PREVALENCE AND PREDICTORS OF COMPLEMENTARY AND ALTERNATIVE MEDICINE USE AMONG CHILDREN ATTENDING AN ASTHMA CLINIC IN A TERTIARY HOSPITAL IN GHANA

Ahor-Essel K [1]; Alhassan Y [2]; Dame JA[1,3]; Karikari NO[1]; Adabayeri VM[1]; Goka B[1,3]

[1] Department of Child Health, Korle Bu Teaching Hospital, Accra, Ghana; [2] Department of Biostatistics, School of Public Health, University of Ghana, Accra, Ghana ;[3]Department of Child Health, University of Ghana Medical School, College of Health Sciences, Accra, Ghana

Abstract

Objective: The objectives of this study were to determine the prevalence and type of CAMs, and predictive factors among Ghanaian children with asthma.

Methodology: A cross-sectional study involving 110 children with physician-diagnosed asthma attending the Asthma Clinic of the Department of Child Health (DCH), Korle Bu Teaching Hospital (KBTH), Accra were consecutively recruited between February 2018 to May 2019. Data were collected with a semi-structured, pre-tested, investigator-administered questionnaire.

Results: Out of the 110 participants, forty-nine (44.5%) had used CAM within the last 12 months. The three most frequently used remedies as stand-alone or in combination were honey (80.0%), garlic (34.2%) and lemon/lime (26.3%%). In the multivariable logistic regression analysis, CAM use among children aged 10--13 years was over 4 times the use among those aged 5--9 years (AOR=4.45, 95% CI: 1.32-14.98, p=0.016), 71% less among female children (AOR: 0.29, 95% CI: 0.10-0.80, p=0.017) and 85% less among mothers in middle occupation class relative to the low occupation class (AOR: 0.15, 95% CI: 0.15, 95% CI: 0.03-0.77, p=0.023).

Conclusion: There was high prevalence of CAM use among the children attending the asthma clinic, KBTH. Adolescents and children from low occupational class are more likely to use CAM, while the female child was less likely.

Key words: *Complementary and alternative medicine, asthma, occupational class*

Introduction

Complementary and Alternative medicine (CAM) is "a group of diverse medical and healthcare systems, practices, and products that are not generally considered part of conventional medicine."[1] Complementary medicine is used concurrently with mainstream medicine (e.g., herbal preparations), while alternative medicine is purposefully used to replace conventional medicine (e.g., Ayurveda, chiropractic, homeopathy, naturopathy, and acupuncture).[2] CAM has widespread use among children living with chronic diseases such as asthma, especially in low-and-middle-income countries (LMICs), like Ghana.[3,4] The World Health Organization estimates that about 80% of the world population accesses healthcare through non-orthodox healthcare systems.[5] Globally, CAM therapies such as herbal medicine, acupuncture, homoeopathy, yoga, massage therapy, traditional Chinese medicine and Ayurveda medicine are patronised as treatment for asthma,[1,6] especially in resource-poor settings.[3] Among children with asthma, the use of herbal preparations such as teas, cough syrup, camphor, oil and menthol as well as honey and prayers are common in high income countries.[7] These are also reported in LMIC like Nigeria, [3] where

Corresponding Author: **Dr. Kojo Ahor-Essel**
Korle Bu Teaching Hospital, P.O Box 77, Korle Bu, Accra
Email Address: kojopriestyych@yahoo.com
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due to poverty and lack of access to mainstream healthcare systems and the high cost of guideline specific medications like the inhaled corticosteroids (ICS) patients seek to the use of CAM for the treatment of their disease.[3,8] In Ghana, Goka *et al* [4] reported that most parents (80%) of 69 children with asthma considered herbal medicine to be an important therapy for asthma, even though only 36.4% of those with that belief admitted to administering herbal preparations to their wards. Other therapies considered important were lime/lemon and honey combination (20%), while only 1.5% of the parents mentioned prayers as an important treatment option.

