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1 Identification of the conditions that Complementary Medicine 2 Practitioners recommend gluten free diets for in Australia.

3 Abstract:

5 **Introduction**

6 A gluten free diet (GFD) is indicated for the medical management of coeliac disease as well
7 as gluten ataxia, dermatitis herpetiformis, and wheat allergy. Complementary medicine
8 practitioners (CMPs) recommend removing gluten from the diet, but it is not known what
9 symptoms or conditions they recommend gluten free diets for. The aim of this study is to
10 describe for what conditions Australian naturopaths, Western herbalists and nutritionists (non-
11 dietetic) recommend a gluten free diet.

13 **Methods**

14 This was a sub-group analysis nested within a cross-sectional survey of practitioners recruited
15 through the PRACI practice-based research network and relevant professional associations.
16 A 40-item survey collected information on sociodemographic characteristics, practice and
17 professional characteristics and specific questions on gluten related disorders between
18 February and August 2017. Data was described using frequencies and percentages along
19 with one-way ANOVA to determine group differences.

20 **Results**

21 One hundred and forty-five complementary practitioners responded to the survey. The
22 gastrointestinal conditions most frequently prescribed a GFD for were non-coeliac gluten
23 sensitivity (99%), medically diagnosed coeliac disease (95.2%), inflammatory bowel disease
24 (73.1%) and irritable bowel syndrome (60%). The most frequently prescribed GFDs for extra-
25 intestinal conditions were skin conditions (60%), children with developmental disorders
26 (53.1%), mental health conditions (46.2%) and weight management.

28 **Discussion**

29 Results suggest that given the broad application of GFDs by CMPs, there may be therapeutic
30 benefits for conditions other than known gluten related disorders. However, in the absence of
31 appropriate investigations for gluten related disorders, the recommendation and positive
32 response to a GFD may be inadvertently treating an undiagnosed gluten related disorder. In
33 addition, a GFD may also be inadvertently managing other unknown intolerances that require
34 different clinical management.

36 **Conclusion**

37 This research highlights the need for further investigation into the potential benefits resulting
38 from prescribing GFDs for conditions where there is no established evidence for the exclusion
39 of dietary gluten.

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42 **Keywords:** Complementary Medicine Practitioners; Naturopath; Nutrition; Gluten Free Diet;
43 Coeliac Disease; Conditions

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Introduction

Excluding gluten containing foods from the diet has become a popular choice by people in Australia. The main drivers of this trend are thought to be associated with the popular belief that 'gluten avoidance' is a healthier way to eat [1], coupled with extensive marketing in Australia and throughout other parts of the world. In addition, food industry promoted gluten free products were estimated to yield \$1,328 million USD in 2016 [2]. Nevertheless, strict adherence to a gluten free diet (GFD) is essential for the management of coeliac disease and plays a role in the treatment of gluten related disorders including, gluten ataxia, non-coeliac gluten sensitivity (NCGS), wheat allergy [3], and dermatitis herpetiformis [4].

Coeliac disease (CD) is an autoimmune disorder resulting from an interaction between dietary, genetic and immunological factors. It is estimated that 1.2% of Australian men and 1.9% of Australian women are living with coeliac disease [5], with an estimated 80% of cases remaining undiagnosed [6]. Coeliac disease can present at any age with protean presentations [7] [8]. NCGS is a disorder that exhibits similar symptoms to coeliac disease with the absence of specific biological markers of disease [9]. People with NCGS have symptom relief following removal of dietary gluten. The true prevalence of NCGS is not known but estimates suggest it affects between 0.6 to 6% of the Australian population [10].

The medical requirement for a GFD only makes up a small portion of the 20% of Australians reported to be following a GFD [11]. There has been a number of studies that have identified the potential benefits of following a GFD in conditions other than gluten related disorders [1]. However, it is proposed that many people who are receiving symptomatic relief from a GFD are doing so because of the inadvertent removal of fermentable carbohydrates or specific antigenic wheat proteins [12]; therefore, it is unnecessary to exclude all gluten containing grains [1].

