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ALTERNATIVE MEDICINE

A Longitudinal Analysis of Complementary and Alternative Medicine Use by a Representative Cohort of Young Australian Women with Asthma, 1996–2006

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Background. There is evidence of asthma patients using complementary and alternative medicine (CAM). This article reports the findings of the first ever longitudinal study of CAM use among women with asthma from a large nationally representative sample. *Methods.* A longitudinal analysis of questionnaires completed in 1996, 2000, 2003, and 2006 as part of the Australian Longitudinal Study on Women's Health. The cohort began with 14,701 randomly selected young women (aged 18–22 years). CAM use was defined as a consultation with a range of complementary practitioners in the 12 months prior to each survey. Statistical analyses included the use of generalized estimating equations. *Results.* Over the 10-year period, approximately 26% of the women were asthmatic. Asthmatic women were significantly more likely to use CAM (19%, 22%, and 36% for surveys 2–4, respectively) than non-asthmatic women (15%, 20%, and 32% for surveys 2–4, respectively). CAM use increased as time since asthma diagnosis increased. However, only the increase in consultations with a naturopath/herbalist remains statistically significant when the CAM modalities are considered individually alongside asthma status. The longitudinal model suggests that women with asthma are 1.13 (95% CI: 1.05–1.21) times more likely to consult with a CAM practitioner ($p < .001$). The study also shows that CAM users have a higher dissatisfaction with conventional healthcare services and consultations when compared to CAM non-users. *Conclusion.* These findings suggest that women with asthma may turn to CAM after conventional care fails to adequately address their healthcare needs.

Keywords alternative medicine, asthma, complementary medicine, longitudinal studies, women

INTRODUCTION

Asthma is a chronic inflammatory disorder of the airways that affects 300 million people worldwide and its prevalence increases by 50% every decade (1). According to estimations of the Global Initiative for Asthma, there may be an additional 100 million persons with asthma by 2025, many of them children (2). Asthma currently accounts for about 1 in every 250 deaths and results in 15 million disability-adjusted life years lost per year worldwide (2).

In Australia, a total of 402 deaths or 0.3% of all deaths were attributed to this disease in 2006 (3). In 2010, asthma was estimated to be the 10th leading contributor to the overall burden of disease, with about 10% of the population having the disease, and accounting for 2.3% of the total number of disability-adjusted life years or the loss of 66,000 years of healthy life (4). It is predicted that asthma will continue to rank as one of the major causes of disease in Australia (5).

Although the majority of adult asthma patients have mild or very mild forms of the condition, many of them rate their health worse than people without asthma (6). Asthma patients are also more likely to have psychological distress, to stay more days out of work, and to be obese (6). Overall, asthma is associated with poorer quality of life (7).

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Drug therapy is the cornerstone of asthma treatment and the most commonly used drug classes to treat asthma in Australia include short-acting and long-acting beta agonists and inhaled corticosteroids (8). However, recent years have shown international evidence of an increasing number of patients turning to complementary and alternative medicine (CAM) for treatment or management of their asthma (9–14). In Australia, the National Health Survey 2007–2008 found that 5.3% of persons with asthma reported using vitamins, minerals, and herbal treatments to treat the disease (15).

CAM here refers to those healthcare practices, technologies, and products not traditionally part of conventional medicine or the medical curriculum (16). Although the evidence base of CAM for asthma remains relatively weak (17, 18), many users have reported improvement and/or satisfaction with the use of these modalities/therapies (10, 19, 20).

Despite the rising international popularity of CAM, there remains a lack of reliable evidence regarding the prevalence of CAM use among asthma patients as well as clinical and demographic characteristics of asthmatic CAM users. A systematic review examining CAM use for asthma reported that 20–30% of adults and 50–60% of children with asthma may be using CAM at any one time (10: p. 386). This review identified breathing techniques, herbal products, homeopathy, and acupuncture as the most commonly used modalities/therapies for the treatment of asthma. Another survey in the United Kingdom involving 1320 randomly selected asthma patients found that

15% had used CAM for asthma, with homeopathy, herbal medicine, and relaxation being the most widely used (21). Two other surveys on asthma patients in Turkey have identified 43% ($n = 209$) (19) and 52% ($n = 313$) (22) of their respective samples of asthma patients as having used CAM. A recent US study reported that CAM use differed significantly by asthma severity with 49% of those experiencing an asthma episode in the past 12 months using CAM. In comparison, only 42% of patients who did not have an episode in the same period used CAM (23). This study also revealed that patients with a single comorbid condition were more likely to employ self-care-based CAM (such as herbs, energy/reiki, and meditation) than practitioner-based CAM such as acupuncture. However, the use of such self-care-based CAM declined with the presence of two or more comorbidities. These findings suggest that patients may make a choice to employ different CAM use based upon the severity of their asthma and the threat of comorbid conditions (23).