There are several reasons why people would use CAM. Some of the reasons reported are affordability, accessibility, dissatisfaction with western medicine, no known side effect with CAM, fear of adverse drug reactions with conventional medicine, and the need for more individual attention.[2] Other reasons attributed to CAM use include its complementary nature with orthodox medicine in disease management and the perceived belief that CAM treats the causes of the ailment and does not merely relieve symptoms. Additionally, CAM has a natural and holistic appeal, i.e., CAM use improves the whole person: body, mind and soul.[9] In Nigeria, Oshikoya *et al*[3] reported in a prospective study that parents use CAM for their children with asthma as a form of direct cure, to improve the physical condition of their children or to relieve symptoms of the disease.

Contrary to the popular belief that CAM users are uneducated, several studies in high-income countries

like the United States of America (USA) found that parents of these children are well educated.[7,9] In a study by Oshikayo et al,[3] in Nigeria, parents of the children who consumed CAM had secondary level education or higher (67%). However, the use of CAM among the well-educated is said to be associated with the consumption of dietary supplements, vitamins, massage, acupuncture and chiropractic medicine. In contrast, the use of folk medicine, defined as a "range of remedies including prayer, healing touch or laying on of hands, charms, herbal teas or tinctures, magic rituals" was found to be of higher use among the minority (blacks and Hispanic) and the poor in society in the 2002 National Health Interview Survey in the USA.[7] Similarly, this has been reported in a systematic review of studies from sub-Sahara Africa,[8] though the study was not only on asthma.

Parents of CAM users either do not discuss with their regular health care providers, albeit they were eager to do so,[3] or only a few discuss the use of CAM with their asthma healthcare team, because many of them believe that it is not important or not within the professional capability of their orthodox health care provider.[10,11] In Africa, patients refuse to disclose the use of CAM to their health care practitioner for fear of being attended to poorly and the apparent negative attitude of the health care personnel towards the user of CAM.[8] It is also reported that healthcare practitioners do not enquire about the use of CAM among their patients even when they are willing to tell them.[3] This might have been due to high workload, forgetfulness or lack of knowledge or interest from the health personnel. This might not be different in Ghana, and this may have negative consequences on those users of CAM as there could be the possibility of drug-drug interactions and possible consumption of poisonous substances. Furthermore, CAM users are likely to stop taking their orthodox medications which would put them at risk for poor asthma symptom control and acute exacerbations. For example, the use of herbal products was found to be associated with decreased inhaled corticosteroids (ICS) adherence and patients who were using CAM were more likely to have been hospitalised or intubated for asthma compared to those who did not use.[12] It is therefore of paramount importance for the asthma care practitioner to enquire about the use of CAM and initiate discussion with the view of finding the reasons for their use in a non-judgemental manner.

There is a gap in data in Ghana concerning the use of CAM among children with asthma. Specifically, there is lack of knowledge on the prevalence of CAM use among this group of patients, as well as the socio-demographic and clinical factors associated with CAM usage. This needs to be explored to provide evidence, based on which asthma care practitioners can modify their approach to asthma management education taking the use of CAM by patients into account. The evidence from this study could help in reducing CAM use among children with asthma.

It may contribute to public education, policy formulation and may guide future research into CAM use in Ghana.

The aim of this study was to determine the prevalence of CAM use among children with asthma aged 5-13 years who attend the Asthma Clinic of the Department of Child Health (DCH), Korle Bu Teaching Hospital (KBTH), Accra, identify the most commonly used type of CAM, determine the characteristics of the children with asthma who patronise CAM and determine the factors associated with the use of CAM among these children.

Materials and Methods
Study Design
The study was originally designed as a hospital-based 1:1 sex and age matched case-control study to determine factors associated with frequent emergency department (ED) visits by children attending asthma clinic in Korle Bu Teaching Hospital, Accra. The study recruited a total of 110 study participants, 55 controls and 55 cases. Cases were defined as patients who visited the ED at least two times within the preceding 12 months of being interviewed and controls were children who had at most one visits to the ED. For the objective which sought to assess the factors associated with CAM use among children attending the asthma clinic, the analysis considered the data as a cross-sectional study since the outcome, CAM use, was not considered as a matching variable at any point of sampling the children into the database.

