

Use of herbal products, coffee or black tea, and over-the-counter medications as self-treatments among adults with asthma

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Background: There are few data on the use of alternative therapies in adult asthma and their impact on health outcomes.

Objective: The objective of this study was to study the prevalence and morbidity of asthma self-treatment with herbs, coffee or black tea, and over-the-counter (OTC) medications containing ephedrine or epinephrine.

Methods: We carried out a cross-sectional analysis of interview data for 601 adults with asthma recruited from a random sample of pulmonary and allergy specialists. We estimated the 12-month prevalence of reported use of herbal products, coffee or black tea, or OTC products to self-treat asthma and their association with emergency department visits and hospitalization.

Results: Herbal asthma self-treatment was reported by 46 (8%; 95% confidence interval [CI] 6% to 10%); coffee or black tea self-treatment by 36 (6%; 95% CI 4% to 8%), epinephrine or ephedrine OTC use by 36 (6%; 95% CI 4% to 8%), and any of the three practices by 98 subjects (16%; 95% CI 13% to 19%). Adjusting for demographic and illness covariates, herbal use (odds ratio [OR] 2.5; 95% CI 1.1 to 5.6) and coffee or black tea use (OR 3.1; 95% CI 1.2 to 7.8) were associated with asthma hospitalization; OTC use was not (OR 0.8; 95% CI 0.3 to 2.5).

Conclusions: Even among adults with access to specialty care for asthma, self-treatment with nonprescription products was common and was associated with increased risk of reported hospitalization. This association does not appear to be accounted for by illness severity or other disease covariates. It may reflect delay in utilization of more efficacious treatments. (*J Allergy Clin Immunol* 1997;100:789-91.)

Key words: Asthma, outcomes, herbal therapy, coffee, tea

The use of alternative therapies is an important issue in the care of patients with asthma. The prevalence of herbal medication use in the general population has been estimated to be 3%.¹ Yet in certain chronic conditions such as AIDS and in selected groups such as rural

Abbreviations used

CI:	Confidence interval
OR:	Odds ratio
OTC:	Over the counter
QOL:	Quality of life

populations, the prevalence of herbal use appears to be much higher.^{2,3} Asthma-specific herb use has not been ascertained. Another potential source of plant-derived self-treatment for asthma is the ingestion of coffee or black tea specifically to treat symptoms. Two separate population-based studies have found a negative association between coffee^{4,5} or tea⁵ use and overall asthma prevalence, but neither study addressed coffee or tea as specific self-treatment for asthma. In addition to herbal treatments and caffeine, over-the-counter (OTC) medications represent another important group of self-treatments for asthma. Other than a series of studies from Australia,⁶⁻⁸ where OTC β -agonist inhalers are available, and a small case referent study of ephedrine and epinephrine asthma self-treatment,⁹ epidemiologic data on OTC use in asthma alternative therapy are also limited.

To estimate the frequency and risks of self-treatments for asthma, we analyzed cross-sectional data from a cohort study of adults with asthma. We ascertained subjects' use of herbal products specifically ingested to treat their asthma; ingestion of coffee or black tea specifically to treat asthma; and the use of OTC asthma sprays or pills containing epinephrine or ephedrine. We hypothesized that self-treatment with such therapies could be potentially associated with greater asthma morbidity.

METHODS

Subject recruitment

This study was approved by the institutional review board. We have presented details of subject recruitment previously.¹⁰ We randomly selected from all internal medicine board-certified pulmonary or allergy and immunology subspecialists in Northern California who then maintained patient visit logs of adults with asthma 18 through 50 years of age. Of 698 subjects registered, 601 were studied (86% of those eligible): 384 (64%) were from pulmonary practices and 217 (36%) were from allergy subspecialty practices.

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TABLE I. Reported prevalence of herbal products, coffee or black tea, and OTC ephedrine or epinephrine containing asthma self-treatment among 601 adults with asthma recruited from pulmonary and allergy specialists

Self-treatment type	Frequency		
	n	%	(95% CI)
Herbal teas and medications	46	7.7	(5.6-9.8)
Coffee or black tea to treat asthma	36	6.0	(4.1-7.9)
Ephedrine or epinephrine OTCs	36	6.0	(4.1-7.9)
Two or more of the above	18	3.0	(1.5-4.4)
Any one of the above	98	16.3	(13.4-19.3)

Prevalence is defined as any reported use over the 12 months preceding the interview. Seventeen subjects (2.8%; 95% CI 2.1% to 3.5%) were identified as using ephedrine-containing herbal products; four subjects (0.7%; 95% CI 0.02% to 1.3%) reported using unspecified Chinese herbs.

