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# The use of complementary and alternative medicine by asthma patients

T.P. NG<sup>1</sup>, M.L. WONG<sup>2</sup>, C.Y. HONG<sup>2</sup>, K.T.C. KOH<sup>2</sup> and L.G. GOH<sup>2</sup>

*From the Departments of <sup>1</sup>Psychological Medicine and <sup>2</sup>Community, Occupational and Family Medicine, National University of Singapore, Singapore*

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## Summary

**Background:** Use of complementary and alternative medicines (CAM) by asthmatic patients is increasing. Data on the prevalence of CAM use in asthma are limited, and the motivation for patients to seek CAM therapy is uncertain.

**Aim:** To determine the prevalence and pattern of use of complementary therapies in adults treated for asthma in primary care in Singapore, and the demographic and clinical factors associated with their use.

**Design:** Cross-sectional study.

**Setting:** Five primary care clinics in Singapore.

**Methods:** Adult patients with asthma ( $n=802$ ) received a structured questionnaire interview and clinical assessment that included demographic and clinical variables (clinical status, patient's knowledge, self-care and healthcare-seeking

behaviour, and spirometric measurements) and detailed information on CAM use in the past one year.

**Results:** CAM use in the past year was reported by 27.2%, including animal food products (12.3%), herbs (10.3%), herbal-based proprietary medicines (3.2%), and acupuncture or reflexology (1%). The use of CAM was significantly associated with Chinese ethnicity, longer disease duration, moderate and severe persistent asthma, FEV1/FVC <80%, lack of positive response to treatment in the past year, higher patient knowledge score, and multiple sources of care providers.

**Discussion:** The use of CAM is highly prevalent in Asian patients treated for asthma in primary care, and is associated with cultural and clinical factors reflecting a need to improve care.

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## Introduction

The use of complementary and alternative medicines (CAM) for asthma treatment is of great interest in patient care, as it has been the subject of not a few expert review articles in journals and systematic reviews.<sup>1–8</sup> The common forms of CAM used for asthma include traditional Chinese herbs, caffeine-containing coffee and tea, homeopathy, acupuncture, aromatherapy, reflexology, relaxation therapy, massage and even prayer. The mechanisms of action of certain herbal and other therapies elucidated in some reports suggest that they could possibly be beneficial for the treatment of asthma and other allergic diseases. However, the available

evidence supporting the efficacy of CAM therapies from well-designed clinical trials is limited.<sup>4–8</sup> This, and the possibility of toxicities and harmful drug interactions in patients who use complementary medicines concurrently with conventional Western medicines, are of great concern to the physician and patient care.

Although CAM is believed to be widely used by asthma patients, few studies have reported its prevalence in such patients.<sup>9–13</sup> The prevalence and pattern of use of CAM is also expected to vary in culturally diverse patient populations. In Singapore, with a multi-ethnic population (3 million) of Chinese

(77%), Malays (15%) and Indians (8%), asthma patients have long been known to use herbal medicines and other forms of traditional therapies either alone or in addition to modern prescription medicines.

The reasons why patients in general seek complementary or alternative medicines have been investigated in previous studies, and include a positive valuation of complementary treatment, the ineffectiveness of orthodox treatment for their complaint, concern about the adverse effects of orthodox medicine, and dissatisfaction with care, particularly communication with doctors.<sup>14</sup> Asthma patients may particularly seek complementary therapies because the chronicity of their illness necessitates long-term and continuing self-care, thus leading to disaffection with the outcomes of care by providers, and their perceived toxicities of modern prescription medicines, such as from inhaled corticosteroids. To our knowledge, there are no clinical studies that have investigated the specific clinical and self-care behavioural factors that predispose asthma patients to use CAM.

It is widely recognized that it is important for physicians to inquire and discuss the use of CAM with their patients. There are, however, few empirical data to support better understanding of the impetus for patients to seek complementary therapies. The use of CAM in itself may be a reflection of attitudes and self-care behaviour in the patient, and quality of asthma care provision, that deserves close attention by the physician.

The objectives of this study were to determine the prevalence and pattern of use of complementary therapies in adult patients receiving primary care treatment for asthma in Singapore, and to evaluate the clinical and self-care related factors associated with their use.

## Methods

The data for analysis were obtained from a 1993 cross-sectional study of asthma patients receiving primary ambulatory care in government outpatient clinics in Singapore. The patient population and the clinical measurements have been described in detail previously, and are only briefly described here.