It has been reported that the majority of GFDs are self-prescribed, or prescribed by a complementary medicine practitioner (CMP) often prior to the appropriate exclusion of gluten related disorders [11]. In addition, it has been found that people with non-coeliac gluten sensitivity (NCGS) are less receptive to conventional medicine and more receptive to complementary medicine [13]. To our knowledge, there have been no studies exploring what conditions CMPs recommend GFDs for. Therefore, this study aimed to describe the health conditions for which Australian naturopaths, Western herbalists and nutritionists (non-dietetic) recommend a gluten free diet.

38 **Methods**

39

40 Study design

41 A sub-group analysis of a cross-sectional survey of Australian naturopaths, nutritionists
42 (non-dietetic) and Western herbal medicine practitioners.

43 Participants

44 The sample population comprised of 145 complementary medicine practitioners (i.e.
45 naturopaths, nutritionists, Western herbalists) who were currently practicing in Australia and
46 reported prescribing gluten free diets to patients. Due to the recruitment method we were
47 unable to calculate a response rate for this study.

48 Measures

49 This GFD sub-study included items that measured sociodemographic characteristics such as
50 age, gender, and practice location. Data on practice and professional characteristics were also
51 collected through items measuring professional education (level of education and length of
52 time since highest qualification) and length of time in full-time or part-time practice. Questions
53 were also asked specifically focused on gluten related disorders including clinical
54 management, and practice behaviours.

55 Data collection

56 The survey was administered electronically between February and August 2017 through the
57 SurveyGizmo online platform. Recruitment was conducted through the Practitioner Research
58 and Collaboration Initiative PRACI practice-based research network. The study was also
59 advertised to practitioners through professional associations including the Australian Natural
60 Therapists Association and the Naturopaths and Herbalists Association of Australia.

61 Data analysis

62 Data were analysed in Stata14® statistical analysis software. Binary variables were created
63 for the items: medically diagnosed with coeliac disease, gastrointestinal conditions
64 recommend for gluten diets, and extra-intestinal conditions recommend for GFDs (e.g.
65 respiratory disorders). Descriptive analysis (frequency and percentage) was conducted for
66 age, gender, coeliac disease diagnosis, location, level of qualification, years since highest
67 qualification, years as a CMP, recommendations of GFDs for selected conditions,
68 communication styles, how well the communication was received, reason for not
69 communicating with a general practitioner, further education choices and knowledge on gluten
70 free disorder questions.

71 Chi square analysis was used to test associations between age, level of qualification, years in
72 practice, type of gastrointestinal condition, type of extra-intestinal conditions, and
73 recommending a GFD. Cramer's V was used to determine the strength of the associations.

74

75 Ethics

76 Ethical approval for the study was provided by The Human Research Ethics Committee of the
77 University of Sydney (HREC-approval number 2017/139), and the PRACI steering committee
78 approved the use of the PRACI database for recruitment (PRACI approval number 20170110).

79

80 Results

81 Demographic and practice characteristics

82

83 Question 1 of the survey asked participants if they prescribed GFDs in practice. There were
84 145 practitioners who answered yes to this question and completed the survey. Of these
85 practitioners, 7.6% (n=11) had been medically diagnosed with CD for 10.3 ± 2.46 years. 99.3%
86 (n=144) of practitioners recommended a GFD within their practice, and 50% (n=73) personally
87 followed a GFD.

88

89 The sample was mainly comprised of females (92.4%), with the majority of participants located
90 in Victoria (30.5%), New South Wales (29.8%), and Queensland (26.4%). Sixty-five percent
91 have attained a Bachelor degree with 13% possessing post-graduate qualifications. The
92 majority of practitioners have achieved their highest qualification in the last 10 years (58%)
93 and have been in practice as CMP for less than 10 years (58%). See Table 1 a summary of
94 demographic information.