Study Settings
The study was conducted among children with physician-diagnosed bronchial asthma who were attending the weekly asthma clinic of the department of child health, Korle Bu Teaching Hospital, Accra from February 2018 to May 2019. The annual clinic attendance is about 630 patients. Thus, on average, about 13 patients are seen at the clinic weekly with about five of them being new cases.

Sample Size and Power Analysis
Given that the study was not originally designed as a cross-sectional study, the power analysis is conducted to assess the precision of using a sample size of 110. Using a sample size of 110, and CAM use among the controls of 34.6% from this study, at 0.05 level of significance and 80% power, the study is powered to detect a difference in prevalence of at least 26.4%.

Inclusion Criteria
The inclusion criteria were children aged 5-13 years and enrolled at the asthma clinic with physician--diagnosed asthma for at least one-year, with no evidence of acute exacerbation at the time of recruitment, and whose parents had consented to take part in the study. Informed assent was sought from participants who were aged 8 years and above.

Exclusion Criteria

Patients were excluded if they were outside this age category, if they had any congenital or acquired lung or heart disease. Also excluded were patients who had other chronic conditions such as sickle cell disease, Human Immunodeficiency virus/Acquire Immunodeficiency Syndrome (HIV/AIDS) as well as those whose parents refused to consent.

Data Collection

The eligible patients and their parents were approached by the researchers. The purpose of the study was explained in the language that was most comfortable for the participants and written informed consent was sought from those who were voluntarily willing to participate. English was the primary language used. A pre-tested, semi-structured, interviewer-administered and face validated questionnaire was used to collect the data. The questionnaire contained information on socio-demographic characteristics of the child (sex, age, birth order) and the parents (age, educational level, occupational classification according to the United Kingdom Registrar General Classification/Social Class Based on Occupation).[13] Data was also collected on the type of housing and the source of energy for cooking.

Information on the frequency of emergency department (ED) visit in the past 12 months was obtained. The participants were classified into frequent ED visits (participants who had had two or more ED admissions in the preceding 12 months to relieve bronchospasm by nebulisation),[14] and no frequent ED visits (participant who had less than two ED admissions in the preceding 12 months to relieve bronchospasm by nebulisation).[14] Parents were asked *"Has your child used complementary and alternative medicine to treat his or her asthma in the past 12 months? If yes, please state the type…a) herbal remedies; b) faith-based; c) chiropractic; d) folk medicine.* Assessment of asthma symptom control was done using the modified consensus-based GINA assessment guideline of asthma control.[15] which categorises patients as well-controlled, partially controlled, or uncontrolled.

The dependent variable was CAM use within the last 12 months. Independent variables were the sex of the child, parents' educational level, occupational class, type of housing, source of energy for cooking, level of asthma control and frequency of emergency department (ED) visits.

Ethical Considerations

Ethical clearance was approved by the Institutional Review Board (IRB) of the Korle Bu Teaching Hospital, Accra (Reference No: KBTH IRB/0077/2017). Approval was sought from the head of department of DCH, KBTH.

Data Management and Analysis

All data were entered into Microsoft Excel 2010 and imported into Stata IC version 15 (Stata Corp, College station, TX, USA). Descriptive statistics (frequency and percentage) was used for the analysis of participants' socio-demographic information and other categorical variables. Measured continuous variables were analysed as median (lower quartile, upper quartile). Association between socio-demographic characteristics, frequency of ED visits, level of asthma symptom control and the use of CAM was determined using chi-square tests or Fisher's exact test where appropriate. All the variables were used as candidate sets for the univariable and multivariable conditional binary logistic regression analysis. The univariable binary logistic regression was employed to determine the predictors of CAM use based on the crude odds ratio (COR) at a 95% confidence interval (p-values < 0.05). Adjusted odds ratio (AOR) with 95% confidence interval was employed to assess the strength and direction of the association, while P-value <0.05 was used to determine statistical significance in the multivariable binary logistic regression analysis.