### Setting

Subjects were asthmatic patients in public-sector primary-care clinics in Singapore,<sup>15</sup> which provide a comprehensive range of subsidized primary care for 20% of the population, especially those in lower income groups. Asthma patients in these clinics are provided with continuing long-term asthma care,

including subsidized medications, patient education and training in asthma self-care. Five large polyclinics out of a total of 12 in different parts of Singapore were chosen as study centres.

### Patients

There were a total of 802 adult asthma patients, aged 21–54 years, treated for asthma for at least a year at the primary care out-patient clinics. Asthma patients were identified by diagnostic coding from the patient register, and their case notes were reviewed by one doctor involved in each study centre, who excluded cases with erroneous or ambiguous diagnosis determined according to standard clinical criteria. The criteria were: typical symptoms of episodic wheeze, shortness of breath and chest tightness, which were relieved by the use of bronchodilators, at least one recorded diagnosis of asthma in the case notes, and/or at least one clinical documentation of rhonchi or diminished air entry. No bronchial provocation tests were done.

The 1352 patients fulfilling these criteria were invited by letter and/or phone call to attend a special interview at their respective polyclinics. Of these, 68 could not be reached because of invalid addresses, and 50 were not interviewed for reasons such as being abroad, in detention or mentally retarded. Of the net eligible 1234 patients, 47 refused to be interviewed because of reasons such as 'no time', 'now well', and 385 did not respond to letters by invitation (sent three times) and had no contact telephone numbers. Overall, 802 patients were successfully interviewed, giving a response rate of 65%.

### Measurements

Each patient received an extensive structured questionnaire interview and clinical assessment that included information on demographic variables, clinical status, patient's knowledge, inhaler technique, healthcare-seeking behaviour, and spirometric measurements.

Clinical information included atopy and family history of asthma, the frequency over the past year of day and nocturnal asthma symptoms, visits to emergency room (ER) and hospital admissions and limitations of daily activities. The progression of asthma symptoms over the past year was assessed by a single question that asked whether the patient's symptoms had been progressively getting worse with more frequent episodes, remaining the same, or getting better with less frequent episodes. Another question asked the patient to report whether his/her response to asthma treatment at the primary care

out-patient clinic over the past year had been 'better', 'the same' or 'worse'.

The patient's forced expiratory volume in one second (FEV1) and forced vital capacity (FVC) was measured with a hand-held microspirometer (Microspirometer, Micro Medical), following American Thoracic Society (ATS) recommended procedures for standardization of pulmonary function measurements.<sup>16</sup> The repeatability and validity of this instrument has been studied in the local population, and regression formulae for normative values have been derived for each gender and ethnic group (Chinese, Malay and Indian).<sup>17</sup> Technically acceptable spirometric measurements were obtained for 760 patients.

The symptom and spirometric data were used to classify the patient's asthma severity as 'intermittent', 'mild persistent', 'moderate persistent' and 'severe persistent' according to the GINA Classification.<sup>18</sup>

Inhaler technique was assessed by observing the patient as he/she performed a self-administration of his own inhaler, and scoring the patient on a checklist of six performance criteria. Inhaler technique was scored as 'satisfactory' for achieving five or six performance criteria, and 'less than satisfactory' for achieving less than five.

The patient's knowledge of asthma and its self-care was assessed by a 16-question items (yes/no) scale that assessed the patient's basic knowledge of the disease, recognition and avoidance of environmental triggers, and the use of bronchodilator and steroid for treatment. The summed score ranging from 0 to 16 was used to categorize knowledge level in three approximate tertiles: poor (0–3), satisfactory (4–6) and good (7–16).

Information obtained on the patient's healthcare-seeking behaviour related specifically to whether he/she used additional care providers besides the government primary clinic presently registered under, such as other primary care clinic(s), private general practitioner(s), hospital specialist(s), or other alternative health care providers, as well as the total number of alternative health care providers.

A detailed questionnaire was used to ascertain whether the patient used any complementary therapy in the past year, specifying types and details of the complementary therapy used. Complementary therapy in this study included the use of 'food' therapies, such as all kinds of wild animal meat products, such as crocodile, bats, camel, etc., since specific food-based therapy is a formal element in the Chinese pharmacopoeia, and is commonly used as traditional remedies for asthma, as documented by previous expert reviews<sup>3</sup> and revealed by focus group research.

