries that establishes a time limit for evidence) as the minimum requirement for recognition of traditional claims as a form of evidence.²⁸

A manual search of the NUNM library catalog was also conducted. Individual searches were employed using the following search terms: *women's health, naturopath**; *herbal medicine*; and *eclectic**. Each search was refined to the same parameters of the previous search. An additional hand search was conducted at the Friedhelm Kirshfeld Rare Book Collection. All identified texts were assessed in the same manner using title, table of contents, and chapter analysis for relevance to the topic. Traditional texts were included if they were published between 1800 and 1941, reported on naturopathic treatments for endometriosis, dysmenorrhea, or menorrhagia, and were published in Australia, Canada, or USA. Traditional texts were excluded if there was not a clear reference to naturopathy or where the author's known biography does not include a clear link to the naturopathic profession. In addition, traditional texts were also accessed through a website database Archive.org, which holds digital collections on a wide range of texts.

Naturopathic periodicals published from 1800 to 2016 were also included. Identification of periodicals was conducted using a manual search through the Friedhelm Kirshfeld Rare Book Collection, the National Library of Australia, and the State Library of South Australia. These libraries were selected as they have a well-regarded collection of periodicals relating to naturopathy that were not duplicated in other major libraries. Periodicals were included if they reported on the naturopathic treatment for endometriosis, dysmenorrhea, and menorrhagia, were published in Australia, Canada, or USA, and were published in English. As the project focused on Western naturopathy, English was the only language included.

Analysis

Data extraction involved reading sources and extracting data relevant to the topic. Extracted data were developed into Microsoft Word files, which were uploaded into the software program NVivo for thematic analysis. Thematic analysis was conducted using a content analysis approach where coding in NVivo was derived directly from the data extracted. This approach allowed for recording themes that were highlighted in the included texts. R.R. conducted the data extraction and thematic analysis. A.S. and J.W. conducted cross-checking of coding and thematic analysis.

Reference to "menstrual cramps," "painful menstruation," "uterine cramps," and "uterine pain" within included sources was extracted and aggregated to the "dysmenorrhea" node. Likewise, "excessive menstruation" and "profuse menstruation" were coded to the "menorrhagia" node. Each individual treatment for the management of endometriosis, dysmenorrhea, or menorrhagia was allocated to an individual node and

was cross coded. Recommendations with combined treatments were assigned to each individual treatment node and were cross coded with the condition.

Results

Traditional texts

A total of 97 texts were identified from the NUNM electronic search. An additional 18 were identified from a manual search of the NUNM library catalog, and an additional 5 were identified from a hand search through the Friedhelm Kirshfeld Rare Book Collection, generating 120 for inclusion. From the 120 texts, 9 were duplicates, 50 were excluded based on review of title and/or chapter analysis, and 26 were excluded for not mentioning the topic. A total of 35 traditional texts were included. Figure 1 reports the selection process for the traditional texts.

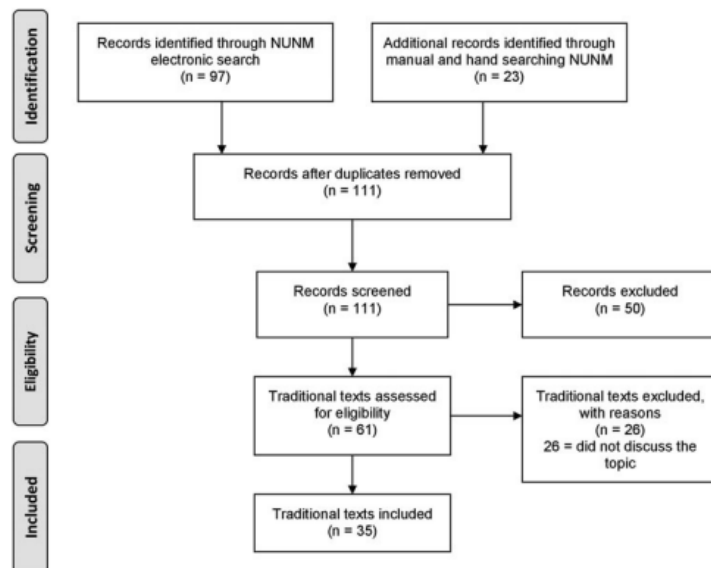
Contemporary texts

A total of 130 contemporary texts were identified from the education institutions. A total of 35 were duplicates, 30 were excluded based on review of the book's description, and 6 were excluded based on table of contents, leaving 59 for assessment. From review of the chapters, 12 were excluded for not being of relevance, leaving 47 for inclusion. Figure 2 reports the selection process for the contemporary texts.

Traditional and contemporary periodicals

Based on title, 126 periodicals were assessed. From this figure, 102 were excluded for not being of relevance, leaving 24 periodicals for assessment. From assessment of the 24 periodicals (by title), 97 individual articles were assessed

FIG. 1. Selection process for the traditional texts. NUNM, National University of Natural Medicine.



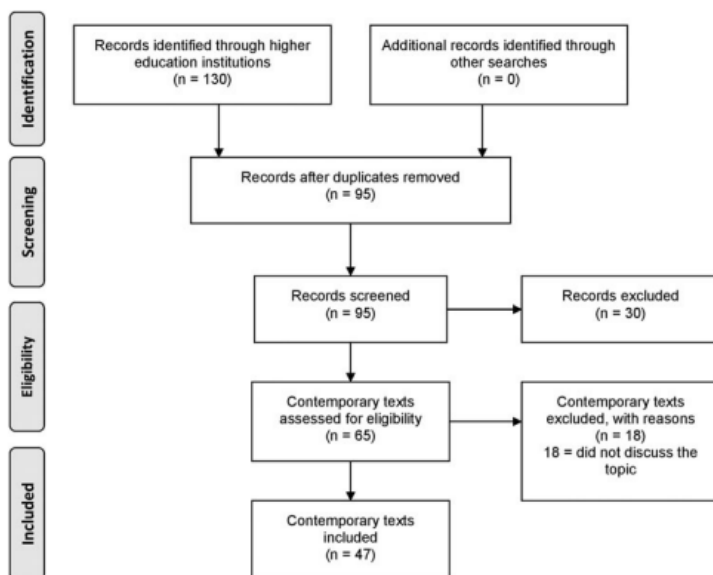


FIG. 2. Selection process for contemporary texts from higher education institutions.

for inclusion with 14 being excluded. The remaining 83 articles were included. The final included periodicals were allocated into traditional (years 1800–1941) ($n = 52$) or contemporary periodicals (years 1942–2016) ($n = 31$). Figure 3 reports the selection process for the traditional and contemporary periodicals.

In total, 167 naturopathic sources were included in the project.

Herbal medicine

Herbal medicine was the most reported treatment with 220 herbs for dysmenorrhea, 163 for menorrhagia, and 84 for endometriosis. Table 1 displays the herbal medicines for endometriosis, dysmenorrhea, and menorrhagia.

The most recommended herb for dysmenorrhea was *Cimicifuga racemosa* with 69 recommendations, with a continuous history of use across 23 traditional texts,^{29–51} 5 traditional periodicals,^{52–56} 22 contemporary texts,^{1,57–77} and 2 contemporary periodicals.^{78,79} Similarly, *Viburnum opulus*, *Caulophyllum thalictroides*, and *Anemone pulsatilla* were mentioned across traditional and contemporary sources. These herbs were recommended from 1856 to 2014. *Senecio aureus* and *Atropa belladonna*, while frequently listed, were only found in traditional sources with the most recent from 1935.^{29,51} *Gelsemium sempervirens* was primarily reported in traditional sources and in one contemporary source. Herbal medicines only identified in contemporary texts included *Rubus idaeus* ($n = 15$), *Zingiber officinale* ($n = 14$), *Angelica sinensis* ($n = 14$), *Achillea millefolium* ($n = 12$), *Piscidia erythrina* ($n = 11$), and *Valeriana officinalis* ($n = 10$).

The herb most frequently identified for menorrhagia was *A. millefolium* with 34 recommendations,^{29,32,34,37,41–43,58,61,64,67,68,74–77,80–90} across 8 traditional texts,^{29,32,34,37,41–43,90} 2 traditional periodicals,^{88,89} 17 con-

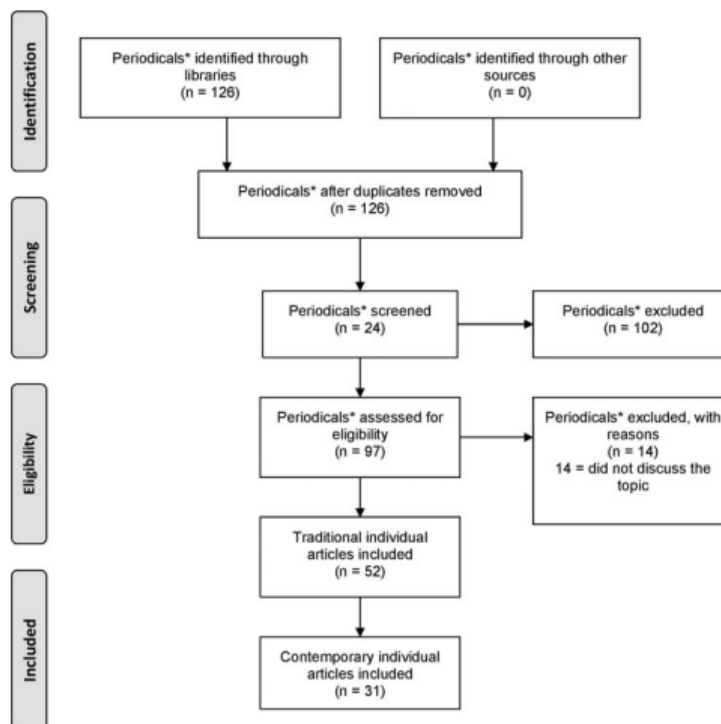
temporary texts,^{58,61,64,67,68,74–77,81–87,91} and 1 contemporary periodical,⁸⁰ during 1856–2016.^{29,87} *Claviceps purpurea* ($n = 12$)^{31,33,35,38,39,43,46,48,49,51,92,93} was frequently identified in traditional sources with one contemporary source.⁵⁹ Similarly, all reports of *Cephaelis ipecacuanha* and *C. racemosa* were from traditional sources, with no recommendations from contemporary sources. *S. aureus* was listed in traditional sources ($n = 10$)^{29,30,34,37,40,44–46,49,94} and in five contemporary sources.^{67,71,75,86,87} The most referenced herbs from contemporary sources were *A. millefolium* ($n = 17$)^{58,61,64,67,68,74–77,80–87} and *Capsella bursa-pastoris* ($n = 17$).^{58,59,61,64,67,68,74,76,77,81,83,84,86,87,95–97} Recommendations for *R. idaeus* were reported in more contemporary sources^{64,67,69,70,82,84,86,95,98–100} compared to traditional sources.⁴⁴ *Vitex agnus-castus* was only reported from contemporary sources ($n = 11$),^{61,64,67,68,71,73,76,83,85,87,95} with no recommendations from traditional sources.

Herbal treatments for endometriosis were few with 84 herbal medicines recommended. The top 20 herbs were recommended from contemporary texts during 1993–2016,^{83,87} with no recommendations from traditional sources. The most prominent herb recommendation across all sources was *V. agnus-castus* with 17 recommendations across 16 contemporary texts.^{60–64,67,69,71,73,74,76,83,84,86,87,101}

Mineral medicine

Table 2 displays the mineral medicines for endometriosis, dysmenorrhea, and menorrhagia. There were 12 minerals recommended for dysmenorrhea in 8 traditional texts,^{29,35,38,40,44,49,51,102} 14 contemporary texts,^{1,60,63–65,70,72–74,83,97,103–105} and 4 contemporary periodicals,^{79,106–108} during 1856–2014. Magnesium was the most

FIG. 3. Identification of naturopathic traditional and contemporary periodicals. *Periodicals refer to periodical title, including all available volumes.



commonly recommended mineral ($n=20$) followed by iron ($n=13$), calcium ($n=12$), phosphate ($n=7$), and iodine ($n=6$). A higher proportion of these recommendations were found in contemporary (texts: $n=14$; periodicals: $n=4$) compared to traditional sources (texts only: $n=8$).

For endometriosis management, 10 minerals were identified. The most common were selenium ($n=7$), magnesium ($n=6$), zinc ($n=5$), and calcium ($n=2$). These recommendations were reported during 1991–2016 and were across eight contemporary texts^{60,64,65,67,86,87,101,109} and one contemporary periodical.¹⁰⁶ There were no recommendations for minerals from traditional sources.

For menorrhagia, there were eight reported minerals across three traditional texts,^{40,44,110} one traditional periodical,¹¹¹ seven contemporary texts,^{64,83,85–87,97,104} and two contemporary periodicals.^{106,112} The most common was iron ($n=11$) across 10 sources.^{44,64,83,85–87,97,104,106,110} Other common minerals included calcium ($n=3$), phosphate ($n=3$), potassium ($n=3$), and zinc ($n=2$). These minerals were reported in three traditional texts,^{40,44,110} seven contemporary texts,^{64,83,85–87,97,104} and two contemporary periodicals^{106,112} between 1905 and 2016.^{44,87}

Clinical nutrition

Table 3 displays the nutritional treatments for endometriosis, dysmenorrhea, and menorrhagia. Across all three

conditions, more nutritional medicine ($n=29$) treatments were listed for the management of endometriosis compared to dysmenorrhea and menorrhagia, although all of these recommendations were only reported in the contemporary sources.^{60,64,65,67,73,74,76,83,86,87,97,101,106, 109,112–114} The earliest nutritional treatment for endometriosis was vitamin E and was found in two contemporary periodicals from 1982¹¹² to 1991.¹⁰⁶ Vitamin E was also reported the largest number of recommendations ($n=13$). Other popular nutrients were eicosapentaenoic acid/docosahexaenoic acid ($n=11$), vitamin C ($n=9$), vitamin B complex ($n=7$), β -carotene ($n=6$), *Lactobacillus acidophilus* ($n=4$), choline ($n=3$), cysteine ($n=3$), γ -linolenic acid ($n=3$), and grape seed extract ($n=3$).

The nutritional management of dysmenorrhea was reported across 28 nutritional medicines, with the most prominent recommendation being vitamin E ($n=17$).^{1,63–65,67,70,72,73,97,103,104,106–108} Vitamin E was reported across 11 contemporary texts^{1,63–65,67,70,72,73,97,103,104} and 3 periodicals^{106–108} during 1991 and 2014. Other frequently reported treatments were eicosapentaenoic acid/docosahexaenoic acid ($n=12$), γ -linolenic acid ($n=9$), vitamin B6 ($n=8$), vitamin B3 ($n=7$), vitamin B1 ($n=6$), vitamin C ($n=5$), bromelain ($n=3$), folic acid ($n=2$), and probiotics ($n=2$, strain not specified). These recommendations were only reported in contemporary sources, with no recommendations

TABLE 1. COMMON HERBAL MEDICINES RECOMMENDED FOR ENDOMETRIOSIS, DYSMENORRHEA, AND MENORRHAGIA AS IDENTIFIED IN TRADITIONAL AND CONTEMPORARY SOURCES

Herbal medicine	Endometriosis			Dysmenorrhea			Menorrhagia		
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	
<i>Achillea millefolium</i>	—	n=5 Wood ⁵⁸ ; Alf ⁸⁴ ; Kaur et al. ⁶⁴ ; Romm ⁷³ ; Wood ⁷⁶	—	n=14 Gladstar ⁸³ ; Wood ⁸⁶ ; Weiss ⁵⁷ ; King ²⁶ ; Brown ³² ; Scudder ³⁴ ; Alf ⁸⁴ ; Bliss ⁷⁶ ; Van Wyk ³⁷ ; Scudder ³⁴ ; Dean ⁴³ ; Fyfe ⁴² ; Felter and Lloyd ⁷⁴ ; Fisher ⁶⁸ ; Gladstar ⁸³ ; Wood ⁷⁶ ; Romm ⁷³ ; Bone and Mills ⁷⁶ ; Sarris and Wardle ¹	n=10 King ²⁶ ; Brown ³² ; Scudder ³⁴ ; Felter and Lloyd ⁷⁴ ; Mauselet ⁷⁵ ; Lust ⁸⁵ ; Riggs ⁸⁹	n=24 Atkinson ⁸⁰ ; Lust ⁸¹ ; Frawley and Lad ⁸² ; Gladstar ⁸³ ; Wood ⁷⁶ ; Alf ⁸⁴ ; Bone ⁶¹ ; Kaur et al. ⁶⁴ ; Gladstar ⁸³ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Trickey ⁷⁴ ; Wood ⁷⁶ ; Pizzorno et al. ⁸⁷ ; Bone and Mills ⁷⁶ ; Frances ⁷⁷ ; Pizzorno and Murray ⁸⁶	—	—	—
<i>Alchemilla vulgaris</i>	—	n=4 Alf ⁸⁴ ; Godfrey and Saunders ⁷¹ ; Romm ⁷³ ; Tobyn ¹⁵⁸	—	—	n=2 No author ¹⁵⁹ ; Milton ⁵⁶	n=10 Wood ⁸⁶ ; Gladstar ⁸³ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Godfrey and Saunders ⁷¹ ; Tobyn ¹⁵⁸ ; Trickey ⁷⁴ ; Pizzorno and Murray ⁸⁶ ; Frances ⁷⁷	—	—	—
<i>Aletris farinosa</i>	—	—	n=9 King ²⁶ ; Webster et al. ⁴⁰ ; Felter and Lloyd ⁴⁴ ; Ellingwood ⁴⁶ ; Meyer ⁴⁸ ; Larsen ¹	n=4 Fisher ⁶⁸ ; Godfrey and Saunders ⁷¹ ; Trickey ⁷⁴ ; Sarris and Wardle ¹	n=5 Brown ³² ; Watkins ³⁹ ; Felter and Lloyd ⁴⁴ ; Meyer ⁴⁸ ; Mauselet ⁷⁵	n=4 Atkinson ⁸⁰ ; Hudson ⁶⁷ ; Trickey ⁷⁴ ; Pizzorno and Murray ⁸⁶	—	—	—
<i>Anemone pulsatilla</i>	—	n=4 Micozzi and Lowdo ⁶³ ; Kaur et al. ⁶⁴ ; Romm ⁷³ ; Frances ⁷⁷	—	—	—	—	—	—	—
<i>Angelica sinensis</i>	—	n=6 Gladstar ⁸³ ; Micozzi and Lowdo ⁶³ ; Kaur et al. ⁶⁴ ; Kirschmann ¹⁰⁹ ; Romm ⁷³ ; Bone and Mills ⁷⁶	—	n=17 Gladstar ⁸³ ; Bone ⁷⁶ ; Alf ⁸⁴ ; Bone ⁶¹ ; Micozzi and Lowdo ⁶³ ; Tilgner ⁶⁹ ; Braun and Cohen ⁷⁰ ; Godfrey and Saunders ⁷¹ ; Leach ⁷⁴ ; Romm ⁷³ ; Trickey ⁷⁴ ; Bone and Mills ⁷⁶ ; Sarris and Wardle ¹	—	—	—	—	—
<i>Astragalus membranaceus</i>	—	n=4 Micozzi and Lowdo ⁶³ ; Kaur et al. ⁶⁴ ; Romm ⁷³ ; Bone and Mills ⁷⁶	—	—	—	—	—	—	—