Results

The socio-demographic and the clinical characteristics of the study's population are shown in Table 1. A total of 110 participants were included in the analysis. There was a male preponderance, with a male to female ratio of 1.4:1. The median (IQR) age of the participants was 7 (6,10) years. Majority of the mothers 85 (77.3%) and the fathers 98 (89.1%) of the children involved in the study had received secondary education or higher. Most of the mothers 59 (53.6%) as well as the fathers 69 (62.7%) were in the higher occupational classes. Most of the study participants 67 (60.9%) had poorly controlled asthma (partially controlled and uncontrolled). The types of CAM used by the participants are shown in Table 2. Forty-nine (44.5%) of the study population had used one form of CAM or the other. Thirty-eight (38/49, 77.5%) of these used different combinations of herbal remedies while 10/49 (20.4%) reported to have used faith-based therapy as CAM. The three most frequently used remedies as standalone or in combination were honey (n=30/38, 80.0%), garlic (n=13/38, 34.2%) and lemon/lime (n=10/49, 26.3%) (Table 2).

Bivariate association between socio-demographic and clinical characteristics and the use of CAM

Table 3 shows the association between socio-demographic and clinical characteristics and CAM use. The following factors were significantly associated with the use of CAM; age of the participant (p=0.049), sex (p=0.033), mothers educational level (p<0.001), fathers educational level (p=0.005), mothers occupational class (p<0.001), fathers occupational class (p=0.025), housing characteristics (p=0.004), source of fuel for cooking (p=0.031) and frequency of ED visits (p=0.035).

Table 1: Frequency distribution of socio-demographic and clinical characteristics of the participants and their parents

Variable	Total (N=110) n (%)
Age of child in years, median (IQR)	7 (6,10)
Age group	
5-9 years	80 (72.7)
10-13 years	30 (27.3)
Sex	
Male	64 (58.2)
Female	46 (41.8)
Mother's education	
Basic	25 (22.7)
Secondary	29 (26.4)
Tertiary	56 (50.9)
Father's education	
Basic	12 (10.9)
Secondary	29 (26.4)
Tertiary	69 (62.7)
Mother's occupational class	
Class I&II	59 (53.6)
Class III	23 (20.9)
Class IV&V	25 (22.7)
Missing	3 (2.7)
Father's occupational class	
Class I&II	69 (62.7)
Class III	26 (23.6)
Class IV&V	12 (10.9)
Missing	3 (2.7)
Housing	
Compound	28 (25.5)
Self-contained	82 (74.5)
Source of energy for cooking	
Firewood/charcoal	8 (7.3)
Liquefied petroleum Gas (LPG)	79 (71.8)
Firewood & LPG	23 (20.9)
Levels of asthma control	
Well controlled	42 (38.2)
Partially controlled	38 (34.5)
Uncontrolled	29 (26.4)
Missing	1 (0.9)
Frequency of ED visit in the past 12 months	
Two or more	55 (50.0)
One or no visit	55 (50.0)
Ever used CAM in the last 12 months	
Yes	49 (44.5)
No	61 (55.5)

Interquartile range: (IQR), n: frequency. %: column percentage

Table 2: Frequency distribution of the types of CAM used and the different combination of herbal remedies used by the studied population

Alternate medicine used	Total n (%)
Coconut and egg	1(2.0)
Garlic and lemon	1(2.0)
Garlic	1(2.0)
Garlic & honey	6 (12.2)
Honey	12 (25.0)
Honey, lime	4 (8.2)
Honey and herbal medicine	1(2.0)
Honey, cinnamon powder	3 (6.1)
Honey, garlic, Grains of selim (xylopia aethiopica (hwentia)]	1(2.0)
Lime, honey, ginger, garlic	3 (6.1)
Lime	1(2.0)
Onion, garlic, honey	1(2.0)
[Aidan fruit [tetrapleura tetraptera (Prekese)], grains of selim (xylopia aethiopica)	1(2.0)
Warm water, lime, honey	1(2.0)
Faith based	10(20.4)
Combination of faith and herbal remedies	1(2.0)
Mother didn't know the name	1(2.0)
Total	**49**

Binary logistic regression model of factors associated with the use of CAM among children with asthma