Evidence indicates asthma patients who use CAM are likely to be younger, female, have higher education/income, and a longer duration of disease than those who do not use CAM (21–24). These findings are similar to those reported in previous general population studies on CAM use (25, 26). Although CAM use is a common practice of contemporary societies, results of large-scale surveys found that the majority of people using CAM do so to complement conventional care rather than as an alternative to it (26–29). However, previous studies revealed that only a small proportion of asthma patients disclose their CAM use to their conventional doctor (21, 22, 30). In addition to personal health history, there is also evidence that recommendations from friends and relatives are important in asthma patients' decision-making regarding CAM use (14, 22, 31).

This article—reporting the findings of the first ever longitudinal study of CAM use among women with asthma from a large nationally representative sample—provides the first empirical evidence of the prevalence and predictors of CAM use over time.

Methods

Sample

This research was conducted as part of the Australian Longitudinal Survey of Women's Health, which was designed to investigate multiple factors affecting the health and well-being of women over a 20-year period. Women in three age groups ("young," 18–23; "mid-age," 45–50; and "older," 70–75 years) were randomly selected from the national Medicare database (32). The focus of this study is women from the young cohort who have been surveyed four times over a 10-year period (1996–2006). The baseline survey, survey 1 ($n = 14{,}779$), was conducted in 1996 and the respondents have been shown to be broadly representative of the national population of women in the target age groups (33). Survey 2 was conducted in 2000, survey 3 was conducted in 2003, and survey 4 was conducted in 2006.

Demographic Measures

Postcode of residence at the time of each survey was used to classify area of residence as urban or non-urban. Women were asked about their current marital status and the highest educational qualification they had completed. Based on the response to a question about history of smoking, the women were categorized as being a current smoker or ex-smoker/never smoked.

Measure of Health Status

The women were asked how often they experienced a list of symptoms (such as back pain, tiredness, difficulty sleeping) in the previous 12 months.

Measures of CAM Use and Self-Prescribed CAM Treatments

In surveys 1–3, the women were defined as being CAM users by their response to the question "How many times have you consulted an alternative health practitioner (e.g., chiropractor, naturopath, acupuncturist, herbalist) for your own health in the past 12 months?" In survey 4, individual CAM practitioners were listed and the women were defined as CAM users if they indicated that they had consulted with a range of CAM practitioners (i.e., chiropractor, massage therapist, acupuncturist, naturopath/herbalist, other CAM practitioner). In survey 4, a question was also asked about the women's use of self-prescribed CAM therapies. Women were defined as having used a self-prescribed CAM by their response to the question "How often have you the following therapies [vitamins/minerals, meditation/yoga, herbal medicines, aromatherapy oils, Chinese medicine] for your own health in the past 12 months"?

Outcome Measure

In the 1996 survey, the women were asked if they had been diagnosed or treated for asthma. In the subsequent surveys, the women were asked if they had been diagnosed or treated for asthma in the period since the previous survey.

Statistical Analyses

Chi-square tests were used to compare asthma groups across CAM consultations and self-prescribed CAM treatments. A generalized estimating equation (GEE) model was used to investigate the longitudinal relationship between asthma and consultation with a CAM practitioner, with adjustment for potential confounding variables. All analyses were conducted using the statistical software SAS 9.1 (SAS Institute Inc. Cary, NC, USA). Due to the large sample size, a .005 level of statistical significance was used.

Results

Across the four survey periods (2000–2006), the percentage of women who had asthma ranged between 25.1% and

TABLE 1.—Comparison of asthma status against consultation with CAM practitioners, 1996–2006.