Interview and survey instruments

We asked subjects about alternative and nonprescription asthma therapies taken in the 12 months preceding the interview. Subjects were asked whether they had used "herbal or other natural treatments specifically for asthma"; to identify "coffee or black tea that you use specifically to treat your asthma"; and to identify both OTC (nonprescription) asthma sprays such as Primatene Mist and other OTC (nonprescription) asthma medicines used.

We quantified asthma severity by using a validated scoring system.^{10,11} We quantified subject-perceived asthma control by using an 11-item questionnaire battery.¹² We quantified asthma-specific quality of life (QOL) by using a 20-item validated battery.¹³ We also included a 36-question health status battery (SF-36).^{14,15} We defined all other variables on the basis of structured interview responses. All interviews were in English. Instruments specific to ethnic subgroups were not used.

Statistical analysis

We tested the differences in dichotomous outcomes by using either the χ^2 test, *t* test, or the Wilcoxon rank sum test. We used logistic regression analysis to estimate the associations between self-treatment and emergency department visits or hospitalizations for asthma. We defined emergency department visits dichotomously as two or more and asthma hospitalization as one or more over 12 months. We included in the multiple logistic analyses: age, sex, completion of 4 years or more of college education, marital status, annual per-adult family income, history of atopy (history of either of allergic rhinitis or atopic dermatitis), childhood asthma onset, severity of asthma score, asthma QOL score, perceived asthma control score, and general health status score (SF-36).

RESULTS

Self-treatment with nonprescription therapies for asthma was frequent (Table I). Herbal product use was cited by 46 (8%) of the respondents. Seventeen (37% of herbal users) identified used an ephedrine-containing herbal product. Four subjects (9% of herbal users) reported using unspecified "Chinese herbs" to treat their asthma. There were 10 subjects who reported using both herbal products and coffee or black tea to treat their

asthma, although fewer than three would have been expected by chance alone ($p < 0.001$). Only two subjects reported using ephedrine or epinephrine OTC products, herbal products, and coffee or black tea.

We examined a number of potential covariates of self-treatment (Table II). A significantly higher proportion of women reported herbal use, and a significantly greater proportion of men reported OTC product use ($p < 0.05$). Subjects who reported coffee or black tea self-treatment for asthma had significantly worse severity of disease and asthma-specific QOL and more frequently had a history of childhood asthma onset ($p < 0.05$). Asthma-specific QOL was also significantly worse among those reporting herbal use compared with all others ($p < 0.05$).

Spirometry data were available for 66% of subjects overall. The FEV₁ as a percentage of the age, height, and predicted value did not differ statistically by alternative treatment practice.

Taking into account all of the covariates in Table II in a multiple logistic regression analysis (Table III), coffee or black tea self-treatment for asthma was strongly associated with increased risk of emergency department visits (odds ratio [OR] 3.1; 95% confidence interval [CI] 1.3 to 7.1) and hospitalization (OR 3.1; 95% CI 1.2 to 7.8). In contrast, herbal product use was associated only with hospitalization (OR 2.5; 95% CI 1.1 to 5.6). The subgroup of ephedrine herbal users ($n = 17$) did not have increased hospitalization risk (OR 0.8; 95% CI 0.2 to 4.0). Use of ephedrine or epinephrine OTC products was not associated with either emergency department use or hospitalization.

DISCUSSION

Studying those recruited from subspecialty medical practices assures that our subjects had access to care. For this reason it is unlikely that coffee or black tea or herbal use are related to hospitalization because they are surrogates for access to care. Our study group may have had more severe asthma, but we did take into account in our analysis, severity as well as a number of other asthma-specific covariates, including QOL and educational level (which was high in this group). None accounted for the associations that we observed. If the association between respondents' self-treatments and reported emergency department visits or hospitalizations reflected a generic reporting bias, we would have anticipated this association to be present for all three types of treatments we analyzed, but it was not. Self-treatment with certain nonprescription therapies could be a marker for increased utilization of discretionary health care services globally, but hospitalization for asthma, which is not discretionary, cannot be explained on this basis. It is unlikely that the association that we observed between coffee or black tea or herbal use and asthma hospitalization reflected sympathomimetic toxicity, given the lack of such a relationship to the ephedrine herbal subgroup or OTC nonprescription sympathomimetic medication use (ephedrine and epinephrine).