## Statistical analysis

Categorical data and logistic regression analyses were used for  $\chi^2$  comparison of prevalence of CAM use in patient subgroups, and to estimate ORs (and 95% CIs) of association of individual variables with CAM use. Multiple regression models were used to estimate adjusted ORs of association, taking into account potential confounding by other variables. Significant variables identified from univariate analyses were selected for multiple logistic regression modelling, including plausible variables with borderline statistical significance. Both the full model with all variables entered in the model and the forward stepwise selection modelling using  $p$  values  $< 0.05$  for entry and  $p < 0.10$  for removal, were used to determine a final model of predictor variables. The two models yielded similar results, hence the parsimonious model from the stepwise model is presented in this report. All analyses were done using SPSS (Statistical Package for Social Sciences, SPSS Inc).

## Results

Of 802 asthma patients, 27.2% (222 patients) reported using any complementary therapy in the past one year (Table 1). Animal food products were used by 12.3% (99 patients) and herbs were used by 10.3% (83 patients). Chinese proprietary medicines, which are herbal-based products formulated as tablets or capsules, but sometimes containing Western prescription medicines such as steroids or antibiotics, were used by 3.2% (26 patients). The use of acupuncture and reflexology was reported by seven (1%) and three patients, respectively. The list of animal food products used as traditional remedies for asthma included crocodile meat, fruit bat, camel heart, lamb or goat, snake, frog, monkey, bird's nest, horse, tiger, turtle, mice, iguana, rabbit, dog, black-skinned chicken, eel, fish roe, fish oil and cockroach. The ethnically-differentiated herbs used included Chinese, Malay (Jamu) and Indian (Ayurvedic) herbs, but cross-cultural use of CAMs were also noted, especially Malays and Indians using Chinese herbs and proprietary medicines. The common Chinese herbs used include Ma Huang, Cordyceps, Ling Zhi, Ginseng, Herba Ajugae, Semen Armeniacae Amarum, Radix Glycyrrhizae, Vitex cannabifolia, Radix Codonopsis, Pinellia Tuber and Radix Atractylodis Macrocephalae. Other medicinal plants used included aloe vera and ginger.

The prevalence of complementary therapy used varied by demographic groups of patients (Table 2). This was significantly higher in male patients and in

**Table 1** Use of complementary therapies by asthmatic patients in primary care clinics, Singapore ( $n=802$ )

	<i>n</i>	%
None	580	72.3
Complementary medicine	222	27.7
Animal products	99	12.3
Crocodile	35	4.4
Fruit bat	33	4.1
Camel heart	10	1.2
Others*	46	5.7
Plant and herbs	83	10.3
Chinese herbs**	51	8.4
Malay Jamu herbs	12	1.5
Indian Ayurvedic herbs	7	0.9
Aloe vera, ginger	8	1.0
Chinese proprietary medicine	26	3.2
Others	10	1.0
Acupuncture	7	0.9
Reflexology	3	0.1

\*Other animal products included: lamb (8), goat (3), snake (6), frog (2), deer (3), monkey (3), bird's nest (2), horse (1), tiger (1), turtle (1), mice (1), iguana (1), rabbit (1), dog (1), black chicken (1), cockroach (1), eel (1), fish roe (2), fish oil (2). \*\*Including: Cordyceps, Ling Zhi, Ginseng, Herba Ajugae, Semen Armeniacae Amarum, Radix Glycyrrhizae, Vitex Cannabifolia, Radix Codonopsis, Pinellia Tuber and Radix Atractylodis Macrocephalae.

**Table 2** Personal demographic factors and complementary therapy use in asthma patients in primary care

Variables	CAM users	<i>p</i> (2-sided)
Total ( $n=802$ )	222 (27.7%)	
<i>Gender</i>		
Male ( $n=338$ )	109 (32.2%)	0.014
Female ( $n=464$ )	113 (24.4%)	
<i>Ethnicity</i>		
Chinese ( $n=385$ )	147 (38.2%)	0.001
Malay ( $n=249$ )	48 (19.3%)	
Indian and others ( $n=168$ )	27 (16.1%)	
<i>Age</i>		
< 30 years ( $n=178$ )	48 (27.0%)	0.557
30–39 years ( $n=272$ )	70 (25.7%)	
≥ 40 years ( $n=352$ )	104 (29.5%)	
<i>Educational level</i>		
Primary or less ( $n=163$ )	37 (22.7%)	0.279
Secondary ( $n=277$ )	81 (29.2%)	
Post-secondary and tertiary ( $n=362$ )	104 (28.7%)	