(continued)

TABLE 1. (CONTINUED)

Herbal medicine	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>Atropa belladonna</i>	—	—	n = 10 King ²⁹ ; Phillips ³¹ ; Locke and Felter ⁶⁸ ; Felter and Lloyd ⁶⁸ ; Felter ⁶⁹ ; Wilson ⁵¹	n = 3 Weiss ¹⁵⁷ ; Frances ⁷⁷	—	—
<i>Capsella bursa-pastoris</i>	—	—	—	—	n = 8 ⁸⁸ ; Scudder ³⁷ ; Watkins ³⁰ ; Fyfe ⁴² ; Felter and Lloyd ⁴³ ; Ellingwood and Lloyd ⁴³ ; Mausert ⁸¹ ; Wilson	n = 10 Lust ³¹ ; Gladstar ⁸³ ; Wood ⁸⁸ ; Blumenthal ⁸³ ; Afls ⁸⁴ ; Bone ⁶¹ ; Van Wyk and Wink ⁶⁶ ; Kaur et al. ⁸⁴ ; Osiecki ⁹⁷ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Trickey ⁷⁴ ; Pizzorno and Murray ⁸⁶ ; Bone and Mills ⁷⁶ ; Frances ⁷⁷ ; Pizzorno et al. ⁸⁷
<i>Caulophyllum thalictroides</i>	—	—	—	—	n = 7 King ²⁹ ; Coe ³⁰ ; Adolphus ¹⁶⁰ ; Felter and Lloyd ⁴⁴ ; Felter and Lloyd ⁴⁴	n = 8 Afls ⁸⁴ ; Bone ⁶¹ ; Hudson ⁶⁷ ; Tilener ⁶⁹ ; Godfrey and Saunders ⁷¹ ; Trickey ⁷⁴ ; Pizzorno and Murray ⁸⁶ ; Frances ⁷⁷
<i>Cephaelis ipecacuanha</i>	—	—	—	—	n = 9 Phillips ³¹ ; Scudder ³⁷ ; Goss ³⁵ ; Fyfe ⁴² ; Felter and Lloyd ⁴⁴ ; Ellingwood and Lloyd ⁴³ ; Felter	—
<i>Chamaelirium luteum</i>	—	—	n = 16 Scudder ¹⁶¹ ; Felter ¹⁶² ; Howard ²⁶ ; King ²⁹ ; Coe ³⁰ ; Goss ³⁵ ; Locke and Felter ⁶⁸ ; Felter and Lloyd ⁴⁴ ; Ellingwood ⁴⁶ ; Bjlar ⁴⁷ ; Meyer ⁴⁸ ; Wilson	n = 10 Bradley ⁵⁷ ; Bone ⁶¹ ; Osiecki ⁹⁷ ; Barnes et al. ⁶⁶ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Godfrey and Saunders ⁷¹ ; Leach ⁷² ; Hechman ¹⁰³ ; Surris and Wardle ¹	n = 5 Griffith ¹⁶³ ; King ²⁹ ; Watkins ³⁰ ; Fyfe ⁴² ; Ellingwood ⁴⁶	n = 3 Osiecki ⁹⁷ ; Trickey ⁷⁴ ; Wood ¹⁵

(continued)

TABLE 1. (CONTINUED)

Herbal medicine	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>Cimicifuga racemosa</i>	—	n=9 Hoffman ⁶² ; Micozzi and Lowdog ⁶³ ; Kaur et al. ⁶⁴ ; Ostrzenski ⁶⁰ ; Frances ⁶¹ ; Tilgner ⁶⁹ ; Braun and Cohen ⁷⁰ ; Romm ⁷³ ; Kirschmann ⁶⁹ ; Hudson ⁶⁷	n=42 Scudder ⁵² ; Webster ⁵³ ; Felter ⁵⁴ ; King ⁵⁵ ; Coe ³⁰ ; Phillips ³¹ ; Brown ³² ; Scudder ³³ ; Scudder ³⁴ ; Goss ³⁵ ; Scudder ³⁶ ; Scudder ³⁷ ; Locke and Felter ³⁸ ; Watkins ³⁹ ; Webster et al. ⁴⁰ ; Dean ⁴¹ ; Fyfe ⁴² ; Felter and Lloyd ⁴³ ; Felter and Lloyd ⁴⁴ ; Ellingwood and Lloyd ⁴⁵ ; Ellingwood ⁴⁶ ; Blair ⁴⁷ ; Meyer ⁴⁸ ; Felter ⁴⁹ ; Rexford ⁵⁰ ; Wilson ⁵¹	n=27 Bliss ⁷⁸ ; Wharton ⁷⁹ ; Bradley ⁷⁷ ; Wood ⁷⁸ ; Blumenthal ⁷⁹ ; Ostrzenski ⁶⁰ ; Bone ⁶¹ ; Hoffman ⁶² ; Micozzi and Lowdog ⁶³ ; Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Barnes et al. ⁶⁶ ; Hudson ⁶⁷ ; Fisher ⁶⁸	n=8 ⁶⁴ ; King ²⁹ ; Scudder ³³ ; Watkins ³⁹ ; Felter and Lloyd ⁴³ ; Felter and Lloyd ⁴⁴ ; Wilson ⁵¹	—
<i>Cinnamomum cassia</i>	—	—	—	—	n=9 Scudder ³³ ; Watkins ³⁹ ; Dean ⁴¹ ; Felter and Lloyd ⁴³ ; Felter and Lloyd ⁴⁴ ; Wilson ⁵¹	n=4 Gladstar ⁸³ ; Alf ⁸⁴ ; Hudson ⁶⁷ ; Pizzorno and Murray ⁸⁶
<i>Claytonia purpurea</i>	—	—	—	—	n=14 Phillips ³¹ ; Scudder ³³ ; Goss ³⁵ ; Locke and Felter ³⁸ ; Watkins ³⁹ ; Felter and Lloyd ⁴³ ; Ellingwood ⁴⁶ ; Meyer ⁴⁸ ; Felter ⁴⁹ ; Larsen ⁵¹ ; Scudder ⁵² ; Wilson ⁵¹	n=1 Blumenthal ⁹⁹
<i>Curcuma longa</i>	—	n=5 Kaur et al. ⁶⁴ ; Romm ⁷³ ; Trickey ⁷⁴ ; Bone and Mills ⁷⁵	—	—	—	—
<i>Dioscorea villosa</i>	—	n=6 Hoffman ⁶² ; Gladstar ⁸³ ; Ostrzenski ⁶⁰ ; Hudson ⁶⁷ ; Romm ⁷³	n=11 King ²⁹ ; Kost ¹⁶⁵ ; Coe ³⁰ ; Scudder ³³ ; Locke and Felter ³⁸ ; Ellingwood ⁴⁶ ; Ellingwood and Lloyd ⁴⁵ ; Felter ⁴⁹ ; Rexford ⁵⁰ ; Wilson ⁵¹	n=19 Gladstar ⁸³ ; Wood ⁸⁸ ; Ostrzenski ⁶⁰ ; Alf ⁸⁴ ; Bone ⁶¹ ; Hoffman ⁶² ; Micozzi and Lowdog ⁶³ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Braun and Cohen ⁷⁰ ; Godfrey and Saunders ⁷¹ ; Romm ⁷³ ; Leach ⁷² ; Trickey ⁷⁴ ; Bone and Mills ⁷⁵ ; Hechman ¹⁰³ ; Sarris and Wardle ¹⁰⁴	—	—

(continued)

TABLE 1. (CONTINUED)

Herbal medicine	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>Echinacea angustifolia</i>	—	n=4 Micozzi and Lowdog ⁶³ , Kaur et al. ⁶⁴ , Romm ⁷³ , Bone and Mills ⁸⁶	—	—	—	—
<i>Erigeron canadensis</i>	—	—	—	—	n=9 King ²⁹ , Coe ³⁰ , Scudder ³³ , Watkins ³⁹ , Webster et al. ⁴⁰ , Ellingwood and Lloyd ⁴³ , Wilson ⁴⁷	n=2 Hudson ⁶⁷ , Pizzorno and Murray ⁸⁶
<i>Gelsemium sempervirens</i>	—	—	n=15 King ²⁹ , Coe ³⁰ , Brown ³² , Scudder ³³ , Goss ³⁵ , Watkins ³⁹ , Scudder ³³ , Locke and Felter ³⁸ , Watkins ³⁹ , Webster et al. ⁴⁰ , Denton ¹⁰⁹ , Felter and Lloyd ⁴³ , Jones ¹⁰² , Blair ¹¹¹	n=1 Fisher ⁶⁸	—	—
<i>Geranium maculatum</i>	—	—	—	—	n=9 King ²⁹ , Brown ³² , Watkins ³⁹ , Felter and Lloyd ⁴³ , Meyer ⁴⁴ , Felter ⁴⁵ , Unknown author ¹⁷⁰	n=10 Alknsn ⁸⁰ , Vasquez ¹⁷¹ , Vazquez ¹⁷² , Wood ⁸⁸ , Ails ⁸⁹ , Bone ⁶¹ , Hudson ⁶⁷ , Fisher ⁶⁸ , Trickey ⁷⁴ , Pizzorno and Murray ⁸⁶
<i>Glycyrrhiza glabra</i>	—	n=4 Micozzi and Lowdog ⁶³ , Kirschmann ¹⁰⁹ , Romm ⁷³ , Bone and Mills ⁸⁶	—	—	—	—
<i>Gossypium herbaceum</i>	—	n=3 Micozzi and Lowdog ⁶³ , Romm ⁷³ , Godfrey ⁷¹ , and Saunders ⁷¹	—	—	—	—
<i>Hydrastis canadensis</i>	—	—	—	—	n=9 Brown ³² , Watkins ³⁹ , Cook ⁹¹ , Adolphus ¹⁶⁰ , Felter and Lloyd ⁴³ , Lloyd ⁷³ , Ellingwood and Lloyd ⁴⁵ , Felter ⁴⁶ , Wilson ⁵¹	n=8 Hedges ¹⁷⁴ , Frawley and Lad ⁸⁷ , Bradley ⁵⁷ , Bone ⁶¹ , Hudson ⁶⁷ , Fisher ⁶⁸ , Trickey ⁷⁴ , Pizzorno and Murray ⁸⁶
<i>Juniperus sabina</i>	—	—	—	—	n=8 King ²⁹ , Phillips ³¹ , Goss ³⁵ , Scudder ³³ , Locke and Felter ³⁸ , Fyle ⁴² , Felter and Lloyd ⁴³ , Jones ¹⁰²	n=2 Hudson ⁶⁷ , Pizzorno and Murray ⁸⁶

(continued)

TABLE 1. (CONTINUED)

Herbal medicine	Endometriosis			Dysmenorrhea			Menorrhagia		
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	
<i>Leonurus cardiaca</i>	—	n=5 Ostrzenski ⁶⁰ ; Hudson ⁶⁷ ; Romm ³³ ; Pizzorno and Murray ⁸³ ; Pizzorno et al. ⁸⁷	n=4 Felter and Lloyd ⁴⁴ ; Ellingwood and Lloyd ⁴⁵ ; Ellingwood ⁴⁶ ; Rexford	n=12 Bone ⁶¹ ; Gladstar ⁸³ ; Ails ⁸⁴ ; Gladstar ⁸⁵ ; Fisher ⁶⁴ ; Leach ⁷² ; Romm ³³ ; Frances ⁷⁷	—	—	—	—	
<i>Matricaria recutita</i>	—	—	n=10 King ²⁰ ; Brown ³² ; Locke and Felter ¹³ ; Webster et al. ⁴⁰ ; Felter ⁴³ ; Felter and Lloyd ⁴⁴ ; Blair ⁷¹ ; Felter ¹⁷⁶ ; Felter ⁶¹ ; Rexford	n=16 Wharton ⁷⁹ ; Wharton ¹⁰⁸ ; Wood ⁸⁶ ; Ails ⁸⁴ ; Bone ⁶¹ ; Hudson ⁶⁷ ; Fisher ⁶⁴ ; Leach ⁷² ; Romm ³³ ; Trickey ⁷⁴ ; Bone and Mills ⁷⁶ ; Sarris and Wardle ¹	—	—	—		
<i>Mitchella repens</i>	—	—	n=11 Howard ¹³⁶ ; King ²⁰ ; Locke and Felter ¹³ ; Fyfe ⁴² ; Felter and Lloyd ⁴⁴ ; Ellingwood and Lloyd ⁴⁵ ; Ellingwood ⁴⁶	n=13 Milton ⁸⁶ ; Wharton ¹⁰⁷ ; Wharton ¹⁰⁸ ; Boyle and Saine ³³ ; Ails ⁸⁴ ; Micozzi and Lowdog ⁶³ ; Fisher ⁶⁴ ; Tilener ⁶⁹ ; Godfrey and Saunders ⁷¹ ; Leach ⁷² ; Romm ³³ ; Wood ⁸⁶ ; Frances ⁷⁷	n=5 King ²⁰ ; Meyer ⁴⁸ ; Fyfe ⁴² ; Felter and Lloyd ⁴⁴	n=5 Ails ⁸⁴ ; Godfrey and Saunders ⁷¹ ; Trickey ⁷⁴ ; Frances ⁷⁷ ; Milton ⁸⁶	—		
<i>Paeonia lactiflora</i>	—	n=4 Micozzi and Lowdog ⁶³ ; Romm ³³ ; Tobyn ¹³⁸ ; Trickey ⁷⁴	—	—	—	—	—		
<i>Pinus pinaster</i>	—	n=5 Trickey ⁷⁴ ; Murray and Pizzorno ¹⁰¹ ; Pizzorno and Murray ⁸⁶ ; Bone and Mills ⁷⁶ ; Pizzorno et al. ⁸⁷	—	—	—	—	—		
<i>Piscidia erythrina</i>	—	—	n=4 Watkins ³⁶ ; Webster et al. ⁴⁰ ; Fyfe ⁴² ; Ellingwood and Lloyd ⁴⁵	n=11 Bradley ⁵⁷ ; Bone ⁶¹ ; Barnes et al. ⁶⁶ ; Fisher ⁶⁴ ; Tilgner ⁶⁹ ; Godfrey and Saunders ⁷¹ ; Leach ⁷² ; Romm ³³ ; Trickey ⁷⁴ ; Frances ⁷⁷ ; Sarris and Wardle	—	—	—		
<i>Rubus idaeus</i>	—	—	—	n=16 Phyllis ⁸⁸ ; Blackwell ⁸⁹ ; Frawley and Lad ⁸² ; Gladstar ⁸⁵ ; Wharton ¹⁰⁷ ; Wharton ⁷⁹ ; Wharton ¹⁰⁸ ; Gladstar ⁸⁵ ; Fisher ⁶⁴ ; Braun and Cohen ⁷⁰ ; Romm ³³ ; Trickey ⁷⁴ ; Bone and Mills ⁷⁶ ; Frances ⁷⁷ ; Sarris and Wardle ¹	n=1 Felter and Lloyd ⁴⁴	n=11 Frawley and Lad ⁸² ; Gladstar ⁸⁵ ; Ogilvie ⁹⁰ ; Ails ⁸⁴ ; Kaur et al. ⁶⁴ ; Hudson ⁶⁷ ; Pizzorno and Murray ⁸⁶ ; Tilgner ⁶⁹ ; Braun and Cohen ⁷⁰ ; Phyllis ⁸⁸ ; Blackwell ⁸⁹	—		

(continued)

TABLE 1. (CONTINUED)

Herbal medicine	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>Senecio aureus</i>	—	—	<i>n</i> = 17 King ⁷⁹ ; Kog ¹⁴⁶ ; Coe ³⁰ ; Brown ³² ; Scudder ³⁴ ; Goss ³⁵ ; Watkins ³⁶ ; Webster ⁶¹ ; Dean ⁴¹ ; Felter and Lloyd ⁴⁴ ; Ellingwood and Lloyd ⁴⁵ ; Ellingwood and Lloyd ⁴⁶ ; Felter ⁴⁹ ; Mausert	<i>n</i> = 2 Godfrey and Saunders ⁷¹ ; Wood ⁷⁵	<i>n</i> = 10 King ⁷⁹ ; Coe ³⁰ ; Scudder ³⁴ ; Scudder ³⁷ ; Watkins ³⁶ ; Webster ⁶¹ ; Felter and Lloyd ⁴⁴ ; Ellingwood and Lloyd ⁴⁵ ; Ellingwood ⁴⁶ ; Felter ⁴⁹	<i>n</i> = 5 Hudson ⁶⁷ ; Godfrey and Saunders ⁷¹ ; Wood ⁷⁵ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷
<i>Silybum marianum</i>	—	<i>n</i> = 3 Micozzi and Lowdog ⁶⁵ ; Romm ⁷⁵ ; Bone and Mills ⁷⁶	—	—	—	—
<i>Tanacetum officinale</i>	—	<i>n</i> = 7 Gladstar ⁸⁵ ; Ostrzenski ⁶⁰ ; Micozzi and Lowdog ⁶⁵ ; Hudson ⁶⁷ ; Romm ⁷⁵ ; 86; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	—	—
<i>Trillium erectum</i>	—	—	—	—	<i>n</i> = 11 King ⁷⁹ ; Coe ³⁰ ; Brown ³² ; Scudder ³⁴ ; Webster et al. ⁴⁰ ; Felter and Lloyd ⁴⁴ ; Meyer ⁴⁸ ; Larsen ⁵³ ; Unknown author	<i>n</i> = 9 Aikimon ⁸⁰ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Tilgner ⁶⁹ ; Trickey ⁷⁴ ; Wood ⁷⁵ ; Pizzorno and Murray ⁸⁶ ; Bone and Mills ⁷⁶
<i>Valeriana officinalis</i>	—	<i>n</i> = 3 King ⁷⁹ ; Felter and Lloyd ⁴⁴ ; Rexford ¹⁰	<i>n</i> = 10 Frawley and Lad ⁸² ; Gladstar ⁸⁵ ; Weiss ¹⁵⁷ ; Barnes et al. ⁶⁶ ; Hudson ⁶⁷ ; Tilgner ⁶⁹ ; Leach ⁷² ; Trickey ⁷⁴ ; Frances ⁷⁷ ; Sarris and Wardle	—	—	—
<i>Viburnum opulus</i>	—	<i>n</i> = 5 Ostrzenski ⁶⁰ ; Kaur et al. ⁶⁴ ; Hudson ⁶⁷ ; Romm ⁷⁵ ; Bone and Mills ⁷⁶	—	—	—	—
<i>Viburnum prunifolium</i>	—	<i>n</i> = 13 Felter ⁶² ; Webster ⁴⁰ ; Scudder ³⁴ ; Goss ³⁵ ; Cook ⁹¹ ; Felter and Lloyd ⁴⁴ ; Ellingwood ⁴⁶ ; Lloyd ⁴⁵ ; Ellingwood ⁴⁶ ; Meyer ⁴⁸ ; Felter ⁴⁹ ; Larsen ⁵³ ; Rexford ¹⁰ ; Wilson	<i>n</i> = 21 Wharton ⁷⁹ ; Wood ⁵⁸ ; Weiss ¹⁵⁷ ; Ostrzenski ⁶⁰ ; Bone ⁶¹ ; Hoffman ⁶² ; Micozzi and Lowdog ⁶⁵ ; Van Wyk and Wink ⁸⁶ ; Gladstar ⁸⁵ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Godfrey and Saunders ⁷¹ ; Leach ⁷² ; Romm ⁷⁵ ; Trickey ⁷⁴ ; Wood ⁷⁵ ; Bone and Mills ⁷⁶ ; Hechtman ¹⁰⁸	<i>n</i> = 9 Felter ⁶² ; Webster ⁴⁰ ; Scudder ³⁴ ; Scudder ³⁷ ; Wilson ¹¹ ; Felter and Lloyd ⁴⁴ ; Meyer ⁴⁸ ; Cook ⁹¹	<i>n</i> = 3 Bliss ⁷⁸ ; Godfrey and Saunders ⁷¹ ; Wood ⁷⁵	