	Survey 1 (1996)		Survey 2 (2000)		Survey 3 (2003)		Survey 4 (2006)	
	Asthma		Asthma		Asthma		Asthma	
	Yes	No	Yes	No	Yes	No	Yes	No
CAM use	($n = 3683$) (%)	($n = 10{,}959$) (%)	($n = 2653$) (%)	($n = 6943$) (%)	($n = 2349$) (%)	($n = 6593$) (%)	($n = 2264$) (%)	($n = 6517$) (%)
Yes	10	9	19	15	22	20	36	32
No	90	91	81	85	78	80	64	68
p-value	.066		<.001		.031		.002	

27.6%. In terms of asthma incidence, there were 276 new cases in 2000, 256 new cases in 2003, and 277 new cases in 2006.

Table 1 shows the association between asthma status and consultation with a CAM practitioner. There was an increasing trend of CAM use by all women. Although there was a pattern of higher CAM use by women with asthma across all surveys, a highly significant association was found in the year 2000, where 19% of women with asthma used CAM compared to 15% of women without asthma using CAM. Similarly, in 2006 a significant association was reported, where 36% of women with asthma used CAM compared to 32% of women without asthma using CAM.

A comparison of CAM use at each survey by groups defined by when diagnosis of asthma occurred is shown in Table 2. This table reveals the increasing use of CAM by all women and there is an apparent higher use of CAM by women who have had the longest diagnosis of asthma, especially at survey 4 where CAM use increases with time since diagnosis. However, these patterns were only statistically significant for survey 2 ($p = .002$). It is interesting to note that in all survey periods, the group of women with the lowest percentage of CAM use are those who are diagnosed with asthma in the subsequent survey period. These women then have the greatest increase in CAM use in that subsequent survey period. For example, 17% of women who were first diagnosed with asthma at survey 2 used CAM, but in survey 1 only 8% of these women used CAM.

TABLE 2.—CAM use, as defined by consultation with CAM practitioners, at each survey by period when asthma was diagnosed.

	Survey 1 (1996)	Survey 2 (2000)	Survey 3 (2003)	Survey 4 (2006)
Asthma	% CAM use	% CAM use	% CAM use	% CAM use
Diagnosis at S1	10	19	22	36
Diagnosis at S2	8	17	21	38
Diagnosis at S3	10	13	24	33
Diagnosis at S4	11	18	20	32
No diagnosis	9	15	20	32
p-value	.256	.002	.238	.013

- - - - separates women with a diagnosis of asthma from women without a diagnosis of asthma at each time period.

Table 3 shows the consultation with individual CAM practitioners and use of self-prescribed CAM by time since diagnosis of asthma at survey 4. With the exception of consultation with a naturopath/herbalist, there were no other significant trends for increased CAM use, either for consultations with a CAM practitioner or use of self-prescribed CAM, with increased time since diagnosis of asthma. For consultations with a naturopath/herbalist, the lowest percentage use occurred in the first 6 years since diagnosis of asthma, whereas the highest percentage use occurred in the period 6 years or more since asthma diagnosis.

In Table 4, the longitudinal GEE model shows the relationship between consultation with a CAM practitioner and asthma status, adjusted for time (survey), and the potential confounders of smoking status, area of residence, marital status, level of education, and number of symptoms. After adjusting for confounders, the odds of women with asthma using CAM is 1.13 (95% CI: 1.05–1.21) times greater than for women without asthma. In addition, the odds of CAM use increases with time, whereas in survey 4, the odds of women using CAM is 4.5 (95% CI: 4.14–4.90) times greater than for women 10 years earlier (survey 1).

In terms of the confounding variables, CAM use was higher among women from rural areas (OR = 1.02; 95% CI: 0.96–1.09) compared to women from urban areas ($p = .5318$); non-smokers (OR = 1.08; 95% CI: 1.00–1.15) compared to current smokers ($p = .0407$); and with increasing number of symptoms (OR = 1.08; 95% CI: 1.07–1.09) ($p < .0001$). CAM use was lower among: women who were married or in a de facto relationship (OR = 0.92; 95% CI: 0.87–0.98) compared to women who never married ($p = .0147$); and women with no formal education (OR = 0.47; 95% CI: 0.35–0.63) and high school only (OR = 0.78; 95% CI: 0.72–0.84) compared to women with a university qualification ($p < .0001$).