Table 4 shows the univariable and multivariable binary logistic regression analysis of the predictors of CAM use among the children aged 5-13 years with asthma in DCH, KBTH, Accra. The current study showed in the univariable logistic regression analysis that the female sex (COR=0.43, 95% CI: 0.19 - 0.94, p=0.035), participants whose mothers had tertiary education (COR=0.14, 95% CI: 0.05-0.41, p<0.001), participants who lived in self-contained houses (COR=0.27, 95% CI:0.11-0.68, p=0.005), and participants who had frequent ED visits (COR=0.44, 95% CI: 0.2-0.95, p=0.037) were protective against CAM use. After adjusting for maternal educational level, maternal occupational class, paternal education, paternal occupational class, housing characteristics, source of energy for cooking, asthma control level, and frequency of ED visits, CAM use was over 4 times high among children aged 10-13 years (AOR=4.45, 95% CI: 1.32-14.98, p=0.016) and 71% less among the female children (AOR=0.29, 95% CI: 0.10-0.80, p=0.017) compared to their male counterparts and 85% less among children whose mothers were in the middle occupation class (Class III) compared to mothers in the lowest occupation class (AOR=0.15, 95% CI: 0.03-0.77, p=0.023). (Table 4)

Table 3: Association between Socio-demographic and clinical characteristics of study respondents and the use of CAM

| Variables | Total | Use of alternate medicine | | Chi-square value | P-value |
		Yes (%)	No (%)		
Age group of child				3.99	0.049
5-9 years	80	31 (38.8)	49 (61.3)		
10-13 years	30	18 (60.0)	12 (40.0)		
Sex				4.56	0.033
Male	64	34 (53.1)	30 (46.9)		
Female	46	15 (32.6)	31 (67.4)		
Mother's education				16.10	<0.001
Basic	25	18 (72.0)	7 (28.0)		
Secondary	29	16 (55.2)	13 (44.8)		
Tertiary	56	15 (26.8)	41 (73.2)		
Father's education				10.66	0.005
Basic	12	6 (50.0)	6 (50.0)		
Secondary	29	20 (69.0)	9 (31.0)		
Tertiary	69	23 (33.3)	46 (66.7)		
Mother's occupation				15.12	0.001
Class I&II	59	18 (30.5)	41 (69.5)		
Class III	23	12 (52.2)	11 (47.8)		
Class IV&V	25	19 (76.0)	6 (24.0)		
Father's occupation				7.38	0.025
Class I&II	69	24 (34.8)	45 (65.2)		
Class III	26	17 (65.4)	9 (34.6)		
Class IV&V	12	6 (50.0)	6 (50.0)		
House				8.26	0.004
Compound house	28	19 (67.9)	9 (32.1)		
Self-contained house/	82	30 (36.6)	52 (63.4)		
Level of asthma				3.46	0.063
Controlled	42	14 (33.3)	28 (66.7)		
Poorly controlled	68	35 (51.5)	33 (48.5)		
Source of fuel				F	0.031
Firewood only	8	7 (87.5)	1 (12.5)		
Gas only	79	31 (39.2)	48 (60.8)		
Firewood & Gas	23	11 (47.8)	12 (52.2)		
Frequency of ED visits in the past 12 months				4.45	0.035
Two or more	55	30 (54.6)	25 (45.4)		
One or no visit	55	19 (34.6)	36 (65.4)		
F: P-value from the Fisher's exact test. All other p-values are from the Pearson's chi-square test.					

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Table 4:   Univariable and multivariable logistic regression model of factors predicting the use of CAM