(continued)

TABLE 1. (CONTINUED)

Herbal medicine	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>Vitex agnus-castus</i>	—	n=17 Gladstar ⁸³ ; Ostrzenski ⁶⁰ , Aifs ⁸⁴ ; Bone ⁶ ; Hoffman ⁶² ; Micozzi and Lowdog ⁶³ ; Kaur ⁶⁴ ; Hudson ⁶⁷ ; Tilgner ⁶⁹ ; Godfrey and Saunders ⁷¹ ; Romm ⁷³ ; Trickey ⁷⁴ ; Murray and Pizzorno ⁸⁶ ; Bone and Mills ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	—	n=13 Gladstar ⁸³ ; Bone ⁶¹ , Gladstar ⁸⁵ ; Kaur ⁶⁴ , Hudson ⁶⁷ ; Fisher ⁶⁸ ; Godfrey and Saunders ⁷¹ ; Romm ⁷³ ; Pizzorno and Murray ⁸⁶ ; Bone and Mills ⁸⁶ ; Pizzorno et al. ⁸⁷
<i>Zanthoxylum americanum</i>	—	n=4 Ostrzenski ⁶⁰ ; Hudson ⁶⁷ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	—	—
<i>Zingiber officinale</i>	—	n=5 Micozzi and Lowdog ⁶³ , Kaur et al. ⁶⁴ ; Romm ⁷³ ; Trickey ⁷⁴ ; Bone and Mills ⁸⁶	n=3 Ellingwood and Lloyd ⁴⁵ ; Meyer ⁴⁸ ; Felten ⁴⁹	n=20 Gladstar ⁸³ ; Ostrzenski ⁶⁰ ; Bone ⁶ ; Kaur et al. ⁶⁴ ; Gladstar ⁸⁵ ; Hudson ⁶⁷ ; Fisher ⁶⁸ ; Braun and Cohen ⁷⁰ ; Trickey ⁷⁴ ; Gladstar ¹⁷⁸ ; Bone and Mills ⁸⁶ ; Sarris and Wardle ¹ ; Leach ⁷² ; Romm ⁷³	—	—

TABLE 2. TOP 5 MINERALS AND NUMBER OF RECOMMENDATIONS ACROSS THE CONTEMPORARY AND TRADITIONAL SOURCES

Minerals	Endometriosis			Dysmenorrhea			Menorrhagia		
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	
Calcium (phosphate)	—	n=2 Kaur et al. ⁶⁴ ; Kirschmann ¹⁰⁹	—	n=12 ¹⁰⁶ ; Wharton ¹⁰⁷ ; Wharton ⁷⁹ ; Wharton ¹⁰⁸ ; Ostrzenski ¹⁰⁴ ; Kaur et al. ⁶⁴ ; Leach ⁷² ; Romm ⁷³ ; Hechtman ¹⁰⁵ ; Sarris and Wardle ¹	n=1 Webster et al. ⁴⁰	n=2 Dillon ¹⁰⁶ ; Atkinson ¹¹²	—	—	—
Iodine (alone, kelp, or with other minerals)	—	n=1 Kaur et al. ⁶⁴	n=6 ²⁹ ; Goss ³⁵ ; Locke and Felter ³⁸ ; Felter and Lloyd ⁴⁴ ; Felter ⁴⁹	—	—	—	—	—	—
Iron (chloride, phosphate, sulfate, gluconate or Lloyd's Iron)	—	—	n=7 Goss ³⁵ ; Locke and Felter ³⁸ ; Webster et al. ⁴⁰ ; Felter and Lloyd ⁴⁴ ; Felter ⁴⁹ ; Wilson ⁸¹	n=6 ¹⁰⁶ ; Gladstar ⁸³ ; Werbach and Moss ¹⁰⁴ ; Osiecki ⁹⁷ ; Leach ⁷² ; Hechtman ¹⁰⁵	n=2 Felter and Lloyd ⁴⁴ ; Melendy ¹¹¹	n=9 Dillon ¹⁰⁶ ; Gladstar ⁸³ ; Werbach and Moss ¹⁰⁴ ; Kaur et al. ⁶⁴ ; Osiecki ⁹⁷ ; Gladstar ⁸³ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	
Magnesium (rotate, chelate, or phosphate)	—	n=6 Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Kirschmann ¹⁰⁹ ; Murray and Pizzorno ¹⁰¹	n=1 ¹⁰² Jones	n=19 ¹⁰⁶ ; Wharton ¹⁰⁷ ; Wharton ¹⁰⁸ ; Murray ¹⁰⁵ ; Werbach and Moss ¹⁰⁴ ; Ostrzenski ¹⁰⁴ ; Micozzi and Lowdog ⁶³ ; Osiecki ⁹⁷ ; Braun and Cohen ⁷⁰ ; Leach ⁷² ; Romm ⁷³ ; Trickey ⁷⁴ ; Hechtman ¹⁰⁵ ; Sarris and Wardle ¹	—	—	—	—	
Phosphate (alone or with other minerals)	—	—	n=5 Locke and Felter ³⁸ ; Webster et al. ⁴⁰ ; Felter and Lloyd ⁴⁴ ; Jones ¹⁰²	n=2 Dillon ¹⁰⁶	n=1 Webster et al. ⁴⁰	n=2 Dillon ¹⁰⁶ ; Atkinson ¹¹²	—	—	
Potassium (chloride or phosphate)	—	n=7 Ostrzenski ¹⁰⁴ ; Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Hudson ⁶⁷ ; Murray ¹⁰¹ ; Pizzorno and Murray ⁸⁸ ; Pizzorno et al. ⁸⁷	—	—	—	—	—	—	
Selenium (form not specified)	—	—	—	—	—	—	—	—	
Zinc (form not specified)	—	n=5 Dillon ¹⁰⁶ ; Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Kirschmann ¹⁰⁹ ; Murray and Pizzorno ¹⁰¹	—	—	—	—	—	—	

TABLE 3. TOP 10 NUTRITIONAL MEDICINES AND NUMBER OF RECOMMENDATIONS ACROSS THE CONTEMPORARY SOURCES

Nutritional medicines	Endometriosis			Dysmenorrhea			Menorrhagia		
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	
β -Carotene	—	<i>n</i> = 6 Ostrzenski ⁶⁰ ; Kaur et al. ⁶⁴ ; Kirschmann ¹⁰⁹ ; Hudson ⁶⁷ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	—	—	—	—	
Bioflavonoids	—	—	—	—	—	<i>n</i> = 5 Kaur et al. ⁶⁴ ; Hudson ⁶⁷ ; Trickey ⁷⁴ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	
Bromelain	—	—	—	<i>n</i> = 3 Kaur et al. ⁶⁴ ; Hendler ¹⁵⁷ ; Romm ⁷³	—	—	—	—	
Chlorophyll tablets	—	—	—	—	—	<i>n</i> = 2 Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	
Choline	—	<i>n</i> = 3 Hudson ⁶⁷ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	—	—	—	—	
Cysteine	—	<i>n</i> = 3 Hudson ⁶⁷ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	—	—	—	—	
Essential fatty acids	—	<i>n</i> = 11 Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Osiecki ⁹⁷ ; Kirschmann ¹⁰⁹ ; Hudson ⁶⁷ ; Romm ⁷³ ; Trickey ⁷⁴ ; Murray and Pizzorno ¹⁰¹ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	<i>n</i> = 12 Wharton ¹⁰⁷ ; Werbach and Moss ¹⁰⁴ ; Ostrzenski ⁶⁰ ; Micozzi and Lowdog ⁶³ ; Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Osiecki ⁹⁷ ; Hudson ⁶⁷ ; Romm ⁷³ ; Leach ⁷² ; Trickey ⁷⁴ ; Hechtman ¹⁰³	—	<i>n</i> = 3 Kaur et al. ⁶⁴ ; Osiecki ⁹⁷ ; Romm	—	—	
Flaxseed oil	—	—	—	—	—	<i>n</i> = 1 Kaur et al. ⁶⁴	—	—	
Folic acid	—	—	—	<i>n</i> = 2 Dillon ¹⁰⁶ ; Hechtman ¹⁰³	—	—	—	—	

(continued)

TABLE 3. (CONTINUED)

Nutritional medicines	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
γ -Linolenic acid	—	<i>n</i> = 3 Gladstar ⁸³ ; Ostrzenski ⁶⁰ ; Hudson ⁶⁷	—	<i>n</i> = 9 Dillon ¹⁰⁶ ; Gladstar ⁸³ ; Wharton ¹⁰⁷ ; Wharton ¹⁰⁸ ; Ostieck ⁹⁷ ; Braun and Cohen ⁷⁰ ; Leach ⁷² ; Romm ⁷³ ; Hechtman ¹⁰³	—	<i>n</i> = 1 Kaur et al. ⁶⁴
Grape seed extract	—	<i>n</i> = 3 Trickey ⁷⁴ ; Murray and Pizzorno ¹⁰¹ ; Bone and Mills ⁷⁶	—	—	—	—
Kelp	—	—	—	—	—	<i>n</i> = 1 Atkinson ¹¹²
<i>Lactobacillus acidophilus</i>	—	<i>n</i> = 4 Kaur et al. ⁶⁴ ; Ostieck ⁹⁷ ; Prousky ¹¹⁴ ; Prousky ¹¹⁵	—	—	—	—
Probiotics (strain not specified)	—	—	—	—	—	—
Vitamin A	—	—	—	<i>n</i> = 2 Kaur et al. ⁶⁴ ; Hechtman ¹⁰³	—	<i>n</i> = 7 Dillon ¹⁰⁶ ; Werbach and Moss ¹⁰⁴ ; Moss ¹⁰⁴ ; Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Hudson ⁶⁷ ; Romm ⁷³ ; Trickey ⁷⁴
Vitamin B complex	—	<i>n</i> = 7 Ostrzenski ⁶⁰ ; Kaur et al. ⁶⁴ ; Kirschmann ¹⁰⁹ ; Hudson ⁶⁷ ; Romm ⁷³ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	—	—	—
Vitamin B1	—	—	—	<i>n</i> = 6 Dillon ¹⁰⁶ ; Werbach and Moss ¹⁰⁴ ; Micozzi and Lowdog ⁶³ ; Hudson ⁶⁷ ; Leach ⁷² ; Trickey ⁷⁴	—	—
Vitamin B3	—	—	—	<i>n</i> = 7 Dillon ¹⁰⁶ ; Werbach and Moss ¹⁰⁴ ; Ostrzenski ⁶⁰ ; Kaur et al. ⁶⁴ ; Ostieck ⁹⁷ ; Hudson ⁶⁷ ; Leach ⁷²	—	—

(continued)

TABLE 3. (CONTINUED)

Nutritional medicines	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
Vitamin B6	—	—	—	<i>n</i> = 8 Dillon ¹⁰⁶ , Wharton ¹⁰⁸ , Ostrzenski ⁶⁰ , Kaur et al. ⁶⁴ , Northrup ⁶⁵ , Osiecki ⁹⁷ , Leach ⁷² , Trickey ⁷⁴	—	—
Vitamin C	—	<i>n</i> = 9 Ostrzenski ⁶⁰ ; Kaur et al. ⁶⁴ ; Osiecki ⁹⁷ ; Kirschmann ¹⁰⁹ ; Hudson ⁶⁷ ; Murray and Pizzorno ¹⁰¹ ; Pizzorno and Murray ⁸⁶ ; Hechtman ¹⁰³ ; Pizzorno et al. ⁸⁷	—	<i>n</i> = 5 Ostrzenski ⁶⁰ ; Kaur et al. ⁶⁴ ; Osiecki ⁹⁷ ; Hudson ⁶⁷ ; Hechtman ¹⁰³	—	<i>n</i> = 7 ¹⁰⁶ ; Werbach and Dillon ¹⁰³ ; Kaur et al. ⁶⁴ ; Moss ¹⁰⁵ ; Osiecki ⁹⁷ ; Hudson ⁶⁷ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷
Vitamin E	—	<i>n</i> = 13 Atkinson ¹¹² ; Dillon ¹⁰⁶ ; Gladstar ⁸³ ; Ostrzenski ⁶⁰ ; Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Osiecki ⁹⁷ ; Kirschmann ¹⁰⁹ ; Hudson ⁶⁷ ; Trickey ⁷⁴ ; Murray and Pizzorno ¹⁰¹ ; Pizzorno and Murray ⁸⁶ ; Pizzorno et al. ⁸⁷	—	<i>n</i> = 17 Dillon ¹⁰⁶ , Wharton ¹⁰⁸ , Wharton ¹⁰⁸ , Werbach and Moss ¹⁰⁵ , Micozzi and Lowdog ⁶³ , Kaur et al. ⁶⁴ , Northrup ⁶⁵ , Osiecki ⁹⁷ , Hudson ⁶⁷ , Braun and Cohen ⁷⁰ , Leach ⁷² , Romm ⁷³ , Hechtman ¹⁰³ , Sarris and Wardle ¹¹⁰	—	<i>n</i> = 4 Dillon ¹⁰⁶ ; Kaur et al. ⁶⁴ ; Northrup ⁶⁵ ; Osiecki ⁹⁷
Vitamin K	—	—	—	—	—	<i>n</i> = 6 Murray ¹⁰⁵ , Kaur et al. ⁶⁴ , Hudson ⁶⁷ , Trickey ⁷⁴ , Pizzorno and Murray ⁸⁶ ; Pizzorno et al.

from traditional sources and the earliest source being from 1991.¹⁰⁶

Nutritional recommendations for menorrhagia were less commonly reported, with a total of 14 nutritional medicines. The most frequently identified treatments were vitamin A ($n=7$) and vitamin C ($n=7$) followed by vitamin K ($n=6$), bioflavonoids ($n=5$), vitamin E ($n=4$), and eicosapentaenoic acid/docosahexaenoic acid ($n=3$). Other less common recommendations included chlorophyll tablets ($n=2$), flaxseed oil ($n=1$), γ -linolenic acid ($n=1$), and kelp ($n=1$). All of the recommendations for nutritional medicines for menorrhagia were identified in the contemporary sources (texts: $n=11$; periodicals: $n=2$) from 1982 to 2016.

Homeopathic remedies

Table 4 displays the homeopathic remedies for dysmenorrhea, menorrhagia, and endometriosis. There were a total of 39 remedies recommended for dysmenorrhea. The most common was *Nux vomica* (*nux-v.*) primarily seen in traditional sources,^{38,39,49,110} with one occurrence in a contemporary periodical from 1995.¹⁰⁷ *Sepia officinalis* (*sep.*) was also more likely to be reported in the traditional sources with three between 1885 and 1898^{35,39,40} and one contemporary source from 2002.⁶⁰ *Belladonna* (*bell.*) and *Chamomilla* (*cham.*) were reported during 1926–1995.^{107,110,115}

Similar to dysmenorrhea, there were 40 homeopathic remedies for menorrhagia. The most common were *Apis mellifica* (*apis*),^{38,43,116} *Ipecacuanha* (*ip.*),^{39,110,115} *Aletris farinosa* (*alet.*),^{64,75} *Carbo vegetabilis* (*carbo-v.*),³³ and *Crocus sativus* (*croc.*)^{110,115}; *A. mellifica* (*apis*),^{38,43,116} and *Ipecacuanha* (*ip.*)^{39,110,115} were identified across the same sources (traditional texts: $n=2$; contemporary text: $n=1$). *A. farinosa* (*alet.*) was the only remedy without recommendations from the traditional sources,^{64,75} while *Carbo vegetabilis* (*carbo-v.*) had two recommendations from one traditional text³³ and no recommendations from contemporary sources.

Seven homeopathic remedies were identified across two contemporary texts^{64,109} for the management of endometriosis. There were no recommendations of homeopathic remedies from the traditional sources.

Hydrotherapy

Table 5 displays the recommendations for hydrotherapy for dysmenorrhea and menorrhagia. The application of hydrotherapy for dysmenorrhea was found in 10 sources, including 1 contemporary text,⁷³ 3 contemporary periodicals,^{79,117,118} 3 traditional texts^{35,119,120}, and 3 traditional periodicals.^{121–123} From these 10 sources, there were 7 hydrotherapy treatments for dysmenorrhea. The most common treatments included a hot bath,^{73,79,121} a hot sitz bath,^{79,117,119} and a warm bath.^{35,119,120} Also identified were enemas¹²² and hot water compresses.⁷³ Hydrotherapy treatments were found in sources published between 1885 and 2010 during which time the main treatments recommended in both traditional and contemporary resources were hot baths^{73,79,121} and the hot hip/sitz baths,^{79,117,119} while the warm baths were no longer recommended within the contemporary sources.

Eight hydrotherapy treatments were identified for menorrhagia in one contemporary text,¹²⁴ one contemporary periodical,¹²⁵ five traditional texts,^{33,120,126–128} and two traditional

periodicals.^{121,129} From these sources, treatments included a vaginal douche,^{33,128} a cold compress,^{120,128} a cold sitz bath,^{124,125} a cold bath,¹²⁷ and a hot enema.¹²⁹ These recommendations were found in sources published between 1881 and 1988. The use of the cold bath was used during the earlier part of the 20th century,¹²⁷ while a cold sitz bath was recommended in the later part of the 20th century.^{124,125}

There were no recommendations of hydrotherapy for endometriosis.

Chemical-based medicines

Table 6 displays commonly identified chemical-based medicines for dysmenorrhea and menorrhagia. In the context of this article, chemical-based medicines refer to chemical substances and compounds that were used as treatments in these conditions. A total of 15 chemical-based medicines were found for dysmenorrhea. The most common were quinine sulfate,^{29,44} ammonium acetate,^{38,44} borax,^{40,49} cerium oxalate,^{40,49} and ether.^{38,49} These recommendations come from five traditional texts^{29,38,40,44,49} from 1856 to 1922.

Chemical-based medicines for menorrhagia were reported across six traditional texts^{29,32,33,38,44,49} and one traditional periodical.¹³⁰ These included nine chemical-based medicines such as gallic acid,^{33,38} acidum tannicum,⁴⁹ ammonia,²⁹ berberine sulfate,¹³⁰ and hydrastininiae hydrochloras.⁴⁴ These medicines were recommended in traditional sources during 1856–1922.^{29,49}

There were no recommendations for the treatment of endometriosis with chemical-based medicines.