Table 5 reports satisfaction with GP by CAM use at different times since diagnosis of asthma at survey 4. CAM users diagnosed with asthma were in general less satisfied with GP consultations than asthma patients who did not use CAM. However, these differences were not statistically significant. It is interesting to note that within the group of non-asthmatic women, CAM users were less satisfied ($p < .001$) with GP than non-CAM users regarding "GP's explanation of problem and treatment," "GP's

TABLE 3.—Consultation with a CAM practitioner and use of self-prescribed CAM in 2006 (survey 4) by time since diagnosis of asthma.

		Time since diagnosis of asthma					
		Never	<3 years	3–6 years	6–9 years	10+ years	*p*-value
Consultation with a CAM practitioner							
Chiropractor	Yes (%)	14.8	15.2	13.9	17.1	17.2	.112
Osteopath	Yes (%)	5.1	5.1	5.4	6.7	5.3	.882
Acupuncture	Yes (%)	6.2	4.7	7.9	6.2	6.6	.625
Naturopath/herbalist	Yes (%)	12.0	10.5	8.6	14.7	14.5	.009
Other CAM	Yes (%)	8.3	9.0	10.7	6.7	9.2	.456
Self-prescribed CAM							
Vitamin/minerals	Yes (%)	65.5	70.3	60.3	66.5	65.9	.267
Yoga/meditation	Yes (%)	20.5	23.9	20.6	15.6	22.2	.105
Herbal medicines	Yes (%)	18.5	20.3	17.5	21.2	20.8	.165
Aromatherapy oils	Yes (%)	20.2	21.1	25.4	24.5	23.0	.029
Chinese medicine	Yes (%)	4.2	3.6	1.6	5.2	4.8	.223

TABLE 4.—GEE model to predict CAM use.

Factors	Odds ratio	95% CI	*p*-value
Asthma			
No	1.00	—	
Yes	1.13	1.05, 1.21	.0007
Time			
Survey 1	1.00	—	
Survey 2	2.20	2.02, 2.41	<.0001
Survey 3	2.37	2.19, 2.58	<.0001
Survey 4	4.50	4.14, 4.90	<.0001
Area of residence			
Urban	1.00	—	
Rural	1.02	0.96, 1.09	.5318
Marital Status			
Never married	1.00	—	
Married/de facto	0.92	0.87, 0.98	.0147
Separated/divorced/widowed	0.94	0.80, 1.11	.4569
Education			
University	1.00	—	
Trade/certificate/diploma	0.99	0.92, 1.07	.8638
High school only	0.78	0.72, 0.84	<.0001
No formal qualifications	0.47	0.35, 0.63	<.0001
Smoking status			
Current smoker	1.00	–	
Non-smoker	1.08	1.00, 1.15	.0407
Number of symptoms	1.08	1.07, 1.09	<.0001

interest about how patient felt about having tests, treatment or advice given," and "Your opportunity to ask all your questions."

DISCUSSION

The study reported here is the first longitudinal analysis of CAM use by women with asthma in the world revealing some interesting findings regarding trends in women's CAM consumption. Specifically, the study results show that CAM use by asthmatic women has increased over the 10-year study period at a significantly faster rate than for non-asthmatic women, a finding that supports results from previous cross-sectional studies on this topic (9, 10, 21, 34).

The longitudinal analysis also shows that CAM use increased with time since diagnosis of asthma although this pattern was not statistically significant. Further, the group of women with the greatest increase in CAM use from one survey period to another were those who moved from pre-diagnosis to diagnosis of asthma in the second survey period. Together these findings suggest that the diagnosis of asthma may have provided the impetus for these women to seek out CAM and many of them continued to use CAM afterwards. This relationship between illness diagnosis and increase in CAM use has also been observed in other disease. For instance, a survey of cancer patients from 14 European countries found that the use of herbal medicine tripled following cancer diagnosis (35).