Variable	Simple Binary Logistic Regression Model		Multiple Binary Logistic Regression Model	
	COR [95% CI]	P-value	AOR [95% CI]	P-value
Age group				
5-9 years	1.00 [reference]		1.00 [reference]	
10-13 years	2.37 [1.00, 5.61]	0.050	4.45 [1.32, 14.98]	0.016
Sex				
Male	1.00 [reference]		1.00 [reference]	
Female	0.43 [0.19 - 0.94]	0.035	0.29 [0.10, 0.80]	0.017
Mother's education				
Basic	1.00 [reference]		1.00 [reference]	
Secondary	0.48 [0.15 - 1.5]	0.207	3.25 [0.60, 17.50]	0.170
Tertiary	0.14 [0.05 - 0.41]	<0.001	0.22 [0.01, 3.67]	0.289
Father's education				
Basic	1.00 [reference]		1.00 [reference]	
Secondary	2.22 [0.56 - 8.87]	0.258	2.31 [0.21, 25.92]	0.497
Tertiary	0.5 [0.14 - 1.73]	0.274	1.07 [0.09, 13.21]	0.957
Mother's occupational class				
Class I&II	0.14 [0.05, 0.41]	<0.001	0.79 [0.04, 15.38]	0.878
Class III	0.34 [0.10, 1.18]	0.091	0.15 [0.03, 0.77]	0.023
Class IV&V	1.00 [reference]		1.00 [reference]	
Father's occupational class				
Class I&II	0.53 [0.15, 1.85]	0.321	8.21 [0.96, 70.44]	0.055
Class III	1.89 [0.47, 7.64]	0.372	10.41 [0.98, 111.14]	0.052
Class IV&V	1.00 [reference]		1.00 [reference]	
Housing				
Compound house	1.00 [reference]		1.00 [reference]	
Self-contained house/	0.27 [0.11 - 0.68]	0.005	0.41 [0.12, 1.38]	0.148
Level of asthma				
Controlled	1.00 [reference]		1.00 [reference]	
Poorly controlled	2.12 [0.95, 4.73]	0.066	1.50 [0.52, 4.31]	0.454
Source of energy for cooking				
Firewood only/ with Gas	1.00 [reference]		1.00 [reference]	
Gas only	0.47 [0.20, 1.09]	0.078	0.70 [0.19, 2.55]	0.585
Frequency of ED visits				
Two or more	1.00 [reference]		1.00 [reference]	
One or no visit	0.44 [0.2 - 0.95]	0.037	0.72 [0.27, 1.90]	0.503

COR: crude odds ratio. AOR: adjusted odds ratio. CI: confidence interval.

Discussion

Complementary and alternative medicine use among children with asthma who attend asthma clinics is not one of the main topics that are addressed by the health care provider. This has been attributed to the fact that patients are not willing to share such information due to the perception that they might upset the health care professional.[3] On the other hand, the health care provider might not enquire about the use of CAM and so it does not get to be discussed.[3] The current study sought to find the prevalence, socio-demographic and clinical characteristics and factors associated with CAM use among children with asthma aged 5-13 years who attend the asthma clinic, DCH, KBTH, Accra, who use CAM.

Our study showed a high prevalence (44.5%) use of CAM among the study population. The most frequently used CAM were honey, garlic and lime. Kalaci et al[10] reported 76.4% of CAM use by children with asthma in Canada. Humidifiers, air purifiers and multivitamins were the most common modalities in their study. In Turkey, Hacaoglu et al [17] found 66% of children with asthma used CAM, with herbal medicine, honey and

grape syrup being the most frequently used CAM. An earlier study conducted in our facility showed that 29% of the study's population were using CAM, with lime and honey being the most commonly used modalities.[4] Oshikoya et al[3] in Nigeria reported in 2008, a significant but lower prevalence (25%) of CAM use among children with asthma. Similarly, they also found that the commonest CAM were the herbal remedies. The higher prevalence in our study could reflect an increasing trend in the use of CAM globally.[18] The wide diversity in the prevalence among different countries may be due to differences in the definition of CAM, socio-demographic characteristics, culture, beliefs of the people involved in the study, and different types of products considered as CAM by different group of people.[19]

Our study revealed that the female child with asthma is less likely to use CAM compared to the male. This is contrary to a previous study in Norway which showed that male teenagers have reduced odds of using CAM for various diseases.[20] The reasons for gender disparities in asthma are not well understood but have been linked to hormonal and immunological factors as well as differences in gender-related responses to environmental factors.[21,22] While females may be at a higher risk of disease severity, acute exacerbations, hospitalizations and death compared to their male counterparts, boys up to 14 years of age, are at a higher risk of asthma-related outpatient department (OPD) and emergency room visits and hospitalizations.[23–25] This has been buttressed by the fact that young boys have smaller airway diameter in relation to their lung volume compared to their female counterparts, consequently, putting them at risk of airway obstructions.[26,27] Based on this assertion we speculate that because young females are less likely to visit the ED for acute asthma care, their caregivers are unlikely to resort to using CAM with the hope of curing their ailment.