Discussion

Evolution of naturopathy

This is the first article to describe naturopathic treatments for the management of endometriosis, dysmenorrhea, and menorrhagia, drawing on traditional and contemporary sources. The results suggest that naturopathic practice has a rich history of multiple disciplinary treatments used to manage these conditions, but changes in treatments over time provide evidence that naturopathic practice is continually evolving. Upon its formation, naturopathy incorporated the Nature Cure practice, defined as a system of health care which treated disease with hydrotherapy, fresh air, and wholesome food,¹³¹ as well as the incorporation of other "natural" therapies such as herbal medicine and homeopathy.² Although based on preexisting European traditional medicine systems, during the earliest part of the 20th century, naturopathy became formalized as Benedict Lust and began to modernize the profession through the establishment of qualifications which continued to expand its curriculum to include science, physiotherapy, herbal medicine, and a broad range of therapies that were considered amenable to naturopathic philosophy of healing,² particularly *vis medicatrix naturae* (healing power of nature).¹³² Naturopathy, particularly in America, continued to absorb such treatments,^{132–134} with some influences from eclectic medicine,^{2,135} as well as Lindlahr's theories on the practice of using food as medicine.² The influence of naturopathic predecessors continues even in the absorption of modern therapies (such as clinical nutrition) and suggests elements of naturopathy as a living system of health care through its

TABLE 4. TOP 5 HOMEOPATHIC REMEDIES AND NUMBER OF RECOMMENDATIONS ACROSS THE CONTEMPORARY AND TRADITIONAL SOURCES

Homeopathy	Endometriosis		Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
<i>A. farinosa</i> (alet.)	—	—	—	—	—	<i>n</i> =2 Kaur et al. ⁶⁴ ; Wood ¹³ ;
<i>Apis mellifica</i> (apis.)	—	—	—	—	<i>n</i> =2 Locke and Feller ³⁸ ; Felter and Lloyd ⁴³	<i>n</i> =1 Koogler ¹¹⁶
Belladonna (bell.)	—	—	<i>n</i> =1 Melendy ¹¹⁰	<i>n</i> =2 Minton ¹¹⁵ ; Wharton ¹⁰⁷	—	—
Carbo vegetabilis (carbo-v)	—	—	—	—	<i>n</i> =2 Scudder ³³	—
Chamomilla (cham.)	—	—	<i>n</i> =1 Melendy ¹¹⁰	<i>n</i> =2 Minton ¹¹⁵ ; Wharton ¹⁰⁷	—	—
<i>C. racemosa</i> (cimic.)	—	<i>n</i> =1 Kaur et al. ⁶⁴	—	—	—	—
<i>Crocus sativus</i> (croc.)	—	—	—	—	—	—
Folliculinum (foll.)	—	<i>n</i> =1 Kaur et al. ⁶⁴	—	—	<i>n</i> =1 Melendy ¹¹⁰	<i>n</i> =1 Minton ¹¹⁵
Ipecacuanha (ip.)	—	—	—	—	<i>n</i> =2 Watkins ³⁹ ; Melendy ¹¹⁰	<i>n</i> =1 Minton ¹¹⁵
Potassium phosphoricum (kali-p.)	—	<i>n</i> =1 Kirschmann ¹⁰⁹	—	—	—	—
Luteinum (lutin.)	—	<i>n</i> =1 Kaur et al. ⁶⁴	—	—	—	—
Magnesium phosphoricum (mag-p.)	—	<i>n</i> =1 Kirschmann ¹⁰⁹	—	—	—	—
Nux vomica (nux-v.)	—	—	<i>n</i> =4 Locke and Feller ³⁸ ; Watkins ³⁹ ; Felter ⁴⁹ ; Melendy ¹¹⁰	<i>n</i> =1 Wharton ¹⁰⁷	—	—
Rhus toxicodendron (rhus-t.)	—	—	<i>n</i> =2 Scudder ³³ ; Watkins ³⁹	<i>n</i> =1 Minton ¹¹⁵	—	—
<i>Sepia officinalis</i> (sep.)	—	—	<i>n</i> =3 Goss ³⁵ ; Watkins ³⁹ ; Webster et al. ⁴⁰	<i>n</i> =1 Ostrowski ⁶⁰	—	—
Silicea terra (sil.)	—	<i>n</i> =1 Kirschmann ¹⁰⁹	—	—	—	—
Thiosinaminum (thiosin.)	—	<i>n</i> =1 Kaur et al. ⁶⁴	—	—	—	—

TABLE 5. TOP 5 HYDROTHERAPY TREATMENTS AND NUMBER OF RECOMMENDATIONS ACROSS THE CONTEMPORARY AND TRADITIONAL SOURCES

Hydrotherapy	Dysmenorrhea		Menorrhagia	
	Traditional recommendations	Contemporary recommendations	Traditional recommendations	Contemporary recommendations
Cold bath	—	—	<i>n</i> = 1 Kuhn ¹²⁷	—
Cold compress	—	—	<i>n</i> = 3 Juettner ¹²⁰ ; Juettner ¹²⁸	—
Cold sitz bath	—	—	<i>n</i> = 2 Dixon ¹²⁵ ; Boyle and Saine ¹²⁴	—
Enema	<i>n</i> = 1 Stretch ¹²²	—	<i>n</i> = 1 Unknown Author ¹²⁹	—
Hot bath	<i>n</i> = 1 Tilden ¹²¹	<i>n</i> = 2 Wharton ⁷⁹ ; Romm ⁷³	—	—
Hot compress	—	<i>n</i> = 1 Romm ⁷³	—	—
Hot sitz bath	<i>n</i> = 1 Schilling ¹¹⁹	<i>n</i> = 2 Lust ¹¹⁷ ; Wharton ⁷⁹	—	—
Vaginal douche	—	—	<i>n</i> = 3 Scudder ³³ ; Juettner ¹²⁸	—
Warm bath	<i>n</i> = 3 Goss ³⁵ ; Juettner ¹²⁰ ; Schilling ¹¹⁹	—	—	—

continued adaption and sharing of cultural medicine.¹³⁶ Differences in treatments suggest that naturopathy appears to be continually evolving, as it appears that the boundaries of the profession are not fixed. This can be reflected in the contested boundaries of knowledge of the profession¹³⁶ which are constantly debated and redefined within the profession of what it means to be a naturopath and what disciplines are considered to be naturopathic. This could also be defined by the influence of professional elites or groups within naturopathy that steer or influence practice, as has occurred similarly in other CM professions.¹³⁷ Given that

one of the common criticisms of traditional medicine systems is their fixed systems and that they do not evolve when faced with new evidence,¹³⁸ their research suggests that significant differences in common treatments over time have occurred; however, further scholarly work is needed to examine the evolution and factors that influence such changes.

Continuity in the use of herbal medicine

Herbal medicine was the only treatment which displayed a long history and continued inclusion in contemporary

TABLE 6. TOP 5 CHEMICAL-BASED MEDICINES AND NUMBER OF RECOMMENDATIONS ACROSS TEXTS

Chemical-based medicines	Dysmenorrhea	Menorrhagia
	Traditional recommendations	Traditional recommendations
Acidum tannicum	—	<i>n</i> = 1 Felter ⁴⁹
Ammonia	—	<i>n</i> = 1 King ²⁹
Ammonium acetate	<i>n</i> = 2 Locke and Felter ³⁸ ; Felter and Lloyd ⁴⁴	—
Berberine sulfate	—	<i>n</i> = 1 Unknown Author ¹³⁰
Borax	<i>n</i> = 2 Webster ⁴⁰ ; Felter ⁴⁹	—
Cerium oxalate	<i>n</i> = 2 Webster et al. ⁴⁰ ; Felter ⁴⁹	—
Ether	<i>n</i> = 2 Locke and Felter ³⁸ ; Felter ⁴⁹	—
Gallic acid	—	<i>n</i> = 2 Scudder ³³ ; Locke and Felter ³⁸
Hydrastinae hydrochloras	—	<i>n</i> = 1 Felter and Lloyd ⁴⁴
Quinine sulfate	<i>n</i> = 4 King ²⁹ ; Felter and Lloyd ⁴⁴	—

sources. This supports the view from leading international organizations such as the World Naturopathic Federation that herbal medicine is a popular therapeutic tool for naturopathic practice.¹³⁹ However, specific herbs prescribed for these conditions have changed over time, and there may be varying reasons for this. Some variations may indicate that herbal medicine use is highly influenced by cultural setting, for example, *V. agnus-castus* has been used in European practice for menstrual irregularities¹⁴⁰; however, it was not identified in the traditional sources from Australia and North America, yet it is included in most modern texts. This suggests it is possible that contemporary naturopathic practice is being influenced by increased naturopathic global collaboration and research.^{141,142} Additional reasons for changes in herbal prescribing can also include that some herbs are known for safety issues (such as in the case of *C. ipecacuanha*¹⁴³ and *A. Beladonna*^{77,144}) and have since been superseded by other herbs with a more favorable safety profile. Again, these developments suggest that naturopathic medicine is not a static profession, but one that is continually progressing.

Adoption of clinical nutrition treatments

While herbal medicine has had a long-standing position in naturopathic practice, clinical nutrition has been adopted into naturopathy more recently. Clinical nutrition is a universal term that is used by primary health care professions, including those described as CM,¹⁴⁵ referring to the principle that micronutrients are required for biochemical metabolism,¹⁴⁶ which can be sourced from food and supplementation to optimize health or correct pathologies.¹⁴⁵ The concept of nutritional medicine was not well recognized until the mid 18th century where science began to investigate nutrition.¹⁴⁷ Over the past half a century, clinical nutrition has evolved rapidly; however, it wasn't until 1985 when the Institute of Medicine recommended the integration of nutrition into medical school curriculum.¹⁴⁸ Despite these recommendations, there has been some resistance by medical schools to meet the recommended minimum curriculum requirements, which has led to a need to advocate its importance in conventional practice.¹⁴⁹

While clinical nutrition has faced this difficulty, it has been embraced by the naturopathic profession, with recommendations for treatments for endometriosis, dysmenorrhea, and menorrhagia over the contemporary period forming a major element of naturopathic practice, even where it was relatively absent in traditional texts. While nutritional medicine was not one of the founding practices for naturopathy, it appears that it has been incorporated as an important aspect of treatment within contemporary naturopathic education and practice as part of the evolution of the profession.¹³⁴

Evolution of other naturopathic treatments

In contrast to the increased scope of herbal and nutritional medicine, a number of once-dominant modalities have since decreased or become nonexistent in contemporary naturopathic medicine. Chemical-based medicines were originally incorporated into naturopathy through eclectic medicine influences and largely ceased to exist in modern naturopathic treatments, most likely due to the advancement in research and clinical knowledge that many of these sub-

stances are poisonous or have safety concerns (such as the substance Ether¹⁵⁰). Hydrotherapy was historically an important treatment in naturopathy; yet, based on this research its contemporary application appears to be significantly reduced. This may be due to a number of factors; in the Australian context, changes in the course delivery models in the 1980s are thought to be largely responsible,¹⁵¹ with hydrotherapy gradually being removed from the curriculum in favor of ingested medicines.¹⁵² Similarly, homeopathy was once a dominant treatment in naturopathic practice²; however, its application in these conditions in contemporary texts is limited in comparison to other treatments. Additional factors outside of the profession—for example, the controversy surrounding the scientific validity of homeopathy—may also have an influence on the limited contemporary use of homeopathy.¹⁵³

Endometriosis as a contemporary health condition

Endometriosis is a complex disease that has a nebulous historical diagnosis and continues to face challenges relating to diagnosis and scientific understanding.¹⁵⁴ Additional challenges relate to current diagnostic processes,¹⁵⁴ social stigmatization of menstruation, delay in diagnosis, and most notably the difficulties women face in receiving care, often due to limited medical understanding from primary health care professionals.^{14,154} In the context of this research, the ambiguous history of the disease may be reflected in the absence of recommendations across traditional sources. While a large number of herbal medicines were identified for the treatment of dysmenorrhea and menorrhagia, there was a notable absence of herbal medicines—or any other treatment—listed for endometriosis from traditional sources. Absence of treatments for endometriosis may not reflect naturopathy ignoring this condition, but may highlight its ambiguous nature and the historical observations in misdiagnosis noted in history,¹⁵⁴ or may reflect a traditional diagnostic pattern that does not align with conventional diagnosis. Endometriosis is considered to be a relevantly new disease, which is commonly overlooked by conventional health care professionals,¹⁴ and issues with diagnosis continue to exist. Exploring traditional treatment patterns around symptoms consistent with endometriosis may provide insights into the traditional concept of endometriosis in naturopathic practice and may provide insights into modern endometriosis management.

Future Research and Limitations

This project is not without limitations. First, the study design has its own disadvantages in terms of its subjective nature and lack of representativeness.¹⁵⁵ In addition, this list of naturopathic sources may not be considered an exhaustive list as some sources may have been missed due to lack of availability at the time of data extraction and many of the traditional periodicals were incomplete volumes or were missing pages. While this project identifies a robust history of treatments used in dysmenorrhea, menorrhagia, and some cases for endometriosis, it does not provide the details on how this was translated to practice and what actually occurs in naturopathic practice, and as such additional research in this area is warranted. Doing so may identify additional complementary treatments that are beneficial to women

suffering with these reproductive conditions. In addition, as this article describes the treatments recommended for the discussed conditions over a period of time, further research investigating the evolution of treatments could be warranted.

This research also has implications to education and practice. In particular, the findings of this research may prove valuable to educators involved in the design and delivery of naturopathic curriculum, particularly in terms of ensuring that naturopathic students and practitioners are receiving education as they respond to internal and external demands for naturopaths to engage with evidence-based practice. For example, as discussed in this article, various chemical medicines ceased being used in the treatment of these menstrual conditions, possibly due to the safety concerns associated with such treatments. While in the case for herbal medicine, the changes over time may be due to an increase in the evidence base and scientific understanding of the mechanism of action. Equally, clinicians and professional leaders may benefit from the deeper understanding of the changing treatment approach of naturopathy over the last 200 years as it relates to current naturopathic practice. Their findings may also assist researchers examining the women's menstrual health complaints encompassed by this study or naturopathic medicine more broadly, by highlighting treatments that may warrant closer empirical study.

Conclusions

The findings of this article provide insights into the documented historical and contemporary naturopathic treatments for endometriosis, dysmenorrhea, and menorrhagia. While philosophical principles remain the core of naturopathic practice, the therapeutic armamentarium appears to have changed and a number of the original naturopathic treatments appear to have been retained as key elements of treatment for these conditions. Such insights into naturopathic treatments will be of interest to clinicians providing care to women, educators delivering naturopathic training, and researchers conducting clinical and health service naturopathic research.

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Appendix 8.1.1

Chapter 8: Perceived effectiveness and use of naturopathic treatments for endometriosis: A cross-sectional survey of Australian naturopaths experienced in endometriosis management.

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Research paper

Perceived effectiveness and use of naturopathic treatments for endometriosis: A cross-sectional survey of Australian naturopaths experienced in endometriosis management

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ABSTRACT

Introduction: Women with endometriosis are commonly dissatisfied with the standard treatments available and, as such, novel treatment options for endometriosis care needs to be explored. Women with endometriosis are known to seek care from naturopaths to assist in disease management. However, there is limited evidence on the types of treatments naturopaths employ when providing care to women with endometriosis.

Methods: This cross-sectional survey describes the naturopathic treatments utilised to manage endometriosis and the perceived effectiveness of those treatments. Naturopaths who self-identified as having experience in women's reproductive diseases were invited to participate in the survey ($n = 109$). Participants were recruited from the Practitioner Research and Collaboration Initiative (PRACI), a Practice-Based Research Network (PBRN). Data was collected via an online 62-item survey.

Results: A total of 29 Australian naturopaths completed the survey (response rate = 26.6%). Participants reported frequently utilising lifestyle recommendations (75.8%), herbal medicines (72.4%), clinical nutritional medicines (72.4%), and dietary recommendations (68.9%). The most frequently prescribed treatments included essential fatty acids (65.5%), exercise (62%), magnesium (55.1%), and *Curcuma longa* (Turmeric) (48.2%). Respondents who reported prescribing these treatments frequently perceived them to be effective, with the highest level of perceived effectiveness reported for *Curcuma longa* (Turmeric) (48.2%) and magnesium (44.8%).

Conclusions: Naturopaths appear to employ various treatments and report varied perceived effectiveness of those treatments in the management of endometriosis. Clinical research is needed to evaluate the clinician experience and verify the potential value of naturopathic treatments in improving the symptoms and quality of life of women with endometriosis.

1. Introduction

Naturopathy is a traditional medicine system guided by a distinct philosophical framework accepted and codified by the global naturopathic profession [1,2]. This framework involves a patient-centered approach to clinical case management and is the guiding force in the application of naturopathic treatments in clinical practice [3]. Naturopaths employ a range of treatments which can include ingestive medicines – most commonly herbal medicine and nutritional supplementation – as well as dietary and lifestyle recommendations [4]. These treatments can vary depending on the country, the socio-political

context of practice [5], and the diverse training qualifications in naturopathy. In Australia, naturopaths are degree trained and undertake a four-year degree that incorporates health sciences (e.g., physiology, anatomy, chemistry, biochemistry, differential diagnoses, and clinical examination), social sciences (e.g., psychology and counselling), naturopathic theory, and naturopathic clinical disciplines (e.g., ingestive medicines including herbal medicine and clinical nutritional medicine, lifestyle recommendations, and dietary counselling) [6]. However, changes in the Australian qualifications framework for educational standards in naturopathy has resulted diversity in qualifications with some naturopaths holding vocational qualifications such as diplomas or

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advanced diplomas in naturopathy [7]. As a healthcare profession, naturopathy is commonly utilised by the Australian population [8]. However, naturopathic use appears to have a higher prevalence rate among women who may be experiencing chronic and complex diseases such as endometriosis [9,10].

Endometriosis is a complex hormone-dependent inflammatory reproductive disease that is associated with cyclic and non-cyclic pelvic pain with menstruation as well as varying symptomatology that can include dyspareunia, dysuria, and infertility [11]. The cause of endometriosis has yet to be fully determined, but retrograde menstruation is a commonly accepted theory [11]. An estimated 10% of women worldwide [12], and 11% of women of reproductive age in Australia [13], are diagnosed with endometriosis. Contemporary endometriosis treatment employs pharmaceutical treatments and surgical interventions that aim to suppress symptomatology; however, these treatments can often be costly, invasive, and include side effects that may contribute to reduced quality of life [14]. The current gold standard of endometriosis care is not curative and can result in polypharmacy or repeated surgical measures due to the recurrence of lesions and symptoms [11]. Due to the multifactorial and complex characteristics of the disease, women with endometriosis are known to experience various unmet healthcare needs [14] and access a wide variety of health services as well as employing various self-care treatments to manage the disease [15,16]. Unmet healthcare needs pertaining to the access of various health services can be related to delay in diagnosis, dissatisfaction with standard care including side effects and ineffectiveness of pharmaceutical treatments [17,18], and the need for repeated laparoscopic surgeries [11]. For these reasons, among others, women with endometriosis may seek care from healthcare services outside of conventional care to reduce symptomatology and disease recurrence. Therefore, there is an increasing need to identify other novel and effective treatments that, at a minimum, may provide women with symptomatic relief and improve their quality of life.