**Table 3** Clinical factors and CAM use in asthma patients in primary care

Variables	CAM users	<i>p</i> (2-sided)
<i>Atopy</i>		
Yes ( $n=458$ )	98 (28.5%)	0.716
No ( $n=344$ )	124 (27.1%)	
<i>Family history of asthma</i>		
Yes ( $n=426$ )	124 (29.1%)	0.378
No ( $n=376$ )	98 (26.1%)	
<i>Duration of asthma</i>		
1–9 years ( $n=254$ )	50 (19.7%)	0.001
10–19 years ( $n=190$ )	53 (27.9%)	
20+ years ( $n=358$ )	119 (33.2%)	
<i>Asthma severity (GINA)</i>		
Intermittent/mild persistent ( $n=251$ )	51 (20.3%)	0.004
Moderate persistent ( $n=249$ )	83 (33.3%)	
Severe persistent ( $n=302$ )	88 (29.1%)	
<i>FEV1/FVC%</i>		
≥ 80 ( $n=492$ )	108 (22.0%)	< 0.001
60–80 ( $n=220$ )	76 (34.5%)	
< 60 ( $n=48$ )	28 (58.3%)	
<i>Visits to ER in past year</i>		
0–1 ( $n=610$ )	157 (25.7%)	0.035
2–3 ( $n=110$ )	33 (30.0%)	
4+ ( $n=82$ )	32 (39.0%)	
<i>Symptom progression in past 1 year</i>		
Less frequent episodes ( $n=324$ )	71 (21.9%)	0.002
About the same ( $n=349$ )	118 (33.8%)	
More frequent episodes ( $n=129$ )	33 (25.6%)	
<i>Response to treatment over the past year</i>		
Better ( $n=338$ )	68 (20.1%)	< 0.001
Same ( $n=328$ )	95 (30.2%)	
Worse ( $n=136$ )	55 (40.4%)	

Chinese patients, but did not differ by age group or educational level.

Neither atopy nor a family history of asthma was associated with the use of complementary therapy in these patients (Table 3). Clinical factors were strongly associated with complementary therapy use. Patients with longer duration of asthma (10 years or more) were significantly more likely to use complementary therapy. Patients categorized as moderate and severe persistent asthma according to GINA classification of asthma severity also had a higher prevalence of complementary therapy use. In particular, disease severity assessed by FEV1/FVC

**Table 4** Health behavioural factors and CAM use in asthma patients in primary care

Variables	CAM users	<i>p</i> (2-sided)
<i>Knowledge score</i>		
Poor: 0–3 ( <i>n</i> = 261)	46 (17.6%)	
Satisfactory: 4–6 ( <i>n</i> = 250)	57 (22.8%)	
Good: 7–16 ( <i>n</i> = 291)	119 (40.9%)	<0.001
<i>Inhaler technique</i>		
Less than satisfactory ( <i>n</i> = 449)	123 (27.4%)	
Satisfactory ( <i>n</i> = 353)	99 (28.0%)	0.90
<i>Use of additional sources of care</i>		
No ( <i>n</i> = 343)	72 (21.0%)	
Yes ( <i>n</i> = 459)	150 (32.7%)	0.001
<i>Number of additional sources of care</i>		
0 ( <i>n</i> = 343)	72 (21.0%)	
1 ( <i>n</i> = 328)	90 (27.4%)	
2 ( <i>n</i> = 103)	40 (38.8%)	
3 or more ( <i>n</i> = 28)	20 (71.0%)	<0.001
<i>Additional treatment from other polyclinics</i>		
No ( <i>n</i> = 643)	167 (26.0%)	
Yes ( <i>n</i> = 159)	55 (34.6%)	<0.001
<i>Additional treatment from GPs</i>		
No ( <i>n</i> = 511)	122 (23.9%)	
Yes ( <i>n</i> = 291)	100 (34.4%)	0.001
<i>Additional treatment from hospital specialists</i>		
No ( <i>n</i> = 676)	174 (25.7%)	
Yes ( <i>n</i> = 126)	48 (38.1%)	0.004
<i>Additional treatment from other sources of care</i>		
No ( <i>n</i> = 757)	192 (25.4%)	
Yes ( <i>n</i> = 45)	30 (66.7%)	<0.001

<80% showed an even stronger association with complementary therapy use. Self-reports of greater frequency of ER use, symptoms remaining the same or getting progressively worse, and having the same or worse response to treatment in the past year were also significantly associated with more frequent use of complementary therapy.

