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Highlights

- This paper examines the detailed healthcare use for headache/migraine in pregnancy.
- 67% of pregnant women consulted with healthcare practitioners for headache/migraine.
- 20% of pregnant women used multiple providers including CAM for headache/migraine.
- Education level is a predictor of healthcare use for headache/migraine in pregnancy.
- Private health insurance is another predictor for headache/migraine management.

Abstract

Objectives: Little is known about women's use of health services affected by headache or migraine during pregnancy. This paper directly addresses the research gap reporting on the healthcare utilization among Australian pregnant women experiencing headache or migraine.

Design and setting: In this retrospective observational study, data on 1,835 Australian pregnant women were obtained from the nationally-representative Australian Longitudinal Study on Women's Health. Information on quality of life and health seeking behaviors regarding conventional medicine and complementary and alternative medicine providers was identified among these participants. Factors associated with healthcare use were analyzed using regression analyses.

Results: A total of 16% of the pregnant women surveyed experienced headache or migraine, and over 20% sought help from more than two types of healthcare practitioners for their headache or migraine. General practitioners (37.8%) were the most commonly consulted providers of pregnant women for their headache or migraine. Women with headache or migraine during pregnancy had

worse health-related quality of life than those without. Education level and private health insurance status of pregnant women are the predictors of the use of healthcare practitioners for their management of headache or migraine (both $p<0.05$).

Conclusions: Headache or migraine during pregnancy significantly impacts upon pregnant women's quality of life. The use of multiple healthcare practitioners, including conventional medicine and complementary and alternative medicine practitioners, highlights the need for further research investigating health services utilization of pregnant women with headache or migraine in different severity and frequency to help inform effective and safe treatment.

Keywords
Headache; migraine; pregnancy; health services; complementary and alternative medicine

Text

Introduction

Headache or migraine is one of the most common complaints among pregnant women[1] and while some experience headache or migraine prior to pregnancy, other women encounter these diseases initially during pregnancy.[2] Women experiencing headache or migraine during pregnancy in comparison with those unaffected are at increased risk of suffering from serious conditions considered potentially dangerous for an expectant mother and her unborn child such as cardiovascular diseases and limited physical functioning.[3,4] Disability due to headache or migraine may range from slight inconvenience to significant debilitation, and constitute not only an individual burden, but also a significant public health problem.[5] Risk factors for headache or migraine during pregnancy include stress,[6] hormonal changes,[2] varied socioeconomic status,[7] education,[8] and exercise behavior.[6]

Pharmacological medications are the most frequently utilized treatments for headache or migraine in non-pregnant populations.[9] However, some medications for headache or migraine are not considered safe during pregnancy.[2,10] A proportion of pregnant women with headache or migraine appear reluctant to use such pharmacological medications, preferring instead to use non-pharmacological treatments such as complementary and alternative medicine (CAM).[1] CAM refers to a diverse group of health practices and products not traditionally associated with the medical profession or curriculum.[11] CAM use among pregnancy may indicate a perception of pregnant women that these CAM therapies/products constitute more natural and safer options for their healthcare.[12]

Despite the substantial level of CAM use during pregnancy[13,14] and the increasing popularity of CAM therapies/products among headache or migraine populations,[15] only limited evidence exists for the efficacy and safety of CAM for headache or migraine.[16] Further, the use of CAM during pregnancy poses additional questions and safety concerns due to the fact that nonprofessional sources (e.g. family and friends) of information on CAM were particularly influential among pregnant women regarding their CAM use.[17] No study to date has provided detailed information on the use of professional sources of pregnant women with regards to the management of their headache or migraine. In direct response to this research gap, the present study examines the health seeking behaviors regarding conventional medicine and CAM modalities; and health-related quality of life among women suffering headache or migraine during pregnancy from a large nationally-representative sample of Australian pregnant women.