Current research indicates that naturopaths employ an array of treatments within their scope of practice that may provide novel or complementary treatment options to women who are experiencing symptomatic endometriosis [19,20]. This previous research provides some insight into the treatments which may be utilised by naturopaths based on traditional naturopathic knowledge and contemporary educational resources [19], however, there is limited evidence on the specific treatments naturopaths use in clinical practice to support women with endometriosis. Identifying what types of naturopathic treatments are used in clinical cases of endometriosis may be supportive in identifying future areas of research to better support women with endometriosis who seek care from naturopaths and for wider clinical implementation that supports the multidisciplinary and collaborative approach needed in endometriosis care. Therefore, this exploratory study aims to describe the naturopathic treatments employed by naturopaths who have experience in providing care to women for the management of endometriosis, and the perceived effectiveness of naturopathic treatments employed in clinical practice.

2. Methods

2.1. Study design

This study was conducted as a cross-sectional survey as a sub-study from the Practitioner Research and Collaboration Initiative (PRACI), a Practice-Based Research Network (PBRN) of complementary medicine practitioners in Australia.

2.2. Setting

This study involved data collection in the form of an online self-administered survey through the SurveyGizmo platform. The survey was open for participation in June 2019 and closed in September 2019.

Data collection occurred for 10 weeks with two reminder invitations (July and August) sent to participants via email.

2.3. Participants

Participants were sampled from the PRACI PBRN who were identified in the PRACI workforce survey as being a naturopath in clinical practice in Australia ($n = 317$). Members of PRACI self-opted for membership to the PRACI PBRN to support advancements in naturopathic research. From the PRACI PBRN sample, $n = 109$ (34.4%) naturopaths identified as specifically having experience in menstrual disorders. Utilising a confidence level of 95%, and a margin of error of 5%, the sample size was calculated at 86 participants. Naturopaths were eligible for inclusion in the study if they were in clinical practice in Australia, were listed as a member of PRACI, specialise in women's menstrual disorders, reported providing care to women for the management of endometriosis in the previous 12 months, and could read English. Naturopaths who indicated that they were not in clinical practice at the time of data collection were excluded.

2.4. Instrument

The survey was conducted as a self-administered survey that covered the following core domains: naturopath demographics; practitioner knowledge of endometriosis; treatments for endometriosis; naturopathic case management; and inter-professional case management. The results presented in this manuscript report on the survey domains including naturopath demographics and treatments for endometriosis. The other domains included in the survey have been reported elsewhere. The questionnaire was developed based on key aspects of previous research conducted in this area [19]. Each domain involved several questions that were multiple choice (binary and categorical multiple-choice questions) and open text responses. The survey took approximately 15–20 min to complete, and responses were completely anonymous. Survey logic was used to open consecutive questions depending on the participant's responses, as such some surveys may have taken longer to complete. Upon opening the survey link, practitioners were required to read the participant information sheet and confirm consent on the initial page of the survey before beginning the survey. Participants who did not provide consent were automatically taken to an exit page of the survey. Before data collection, the survey underwent pilot testing for face validity by a sample of naturopaths in clinical practice to determine the usability, readability, survey function and logic, and appropriateness of the survey for naturopaths in clinical practice. The final self-administered questionnaire was a 62-item online survey.

2.5. Statistical analysis

Raw data was extracted from the SurveyGizmo platform via Microsoft Excel for data cleaning. Responses linked to naturopaths outside of the inclusion criteria were removed from the data set. Incomplete responses were also removed from the data set before being imported into the statistical software program STATA 14 for analysis. Based on the survey questions, categorical and binary variables were developed. Additional binary variables were created based on responses to categorical variables for analysis. Statistical analysis was conducted using descriptive statistics with the use of frequencies and percentages.

2.6. Ethics

Approval to conduct this project through PRACI was obtained in February 2019 (#20190218). Ethical clearance was granted from the Human Research Ethics Committee at the University of Technology Sydney (ETH18-2913) and the Human Research Ethics Committee at Endeavour College of Natural Health (#20190417-RR-1).

3. Results

3.1. Naturopathic demographics

Of the 109 naturopaths recognised as having experience in women's menstrual disorders, 37 naturopaths started the survey. Six partial completed survey responses were removed during data cleaning. An additional two responses were also removed as they did not meet the inclusion criteria of practising naturopathy in Australia. A total of 29 met the inclusion criteria and completed the survey (26.6% response rate). Naturopaths were predominantly female ($n = 27$, 93.1%) and practicing in New South Wales ($n = 14$, 48.2%). Naturopaths who consulted with women for endometriosis management more commonly held a bachelor's degree ($n = 10$, 34.4%) or an advanced diploma ($n = 8$, 27.5%) and reported having between one and five years ($n = 7$, 25%) or 16 and 20 years' ($n = 7$, 25%) experience in clinical practice. Participants most frequently worked between 16 and 20 h per week ($n = 10$, 34.4%) in naturopathic clinical practice and practiced in a solo clinical practice ($n = 18$, 62%). One-third of the participants ($n = 9$, 33.3%) reported providing care to between 11 and 15 women with endometriosis in the previous 12 months (see, Table 1).

3.2. Naturopathic treatments

The most prevalent treatments utilised by participating naturopaths for endometriosis management include lifestyle recommendations ($n = 22$, 75.8%), herbal medicine ($n = 21$, 72.4%), clinical nutritional medicines ($n = 21$, 72.4%), and dietary recommendations ($n = 20$, 68.9%). The least frequently reported disciplines included acupressure ($n = 1$, 3.4%), aromatherapy ($n = 1$, 3.4%), and hydrotherapy ($n = 1$, 3.4%) (see, Table 2).

3.2.1. Herbal medicine

The most common herbal medicines frequently prescribed for endometriosis by participating naturopaths was *Curcuma longa* (Turmeric) ($n = 14$, 48.2%), *Viburnum opulus* (Cramp bark) ($n = 10$, 34.4%), *Vitex agnus-castus* (Chaste berry) ($n = 9$, 31%) and *Angelica sinensis* (Dong quai) ($n = 5$, 17.2%). Most of the participating naturopaths that reported prescribing *C. longa* reported perceiving it to be either 'very effective' or 'effective' ($n = 14$, 48.2%) at reducing endometriosis symptoms. *V. opulus* was reported to be 'very effective' or 'effective' by 31% ($n = 9$) by the prescribing naturopaths. Practitioner perceived effectiveness was also reported as 'very effective' or 'effective' for utilisation of *V. agnus-castus* ($n = 9$, 31%) and *A. sinensis* ($n = 6$, 20.6%) in the management of endometriosis (see, Table 3).

3.2.2. Clinical nutritional medicine

The most frequently reported clinical nutritional medicines prescribed for endometriosis by participating naturopaths was magnesium ($n = 16$, 55.1%), essential fatty acids ($n = 15$, 51.7%), cruciferous indoles ($n = 12$, 41.3%), probiotics ($n = 12$, 41.3%), and zinc ($n = 12$, 41.3%). Many of the naturopaths prescribing magnesium ($n = 13$, 44.8%), essential fatty acids ($n = 12$, 41.3%), cruciferous indoles ($n = 10$, 34.4%), probiotics ($n = 9$, 31%) perceived these treatments to be 'very effective' or 'effective' for managing endometriosis and its associated symptoms (see, Table 3).

3.2.3. Dietary recommendations

The most frequently reported prescribed dietary recommendation by naturopaths for the management of endometriosis was to increase dietary intake of essential fatty acids ($n = 19$, 65.5%) and dietary fibre intake ($n = 19$, 65.5%) (see, Table 4). Other popular dietary recommendations were anti-inflammatory diets (heterogeneously defined but aims at increasing consumption of foods that reduce inflammation) ($n = 17$, 58.6%) and avoidance of dairy intake ($n = 17$, 58.6%) and sugar ($n = 15$, 51.7%). The naturopaths recommending these dietary changes

Table 1.

Sociodemographics of Australian naturopaths who have consulted with women for the management of endometriosis.

Demographics	N (%)
Sex	
Female	27 (93.1)
Male	2 (6.9)
State	
ACT/NT/TAS	0 (0.0)
NSW	14 (48.2)
QLD	5 (17.2)
SA	2 (6.9)
VIC	5 (17.2)
WA	3 (10.3)
Qualification	
Certificate IV	1 (3.4)
Diploma	4 (13.7)
Advanced diploma	8 (27.5)
Bachelor's degree	10 (34.4)
Graduate certificate	1 (3.4)
Graduate diploma	0 (0.0)
Master's degree	5 (17.2)
Professional doctorate/Doctor of Philosophy	0 (0.0)
Years in practice	
1-5 years	7 (25.0)
6-10 years	4 (14.2)
11-15 years	4 (14.2)
16-20 years	7 (25.0)
21-25 years	2 (7.1)
26-30 years	2 (7.1)
31 years or more	2 (7.1)
Hours per week in practice	
1-5 h	3 (10.3)
6-10 h	1 (3.4)
11-15 h	5 (17.2)
16-20 h	10 (34.4)
21-25 h	3 (10.3)
26-30 h	2 (6.9)
31 h or more	5 (17.2)
Clinical setting	
Sole practitioner	18 (62.0)
Multidisciplinary clinic with complementary medicine (CM) practitioners	8 (27.5)
Multidisciplinary clinic with conventional medicine and CM practitioners	1 (3.4)
Health food shop	0 (0.0)
Pharmacy	2 (6.9)
Number of women*	
1-5 women	4 (14.8)
6-10 women	6 (22.2)
11-15 women	9 (33.3)
16-20 women	1 (3.7)
21-25 women	1 (3.7)
26-30 women	3 (11.1)
31 women or more	3 (11.1)

* Number of women with endometriosis consulted over the previous 12-month period.

Table 2.

Prevalence of naturopathic treatments utilised in the clinical management of endometriosis by Australian naturopaths.

Naturopathic treatments	N (%)
Lifestyle recommendations	22 (75.8)
Herbal medicine	21 (72.4)
Clinical nutritional medicines	21 (72.4)
Dietary recommendations	20 (68.9)
Mindfulness	12 (41.3)
Meditation/Imagery	10 (34.4)
Acupuncture	6 (20.6)
Flower essences	5 (17.2)
Homeopathy	5 (17.2)
Massage therapy	3 (10.3)
Acupressure	1 (3.4)
Aromatherapy	1 (3.4)
Hydrotherapy	1 (3.4)
Kinesiology	0 (0.0)
Moxa	0 (0.0)

Table 3.
Frequency and perceived effectiveness of herbal medicine and clinical nutritional medicine prescribed by naturopaths for endometriosis management.

Treatment	Frequency of use			Perceived effectiveness		
	Very frequently/Frequently N (%)	Occasionally/Rarely N (%)	Never N (%)	Very effective/Effective N (%)	Somewhat effective N (%)	Not effective N (%)
Herbal medicine						
<i>Curcuma longa</i> (Turmeric)	14 (48.2)	5 (17.2)	0 (0.0)	14 (48.2)	4 (13.7)	0 (0.0)
<i>Viburnum opulus</i> (Cramp bark)	10 (34.4)	7 (24.1)	1 (3.45)	9 (31.0)	6 (20.6)	0 (0.0)
<i>Vitex agnus-castus</i> (Vitex)	9 (31.0)	10 (34.4)	0 (0.0)	9 (31.0)	7 (24.1)	1 (3.4)
<i>Angelica sinensis</i> (Dong quai)	5 (17.2)	13 (44.8)	1 (3.4)	6 (20.6)	6 (20.6)	0 (0.0)
<i>Taraxacum officinale</i> (Dandelion)	4 (13.7)	13 (44.8)	1 (3.4)	2 (15.3)	3 (23.0)	7 (53.8)
<i>Cimicifuga racemosa</i> (Black cohosh)	3 (10.3)	13 (44.8)	1 (3.45)	3 (10.3)	8 (27.5)	1 (3.4)
<i>Pinus pinaster</i> (French pine bark)	3 (10.3)	6 (20.6)	8 (27.5)	2 (6.9)	4 (13.7)	1 (3.4)
<i>Achillea millefolium</i> (Yarrow)	2 (6.9)	15 (51.7)	0 (0.0)	3 (10.3)	8 (27.5)	4 (13.7)
<i>Dioscorea villosa</i> (Wild yam)	2 (6.9)	13 (44.83)	2 (6.9)	4 (13.7)	6 (20.6)	0 (0.0)
<i>Leonurus cardiaca</i> (Motherwort)	2 (6.9)	12 (41.3)	3 (10.3)	2 (6.9)	5 (17.2)	0 (0.0)
Clinical Nutritional Medicine						
Magnesium	16 (55.1)	2 (6.9)	0 (0.0)	13 (44.8)	3 (10.3)	0 (0.0)
Essential fatty acids	15 (51.7)	3 (10.3)	0 (0.0)	12 (41.3)	4 (13.7)	0 (0.0)
Cruciferous indoles	12 (41.3)	4 (13.7)	2 (6.9)	10 (34.4)	5 (17.2)	0 (0.0)
Probiotics	12 (41.3)	6 (20.6)	0 (0.0)	9 (31.0)	6 (20.6)	0 (0.0)
Zinc	12 (41.3)	6 (20.6)	0 (0.0)	7 (24.1)	6 (20.6)	1 (3.4)
Prebiotics	11 (37.9)	6 (20.6)	1 (3.4)	9 (31.0)	5 (17.2)	1 (3.4)
Iodine	6 (20.6)	10 (34.4)	1 (3.4)	6 (20.6)	6 (20.6)	2 (6.9)
Vitamin E	5 (17.2)	12 (41.3)	0 (0.0)	6 (20.6)	2 (6.9)	2 (6.9)
Vitamin B Complex	5 (17.2)	13 (44.8)	0 (0.0)	8 (27.5)	6 (20.6)	1 (3.4)
Selenium	3 (10.3)	13 (44.8)	1 (3.4)	4 (13.7)	5 (17.2)	3 (10.3)
Vitamin C	2 (6.9)	14 (48.2)	1 (3.4)	5 (17.2)	4 (13.7)	1 (3.4)
Calcium	1 (3.4)	14 (48.2)	2 (6.9)	3 (10.3)	4 (13.7)	1 (3.4)
Beta-carotene	0 (0.0)	13 (44.8)	4 (13.7)	3 (10.3)	2 (6.9)	2 (6.9)

Table 4.
Dietary and lifestyle recommendations used by naturopaths in endometriosis management and their perceived effectiveness.

Treatment	Frequency of use			Perceived effectiveness		
	Very frequently/ Frequently N (%)	Occasionally/ Rarely N (%)	Never N (%)	Very effective/ Effective N (%)	Somewhat effective N (%)	Not effective N (%)
Dietary recommendations						
Increase essential fatty acids (i.e., nuts and fish)	19 (65.5)	0 (0.0)	0 (0.0)	12 (41.3)	4 (13.7)	0 (0.0)
Increase fibre intake (i.e., fruit and vegetables)	19 (65.5)	0 (0.0)	0 (0.0)	13 (44.8)	4 (13.7)	0 (0.0)
Anti-inflammatory diet	17 (58.6)	2 (6.9)	0 (0.0)	16 (55.1)	1 (3.4)	0 (0.0)
Avoid dairy	17 (58.6)	2 (6.9)	0 (0.0)	13 (44.8)	4 (13.7)	0 (0.0)
Avoid sugar	15 (51.7)	4 (13.7)	0 (0.0)	11 (37.9)	5 (17.2)	1 (3.4)
Increase cruciferous vegetables (e.g., broccoli)	14 (48.2)	5 (17.2)	0 (0.0)	11 (39.2)	5 (17.8)	1 (3.4)
Avoid alcohol	14 (48.2)	5 (17.2)	0 (0.0)	8 (27.5)	8 (27.5)	1 (3.4)
Avoid caffeine	10 (34.4)	9 (31.0)	0 (0.0)	5 (27.5)	9 (31.0)	0 (0.0)
Gluten-free diet	8 (27.5)	11 (37.9)	0 (0.0)	8 (27.5)	7 (24.1)	2 (6.9)
FODMAP diet	3 (10.3)	14 (48.2)	2 (6.9)	6 (20.6)	6 (20.6)	2 (6.9)
Avoid red meat	2 (6.9)	16 (55.1)	1 (3.4)	5 (29.4)	7 (41.1)	2 (11.7)
Lifestyle recommendations						
Regular exercise	18 (62.0)	1 (3.4)	0 (0.0)	11 (37.9)	4 (13.7)	0 (0.0)
Remove environmental toxins	14 (48.2)	5 (17.2)	0 (0.0)	5 (17.2)	10 (34.4)	0 (0.0)
Emotional therapy (i.e., counselling)	14 (48.2)	5 (17.2)	0 (0.0)	9 (31.0)	5 (17.2)	0 (0.0)
Sleep hygiene practices	13 (44.8)	5 (17.2)	1 (3.4)	7 (24.1)	7 (24.1)	0 (0.0)
Heat packs	13 (44.8)	6 (20.6)	0 (0.0)	9 (31.0)	6 (20.6)	0 (0.0)
Avoid use of plastic containers	12 (41.3)	7 (24.1)	0 (0.0)	2 (6.9)	12 (41.3)	0 (0.0)
Breathing exercises	12 (41.3)	5 (17.2)	2 (6.9)	8 (27.5)	5 (17.2)	0 (0.0)
Avoid pesticides	11 (37.9)	8 (27.5)	0 (0.0)	2 (6.9)	13 (44.8)	0 (0.0)
Avoid use of tampons	9 (31.0)	9 (31.0)	0 (0.0)	5 (17.2)	6 (20.6)	1 (3.4)
Yoga	9 (31.0)	9 (31.0)	1 (3.4)	7 (24.1)	5 (17.2)	0 (0.0)
Meditation/Imagery	9 (31.0)	9 (31.0)	1 (3.4)	7 (24.1)	6 (20.6)	0 (0.0)
Weight management	8 (27.5)	9 (31.0)	2 (6.9)	6 (20.6)	8 (27.5)	0 (0.0)
Avoid intercourse while menstruating	3 (10.3)	6 (20.6)	8 (27.5)	1 (3.4)	2 (6.9)	3 (10.3)
Transcutaneous electrical nerve stimulation (TENS Machine)	1 (3.4)	8 (27.5)	9 (31.0)	2 (6.9)	3 (10.3)	0 (0.0)
Try to fall pregnant	1 (3.4)	4 (13.7)	13 (44.8)	1 (3.45)	3 (10.3)	1 (3.4)
Tai Chi	0 (0.0)	7 (24.1)	11 (37.9)	2 (6.9)	2 (6.9)	1 (3.4)

commonly perceived following an anti-inflammatory diet ($n = 16$, 55.1%), increasing dietary intake of essential fatty acids ($n = 12$, 41.3%), increasing dietary fibre intake ($n = 13$, 44.8%), and avoiding

sugar intake ($n = 11$, 37.9%) to be 'very effective' or 'effective' for managing endometriosis and its symptoms. Avoiding dairy was also perceived to be 'effective' or 'very effective' by those practitioners who

prescribed it ($n = 13$, 44.8%).

3.2.4. Lifestyle recommendations

Table 4 presents the most frequent lifestyle recommendations prescribed by naturopaths for endometriosis management. The most common lifestyle recommendations included regular exercise ($n = 18$, 62%), removing environmental toxins ($n = 14$, 48.2%), referral for emotional therapy in the form of professional counselling ($n = 14$, 48.2%), sleep hygiene practices ($n = 13$, 44.8%), and heat packs ($n = 13$, 44.8%). Prescribing naturopaths that reported frequently utilising these lifestyle recommendations reported that regular exercise ($n = 11$, 37.9%), referral for emotional therapy in the form of professional counselling ($n = 9$, 31%), and use of heat packs ($n = 9$, 31%) were 'very effective' or 'effective' in endometriosis management.