95

96 **INSERT TABLE 1**

97

98 Health conditions that CM practitioners recommend a gluten free diet for

99

100 The gastrointestinal conditions CMPs recommended a GFD for can be seen Table 2. Medically
101 diagnosed coeliac disease was the condition with the most frequent recommendations for a
102 GFD (95.2%), followed by patients medically diagnosed with NCGS (99%), inflammatory
103 bowel disease (73%), and irritable bowel syndrome (60%).

104

105 Of those who recommended a GFD to patients who were diagnosed with NCGS, there was a
106 medium statistically significant association with CM practitioner qualifications ($p=0.001$) and
107 years in practice ($p=0.013$). Practitioners with higher qualifications or with more years in

108 practice were more likely to recommend a GFD to patients with NCGS. There was also a
109 medium significant association between level of qualification and recommending a GFD to
110 medically diagnosed irritable bowel syndrome ($p=0.046$). Practitioners with a bachelor degree
111 or higher qualification were more likely to recommend a GFD for NCGS, while practitioners
112 with a bachelor degree or lower were more likely to recommend a GFD for IBS.

113

114 **INSERT TABLE 2**

115

116 Extra-intestinal conditions that CM practitioners recommended a GFD for included skin
117 conditions (60%), children with developmental disorders (53%), mental health conditions
118 (46%), weight management (39%) and neurological conditions (33%). A summary of all extra-
119 intestinal conditions a GFD was recommended for can be seen in Table 3.

120 Significant medium associations were found between level of qualification and CM
121 practitioners who prescribed a GFD diet for skin conditions ($p=0,036$) and weight management
122 ($p=0.09$). Practitioners who had a bachelor degree or higher were more likely to recommend
123 a GFD for skin conditions or for weight management than those with a lower qualification.
124 Similarly, a significant medium association was found between length of time in practice and
125 prescription of a GFD for auto-immune disease ($p=0.025$); the longer the practitioner was in
126 practice the more likely they were to recommend a GFD for auto-immune diseases (See Table
127 3).

128 **INSERT TABLE 3**

129

130 **Patient communication with CMPs about GFDs**

131

132 When practitioners were asked if patients enquired about a GFD they reported that the
133 majority of patients wanted to know their opinion on the benefits of a GFD ($n=110$, 78%). A
134 greater number of patients were found to be following a GFD prior to consulting a CMP ($n=82$:
135 57.7%) compared to those who were not ($n=60$: 42.3%; see Table 4)

136 No statistical difference was found between people who have been medically diagnosed with
137 CD and patients who ask CM practitioners opinion on the benefits of GF diet ($p=0.51$).
138 Likewise, no statistical difference was found with CM practitioners who personally follow a GF
139 diet and patients asking them about the benefits of a GFD ($p=0.81$), or between CM
140 practitioners who refer to medical practitioners or specialists and how often people ask for
141 their opinion on the benefits of a GFD ($p=0.855$).

142 **INSERT TABLE 4**

143 **Discussion**

144 The aim of this study was to describe for what health conditions Australian naturopaths,
145 Western herbalists and nutritionists (non-dietetic) recommend a gluten free diet. This study
146 found that the range of conditions, including extra-intestinal conditions, for which CMPs
147 recommend GFDs is diverse. The extent of therapeutic benefit obtained from such
148 recommendations is unknown, which is an important area for future research.

149
150 GFDs are essential for patients with coeliac disease, gluten ataxia, dermatitis herpetiformis
151 and wheat allergy, and provide relief for those with NCGS [8-10]. However, this study has
152 revealed that CMPs are recommending GFDs for a much broader range of health conditions.
153 In addition to the conditions with a medical indication for a GFD, CMPs recommend a GFD to
154 people living with inflammatory bowel disease, irritable bowel syndrome, non-specific
155 gastrointestinal symptoms such as bloating and flatulence, people with chronic constipation,
156 and a number of extra-intestinal conditions. The published evidence to support such a
157 recommendation currently is lacking.