TABLE II. Covariates of self-treatment among 601 adults with asthma

Demographic covariates	Herbals (n = 46)	Caffeine (n = 36)	OTCs (n = 36)	All (n = 601)
Age in years, mean $\pm$ SD	39 $\pm$ 9	38 $\pm$ 10	37 $\pm$ 10	38 $\pm$ 8
Women, n (%)	38 (83%)*	29 (81%)	19 (53%)*	414 (69%)
White, non-Hispanic, n (%)	30 (65%)	23 (64%)	24 (67%)	400 (67%)
$\geq$ 4 Years of college, n (%)	20 (44%)	14 (39%)	14 (39%)	192 (32%)
Married or cohabiting, n (%)	28 (61%)	19 (53%)	18 (50%)	382 (64%)
Annual income in dollars, median	20 000	25 000	25 000	25 000
Severity of Asthma Score, mean $\pm$ SD	13 $\pm$ 6	14 $\pm$ 6*	12 $\pm$ 7	11 $\pm$ 6
Quality of Life Score, mean $\pm$ SD	28 $\pm$ 15*	28 $\pm$ 17*	24 $\pm$ 17	23 $\pm$ 15
Asthma Control Score, mean $\pm$ SD	41 $\pm$ 7	40 $\pm$ 5	41 $\pm$ 6	40 $\pm$ 6
SF-36 General Health, mean $\pm$ SD	57 $\pm$ 23	53 $\pm$ 28	56 $\pm$ 24	55 $\pm$ 25
Childhood asthma onset, n (%)	23 (50%)	25 (69%)*	23 (64%)*	278 (46%)
Atopic history, n (%)	34 (74%)	28 (78%)	28 (78%)	466 (78%)
	(n = 30)	(n = 22)	(n = 21)	(n = 397)
FEV ₁ % predicted, mean $\pm$ SD	82 $\pm$ 21	83 $\pm$ 21	84 $\pm$ 13	81 $\pm$ 23

Severity of asthma score: higher score (maximum = 28) corresponds to greater illness severity. Asthma-specific QOL: greater score (maximum = 80) reflects poorer QOL. Perceived asthma control score: greater score (maximum = 55) reflects greater respondent-perceived ability to control asthma. SF-36 General health (general health status domain of the Medical Outcomes Study): greater score (maximum = 100) reflects better respondent-perceived health status.

Herbals, herbal products specifically used to treat asthma; *Caffeine*, ingestion of coffee or black tea specifically to treat asthma; *OTCs*, use of over-the-counter sprays or tablets for asthma containing epinephrine or ephedrine.

* $p < 0.05$ compared with all other subjects.

TABLE III. Emergency department visits and hospitalization for asthma associated with alternative and OTC medications: multiple logistic regression analysis

Risk factor	≤ 2 Emergency visits Hospitalization			
	OR	(95% CI)	OR	(95% CI)
Herbal asthma treatments	1.2	(0.5-2.7)	2.5*	(1.1-5.6)
Caffeine to treat asthma	3.1*	(1.3-7.1)	3.1*	(1.2-7.8)
OTC epinephrine or ephedrine	0.5	(0.2-1.5)	0.8	(0.3-2.5)

* $p < 0.05$.

Emergency department visits, Two or more reported visits for asthma over 12 months preceding the interview ($n = 125$; 21% of all subjects); *hospitalization*, any reported hospital admission for asthma over the 12 months preceding the interview ($n = 103$; 17%). For each of the risk estimates, the logistic regression models also included age, sex, marital status, college education, per-adult family income, severity of asthma score, asthma QOL score, perceived asthma control score, SF-36 general health status, college education, atopic history, and childhood asthma. These were included in the models on an a priori basis (e.g., not stepwise) whether or not the individual parameter estimates were statistically significant.

Self-treatment, whether with herbals, other plant-derived substances (e.g., caffeine), or synthetic OTC products, is an important issue in health care. These may be called unconventional, alternative, complementary, or unorthodox therapies.^{1,16} We observed that such practices, however termed, are common and associated with an increased hospitalization risk that cannot be easily explained by other factors.

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