3.2.5. Other treatments

A small number of naturopaths also prescribed other treatments such as homeopathy or hydrotherapy. The most reported homeopathic remedies prescribed by naturopaths for endometriosis were Magnesium phosphoricum (Mag-p.) ($n = 2$) and *Cimicifuga racemosa* (cimic.) ($n = 1$). Both homeopathic remedies were perceived to be 'very effective' or 'effective' in endometriosis management by the prescribing naturopaths. One naturopath reported very frequently prescribing a hot ($n = 1$) or warm bath ($n = 1$) for endometriosis management which were perceived by the naturopaths to be 'somewhat effective' in endometriosis management.

A summary list of the most frequently used naturopathic treatments with the highest rating of perceived effectiveness is displayed in Fig. 1.

4. Discussion

This article provides preliminary evidence of the types of treatments for the management of endometriosis utilised by Australian naturopaths in clinical practice. Firstly, the analysis indicates consistency in the disciplines used by Australian naturopaths compared to naturopaths internationally [4,21], namely, herbal medicine, clinical nutritional medicine, lifestyle, and dietary recommendations. Of the therapeutic disciplines used for the management of endometriosis in this study, lifestyle recommendations were reported more frequently than ingestive medicines (i.e., herbal medicine, clinical nutritional medicine, homeopathy). The limited use of other types of treatments for endometriosis may represent the changes in the therapeutic armamentarium in contemporary naturopathic practice and education in Australia where treatments such as homeopathy are less common [19,22]. Changes in naturopathic disciplines may be attributed to the changes in

naturopathic curriculum and internal and external stakeholders who influence the naturopathic profession [19,22]. Additionally, prescribing lifestyle recommendations for endometriosis management may be encouraging women to utilise self-management practices that may have a supportive role in reducing debilitating symptomatology [23]. Addressing lifestyle implications of endometriosis management can support women to influence their experiences of bothersome symptoms while also encouraging a sense of health and wellbeing through the adaption of positive health behaviors including lifestyle and dietary changes [24].

In this study, the most common applications of dietary recommendations by naturopaths for endometriosis included an anti-inflammatory diet, avoiding dairy intake, and increasing essential fatty acid and dietary fibre. Inflammation is considered to be the main factor in endometriosis pathophysiology [25]. The chronic inflammatory nature of the disease is associated with elevated concentration levels of interleukin markers (IL-1 β , IL-6, and IL-8), active immune cells, and prostaglandins present in endometriotic lesions [26]. Additionally, elevated levels of biological inflammatory processes are associated with exacerbation of endometriosis symptomatology resulting in chronic pain [27] and dysregulation between hormonal and inflammatory pathways [25]. Naturopaths prescribing dietary recommendations that have anti-inflammatory potential may be targeting the inflammatory aspect of endometriosis which may be supportive in modulating disease activity. Both the anti-inflammatory diet and increasing consumption of essential fatty acids have activity in down-regulating inflammatory activity of prostaglandins. Addressing the inflammatory processes involved in endometriosis by prescribing an anti-inflammatory diet and the consumption of essential fatty acids, may have a role in amelioration in pain generation [27,28]. In a similar context, naturopaths prescribing an avoidance of dairy may be trying to reduce modifiable dietary habits that are known to contribute to the inflammation process. In this case, the consumption of dairy products has been linked to dysregulation of inflammatory and immune factors that contribute to the risk of endometriosis development, concurrent infertility, and chronic pelvic pain [29]. Likewise, increasing consumption of dietary fibre may reduce the inflammatory process but can also regulate the reabsorption of bioavailable oestrogen that may contribute to endometriosis activity [30]. Additionally, dietary fibre may play a supportive role in microbiome management given recent research evidence that indicates a complex relationship between the microbiome and endometriosis pathophysiology [31], while also exhibiting anti-inflammatory properties within the gastrointestinal system [32] which is often implicated in endometriosis [33]. The prescription decisions of consuming an anti-inflammatory diet, avoiding dairy intake, and increasing essential fatty acid and dietary fibre identified in our study suggest naturopaths may be targeting inflammation associated with endometriosis to manage the disease and symptomatology.

Naturopaths in our study also report prescribing lifestyle changes including regular exercise, professional counselling, and reducing exposure to environmental hazards to women with diagnosed endometriosis. Regular exercise was the most frequently prescribed lifestyle recommendation by prescribing naturopaths for women with endometriosis. Regular exercise is protective against exacerbation of inflammatory pathways as well as a cumulative beneficial effect in reducing menstrual flow and oestrogen activity within the reproductive organs [34,35]. Women with endometriosis can have increased reactive oxygen species in the peritoneal fluid that contributes to the inflammatory picture of endometriosis [34]. Likewise, elevated levels of mental stress can also exacerbate inflammatory pathways due to elevated levels of corticotropin-releasing hormone [36,37]. This activity may contribute to peritoneal inflammation that is associated with chronic pain with endometriosis [37]. Therefore, prescribing regular exercise in cases of endometriosis may be beneficial for women with endometriosis. Recommendations for referrals for emotional therapy in the form of professional counselling was also a frequently prescribed lifestyle

Treatments	
Herbal medicine	
	<i>Curcuma longa</i> (Turmeric)
	<i>Viburnum opulus</i> (Cramp bark)
	<i>Vitex agnus-castus</i> (Vitex)
Clinical nutritional medicine	
	Magnesium
	Essential fatty acids
Dietary recommendations	
	Increase essential fatty acids
	Increase fibre intake
	Avoid dairy
	Anti-inflammatory diet
Lifestyle recommendations	
	Regular exercise
	Emotional therapy (i.e., counselling)
	Remove environmental toxins

Fig. 1. Most frequently reported naturopathic treatments and their perceived effectiveness in endometriosis.

recommendation for endometriosis management. There is strong evidence that women with endometriosis often experience psychological comorbidities [38]. Research also suggests mental health support emphasises a holistic approach involving beneficial outcomes in pain management, pain perception, development of coping mechanisms, and provides a supportive network for women to manage endometriosis [37, 38]. While the pathogenesis of endometriosis is still unclear, some research has identified a possible association between environmental toxins (e.g.: dioxin and dioxin-like compounds) in endometriosis activity and progression [39,40]. Recent reviews have examined the biological plausibility of environmental toxins (e.g. dioxin, polychlorinated biphenyls, diethylstilbestrol) and endometriosis, reporting that there is some strong correlations between exposure and endometriosis development via endocrine disruptor activity [41,42]. However, methodological issues may limit generalisation of these results [42]. Many of the lifestyle recommendations prescribed by naturopaths for women with endometriosis in our study, encourage patient self-care or the concept of self-efficacy in endometriosis management as some of these lifestyle recommendations can be self-managed by women. Self-management for women with endometriosis has been observed to be associated with a perceived capability to cope and control disease activity and symptomatology [43].

The ingestive medicines that naturopaths report commonly prescribing to women with endometriosis in our study have varied levels of direct and indirect evidence supporting their use. Herbal medicines such as *C. longa* has documented anti-inflammatory, anti-oxidant, and anti-angiogenic properties, with current *in vitro* and *in vivo* evidence indicating the potential therapeutic value in endometriosis prevention and disease management [44]. While other frequently prescribed herbal medicines including *V. opulus* may be beneficial in the presentation of dysmenorrhea [19], such treatments in endometriosis have only attracted animal models to date. These animal studies have demonstrated a reduction in endometriotic lesion volumes and a reduction in inflammatory and angiogenic levels [45,46]. Preparations of *V. agnus-castus* have been used to treat various gynaecological conditions with contemporary evidence observing clinical efficacy in premenstrual syndrome (PMS) through hormonal regulation and neurotransmitter modulation [47,48], which may be beneficial in women experiencing PMS alongside endometriosis [49]. While these herbal medicines hypothetically show promise in the pathophysiology of endometriosis and appear to have had long-standing historical use in naturopathic practice [19], clinical research involving women with diagnosed endometriosis has yet to fully explore this area [20]. Research investigating the potential of the mechanism involved in endometriosis disease management is needed to explore the potential and effective nature of these herbal medicines in endometriosis. Additionally, further research into understanding how these herbal medicines may be beneficial in endometriosis is warranted.

The naturopaths participating in this study also reported using several clinical nutritional medicines that may target various aspects of endometriosis pathophysiology and be supportive in disease management. Participating naturopaths reported frequently prescribing magnesium for the management of endometriosis. Magnesium is a commonly recommended nutritional intervention in cases of reproductive function including premenstrual syndrome and dysmenorrhea [29]. Endometriosis presents with spasmodic activity in the uterus which may contribute to pelvic pain [29]. In our study, naturopaths may be prescribing magnesium due to the potential anti-spasmodic activity of magnesium in smooth muscles such as in the uterus [29,50].

Naturopaths also commonly reported regularly prescribing essential fatty acid supplementation. Essential fatty acid supplementation has many biological factors that modulate inflammatory pathways and may reduce the exacerbation of endometriosis symptoms. Studies have demonstrated that essential fatty acid supplementation, such as omega-3 polyunsaturated fatty acid eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) may reduce endometriotic lesions and modulate

pain by reducing prostaglandin (PGE2) activity that is associated with endometriosis-related pain [51], cellular proliferation, and angiogenesis in endometriosis [52]. These prescriptions by participating naturopaths in this study appear to potentially be targeting the inflammatory characteristics of endometriosis. As many of these treatments have therapeutic actions and hypothetical actions in endometriosis, it is plausible that participating naturopaths in our study may be employing diverse treatments in response to the multifactorial nature of endometriosis.

4.1. Future research

There is emerging scientific evidence suggesting biological plausibility for several of the treatments used by naturopaths. Many of the commonly reported naturopathic treatments hypothetically show promise in the pathophysiology of endometriosis, and many of the herbal and nutritional therapies used by naturopaths in this study have been used in naturopathic practice for over a century [19], however clinical research involving women with diagnosed endometriosis has yet to fully explore this area. Additionally, research exploring how naturopaths view and understand endometriosis pathophysiology and how naturopaths apply these treatments within the clinical setting also warrants investigation. Examination of the types of exercise beneficial to endometriosis management requires further study given its perceived benefits in inflammatory modulation. Likewise, investigating the naturopathic environmental prescription behaviors in endometriosis management also warrants research attention to assess the efficacy of this approach. Further research in these areas could explore each specific naturopathic treatment to identify the specific biological mechanism in endometriosis through intervention studies, but also consider naturopathic whole systems individualised approach to care in women with endometriosis. Naturopathic perceptions of unmet healthcare needs of women with endometriosis and the perceptions of key symptomatology for naturopathic care are also valuable areas of research that have yet to be explored. Doing so, may highlight the importance of naturopathic care in multidisciplinary endometriosis management. Future research could build on this preliminary study, through exploring naturopathy in endometriosis care through consensus methodology such as a Delphi study. Lastly, future research on naturopathy and endometriosis could extend to global practice to better understand naturopathic care for women with endometriosis and to support the generalisation of the research findings.

4.2. Limitations

The findings from this study are preliminary, however, they offer valuable insights into what naturopaths prescribe in clinical case management of endometriosis. This study sought to examine naturopathic treatments by naturopaths who have experience in endometriosis and the perceived effectiveness of treatments they employ in clinical practice. Due to the specific criteria of the naturopaths, it was expected that there would be low participation numbers. Additionally, given the sample was drawn from a self-opted PBRN, the findings may not be generalisable to the greater naturopathic community. The number of PRACI reminders is also a limitation which may have contributed to the small sample size and non-response bias. Potential bias from practitioners on the reported effectiveness of their treatments for endometriosis is also a limitation of the findings. Finally, participation bias is another noted limitation of this study due to the self-administered design of the survey. Notwithstanding, this is the first examination of naturopathic therapies applied in endometriosis which may be a foundational base for further research within real-world clinical practice. This research provides descriptive information regarding naturopathic treatments that may have a plausible effect in endometriosis care. However, further research is needed for a deeper examination of the effectiveness and safety of these treatments. Despite this, the results in this study may be useful for expanding further research on naturopathic

care in endometriosis in the general population.

5. Conclusion

Naturopaths appear to employ various naturopathic treatments that have direct or indirect activity in the pathophysiology of endometriosis that may have a supportive role in conjunction with standard treatment in providing women with symptomatic relief of the disease as well as improving their overall health. Given the complexity and need for a multidisciplinary approach to endometriosis management, further research is needed to explore the naturopathic approach to endometriosis care.

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CRediT authorship contribution statement

Rebecca Redmond: Conceptualization, Data curation, Formal analysis, Writing – original draft. **Amie Steel:** Writing – original draft, Conceptualization. **Jon Wardle:** Writing – original draft. **Jon Adams:** Writing – original draft.

Declaration of Competing Interest

There are no disclosures to declare.

Data availability

The data that support the findings of this study are available from the corresponding author, [RR], upon reasonable request.

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Chapter 9: Naturopathic knowledge and approaches to managing endometriosis: A cross-sectional survey of naturopaths with experience in endometriosis care.



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Naturopathic knowledge and approaches to managing endometriosis: a cross-sectional survey of naturopaths with experience in endometriosis care

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Abstract

Objectives: Endometriosis is a chronic gynaecological disease with varying symptomatology and negative health outcomes. To ensure the best care for women with endometriosis, women require a multidisciplinary team approach. While some women consult with naturopaths for endometriosis, there has been little research on naturopathic knowledge and the naturopathic approach to endometriosis care.

Methods: This cross-sectional survey recruited naturopaths with experience in menstrual disorders from the Practitioner Research and Collaboration Initiative (PRACI) a Practice-Based Research Network (PBRN). Data collection was conducted via an online self-administrated 62-item questionnaire.

Results: Invitations were sent to 109 naturopaths who self-reported having experience in menstrual disorders, of whom 29 completed the survey (26.6% response rate). Naturopaths

perceived endometriosis to be caused by inflammation (n=28, 96.5%) and risk factors associated with familial history (n=26, 89.6%). Many naturopaths aimed at reducing inflammation (n=27, 93.1%) and supporting gastrointestinal function (n=25, 86.2%) in their prescriptions. Naturopaths reported using various healthcare referrals to support women with endometriosis, primarily general practitioners (n=12, 41.3%), acupuncturists/Traditional Chinese Medicine practitioners (n=11, 37.9%), and gynaecologists (n=9, 31%). Naturopaths reported receiving referrals from general practitioners (n=8, 27.5%) and psychologists (n=6, 20.6%).

Conclusions: Naturopathic knowledge and management of endometriosis targets known problematic areas of endometriosis that can have debilitating effects on women's quality of life. Naturopathic care has the potential to align with important health outcomes for women with endometriosis however, further attention is needed to assess the effectiveness and continue to establish a multidisciplinary approach involving naturopathic care.

Keywords: chronic disease; endometriosis; health services; naturopathy; women's health.

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Introduction

Globally, endometriosis is estimated to affect 10% of reproductive-age women with symptoms presenting differently among individuals [1]. Endometriosis is defined as a chronic gynaecological disease that has multifactorial pathophysiology [2]. Although the pathogenesis for endometriosis is unclear, there are several dominant theories involving retrograde menstruation, coelomic metaplasia, genetics, inflammation, stem cells, and immune dysfunction [2, 3]. Symptoms of endometriosis can include dysmenorrhoea, menorrhagia, dyspareunia, dysuria, chronic pelvic pain, and infertility [4]. However, some women can be asymptomatic and disease severity (i.e. the extent of endometrial lesions) does not correlate to the presence or severity of symptoms [5]. The varying impacts of endometriosis can result in substantial negative implications on a woman's quality of

life involving their social life, relationships, employment, financial burden, education, and overall health and well-being [6]. The cost of endometriosis in Australia alone is estimated to be \$9.7 billion annually [7]. Women with endometriosis often receive healthcare through pharmaceutical interventions and laparoscopic surgery [8, 9]. The effectiveness of pharmaceutical interventions can vary depending on the type of treatment and presentation of endometriosis. Some pharmaceutical treatments (e.g. oral contraceptive pill, GnRH analogues) show promise in providing endometriosis-associated pain relief and are well tolerated in symptomatic women [2]. After diagnosis, women can still experience disease progression [8] with reports of recurrence between 6 and 67% post laparoscopic surgery within an average of two to five years [10].

Women with endometriosis are known to seek care from various healthcare professions within conventional medicine [5, 11], allied health, and traditional and complementary medicine (T&CM) [5, 12, 13]. Research suggests that women with endometriosis need to have access to a multidisciplinary team for ongoing management [5], to improve long term clinical outcomes [14], and for access to pain management services [9]. As a healthcare service, T&CM professions such as naturopathy are utilised by reproductive-age women, particularly those with chronic diseases [13, 15–17]. Reasons for T&CM use by women with endometriosis can be due to medical dismissal, taking control of their symptoms and disease, dissatisfaction with standard care [12] or that some T&CM treatments provide better effectiveness compared to hormonal interventions [18]. Naturopathy, defined as a traditional medicine system is one T&CM profession [19, 20] that is utilised by women with endometriosis [13, 16, 21, 22]. Australian research suggests that naturopaths are one of the most common T&CM professions utilised by women with endometriosis, who are 1.5 times more likely to seek naturopathic care than those without endometriosis [13]. Australian prevalence data reports that 0.7–19.8% of women with endometriosis seek care from a naturopath [13, 16, 21, 22].

Reports of naturopathic treatments for endometriosis [23, 24] and the effectiveness of those naturopathic treatments are in their infancy [23], however, one study reported various naturopathic treatments and the perceived effectiveness by naturopathy users who sought care for endometriosis management [21]. The naturopathic approach to care is underpinned by a philosophical framework emphasising the treatment, prevention, and promotion of health through the application of therapeutic practises (such as herbal medicine, clinical nutritional medicine, dietary counselling, and lifestyle recommendations) [19, 20]. This approach

provides individualised care that is suitable in chronic and complex diseases where a holistic approach is needed [25]. The utilisation of naturopathic therapeutic practises is applied to a patient-centred framework involving an integrative and multidisciplinary approach [26, 27], in conjunction with various forms of naturopathic knowledge.

The patient-centred framework delivered by naturopaths has potential to address areas of endometriosis care that are of importance to women. These areas could be addressed through naturopathy by using a hierarchy of therapeutics [28] that aligns to reducing endometriosis-associated pain, symptom management (particularly bothersome symptoms), improving quality of life, and supporting women's satisfaction with treatment [29] through patient empowerment and self-management strategies, where appropriate. Further, this approach utilises naturopathic knowledge involving the application of traditional knowledge, scientific research, clinical intuition, and expertise delivered through evidence-based practice and adherence to the philosophical frameworks of the profession.

Currently, the Australian Endometriosis Clinical Practice Guideline recommends a multidisciplinary approach to ensure comprehensive care [9]. Research into multidisciplinary care and clinical management programs for endometriosis has investigated the role of conventional and allied healthcare [14, 30] in managing endometriosis. However, there has been little research exploring the naturopathic knowledge and approaches to endometriosis, despite the use of this profession by women with endometriosis [21, 22] and the acknowledgement of naturopathy as a healthcare service for women [9]. In direct response to these gaps, this study aims to explore the naturopathic knowledge and clinical approach including multidisciplinary involvement for endometriosis by naturopaths with experience in menstrual disorders.