Better knowledge score was positively associated with complementary medicine use (Table 4). However, performance score on inhaler technique was not associated with complementary therapy use. The use of additional sources of care from other providers such as other primary care clinics, private general practitioners, hospital specialists, and other

**Table 5** Significant determinants of CAM use in asthma patients from multiple stepwise selection logistic regression analysis

	Adjusted OR	95%CI
<i>Ethnicity</i>		
Chinese ( <i>n</i> = 385)	3.99	2.39–6.66
Malay ( <i>n</i> = 249)	1.42	0.80–2.53
Indian and others ( <i>n</i> = 168)	1.00	
<i>FEV1/FVC%</i>		
≥ 80 ( <i>n</i> = 492)	1.00	
60–80 ( <i>n</i> = 220)	1.75	1.19–2.56
< 60 ( <i>n</i> = 48)	4.33	2.23–8.40
<i>Response to treatment in past year</i>		
Better	1.00	
Same	1.75	1.06–2.89
Worse	1.57	1.05–2.35
<i>Knowledge score</i>		
Poor: 0–3 ( <i>n</i> = 261)	1.00	
Fair: 4–6 ( <i>n</i> = 250)	1.36	0.84–2.19
Good: 7–16 ( <i>n</i> = 291)	2.79	1.78–4.38
<i>Number of additional sources of care</i>		
0 ( <i>n</i> = 343)	1.00	
1 ( <i>n</i> = 328)	1.24	0.84–1.85
2 ( <i>n</i> = 103)	2.01	1.18–3.44
3+ ( <i>n</i> = 28)	6.18	2.31–16.53

providers was significantly more associated with complementary therapy use, and the prevalence of complementary therapy use increased stepwise with increasing number of alternative health care providers.

Multiple stepwise selection logistic regression modelling resulted in the final selection of five significant determinants of complementary therapy use. These were: (i) Chinese ethnicity, which was associated with 4 times increased odds of complementary therapy use; (ii) FEV1/FVC% <80%, with about 2 times or more increased odds, and especially patients with FEV1/FVC% <60% were 5 times more likely to use complementary therapy; (iii) 'Not having a better response (same or worse) to treatment over the past year' was associated with an almost 2 times increased odds of using complementary therapy; (iv) good knowledge score was associated with almost 3 times increased odds; (v) use of two or more alternative health care providers—at least 2 times and up to 6 times increased odds of complementary therapy use for those who used two providers and three or more providers, respectively. In the alternative saturated model with all other variables entered, 'severe persistent' asthma severity

on the GINA grading, together with FEV1/FVC <60% were both associated with significant increased odds of using complementary therapy, although the magnitude of the OR estimates for both were reduced for both variables. Male gender and long asthma duration were found to be significantly associated with complementary therapy use in the univariate models, but not in the multivariate model, because they were associated with low FEV1/FVC and lack of response to treatment in the past year.

## Discussion

This study of asthmatic Asian patients revealed interesting differences in the prevalence and pattern of CAM use, compared to asthmatic Western patients. Large sample-based reported prevalence data of CAM use specifically for asthma are limited. In a US study<sup>9</sup> of 482 adult patients with clinically diagnosed asthma in 1993, the one-year prevalence of CAM use was 14% (8% for herbal therapy and another 6% for self-treatment with caffeinated coffee or tea). In a 1999 population-based study<sup>10</sup> of adults with self-reported physician diagnosis of asthma in Northern California, 42% reported the use of alternative therapies in the past year, 16% concurrently with prescription medications, and another 26% using CAM alone. Obviously, data from clinic or hospital-based samples of asthmatic patients will not include such asthmatic patients who self-treat with CAM alone. In the UK,<sup>11</sup> of 373 patients with self-reported physician diagnosis of asthma in the European Community Respiratory Health Survey in 1990–1992, only 3% used any alternative therapy. A 1997 UK postal survey<sup>12</sup> of 4741 asthmatic patients in an asthma organization (24% response rate) suggested that the use of CAM was commonplace (prevalence rate for reporting 'ever used' of alternative therapy was 11% for herbal therapy, 7% for acupuncture and 1% for reflexology). However, a very recent 2003 study<sup>13</sup> of a more representative cross-section of the UK asthma population indicated that only 6% were current users of complementary therapies.

