

Parental Asthma-Related Knowledge and Asthma Control in their Children in Accra, Ghana

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Abstract

Asthma ranks among the top 20 chronic conditions for the global ranking of disability-adjusted life years in children and is the most prevalent chronic condition in children. In the mid-childhood ages of 5–14 years, it is among the top 10 causes. Parental asthma knowledge is a crucial influencer of management practices and disease control. To achieve guided self-management, education is one of the six essential features. Assessing parents' asthma-related knowledge (ARK) is a significant requirement for improving childhood asthma management. The primary objective of this study was to document the ARK of parents of children (0-18 years) with asthma and identify how their knowledge impacts the control of the medical condition in their children in Accra, Ghana. A short questionnaire was designed and implemented to gather relevant information for the study. We also determined the number of children using an asthma action plan. A total of 200 questionnaires were administered. The median age of the children in the study was 10.7 years, with a mean age of 10.0 years. Seventy-one per cent of the children were males. This variation is based on the standard population, where asthma in boys is nearly twice as significant as in girls before age 14. Asthma educators should pay attention to the level of education of the parents of asthmatic children. The result indicates a higher level of asthma control in children whose parents have a higher level of education. However, it is concerning that only 17.2% of children had an asthma action plan, highlighting the urgent need for action in this area.

Keywords: *Asthma, Asthma Action Plan, Asthma Knowledge, Children, Parents.*

Introduction

Asthma is one of the most common chronic diseases of the airways and is characterized by inflammation and narrowing of the airways, which can make breathing difficult. Over 330 million people worldwide are estimated to have asthma [1, 2].

Predicting which child will develop asthma can not be proven with certainty. However, studies have identified specific predictors, such as skin and food allergies, hay fever, a family history of allergies or asthma, prenatal and postnatal exposure to tobacco smoke, obesity, and living in an area with high air pollution [3, 4].

Diagnosing asthma in children can be difficult. It is known that many children will go symptom-free for long periods. Asthma symptoms mimic those of other respiratory diseases and, thus, could be easily misdiagnosed [5]. Depending on your child's age, it may be difficult for them to explain their symptoms. Some children with asthma may show the same symptoms as adults - (shortness of breath, chest tightness or pain, wheezing when exhaling, which is a common sign of asthma in children, trouble sleeping caused by shortness of breath, coughing or wheezing, coughing or wheezing attacks that are worsened by a respiratory virus, such as a cold or the flu

[6]. In contrast, chronic cough may be the sole symptom in others [7]. While some researchers believe that we inherit a tendency to be allergic to one or both of our parents, others do not think that the propensity to be allergic to a specific allergen is inheritable. Interestingly, a mother with eczema may have a child who develops hay fever but not eczema. The most critical factor in determining if a child is more likely than another to develop asthma is a family history of physician-diagnosed allergies, eczema or asthma in parents [8]. Allergies and asthma tend to run in some families, and we know that if one parent has been physician-diagnosed with allergies or asthma, the chance of the child developing asthma is about 50%. In contrast, if both parents have physician-diagnosed allergies and or asthma, the risk of the child developing asthma climbs to 75%. The highest risk is if the mother has asthma [9].

Smoking in the home increases the risk of asthma. Declare your home and car smoke-free zones. House dust and mites are also risk factors. Early exposure to large amounts of house dust and dust mites increases the risk of asthma and Premature Births. Asthma is known to be more prevalent in premature infants, those born at less than 36 weeks of gestation [10].

Pets should be avoided in families with allergic diseases such as hay fever and eczema—allergies commonly cause asthma symptoms or flare-ups. Exposure to dust mites, dander from dogs or cats, pollen and other environmental allergens can trigger an asthma attack. Non-allergic triggers such as cold air, pollution or exercise [11] can cause asthma in some children. It is essential to monitor patterns in asthma symptoms as they are important and can help your doctor diagnose. Attention should be paid to when symptoms occur - at night or early morning, during or after exercise, during certain seasons, after laughing or crying, or when exposed to common asthma triggers [12].

According to international guidelines and strategies, asthma control is essential for success and disease control. In childhood

asthma, parents play a crucial role in managing their child's asthma, making the study's focus on parental knowledge particularly significant [13].

Current evidence suggests that parents' knowledge about asthma can influence asthma control [14] and disease control in children [15]. Therefore, they should receive training on asthma, asthma medications and equipment, self-management techniques, and an action plan on hand [6]. Most studies have relied on mothers as primary caregivers for children with asthma, thus making their education and understanding of asthma management very crucial [16].