Materials and methods

Study design

This study employed a cross-sectional survey design as a sub-study of the Practitioner Research and Collaboration Initiative (PRACI) – a practice-based research network (PBRN) of complementary medicine practitioners in Australia [31].

Setting

The survey was a self-administered questionnaire that was accessible on the SurveyGizmo platform. Data collection was open in June 2019

and closed in September 2019. Participation reminder invitations were sent to registered PRACI members in July and August 2019 by email.

Participants

Participants were recruited through the PRACI PBRN. Members of PRACI self-opted to enter the PBRN to support naturopathic advancements in Australia. Registered PRACI members who were in clinical practice as a naturopath ($n=317$) and who self-identified as having experience in women's menstrual disorders ($n=109$) were invited to participate in the study. From this sample $n=109$ (34.4%) of naturopaths in PRACI received an invitation to participate in this study. Naturopaths were included if they were practising as a naturopath in clinical practice at the time of data collection, had consulted with a woman for endometriosis in the previous 12 months and could read English. Naturopaths who were PRACI members who were not currently in clinical practice and/or did not reside in Australia at the time of data collection were excluded from the survey.

Data instrument

The self-administered survey domains included *naturopath sociodemographics*, *naturopathic treatments for endometriosis*, *naturopathic disease knowledge of endometriosis*, *naturopathic clinical management for endometriosis*, and *interprofessional approach to endometriosis care*. The survey was developed based on previous research [24]. The results presented in this study report on the survey domains including *naturopath sociodemographics*, *naturopathic disease knowledge of endometriosis*, *naturopathic clinical management for endometriosis*, and *interprofessional approach to endometriosis care*. The other domains included in the survey have been reported elsewhere [23]. In the context of this study, the domain *naturopathic disease knowledge of endometriosis* refers to the alignment of traditional knowledge, naturopathic philosophical frameworks and medical science [25] in understanding endometriosis. The questionnaire involved both multiple choice (binary and categorical multiple-choice questions) and open response questions and took approximately 15–20 minutes to complete. Survey logic was used to open consecutive questions depending on the participant's responses; therefore, some surveys may have taken 20–30 minutes to complete. Participation was anonymous and survey responses were unable to be edited after submission. The questionnaire was pilot tested for face validity by five qualified (degree granted) naturopaths in Australian clinical practice. Pilot testing involved selecting all questions that may be selected from participants to gauge an accurate time to complete the survey and to ensure all survey logic was functional. The final self-administered questionnaire was a 62-item online survey.

Sample size

The PRACI database had 317 naturopaths in clinical practice in Australia within their membership. From this sample, recruitment invitations were emailed to 109 naturopaths who self-identified as having experience in menstrual disorders. Using a margin of error of 5%, confidence interval of 95%, and 50% response distribution, the sample size was calculated at $n=86$. The invitations were sent by the PRACI administrators on behalf of the research team.

Statistical analysis

Raw data was collected through SurveyGizmo and extracted to Microsoft Excel for data cleaning. Participants were required to respond to the eligibility criteria at the start of the survey. Participants that did not meet the eligibility were directed to exit the survey. Those that were eligible were invited to proceed with the survey. Incomplete surveys were also removed from the data set during the cleaning stage. Cleaned data was imported into STATA 14 for analysis. Variables were developed in accordance with the participant responses to the survey questions. Statistical analysis was conducted as descriptive statistics using categorical and binary variables represented as frequencies and percentages. Additional analysis was conducted using the Chi-squared test to determine the main reasons for referrals from naturopaths and to naturopaths from other healthcare professions.

Results

Practitioner sociodemographics

A total of 29 naturopaths met the inclusion criteria and completed the survey (26.6% response rate). Of the naturopaths that were invited to participate ($n=109$), 72 participants did not respond to the recruitment invitations and begin the survey, leaving 37 naturopaths who commenced the survey. During data cleaning, six responses were removed as they were incomplete and an additional two responses were also removed for not meeting the inclusion criteria of being a naturopath in Australia at the time of data collection. Most of the naturopaths reported being female ($n=27$, 93.1%) and practising in New South Wales ($n=14$, 48.2%). Respondents reported holding a bachelor's degree ($n=10$, 34.4%) or an advanced diploma ($n=8$, 27.5%) in naturopathy. Most respondents reported having either between one and five years ($n=7$, 24.1%) or 16 and 20 years ($n=7$, 24.1%) experience in clinical practice as a naturopath. More than half of those who responded were working in solo clinical practice ($n=18$, 62%) and most frequently working between 16 and 20 h per week ($n=10$, 34.4%). One-third of respondents ($n=9$, 31%) reported providing naturopathic care to between 11 and 15 women with diagnosed endometriosis in the previous 12 months (see Table 1).

Clinical knowledge of the causes and risks of endometriosis

Naturopaths who had consulted with women with endometriosis in the previous 12 months reported that inflammation ($n=28$, 96.5%) was the main cause of endometriosis pathogenesis. Other reported causes of endometriosis perceived by

Table 1: Sociodemographics of participant naturopaths who consult with women for the management of endometriosis.

Sociodemographics	n (%)
Sex	
Female	27 (93.1)
Male	2 (6.9)
State	
ACT/NT/TAS	0 (0.0)
NSW	14 (48.2)
QLD	5 (17.2)
SA	2 (6.9)
VIC	5 (17.2)
WA	3 (10.3)
Qualification	
Certificate IV	1 (3.4)
Diploma	4 (13.7)
Advanced diploma	8 (27.5)
Bachelor's degree	10 (34.4)
Graduate certificate	1 (3.4)
Graduate diploma	0 (0.0)
Master's degree	5 (17.2)
Professional doctorate/Doctor of Philosophy	0 (0.0)
Years in practice	
1–5 yrs.	7 (24.1)
6–10 yrs.	4 (13.7)
11–15 yrs.	4 (13.7)
16–20 yrs.	7 (24.1)
21–25 yrs.	2 (6.9)
26–30 yrs.	2 (6.9)
31 yrs. or more	2 (6.9)
Hours per week in practice	
1–5 h	3 (10.3)
6–10 h	1 (3.4)
11–15 h	5 (17.2)
16–20 h	10 (34.4)
21–25 h	3 (10.3)
26–30 h	2 (6.9)
31 h or more	5 (17.2)
Clinical setting	
Sole practitioner	18 (62.0)
Multidisciplinary clinic with complementary medicine (CM) practitioners	8 (27.5)
Multidisciplinary clinic with conventional medicine and CM practitioners	1 (3.4)
Health food shop	0 (0.0)
Pharmacy	2 (6.9)
Number of women^a	
1–5 women	6 (20.6)
6–10 women	6 (20.6)
11–15 women	9 (31.0)
16–20 women	1 (3.4)
21–25 women	1 (3.4)
26–30 women	3 (10.3)
31 women or more	3 (10.3)

^aNumber of women with endometriosis consulted with over the previous 12-month period.

naturopaths was genetics (n=24, 82.7%), excessive oestrogen levels (n=20, 68.9%), microbiome dysbiosis (n=20, 68.9%), and excessive exposure to toxins (n=19, 65.5%). The risks that respondents most frequently perceived as associated with endometriosis were a familial history of endometriosis (n=26, 89.6%) and environmental exposures (n=25, 86.2%). Other frequently reported risks were poor liver detoxification (n=21, 72.4%) and poor dietary intake and behaviours (n=20, 68.9%) (see Table 2).

Table 2: Clinical knowledge and opinion of causes and risks associated with endometriosis.

	Frequency of clinical disease beliefs		
	Strongly agree/Agree	Undecided	Disagree/Strongly disagree
	n (%)	n (%)	n (%)
Causes of endometriosis			
Autoimmunity	12 (41.3)	10 (34.4)	7 (24.1)
Environmental toxins	19 (65.5)	7 (24.1)	3 (10.3)
Microbiome dysbiosis	20 (68.9)	8 (27.5)	1 (3.4)
Excessive oestrogen	20 (68.9)	6 (20.6)	3 (10.3)
Genetics	24 (82.7)	3 (10.3)	0 (0.0)
Inflammation	28 (96.5)	1 (3.4)	0 (0.0)
Retrograde menstruation	15 (51.7)	6 (20.6)	8 (27.5)
Intercourse while menstruating	0 (0.0)	11 (37.9)	16 (55.1)
Imbalance of oestrogen/progesterone ratio	19 (65.5)	5 (17.2)	4 (13.7)
Poor liver detoxification	19 (65.5)	6 (20.6)	4 (13.7)
Poor dietary intake/habits	19 (65.5)	4 (13.7)	6 (20.6)
Risk of endometriosis			
Early menarche	10 (34.4)	15 (51.7)	2 (6.9)
Environmental exposures	25 (86.2)	3 (10.3)	1 (3.4)
Excessive consumption of alcohol	12 (41.3)	11 (37.9)	5 (17.2)
Family history of endometriosis	26 (89.6)	2 (6.9)	1 (3.4)
Irregular menstrual cycle	12 (41.3)	8 (27.5)	8 (27.5)
Lack of exercise	10 (34.4)	7 (24.1)	11 (37.9)
Low body weight	4 (13.7)	8 (27.5)	16 (55.1)
Multiple sexual partners	2 (6.9)	3 (10.3)	22 (75.8)
Tampon usage	5 (17.2)	12 (41.3)	12 (41.3)
Poor liver detoxification	21 (72.4)	5 (17.2)	3 (10.3)
Poor dietary intake/habits	20 (68.9)	4 (13.7)	5 (17.2)

Naturopathic treatment aims

Most naturopaths indicated that their main aim for endometriosis management was to reduce inflammation (n=27, 93.1%). Other frequently reported treatment aims were supporting gastrointestinal function (n=25, 86.2%), promoting oestrogen detoxification (n=25, 86.2%), and reducing exposure to environmental toxins (n=24, 82.7%) (see Table 3).

Frequent presenting patient complaints and outcomes

Participants frequently reported that dysmenorrhoea was the most common presenting complaint by women with endometriosis identified in their clinical practice (n=27, 93.1%), followed by menorrhagia (n=24, 82.7%), chronic pelvic pain (n=23, 79.3%), and abdominal bloating (n=23, 79.3%). Naturopaths indicated that women most regularly experienced an improvement in general wellbeing (n=23, 79.3%) and quality of life (n=23, 79.3%), a reduction in dysmenorrhoea (n=22, 75.8%), and use of pharmaceutical pain medication (n=21, 72.4%) after receiving naturopathic care for endometriosis management (see Table 4).

Table 3: Frequently reported naturopathic treatment aims for women with endometriosis.

	Naturopathic treatment aims		
	Always/ Very often n (%)	Sometimes/ Rarely n (%)	Never n (%)
Primary naturopathic treatment aim			
Reducing inflammation	27 (93.1)	1 (3.4)	0 (0.0)
Addressing autoimmune factors	14 (48.2)	12 (41.3)	1 (3.4)
Addressing immune dysregulation	20 (68.9)	8 (27.5)	0 (0.0)
Balancing oestrogen and progesterone ratios	19 (65.5)	9 (31.0)	0 (0.0)
Promoting oestrogen clearance	25 (86.2)	3 (10.3)	0 (0.0)
Reducing environmental toxins	24 (82.7)	4 (13.7)	0 (0.0)
Microbiome modulation	21 (72.4)	7 (24.1)	0 (0.0)
Supporting gastrointestinal function	25 (86.2)	1 (3.4)	1 (3.4)
Modulating the hypothalamic pituitary ovarian axis (HPO axis)	21 (72.4)	7 (24.1)	0 (0.0)

Interprofessional care and referrals

The most common referral from a naturopath was to general practitioners (GPs) (n=12, 41.3%), acupuncturists/Traditional Chinese Medicine (TCM) practitioners (n=11, 37.9%), and gynaecologists (n=9, 31%). Their main reasons for referral were that they had identified a need for multidisciplinary team care (GPs: n=10, acupuncturists/TCM practitioners: n=10, gynaecologists: n=8), the women's symptoms had not improved after naturopathic care (GPs: n=7, acupuncturists/TCM practitioners: n=8), and the naturopath felt the case was outside of their scope of practice (GPs: n=7, acupuncturists/TCM practitioners: n=7, gynaecologists: n=5) (see Table 5).

Participants reported commonly receiving referrals from GPs (n=8, 27.5%), psychologists (n=6, 20.6%),

Table 4: Presenting complaints of women with endometriosis who sought care from a naturopath.

Presenting complaint	Presenting complaints by women with endometriosis		
	Always/Very often n (%)	Sometimes/ Rarely n (%)	Never n (%)
Presenting complaint			
Dysmenorrhoea	27 (93.1)	1 (3.4)	0 (0.0)
Menorrhagia	24 (82.7)	4 (13.7)	0 (0.0)
Chronic pelvic pain	23 (79.3)	4 (13.7)	0 (0.0)
Infertility	20 (68.9)	8 (27.5)	0 (0.0)
Preconception care	16 (55.1)	11 (37.9)	0 (0.0)
Dyspareunia	9 (31.0)	18 (62.0)	0 (0.0)
Abdominal bloating	23 (79.3)	5 (17.2)	0 (0.0)
Constipation	18 (62.0)	10 (34.4)	0 (0.0)
Diarrhoea	11 (37.9)	17 (58.6)	0 (0.0)
Lower abdominal pain without menstruation	15 (51.7)	12 (41.3)	1 (3.4)
Musculoskeletal pain	16 (55.1)	11 (37.9)	1 (3.4)
Fatigue	21 (72.4)	7 (24.1)	0 (0.0)
Primary treatment patient outcomes			
Improved fertility	18 (62.0)	3 (10.3)	0 (0.0)
Improved general wellbeing	23 (79.3)	0 (0.0)	0 (0.0)
Improved quality of life	23 (79.3)	0 (0.0)	0 (0.0)
Pregnancy	13 (44.8)	7 (24.1)	0 (0.0)
Reduced episodes of dyspareunia	13 (44.8)	9 (31.0)	0 (0.0)
Reduced episodes of menorrhagia	18 (62.0)	4 (13.7)	0 (0.0)
Reduced episodes of dysmenorrhoea	22 (75.8)	1 (3.4)	0 (0.0)
Reduced episodes pelvic pain	19 (65.5)	4 (13.7)	0 (0.0)
Reduced pharmaceutical usage	21 (72.4)	2 (6.9)	0 (0.0)

Table 5: Referrals and multidisciplinary care management by naturopaths for women with endometriosis.

Referrals from naturopaths to other healthcare professionals ^a	n (%)	Reasons for referrals to other healthcare professionals							
		Outside of scope of practice	Advanced endometriosis	Diagnosed with another reproductive disease	Patient requested referral	Symptoms not improved aftercare	Referral for specialist care	Needs a multidisciplinary team	Transfer of care
		n	n	n	n	n	n	n	n
Acupuncturist/TCM	11 (37.9)	7	4	3	6	8	1	10	3
Chiropractor	2 (6.9)	2	2	1	1	2	1	2	0
Fertility specialist	2 (6.9)	2	2	3	2	2	0	2	2
General practitioner	12 (41.3)	7	4	4	4	7	3	10	3
Gynaecologist	9 (31.0)	5	3	3	5	5	2	8	2
Laparoscopic surgeon	7 (24.1)	4	2	2	4	4	1	7	2
Massage therapist	3 (10.3)	2	1	1	1	2	1	3	2
Osteopath	6 (20.6)	5	4	3	4	6	0	6	2
Pain specialist	3 (10.3)	2	2	2	3	2	0	3	2
Physiotherapist	4 (13.7)	2	1	1	2	1	1	4	1
Psychologist	8 (27.5)	6	5	4	5	5	2	8	2

^aOnly frequencies are reported due to the low responses to the survey item.

Table 6: Referrals from other healthcare professionals to naturopaths for women with endometriosis.

Referrals from other healthcare professionals to naturopaths ^a	n (%)	Referrals received from naturopaths from other healthcare professionals			
		Patient requested referral n	Symptoms not improved aftercare n	Needs a multidisciplinary team n	Transfer of care n
Acupuncturist/TCM practitioner	5 (17.2)	1	1	5	2
Chiropractor	2 (6.9)	2	2	1	1
Fertility specialist	2 (6.9)	0	1	2	1
General practitioner	8 (27.5)	3	2	8	3
Gynaecologist	1 (3.4)	0	0	1	0
Homoeopath	1 (3.4)	0	0	1	0
Laparoscopic surgeon	1 (3.4)	0	0	1	0
Massage therapist	4 (13.7)	3	2	4	2
Nutritionist/Dietitian	5 (17.2)	2	3	5	4
Osteopath	5 (17.2)	2	1	5	1
Pain specialist	1 (3.4)	0	1	1	1
Pharmacist	2 (6.9)	1	1	2	1
Physiotherapist	3 (10.3)	1	2	3	2
Psychologist	6 (20.6)	2	2	6	3

^aOnly frequencies are reported due to the low responses to the survey item.

acupuncturists/TCM practitioners (n=5, 17.2%), nutritionists/dietitians (n=5, 17.2%), and osteopaths (n=5, 17.2%). Naturopaths reported that the main referral reason from these professions was the need for a multidisciplinary team (GPs: n=8, psychologists: n=6, acupuncturists/TCM practitioners: n=5, nutritionists/dietitians: n=5, osteopaths: n=6) (see Table 6).

Discussion

An important aspect to consider for this research is the different perspectives in healthcare from naturopaths compared to medical doctors. In the context of this study, some results may not align with contemporary medical knowledge of endometriosis. This relates to the differences in terminologies, definitions, and approaches between the two aforementioned healthcare professionals. While the differing views between naturopathy and conventional healthcare are known [32], this study adds to previous work by enhancing the understanding of the value and potential role and application of naturopathy in a complex disease like endometriosis.

The majority of naturopaths involved in this study identified inflammation and genetics as the causes of endometriosis. While the pathogenesis of endometriosis is unclear [2, 33], both inflammation and genetics are involved in the proposed pathogenesis theories [2]. Whether inflammation is the factor that perpetuates the disease is not yet known [2, 34]. However, increasing evidence suggests that endometriosis may be a systemic inflammatory disease due to notable increases in activated macrophages and inflammatory cytokines [2, 35]. Medical research does not define endometriosis to be caused by inflammation, however, inflammation is acknowledged as an essential aspect [2, 34]. Study participants stated their patient's primary concern was symptoms that can be caused by inflammation, such as dysmenorrhoea and chronic pelvic pain [36]. To address these concerns, participants described aiming to reduce inflammation, as well as supporting gastrointestinal function and promoting oestrogen clearance. These three aspects of naturopathic care demonstrate that naturopaths may be addressing the philosophical principles *Tolle causam* (treat the cause) and *Tolle totum* (treat the whole person) by focussing on multiple factors in endometriosis pathophysiology. While the clinical naturopathic approach to endometriosis has complexities [25], the approach identified through our

study highlights that naturopaths are targeting a key area of endometriosis pathophysiology in an attempt to achieve positive patient outcomes such as quality of life and reducing dysmenorrhoea. While this approach to care is important in endometriosis management, the efficacy and impact of the naturopathic approach in modulating inflammation-related symptoms are unclear.