In this Asian study, herbal therapy was used in the past year by 13% of asthma patients (including 10% for traditional medicinal herbal preparations and 3% for proprietary formulations of tablets, pills, etc.). The herbal medicines include Ma Huang (ephedra) and cordyceps, which have proven pharmacological benefit. The use of animal food products, reported by 12% of the patients, has been documented in a current review by Zimmet and Tashkin,<sup>3</sup> but not reported in previous research

studies. Recommendation on food modification and therapy is an essential component of the advice given by a traditional herbalist, and is popularized in traditional folk remedies. According to Chinese classical 'Yin-Yang' theory and traditional food beliefs, wild animal meat and organs are a category of 'hot' food which should be taken for 'cold' diseases such as asthma to restore proper balance and attain health in the body. On the other hand, the consumption of caffeine products such as coffee and tea as a specific alternative treatment for asthma, reported by as many as 18% of American patients,<sup>9,10</sup> is not reported by any of these Asian patients. Other alternative therapies which included acupuncture and reflexology was reported by only a few patients (1%), whereas in North California,<sup>10</sup> homeopathy was reported by 9%, acupuncture by 5%, aromatherapy, reflexology and massage by 14% of American subjects with asthma.

Among the ethnic groups of patients in this study, Chinese patients were more likely to use CAM for asthma treatment than non-Chinese. The significant association of complementary therapy use with Chinese ethnicity is noteworthy, as it highlights a strong cultural basis for CAM use. The Chinese have a long and unique tradition of herbal therapy for various ailments, and the popularity of traditional treatment among Chinese remains unabated despite the modernization of medical care.

Although the predominant form of medical help sought by patients is modern Western medicine, Chinese herbalists, Malay Jamu and Indian Ayurvedic practitioners still play an important second-line role when Western allopathic medicine fails to provide relief. For example, although most Chinese patients (73%) usually seek help first from doctors trained in Western medicine for most illnesses, a large proportion of them (42%) consult traditional Chinese herbalists for further consultation for the same illness.<sup>19</sup> This typical form of health-care-seeking behaviour is exemplified by patients in this study, who sought additional sources of care from alternative providers, some as many five different providers (so-called 'doctor-hopping'). This is often regarded as detrimental to continued good primary care, but may also be a reflection of disaffection or dissatisfaction with the care received.

A significant finding in this study is that CAM use is associated with the clinical status of the patient. Those who used complementary therapy had longer and more severe asthma disease and reported a lack of symptomatic improvement from treatment in the past year. These may well represent clinical care factors compelling asthma patients to use alternative therapy. A previous study,<sup>10</sup> however, found no significant association of alternative

therapy with self-assessed severity in asthmatic subjects. However, in that non-clinic based study, asthma severity was evaluated in a very limited way by a single question asking 'how severe do you believe your asthma is? (Severe, moderate, mild or asymptomatic)'. Nevertheless, the same study also found that self-reported physical health status measured using the SF-12 was significantly poorer in herbal users.

The increased likelihood of patients to use CAM while possessing good knowledge of asthma, at first glance, appear contrary, since it is often supposed that mostly patients from low socio-economic backgrounds and with poor functional health literacy are more likely to use CAM. On closer scrutiny, it is probably not surprising in view of the patient's long-standing intimacy with the condition, since many patients have been managing their asthma for several decades. Yet another interpretation of the data is that good asthma knowledge is more likely to be possessed by patients who actively search for information and solutions to their problems, and this may include the use of CAM.

The present study has the limitation of studying only asthma patients receiving primary care in government out-patient clinics. It does not include the prevalence of alternative therapy used alone (not concurrently with Western prescription medicines) by asthma patients in the population, which can only be obtained from a population-based study. These clinics serve about 20% of such patients in the population, who tend to belong to the lower socio-economic segment. Hence, the prevalence and pattern of CAM in the majority of asthma patients with better resources who seek care from private family physicians may not be the same, especially if the level of dissatisfaction with care is also different. Temporal cause and effect relationship between some clinical and behavioural factors and CAM use could not be ascertained with great certainty from a cross-sectional study design, and because we did not collect data on duration of CAM use.

This study gives some understanding of the impetus among asthma patients for seeking complementary and alternative medicines. Our results suggest that asthma patients in primary care who use complementary therapies are more likely to be those with chronic and severe disease and who were not experiencing positive response to Western-based therapy; they were not lacking in knowledge about their disease, its prevention and its treatment, but were more likely to show certain forms of maladaptive health-seeking behaviour, such as multiple alternative sources of care. Knowing that an asthma patient is using CAM should alert physicians to the

possibility that care may be lacking, the patient is dissatisfied with the results of his treatment, or is experiencing problems with self-care and thus seeking help outside the conventional sources of care. In the primary care of asthma patients, therefore, the use of CAM is a clinical marker to identify patients in need of improved asthma care.

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