The findings of the present study that CAM users have higher dissatisfaction with a GP or conventional consultation may help explain why patients turn to CAM for treatment or management of asthma. This result is broadly in line with findings of studies on general CAM users that have identified dissatisfaction with conventional healthcare service as one of the reasons for the rise in CAM consumption (16). In addition, the association of CAM use and dissatisfaction with conventional health service may highlight specific ways in which some asthma patients cope with the chronic condition. There is evidence that CAM helps people with asthma in controlling symptoms and in reducing their reliance on medication (36, 37). A longitudinal study of patients' experiences of asthma and allergy over 8 years discovered that people with asthma tend to distance themselves from medical authority over time and to take personal control of the circumstances of their illness. These attempts represent a desire among patients to retain an ordinary healthy identity and to live a dignified life (38). Mindful of these issues, the use of CAM may be providing asthma sufferers with a sense of choice and empowerment with regard to their treatment and care.

The interpretation of our findings is limited by the fact that CAM use is self-reported by the participants and as such our results may be open to the effects of recall bias. In addition, asthma status was defined by self-report to a single question and the lack of confirmatory diagnosis could potentially bias findings. However, Katz *et al*.

TABLE 5.—Satisfaction with GP by CAM use at different times since diagnosis of asthma at survey 4.

	Time since diagnosis of asthma									
	Never		<3 years		3–6 years		6–9 years		10+ years	
	CAM use		CAM use		CAM use		CAM use		CAM use	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	($n = 1988$) (%)	($n = 4223$) (%)	($n = 99$) (%)	($n = 188$) (%)	($n = 62$) (%)	($n = 126$) (%)	($n = 80$) (%)	($n = 131$) (%)	($n = 713$) (%)	($n = 1274$) (%)
Amount of time spent with GP										
Fair/poor	15	13	17	10	6	15	24	10	16	13
Excellent/very good/good	85	87	83	90	94	85	76	90	84	87
p-value	.0205		.1100		.0896		.0066		.0510	
GP's explanation of problem and treatment										
Fair/poor	17	12	21	13	11	21	30	15	18	14
Excellent/very good/good	83	88	79	87	89	79	70	85	82	86
p-value	<.001		.0870		.0895		.0115		.0256	
GP's interest about how you felt about having tests, treatment, or advice given										
Fair/poor	19	15	24	14	11	24	28	18	20	15
Excellent/very good/good	81	85	76	86	89	76	72	82	80	85
p-value	<.001		.0579		.0424		.1172		.0121	
Your opportunity to ask all your questions										
Fair/poor	14	11	17	11	10	17	20	15	15	13
Excellent/very good/good	86	89	83	89	90	83	80	85	85	87
p-value	.0007		.1890		.1588		.3752		.2640	
Technical skills of the GP (thoroughness, carefulness, competence)										
Fair/poor	13	11	13	11	13	15	16	15	14	10
Excellent/very good/good	87	89	87	89	87	85	84	85	86	90
p-value	.0737		.6731		.5908		.8488		.0289	
Personal manner (courtesy, respect, sensitivity, friendliness)										
Fair/poor	11	9	17	9	11	12	15	12	10	9
Excellent/very good/good	89	91	83	91	89	88	85	88	90	91
p-value	.0443		.0575		.7818		.5627		.3182	

(39) have shown that such self-reported data are valid and comparable to medical record assessments. A further limitation of our study is that we were unable to ascertain whether the self-reported use of CAM was for asthma or for some other condition(s). Nevertheless, a number of design features of our study provide strength to our data and analysis that far outweigh these limitations. In addition to providing the first longitudinal analysis and examining the utilization of a wide range of CAM treatment and provider options available for asthma, the major strength of our study is the examination of data from such a large nationally representative sample of women.

Conclusion

The longitudinal analysis (1996–2006) shows that CAM use among asthmatic women increased over time at a significantly faster rate than among non-asthmatic women. In addition, CAM use among patients also increases as time since diagnosis with asthma increases. These findings suggest that asthmatic women may turn to CAM following unsuccessful conventional treatment in an attempt to address their asthma care needs. These women may also elect to use CAM with a view to concerns about the side effects of conventional asthma medications or as a means of taking control of their treatment options and gaining a sense of empowerment.

The frequent use of a range of CAM among women with asthma warrants further investigation. The prevalence of CAM consumption among asthmatic women also has implications for conventional health service providers who should enquire with their patients regarding possible CAM use.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Ethics Approval

This study was conducted with the approval of the Human Ethics Committee at the University of Queensland and University of Newcastle.

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