Genetics was also considered a cause and risk of endometriosis by participants in our study. The inheritable nature of endometriosis has gained research attention as part of the potential cause of the disease [37, 38]. However, clear identification of genetic variations and inheritance patterns has yet to be fully established [2, 38]. Although, familial aggregation is known to be a high-risk factor for endometriosis [3]. Familial aggregation and linkage analysis studies have identified endometriosis in first-degree family members with continued prevalence in second and third-degree family members [39]. In Australia, naturopathic curriculum does not include in-depth training in genetics but does include the role of genetics in disease processes to understand an individual's metabolic and physiologic risk [37, 40]. Identifying genetics as a cause and risk factor in endometriosis may be indicative of holism which is a focal point in naturopathic philosophy and principles. This holistic approach may present in clinical practice by addressing risk factors that may increase the likelihood of endometriosis such as environmental exposures (e.g. dioxin, polychlorinated biphenyls, diethylstilboestrol) [41]. Additionally, this approach may draw on features of precision medicine whereby naturopaths employ individualised treatments to support the philosophical underpinnings of their clinical care [42]. While consideration of genetics is important, naturopaths drawing on features of precision medicine may be innovative care within naturopathy. However, it could lead to the potential use or overuse of complex or ineffective treatments as an indiscriminate approach rather than resulting in a more conservative approach to endometriosis care. As this study did not collect data on genetic treatments or tests recommended by naturopaths, research focused on this topic is warranted.

Findings in this study suggest that naturopaths aim to support gastrointestinal function and the promotion of oestrogen clearance in endometriosis care. Interesting, both abdominal bloating and menorrhagia were reported as frequent presenting concerns by women with endometriosis. The gastrointestinal system is an important aspect of naturopathic care for reasons relating to its bi-directional function in endocrine, neural, and immunological bio-mechanisms [43]. Naturopaths have historically targeted the gastrointestinal system to improve immunological

functioning, reduce inflammatory processes, balance regulatory systems, and optimise metabolic functioning [44]. Study participants may be targeting this biological system for various reasons. The rationale for addressing gastrointestinal involvement in endometriosis may relate to the immunomodulation and inflammatory process known within the microbiome [45] and addressing abdominal symptoms (such as bloating and irritable bowel syndrome) [46, 47]. From a naturopathic perspective supporting the gastrointestinal system may also promote oestrogen clearance by reducing the reabsorption of deconjugated oestrogen [48]. However, the effectiveness of this approach in endometriosis and symptom management is currently unknown.

Naturopaths in our study appear to attempt multidisciplinary care, by referring women with endometriosis to and receiving referrals from both practitioners within the conventional medicine and T&CM professions. Naturopaths reported referring to General Practitioners (GPs) primarily for a multidisciplinary approach to endometriosis care. GPs are well positioned to provide collaborative support for women with endometriosis with the use of prescribed pharmaceuticals and additional referrals, both of which are commonplace in endometriosis care [2, 49]. Referrals to T&CM professionals – acupuncturists/TCM practitioners – may be indicative of the supportive evidence for these practitioners in treating endometriosis, particularly pelvic pain, and dysmenorrhoea [50–52]. Likewise, the reported referrals from healthcare professionals (such as GPs and psychologists), indicate that these referrals to naturopaths were conducted to establish a multidisciplinary team approach to endometriosis care. This suggests that naturopaths may be a profession to consider for endometriosis multidisciplinary management.

Multidisciplinary care is an essential factor in ensuring adequate evaluation of endometriosis and improvement in patient outcomes [5, 14]. While the findings of referrals in our study are important, there is some evidence of poor communication between naturopathy and other health professionals [32]. Reasons for poor multidisciplinary collaboration between naturopaths and conventional healthcare professionals are often attributed to the differences between philosophical frameworks, negative professional perception of naturopathy, professional competition, and questionable validity of naturopathic care [32, 53]. The limited cross-communication between naturopathy and conventional healthcare professions often relies on the patient to pass knowledge between both healthcare professionals [54, 55]. Ensuring open and respectful communication between healthcare professionals is important in providing optimal care for individuals utilising these professions [15, 17]. Therefore, infrastructure improvement is needed to

encourage cross healthcare collaborations to deliver safe and effective multidisciplinary care involving naturopaths for women with endometriosis.

Limitations

Limitations regarding the low response rate in this study are noted. As low response rates are common within healthcare professions [56], this study attempted to counter this by recruiting through a PBRN as evidence indicates that healthcare professionals who are members of a PBRN may exhibit greater research participation [57]. However, given the sample was drawn from a PBRN, the results may not be generalisable and there were administrative limitations on the number of PBRN email reminders enforced by the PBRN Substudy Guidelines that may have contributed to the small sample size. Additional limitations are noted regarding participation bias and non-responders bias due to the self-administered design of the survey. The survey instrument was designed and pilot tested to ensure alignment to the naturopathic philosophical principles and perspective in clinical care. As such, the results are from a naturopathic perspective which may differ from standard conventional approaches. For example, participants in our study indicated inflammation as a cause of endometriosis. While the direct cause of endometriosis has yet to be identified, inflammation is an essential component of endometriosis pathophysiology [2]. An additional limitation to take into consideration relates to the perspective of the effectiveness of naturopathic treatments by the participants and that the participants recruited in this study self-reported having clinical expertise in endometriosis care. As such, naturopaths with insufficient endometriosis knowledge may pose a risk to women seeking care. Nevertheless, this is the first time to our knowledge that research has examined the naturopathic knowledge and clinical approach to endometriosis care from experienced naturopaths in menstrual disorders. The findings present important insights into the naturopathic approach to care for women with endometriosis in the Australian community. These findings may help to understand the naturopathic approach to managing endometriosis for medical doctors, integrative doctors, and allied healthcare professionals who may consider a collaborative care approach with a naturopath either at their discretion or if a woman with endometriosis is also seeking care from a naturopath. This study provides foundational information that can inform the design and implementation of specific naturopathic research for endometriosis that can be evaluated in more rigorous designs.

Further research

This study provides a preliminary exploration of naturopathic care for the management of endometriosis. However, further research is needed to examine this topic in greater detail. Given the context and methodology used in this study, the ability to capture the depth of the naturopathic patient-centred approach and the naturopathic perspective to care is a missed opportunity. Research reporting on naturopathic perspectives in care is in its infancy with some research conducted on cardiovascular disease [58, 59], however, the naturopathic perspective on endometriosis care has yet to be explored. As the naturopathic approach to endometriosis appears to align with emerging scientific evidence of disease pathophysiology in some areas, additional research is needed to explore the effectiveness of naturopathic care in endometriosis management. Additionally, the investigation of patient outcomes from naturopathic care for endometriosis management also requires attention. The naturopathic approach of targeting gastrointestinal support for women with endometriosis also requires a richer investigation to ascertain the benefit of managing the gastrointestinal system and presenting symptoms that are common with the presentation of endometriosis. To effectively capture naturopathic understanding and conceptual philosophical approaches to endometriosis, further research is needed in line with research frameworks that support naturopathic philosophy. As such, additional research utilising complexity science could be developed to capture rich data on the contemporary holistic approach to endometriosis care [25]. Further research is also needed to provide a deeper examination of the role and value naturopaths may play in the multidisciplinary team approach to endometriosis care, to inform evidence-based incorporation of naturopathic services in endometriosis management, if and when appropriate.

Conclusions

Naturopathic knowledge and management of endometriosis targets known problematic areas of endometriosis that can have debilitating effects on women's quality of life. Naturopathic care has the potential to align with important health outcomes for women with endometriosis however, further attention is needed to assess the effectiveness and continue to establish a multidisciplinary approach involving naturopathic care.

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Author contributions: RR and AS conceptualised the study design. RR conducted data collection and analysis. RR drafted the manuscript. AS, JW and JA contributed to the drafting of the manuscript. All authors approved the final version of the manuscript before submission.

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Informed consent: Informed consent was obtained from all individuals included in this study.

Ethical approval: Participants were provided with study information on the landing page of the survey and were required to indicate consent before accessing the survey questions. Ethics approval was granted from the Human Research Ethics Committee at the University of Technology Sydney (approval number ETH18-2913) and the Human Research Ethics Committee at Endeavour College of Natural Health (approval number #20190417-RR-1). PRACI granted recruitment approval in February 2019 (approval number #20190218).

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Appendix 10.1

Chapter 10: Presents the collective findings of the thesis findings across all three evidence sources that were used to describe the naturopathic treatments and approaches utilised by Australian naturopaths in the clinical care of endometriosis.

	Phase 1	Phase 2A	Phase 2B
Herbal medicines			
<i>Achillea millefolium</i>	✗	✓	✓
<i>Actaea racemosa</i>	✗	✓	✓
<i>Alchemilla vulgaris</i>	✗	✓	✗
<i>Aletris farinosa</i>	✗	✓	✗
<i>Angelica sinensis</i>	✗	✓	✓
<i>Astragalus membranaceus</i>	✗	✓	✗
<i>Atropa belladonna</i>	✗	✓	✗
<i>Capsella bursa-pastoris</i>	✗	✓	✗
<i>Caulophyllum thalictroides</i>	✗	✓	✗
<i>Cephaelis ipecacuanha</i>	✗	✓	✗
<i>Chamaelirium luteum</i>	✗	✓	✗
<i>Cinnamomum cassia</i>	✗	✓	✗
<i>Claviceps purpurea</i>	✗	✓	✗
<i>Curcuma longa</i>	✓	✓	✓
<i>Dioscorea villosa</i>	✗	✓	✓
<i>Echinacea angustifolia</i>	✗	✓	✗
<i>Erigeron canadensis</i>	✗	✓	✗
<i>Gelsemium sempervirens</i>	✗	✓	✗
<i>Geranium maculatum</i>	✗	✓	✗
<i>Glycyrrhiza glabra</i>	✗	✓	✗
<i>Gossypium herbaceum</i>	✗	✓	✗
<i>Hydrastis canadensis</i>	✗	✓	✗
<i>Juniperus sabina</i>	✗	✓	✗
<i>Leonurus cardiaca</i>	✗	✓	✓
<i>Matricaria chamomilla</i>	✗	✓	✗
<i>Mitchella repens</i>	✗	✓	✗
<i>Mixed herbal formulas</i>	✓	✗	✓
<i>Packera aurea</i>	✗	✓	✗
<i>Paeonia lactiflora</i>	✗	✓	✗
<i>Pinus pinaster</i>	✗	✓	✓
<i>Piscidia piscipula</i>	✗	✓	✗
<i>Pulsatilla vulgaris</i>	✗	✓	✗
<i>Rubus idaeus</i>	✗	✓	✗
<i>Silybum marianum</i>	✓	✓	✗
<i>Taraxacum officinale</i>	✗	✓	✓
<i>Trillium erectum</i>	✗	✓	✗
<i>Valeriana officinalis</i>	✗	✓	✗
<i>Viburnum opulus</i>	✗	✓	✓
<i>Viburnum prunifolium</i>	✗	✓	✓
<i>Vitex-agnus castus</i>	✓	✓	✓
<i>Zanthoxylum americanum</i>	✗	✓	✗
<i>Zingiber officinale</i>	✗	✓	✗

	Phase 1	Phase 2A	Phase 2B
Homeopathy			
Homeopathic remedies	✓	✗	✗
Actaea racemosa (cimic.)	✗	✓	✓
Alteris farinosa (alet.)	✗	✓	✗
Apis mellifica (apis.)	✗	✓	✗
Belladonna (bell.)	✗	✓	✗
Carbo vegetabilis (carbo-v)	✗	✓	✗
Chamomilla (cham.)	✗	✓	✗
Crocus sativus (croc.)	✗	✓	✗
Folliculinum (foll.)	✗	✓	✗
Ipecacuanha (ip.)	✗	✓	✗
Kalium phosphoricum (kali-p.)	✗	✓	✗
Luteinum (lutin.)	✗	✓	✗
Magnesium phosphoricum (mag-p.)	✗	✓	✓
Nux vomica (nux-v.)	✗	✓	✗
Rhus toxicodendron (rhus-t.)	✗	✓	✗

	Phase 1	Phase 2A	Phase 2B
Clinical Nutritional Medicine			
Beta-carotene	✗	✓	✓
Bioflavonoids	✗	✓	✗
Bromelain	✗	✓	✗
Calcium	✗	✓	✓
Chlorophyll	✗	✓	✗
Choline	✗	✓	✗
Cruciferous indoles	✗	✗	✓
Cysteine	✗	✓	✗
Essential fatty acids	✓	✓	✓
Flaxseed oil	✗	✓	✗
Folic acid	✗	✓	✗
Gamma-linolenic acid	✗	✓	✗
Grape seed extract	✗	✓	✗
Iodine	✗	✓	✓
Iron	✗	✓	✗
Kelp	✗	✓	✗
Magnesium	✗	✓	✓
Multivitamins	✓	✗	✗
Phosphate	✗	✓	✗
Potassium	✗	✓	✗
Prebiotics	✗	✗	✓
Probiotics	✗	✓	✓
Selenium	✗	✓	✓
Vitamin A	✗	✓	✗
Vitamin B Complex	✓	✓	✓
Vitamin B1	✗	✓	✗
Vitamin B3	✗	✓	✗
Vitamin B6	✗	✓	✗
Vitamin C	✗	✓	✓
Vitamin D	✓	✗	✗
Vitamin E	✗	✓	✓
Vitamin K	✗	✓	✗
Zinc	✗	✓	✓

	Phase 1	Phase 2A	Phase 2B
Hydrotherapy			
Cold bath	✗	✓	✗
Cold compress	✗	✓	✗
Cold sitz bath	✗	✓	✗
Enema	✗	✓	✗
Hot bath	✗	✓	✓
Hot compress	✗	✓	✗
Hot sitz bath	✗	✓	✗
Vaginal douche	✗	✓	✗
Warm bath	✗	✓	✓

	Phase 1	Phase 2A	Phase 2B
Chemical Medicines			
Acidum tannicm	✗	✓	✗
Ammonia	✗	✓	✗
Ammonium acetate	✗	✓	✗
Berberine sulphate	✗	✓	✗
Borax	✗	✓	✗
Cerium oxalate	✗	✓	✗
Ether	✗	✓	✗
Gallic acid	✗	✓	✗
Hydrastininae hydrocholoras	✗	✓	✗
Quinine sulphate	✗	✓	✗

	Phase 1	Phase 2A	Phase 2B
Multidisiplinary Care			
Acupuncturist	✓	✓	✓
Chiropractor	✗	✓	✓
Fertility Specialist	✗	✗	✓
General practitioner	✓	✗	✓
Gynaecologist	✓	✗	✓
Homeopath	✓	✓	✗
Hypnosis	✗	✓	✗
Laparoscopic surgeon	✓	✗	✓
Manipulative therapy	✗	✓	✗
Massage therapist	✗	✓	✓
Maya traditional medicine	✗	✓	✗
Nutritionist/Dietitian	✓	✗	✗
Osteopath	✗	✓	✓
Other allied health practitioners	✓	✗	✗
Other CM practitioners	✓	✗	✗
Other conventional practitioners	✓	✗	✗
Pain Specialist	✗	✗	✓
Physiotherapist	✓	✗	✓
Psychologist	✗	✗	✓
Reflexology	✗	✓	✗
Traditional Chinese Medicine	✗	✓	✓

	Phase 1	Phase 2A	Phase 2B
Dietary Advice			
Anti-inflammatory diet	✗	✗	✓
Avoid alcohol	✗	✓	✓
Avoid animal products	✗	✓	✗
Avoid caffeine	✗	✓	✓
Avoid cold temperature foods and beverages	✗	✓	✗
Avoid dairy	✗	✓	✓
Avoid fats	✗	✓	✗
Avoid grains	✗	✓	✗
Avoid red meat	✗	✗	✓
Avoid salt	✗	✓	✗
Avoid soy-based foods	✗	✓	✗
Avoid stimulating foods	✗	✓	✗
Avoid sugar	✗	✓	✓
Avoid white foods	✗	✓	✗
Consume culinary herbs and spices	✗	✓	✗
Consume dairy	✗	✓	✗
Consume fruit	✗	✓	✗
Consume herbal teas	✗	✓	✗
Consume jelly	✗	✓	✗
Consume juice	✗	✓	✗
Consume legumes	✗	✓	✗
Consume meat products	✗	✓	✗
Consume molasses	✗	✓	✗
Consume nuts and seeds	✗	✓	✗
Consume oils	✗	✓	✗
Consume organic foods	✗	✓	✗
Consume phyto-oestrogens	✗	✓	✗
Consume seafood	✗	✓	✗
Consume soy-based foods	✗	✓	✗
Consume starchy foods	✗	✓	✗
Consume vegetables	✗	✓	✗
Consume water	✗	✓	✗
Consume whole foods	✗	✓	✗
Consume whole grains	✗	✓	✗
Decrease caloric intake	✗	✓	✗
Decrease chocolate intake	✗	✓	✗
Decrease inflammatory foods	✗	✓	✗
Decrease processed foods	✗	✓	✗
Diet specific – Antioxidant diet	✗	✓	✗
Diet specific – FODMAP diet	✗	✓	✗
Diet specific – High essential fatty acid diet	✗	✓	✗
Diet specific – Low fat diet	✗	✓	✗
Diet specific – Oligoantigenic diet	✗	✓	✗
Diet specific – Vegetarian	✗	✓	✗
Gluten-free diet	✗	✗	✓
Increase calcium rich foods	✗	✓	✗
Increase cruciferous vegetables (e.g. broccoli)	✗	✗	✓
Increase dietary fibre	✗	✓	✗
Increase essential fatty acids (i.e. nuts and fish)	✗	✗	✓
Increase fibre intake (i.e. fruit and vegetables)	✗	✓	✓

	Phase 1	Phase 2A	Phase 2B
Selfcare			
Aromatherapy	✗	✓	✗
Avoid excitement	✗	✓	✗
Avoid intercourse while menstruating	✗	✓	✓
Avoid pesticides	✗	✗	✓
Avoid pharmaceutical drugs	✗	✓	✗
Avoid social activities	✗	✓	✗
Avoid use of tampons	✗	✓	✓
Avoid tight clothing	✗	✓	✗
Avoid use of plastic containers	✗	✗	✓
Breathing exercises	✗	✓	✓
Castor oil packs	✗	✓	✗
Cold packs	✗	✓	✗
Colonics	✗	✓	✗
Emotional health adjustments	✗	✓	✗
Emotional therapy (i.e. counselling)	✗	✓	✓
Exposure to fresh air	✗	✓	✗
Heat packs	✗	✓	✓
Keep feet dry	✗	✓	✗
Marriage	✗	✓	✗
Orgasm	✗	✓	✗
Poultices	✗	✓	✗
Quit smoking	✗	✓	✗
Reduce stress	✗	✓	✗
Regular exercise	✓	✓	✓
Remove environmental toxins	✗	✓	✓
Rest	✗	✓	✗
Room temperature foods	✗	✓	✗
Sauna for detoxification	✗	✓	✗
Skin brushing	✗	✓	✗
Slant iron board therapy	✗	✓	✗
Sleep hygiene practices	✗	✓	✓
Small meal portions	✗	✓	✗
Sunshine	✗	✓	✗
Tai Chi	✗	✓	✓
TENS machine	✗	✓	✓
Try to fall pregnant	✗	✓	✓
Use gauze tampons	✗	✓	✗
Wear cotton underwear	✗	✓	✗
Weight management	✗	✓	✓
Yoga/Meditation	✓	✓	✓