Methods

Sample

The retrospective research reported here was conducted as part of a sub-study of the Australian Longitudinal Study on Women's Health (ALSWH). The ALSWH, established in 1996, was designed to examine demographic, social, physical, psychological, and behavioral variables and their impacts on major issues of women's health, wellbeing and health service use, including pregnancy (https://www.alswh.org.au/). Women in three age groups ('young' born 1973-78, 'mid-age' born 1946-51 and 'older' born 1921-26) were randomly selected from the Australian national Medicare database. The respondents have been shown to be broadly representative of the national population of women in the target age groups.[18] The sub-study reported here invited ALSWH women in the 'young' cohort (aged 31-36 years in 2009; n=2,445) who were pregnant at the time

of recruitment or had given birth after February 2009 to complete a mailed 28-page sub-study questionnaire. All the participants gave their informed consent prior to their inclusion in this sub-study. A total of 1,835 women provided informed consent and returned a completed questionnaire providing a response rate of 79.2%. Ethics approval for the sub-study was obtained from the ethics committees at the University of Newcastle, the University of Queensland and the University of Technology Sydney, and this sub-study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Health status and healthcare utilization

In our sub-study questionnaire, women were asked if they had experienced 'headache or migraine' during their pregnancy. If any woman sought help for the headache or migraine, she were further asked from which type of practitioner(s) from a general practitioner (GP), obstetrician, midwife, chiropractor, acupuncturist, herbalist/naturopath, massage therapist, or other CAM practitioner.

Quality of Life

The Short-Form 36 (SF-36) Quality of Life questionnaire was used to produce a measure of health status and quality of life[19] in this sub-study. Results of the SF-36 were reported in eight domains: general health, physical functioning, role physical, bodily pain, role emotional, social functioning, vitality, and mental health.

Confounders

The respondents were asked about their highest educational qualification (school only; trade/certificate/diploma; university), their level of health insurance (yes, full coverage including pregnancy-related care; yes, not including pregnancy-related care; no), marriage status (never married, married/de facto, separated/widowed/divorced), and area of residence (urban or rural). Postcode of residence was used to classify area of residence as urban or non-urban. The participants were also asked if they had been diagnosed or treated for a number of common chronic conditions during pregnancy, including diabetes, hypertension, asthma, bronchitis, depression, anxiety, urinary tract infection, and cancer.

Statistical analyses

Comparisons between the mean scores on the SF-36 dimensions and the headache or migraine group (Yes: sought help; Yes: did not seek help; No) were undertaken using linear regressions, with adjustment for diagnosed conditions. Logistic regression models were employed to determine the associations between women with headache or migraine who sought help for headache or migraine and women with headache or migraine who did not seek help. All the confounding variables were entered into the models. Statistical significance was set at p-value <0.05. All analyses were conducted using statistical program Stata 13.1.

Results

The majority of pregnant women who participated in the sub-study were married or in a de facto relationship (n=1,760, 96.3%), with 60.1% having attained a university degree and 16.0% having a high school only education. More than half of the participants had private health insurance, including cover for pregnancy related expenses (n=1,068, 58.4%), 248 women (13.6%) had private health insurance without cover for pregnancy related expenses and 512 women (28.0%) did not

have private health insurance. In terms of area or residence, 63.1% of the participating pregnant women (n=1,061) lived in an urban area.

During their pregnancy, 293 women (16.0%) experienced headache or migraine, with 196 women (66.9%) seeking help for these complaints from a healthcare practitioner. Of the women who sought help, 141 pregnant women (71.9%) sought help for their headache or migraine from one healthcare practitioner only, 40 (20.4%) sought help from two different healthcare practitioners, 14 (7.1%) sought help from three different healthcare practitioners, and 1 (0.5%) sought help from four different healthcare practitioners. GPs were the most commonly consulted healthcare practitioner type by pregnant women for their headache or migraine (n=74, 37.8%), followed by obstetrician (n=58, 29.6%), chiropractor (n=44, 22.4%), midwife (n=30, 15.3%), massage therapist (n=28, 14.3%), acupuncturist (n=6, 3.1%), and herbalist or naturopath (n=2, 1.0%).