Therefore, evaluating mothers' knowledge and practices is essential to improve childhood asthma management. Parental education about the disease was also associated with better outcomes and fewer child visits to the doctor and hospitalizations. There is evidence that many children whose parents have asthma have many misconceptions about the disease and the use of asthma medications [17, 18].

Asthma can be dangerous for children. Patients often describe this as being unable to exhale like a fish out of water while trying to breathe through a straw. This feeling is caused by swelling of the bronchioles, which causes the airways to narrow. Mucus cells in the bronchioles increase, and breathing becomes difficult [19].

Uncontrolled asthma in children can lead to lung damage. Appropriate treatment and management can prevent such occurrences. Many children may be asymptomatic long before they develop asthma, making it difficult to diagnose the disease. Asthma symptoms can also be confused with symptoms of other respiratory conditions [20].

The GINA document clearly states that an essential part of effective asthma management is enabling adults and children with asthma to manage their condition with pain guidance from a physician [21]. Additionally, self-management reduces asthma and stress in

children [22]. Adult education reduces future hospital admissions and improves symptom control [23]. Education is one of the six critical factors in achieving self-management, including the importance of children and their parents understanding the pathophysiology of asthma as part of effective asthma treatment in children [24].

Improved asthma awareness improves lung function and self-efficacy reduces missed activity days, absenteeism, and emergency department visits, and reduces nighttime use problems due to asthma [25]. Educating caregivers of children with asthma increases asthma awareness, behavioural control, and quality of life [26]. Assessing parents' asthma knowledge (ARK) is a vital tool to improve asthma management in children. The primary purpose of this study is to collect the ARK of parents of children with asthma and determine how their information affects clean drink control of the child's health [27].

One critical recommendation by The Global Initiative for Asthma (GINA) is that if you or your child has asthma, you should discuss developing a personal asthma control plan with your appropriate healthcare professional [28]. An Asthma Treatment Plan is a written document that provides information on how to best recognize and respond to changing asthma symptoms [29]. Your regular asthma medications should include information about which medications to take, how much to take, and how often to take them when you have asthma symptoms and in emergencies. This program is designed to help you and your child manage asthma effectively by giving clear instructions about what to do at different times [30] Research shows that including an asthma prevention plan in your asthma management can help you better manage your condition [31].

This study aims to evaluate the impact of parental ARK as a determinant of asthma management in children aged 0-18 years and to determine the use of the Asthma Action Plan. By focusing on a broad age range, we aim to

provide a valid understanding of the range of children with asthma.

Materials and Methods

The study, meticulously designed with a cross-sectional approach, utilized a questionnaire (Table 1) that is an adapted asthma knowledge Likert type 5-point scale questionnaire for parents of youngsters with asthma developed by Franken et al. [32] (The author sought the consent of Franken and her team before using the questionnaire). Data was collected from September 2023 to February 2024.

A Likert-type scale of 5 points was used to respond to each of the 21 questions. The items were graded '1', '2', '3', '4', and '5' for 'strongly disagree,' 'disagree,' 'neither agree, nor disagree,' 'agree,' and 'strongly agree,' respectively. Negative items were reverse coded by subtracting the response values from 5. This ensured that higher scores always indicated a more positive response. Any missing answers to the asthma knowledge questionnaire were scored a '3'. The total score was calculated by the sum of score item responses, ranging from 21 to 105. We also asked the parents to rate the severity of asthma in their children on a scale of 1 to 10 (where zero is none and ten is very severe) and if they have an asthma action plan for their children.

Patients

The subjects for this study, children with asthma or bronchial hyperreactivity (0–18 years), were recruited from selected Community Pharmacies in Accra, Ghana. The inclusion criteria were all children diagnosed with physician-diagnosed reversible bronchial hyperactive reactivity or asthma before age 15. We excluded children with concomitant diseases, like heart disease, diabetes mellitus, or mental disability, to ensure the focus of our study. The parents of all study participants received a questionnaire after informed consent had been sought. Families with two or more

children received just one questionnaire for one child, maintaining fairness in our sample selection process. Two hundred questionnaires were sent out, and we received 186 responses (93.0%).

Statistical Analysis

Our data analyses were conducted thoroughly using the Statistical Package for Social Sciences for Windows, version 26 (IBM Corp, Armonk, NY, USA). Pearson's correlation coefficients were employed to

assess the correlation levels between total asthma knowledge scores and continuous variables. Cronbach's α coefficient [33] rigorously analyzed the internal consistency of the survey questionnaires, while factor analysis was used to investigate construct validity.

One-way analysis of variance (ANOVA) and Student T-tests were used to determine the association of asthma knowledge and compare different categories of groups. A 0.05 significance level was used for all analyses, ensuring the reliability of our results.