158
159 The results of this investigation are valuable for a number of reasons. First, given the broader
160 clinical application, it could be implied that GFDs are playing a therapeutic role in the
161 management of a number of conditions other than those with established evidence for dietary
162 exclusion of gluten. These recommendations from qualified practitioners are likely to occur if
163 both practitioner and their patients are observing some therapeutic gain. Therefore, this opens
164 up an opportunity for future research to conduct clinical trials or observation studies to confirm
165 or deny this benefit. Consequently, this study has also identified a need for research that
166 evaluates the therapeutic outcomes of GFDs across a broader range of health conditions.
167 Especially those conditions or symptoms that CMPs are most commonly recommending GFDs
168 for including; inflammatory bowel disease, bloating and flatulence, irritable bowel syndrome,
169 chronic constipation, skin conditions, and children with developmental disorders.

170
171 A recent study on NCGS investigated a new theory on possible pathogenic mechanisms [14].
172 This study considered that NCGS was a multi-factor-onset disorder, which can be potentially
173 transient and preventable without a specific genetic pattern. There is a possibility of an
174 epigenetic component which can be strongly related to diet and the microbiota. Therefore,
175 dietary choices, dysbiosis, short chain fatty acid production and possibility intestinal
176 permeability may all be involved with NCGS [14].

177
178 A critical point that cannot be ignored here is the potential that any benefits obtained from a
179 GFD for symptoms or conditions, are not in fact associated with an established gluten related

180 disorder and may be related to intolerance to fermentable carbohydrates. The removal of
181 gluten from the diet may be inadvertently be treating an undiagnosed gluten related disorder
182 or carbohydrate intolerance. It is important that any common co-morbidity or symptoms of a
183 gluten related disorder is fully investigated consistent with established evidence-based clinical
184 guidelines [15]. In addition, symptoms of bloating, flatulence and irritable bowel syndrome
185 have been associated with an intolerance to short-chain carbohydrates [16]. Patients with an
186 intolerance to short chain carbohydrates including fermentable oligosaccharides,
187 disaccharides, monosaccharides and polyols (FODMAPs) respond to excluding FODMAP
188 containing foods; excluding FODMAP containing foods does not necessitate an exclusion of
189 all gluten containing grains, only wheat [17]. Whilst long term exclusion of FODMAP containing
190 foods has been associated with alterations in the microbiome, the consequences of these
191 changes are still being elucidated. There are implications for dietary exclusion of gluten; for
192 example, nutritional deficiencies have been identified in people with CD who adhered to a
193 GFD; however, this is likely to be related to inadequate dietary choices and/or poor recovery
194 of the absorptive surface of the small intestine [18].

195

196 Overall, this study raises more questions than it answers, and reveals numerous areas for
197 further research. It is important to note that the findings of this study are limited by the sample
198 size (n=145) and potentially by the selection of practitioners registered with PRACI or the
199 professional organisations. Furthermore, whilst the range of conditions for which a GFD was
200 recommended was broad, no insights as to the basis of GFD use for these other conditions
201 was either requested or provided. Consequently, as mentioned, there is no evidence to date
202 to demonstrate whether the broader recommendation of a GFD is a fad or in fact an important
203 dietary intervention for a number of conditions other than those with a known medical
204 indication. Further research to investigate the effects of such recommendations is required.

205

206 **Conclusion**

207 This study has identified that CMPs are recommending a GFD for a broad number of health
208 conditions in addition to those with a medical indication for this dietary restriction; including
209 inflammatory bowel disease, irritable bowel syndrome, non-specific gastrointestinal symptoms
210 (e.g. bloating and flatulence), chronic constipation and various extra-intestinal conditions.
211 There is currently no strong evidence to support the benefits of a GFD for these; thus providing
212 opportunities for future research. Future research is also needed to determine the reasons
213 why CMPs recommend GFDs in conditions for which it is not indicated.

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