A comparison of pregnant women with headache or migraine who did or did not seek help for their headache or migraine with women who did not have headache or migraine, across the eight domains of the SF-36 health-related quality of life measure is shown in Table 1. Apart from the domain of role emotional, all other SF-36 domains had statistically significant differences in mean scores between the groups of women. Specifically, women who sought help for their headache or migraine had lower (i.e. worse) average scores for all of the remaining SF-36 domains (mental health, social functioning, general health, bodily pain, vitality, role physical, physical functioning) compared to women who did not have headache or migraine (all $p<0.05$). In addition, women who did not seek help for their headache or migraine had a lower (i.e. worse) average score for the domain vitality compared to women who did not have headache or migraine ($p<0.05$).

Table 1 Comparison of pregnant women who did or did not seek help for their headache or migraine and women who did not have headache or migraine, across the SF-36 health-related quality of life measure

SF-36 domains	**Headache/Migraine**			**p-value**
	Yes		**No**	
	Sought help (n=196)	**Did not seek help** (n=97)	(n=1,542)	
	Mean (SE) *	Mean (SE) *	Mean (SE) *	
Physical functioning [A]	88.4 (1.05)	89.7 (1.58)	91.5 (0.38)	0.014
Role physical [A]	72.5 (2.43)	81.3 (3.72)	81.8 (0.90)	0.002

Bodily pain [A]	70.6 (1.55)	76.1 (2.35)	77.5 (0.57)	<0.001
General health [A]	72.4 (1.27)	74.3 (1.93)	75.9 (0.46)	0.035
Vitality [A,B]	48.3 (1.46)	48.4 (2.21)	53.4 (0.53)	<0.001
Social functioning [A]	80.9 (1.50)	86.1 (2.28)	86.4 (0.55)	0.003
Role emotional	83.4 (2.17)	88.3 (3.31)	87.9 (0.79)	0.156
Mental health [A]	73.5 (1.07)	72.9 (1.62)	76.2 (0.39)	0.015

* adjusted for diabetes, hypertension, asthma, bronchitis, depression, anxiety, urinary tract infection, and cancer

[A] statistically significant difference between the *Yes: sought help* and *No* groups ($p<0.05$)

[B] statistically significant difference between the *Yes: did not seek help* and *No* groups ($p<0.05$)

Table 2 shows the factors associated with pregnant women seeking help from a healthcare practitioner for headache or migraine. Women with no health insurance were almost half as likely (OR=0.53; 95% confidence interval (95% CI): 0.28, 0.99; p=0.048) to seek help for their headache or migraine, compared to women with headache or migraine with health insurance including pregnancy-related care. In addition, women with a university education were 0.42 (95% CI: 0.17, 0.98; p=0.047) times less likely to seek help for their headache or migraine, compared to women with headache or migraine with a school only education.

Table 2 Factors associated with pregnant women seeking help from a health care practitioner for headache or migraine

	Headache/Migraine		
Factor	**Odds ratio**	**95% CI**	**p-value**
Area of residence			
Urban	1.00	-	

Rural	1.11	0.63, 1.95	0.715
Level of education			
School only	1.00	-	
Trade/Certificate/Diploma	0.62	0.24, 1.66	0.350
University	0.42	0.17, 0.98	0.047
Health insurance			
Yes, incl. pregnancy-related care	1.00	-	
Yes, not incl. pregnancy-related care	0.93	0.41, 2.11	0.858
No	0.53	0.28, 0.99	0.048

Discussion

Our study is the first to examine the detailed healthcare utilization for headache or migraine among a large nationally representative sample of pregnant women, producing a number of important findings. Our study shows that approximately two out of three pregnant women with headache or migraine sought help for their headache or migraine from a healthcare practitioner. Previous research in non-pregnant populations has shown that around half of all headache or migraine sufferers seek advice from healthcare practitioners.[20] This divergence in reported prevalence rates between seeking help for headache or migraine during pregnancy as opposed to non-pregnancy headache or migraine may be due to headache or migraine being related to serious illness during pregnancy including hypertension,[3] preeclampsia,[4] heart disease,[21] and depression.[22] Women may be more inclined to seek the advice of a healthcare professional if these symptoms occur during pregnancy if they perceive them to be potentially signs of more serious illness that could negatively influence the course of their pregnancy, delivery and the health of their unborn baby. In addition to the fear of complications, this vulnerable group of pregnant women with headache or migraine may also need more information from the practitioners regarding the usability and safety of routinely used treatments in pregnancy.[23,24]