Table 1. Questionnaire to Assess the Asthma-Related Knowledge of Parents of Children (0-18 Years) with Asthma in Community Pharmacies in Ghana

1. Inhaler use can lead to dependence or addiction ^a FI ^b
2. Inhalers can affect the heart or damage it. ^a FI ^b
3. It's not good for children to use the inhaler for too long. FI ^b
4. After a child's asthma attack, once the coughing is over, the use of the inhaler and medications should stop.
5. Children with asthma should use asthma medications only when they have symptoms (coughing, congestion, or wheezing). ^a FI ^b
6. Using inhalers directly, without a holding chamber, is better so the medication can go more directly to the lungs. ^a FI ^b
7. The leading cause of asthma is airway inflammation.
8. Parents should ask a doctor to tell the school that an asthmatic child shouldn't exercise or participate in physical education classes ^{at} FII ^b
9. Children who have asthma shouldn't participate in sports that make them run too much. ^a FII ^b
10. When a child has an asthma attack, it's best to go to the emergency room, even if symptoms are mild. ^a FI ^b
11. Cold/Flu infections are the leading causes or triggers of asthma attacks.
12. With preventer medications, it does not matter if some doses are missed or you go on and off them.
13. You should use 'preventer medication' for an asthma attack.
14. Blue puffer (Ventolin), Brown puffer (Flixotide), and Green puffer (Serevent) are called 'preventer medications,' so they should be used every day although you are well
15. Parents should give 'reliever medication' to a child as soon as they recognize the first sign of asthma.
16. If an asthmatic child gets the flu/cold, you should administer the inhalers even if there is no coughing or wheezing.
17. If the parents of a child with asthma smoke outside the house, it won't affect the child. ^a FI ^b
18. Some medications for asthma don't work unless they're administered every day. ^A FI ^b
19. Asthma attacks can be prevented if medications are taken, even when there are no symptoms between attacks.
20. It's best not to smoke or let anyone else smoke near a child who has asthma.

21. Asthmatic children might have attacks that are severe enough to require hospitalization in an intensive care unit, or they might even die from an attack.

^aQuestions of the short form 10-item questionnaire. ^FI Factor I indicates the use and working mechanism of inhalators and asthma medication with an individual Cronbach's α coefficient of 0.67. ^{FII}Factor II indicates sports and asthma with an individual Cronbach's α coefficient of 0.75

Results

Table 2 shows the characteristics of the children and their parents. The mothers of the

children completed 61.3% of the questionnaires, while their fathers completed 38.7%.

Table 2. General Characteristics of Parents and Children

Variables	Frequency	Percentage
Children (Age in Years)		
0-5	30	16.1
6-12	75	40.3
13-18	81	43.5
Sex		
Male	132	71
Female	54	29
Parents Gender		
Mothers	114	61.3
Fathers	72	38.7
Mothers' Education Level		
No education	9	7.9
Up to SHS	16	14.0
Bachelor's Degree	29	25.4
Professional Degree	22	19.3
Postgraduate degree	38	33.3
Fathers' Education Level		
No education	6	8.3
Up to SHS	22	30.6
Bachelor's Degree	18	25.0
Professional Degree	4	5.6
Postgraduate degree	22	30.6
Asthma Action Plan		
Yes	32	17.2
No	154	82.8
Asthma Control		
Well-controlled	46	24.7
Partly controlled	91	48.9
Uncontrolled	49	26.3
Asthma Severity Rating by Parents (scale of 1 to 10)	Mean	Standard Deviation

Mothers	5.19	1.81
Fathers	5.36	1.83

A total of 10 questionnaires were excluded (5.0%) for various reasons: no response, substantial part not completed, already completed for another member of the family, the participant added a column 'I don't know' to the questionnaire.

The mean age of the children in category 0-5 years was 3.2, 8.5 years for the 6 to 12-year category, 15.5 years for the 13 to 18-year group, and 10.7 years for all the children who participated in the survey. The median age of the children in category 0-5 years was 3.0, 9.0 years for the 6 to 12-year category, and 16 years for the 13 to 18-year group.

Seventy-one per cent of the children were males (Table 2). This variation is based on the typical population, where asthma in boys is nearly twice as significant as in girls before age 14 [34].

Asthma Knowledge Scores

Parents' asthma knowledge wasn't related to the child's age or gender. Generally, a higher educational level of both parents was linked to higher asthma knowledge. Mothers with no education had scores similar to those with education up to the SHS level. It was also observed that Mothers with bachelor's degrees scored higher than those with no education, up to SHS and professional degrees.