The current study found that children aged 10-13 years are over four times more likely to use CAM compared to those aged 5-9 years. Findings are varied in the literature; while some studies[20,28] suggest that the adolescent population, including the age group of 10-13 years, are at increased risk of CAM use, there are other findings where younger age group, less than 6 years are said to be associated with the use of CAM.[29–31] The reason behind this variation is not well understood. However, adolescents with asthma are known to have poor adherence to their prescribed medications and like experimenting or taking risk with other treatment options.[32] The finding may also be a reflection of parents being more cautious about the use of CAM when their children are younger.

Our data revealed that children whose mothers had received tertiary education and children who lived in self-contained houses had significantly reduced risk of using CAM in the univariable logistic regression analysis. This significance was lost when they were adjusted for other socio-demographic characteristics.

However, these factors are indicators of people from higher socio-economic background. Our data showed that children from middle and high occupational class had reduced odds of CAM use compared to those from the lower occupational classes. Patients of higher socio-economic status would be able to afford the cost of the orthodox medications like the ICS, as such, may not resort to CAM. They are also more likely to be well educated and therefore can understand the teachings that are carried out by the asthma care providers and as such might not use CAM for the treatment of their asthma. The current finding is consistent with studies conducted in Nigeria[3] and other Sub-Saharan African countries.[8] This is contrary to studies which have reported that parents of children who use CAM have higher education level.[9,33] Our study found that children who had either visited the ED once or did not visit the ED in the preceding 12 months had 56% reduced risk of CAM use compared to those who had visited the ED two or more times in that same period. This might be due to the fact that these patients might have well controlled asthma and so had no need to try other non-orthodox medications.[34] The use of herbal products was found to be associated with decreased ICS adherence, consequently leading to increased hospitalization or even intubation for asthma attacks.[12] The evidence suggests that there is the need for asthma care providers to encourage conversation on CAM use with their patients, especially those of lower socio-economic background. CAM use should be discussed in a non-judgemental manner with the caregivers of the patients attending the asthma clinic. This would provide the opportunity to discuss their specific beliefs, dispel myths and reduce the likelihood that they are relied upon in preference to prescribed medications.

The current study did not explore the reasons for the use of CAM. However, several studies have reported reasons why parents may give CAM to their children with asthma. Most have stated the natural and holistic nature of CAM, complementary role and for symptom relief. In other studies, the respondents stated lack of side effects of CAM.[3] It would be revealing to find out the reasons for the use of CAM by the children attending the asthma clinic, KBTH, as this may differ from the aforementioned.

Limitations

The original study design and sample size is not adequately powered to detect the conventional 5% difference in prevalence of binary outcomes studies, in this case, CAM use among children with asthma. Nonetheless, due to the dearth of studies in CAM use among children with asthma in Ghana, this study can serve as a basis for a larger study that is powered to further investigate the phenomenon. Furthermore, the study may be subject to recall bias as participants were asked to provide the answer to the question *"has your ward ever used CAM in the past 12 months"*. There was no way to authenticate their response. The study did not

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seek to find the reason for the use of CAM by these patients; this information could potentially influence the development of guidelines for asthma care.

Conclusion

In conclusion, CAM use was highly prevalent among children attending the asthma clinic in KBTH with honey, lime/lemon and garlic being the most frequently used remedies. The adolescent age group was strongly associated with CAM use, and children from lower socio-economic background were more likely to use CAM. Female sex may be a protective factor against the use of CAM among the children attending the asthma clinic. The asthma care team at the asthma clinic, KBTH should initiate discussions on CAM use with the parents and adolescent children in a non-judgemental manner so they can be counselled appropriately on the need to adhere to prescribed effective medication for good control of their asthma and prevention of potential complications. A larger study on the use and effects of CAM among children with asthma in Ghana is needed.

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