While many pregnant women in our study sought care from a GP and/or an obstetrician for their headache or migraine, some pregnant women with headache or migraine sought help from CAM providers. This finding may be due to safety concerns related to the use of conventional drug therapy as many over-the-counter analgesics for headache or migraine are known to be unsafe during pregnancy, for example ibuprofen which has been associated with congenital

malformations.[25] As a result, some women may be cautious about using conventional analgesics during pregnancy, instead preferring to consult a CAM provider. Indeed, previous research has shown women who use CAM during pregnancy often desire a natural, non-pharmacological[12] and more holistic approach[26] to their health and health challenges during pregnancy. However, many questions remain about the safety of the use of CAM for headache or migraine during pregnancy. For example, commentators stated safety issues in relation to some manual therapies which have not been sufficiently defined or reported,[27] and the efficacy of many CAM products for headache or migraine has not been adequately determined during pregnancy.[28] Detailed investigation into the use of CAM by women with headache or migraine during pregnancy is essential to understand the characteristics of this use and to ensure that CAM is being used effectively and safely.

Our analysis shows pregnant women without health insurance and pregnant women with a higher level of education are less likely to seek help for their headaches or migraine. Previous research has found that having a university education is predictive of CAM use for pregnancy related conditions and symptoms during pregnancy,[29] ending weight to the notion that these women may be self-prescribing CAM products. Meanwhile, pregnant women who suffer from headache or migraine with a relatively high level of education may have lower need for healthcare information from practitioners due to their greater ease of access to information for the selection of appropriate care during pregnancy.[30] Research has also shown that women with private health insurance more commonly seek the services of CAM practitioners during pregnancy,[31] and it is concerning that our data shows that women without private health insurance may not be seeking help of any kind from a health-care professional to manage their headache or migraine pain. Further investigation is necessary to determine whether women experiencing headache or migraine without private health insurance and women with a higher educational status remain without sufficient healthcare and are subsequently at risk of complications; or whether these pregnant women are self-prescribing or seeking over the counter medications for headache or migraine, without the guidance of a healthcare practitioner. In addition, more exploration is needed to identify the impact of pregnant women's knowledge regarding the treatment choices for headache or migraine as well as the impact of women's headache or migraine type or status prior to their most recent pregnancy upon their choices of health services regarding their subsequent headache or migraine care.

A number of limitations to our study require mention. First, our survey was not designed to predominantly or exclusively explore healthcare use for headache or migraine and, as such, more detailed information about the specificity and severity of the primary or secondary headache or migraine was not available. Second, our data was obtained by self-report which may be subject to recall bias. Third, it is not possible from our study design to categorically know the headache status of our participants prior to their most recent pregnancy. Despite these limitations, the opportunity to analyze data from a large, nationally representative sample of pregnant women strengthens our findings and their contribution to this important field of enquiry.

Conclusions

A substantial number of women experience headache or migraine during pregnancy, adversely affecting their quality of life. Two thirds of pregnant women seek help from a healthcare practitioner for headache or migraine with many consulting more than one practitioner type including conventional medicine and CAM practitioners. More research is required to explore this duality of healthcare utilization and investigate the reasons women seek help from multiple

healthcare practitioners. All maternity care professionals should be encouraged to initiate an open conversation with pregnant women in their care about the use of CAM among other possible health-seeking to help ensure safe maternal outcomes for mothers and their babies.

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Authorship
JA and DS led the study design, project management, and planning of the manuscript writing. WP drafted the manuscript. RL performed the statistical analyses. JF, DS, and JA provided critical revision of later drafts. All authors have read and approved the final version of the manuscript.

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