Fathers with professional degrees scored highest amongst all the levels of education. While fathers with no education scored lowest, they also scored lower than mothers without education. Fathers with postgraduate degrees scored slightly higher than mothers with the same qualification. Mothers with no education scored higher than Fathers with no education. The same trend was observed with those with up to SHS level of education. However, Fathers with Bachelor's, professional and postgraduate degrees scored higher than mothers with the same educational qualifications.

Asthma Action Plan – of the 186 responses, only 32 had asthma action plans (17.2%).

Discussion

Asthma is one of the most common diseases in children. Over the years, the increasing prevalence, morbidity, and mortality of asthma have attracted the attention of public health research [35]. In this study, the average knowledge score of parents about asthma was 79.03% (76.9% for mothers, 81.2% for fathers). This is similar to previous results [32, 36]. A significant relationship between parents' education and scores at the 0.01 level (2-tailed) was assessed using Pearson correlation analysis. The correlation was higher for fathers than mothers (0.700 vs. 0.507, 0.01 level, 2-tailed).

Post hoc testing of parent education was not possible because there were fewer than 2 cases in at least one group. One-way ANOVA revealed a positive relationship between parents' education and their scores. Although the education level of highly educated individuals generally had higher scores, we did not find a significant difference. Highly educated parents can be expected to understand asthma better because they can absorb new information more efficiently by gaining experience from their previous education. These results suggest that asthma education should be repeated regularly, even if the children's parents are highly educated [32, 37]. This study links higher education to better asthma awareness scores. The results show that the longer parents had education after high school, the more likely they were to demonstrate asthma awareness.

This study found that parents scored lower on asthma medication than on non-medication questions. This observation suggests that more attention should be paid to educating parents

about asthma medication instructions, use, and the medication's mechanism of action.

When assessing asthma in children, we found a difference in uneducated individuals giving higher scores than those with a college degree. Fathers with SHS and undergraduate and professional degrees scored very highly. All but doctorate-holding fathers scored higher than mothers with the same education.

In another study, children with asthma whose parents had more than a high school education were more likely to use daily corticosteroids than children whose parents were less educated [38]. For this reason, special care and asthma treatment are recommended and strongly encouraged for parents with a high school education or less [39]. ARK programs for parents of children with asthma have been developed in some Western European countries [40]. This is the first of its kind in Ghana. Rhee et al. [41] found that ARK deficiency and poor compliance with treatment were risk factors for asthma.

Managing asthma in children requires much work. Parents need to understand the various causes of asthma, the underlying mechanisms, and the need for medication. They must also learn to monitor lung function, administer life-saving medications, recognize serious illness early, and initiate emergency treatment [42].

An asthma action plan is a written treatment plan or is considered a contract between the healthcare professional and the patient (with the support of their parents or caregivers). The plan describes how to identify allergens or triggers to avoid, how to know if your asthma is getting worse and what to do, which medication to take or how to increase the dose of your regular drugs when to call your healthcare professional (physician, pharmacist, asthma educator) or head to the emergency room and finally, who to contact in an emergency.

Of the 186 responses, only 32 had asthma action plans (17.2%). Interestingly, all the asthma action plans were developed by physician specialists and none by pharmacists

or general physicians. This number is relatively low compared to other studies. Deis et al. [43] determined that 32% of children in their study had asthma action plans. They also found that parents who received an activity plan were more confident about handling their child's asthma. Alhammad et al. [44] found that only one-third of parents received an asthma prevention plan. Educating parents about the methods of action and the use of asthma medications is essential for asthma education [45].

Conclusions

This study shows that asthma education should not be limited to uneducated parents but should also include educated parents. However, special attention should be paid to parents with a high school education or less. An Asthma Control Plan is a self-administered document that provides steps to prevent asthma attacks from becoming severe. It also tells you when to call your doctor or go to the emergency room. Everyone diagnosed with asthma should have an asthma control plan. The Asthma Action Plan aims to prevent and manage asthma symptoms. The Asthma Action Plan leaflet provides daily steps to manage asthma and steps to take during an asthma attack, asthma attack or emergency. Only 17.2% of children with asthma have an asthma control plan. Family doctors, pharmacists and asthma educators in Ghana must teach and train to use this valuable tool to help their clients.

This study determined the consistency of parental information. This suggests that better asthma awareness may encourage parents to monitor their children's asthma better and manage and adhere to their medications.

Parental education was positively associated with ARK scores in this survey. Education affects parents' ability to retain knowledge. Highly educated parents have more knowledge about asthma and can provide better care.

In the case of asthma, regular doctor visits can allow parents to become educated about

asthma. This study shows that parental education to improve asthma control is the most critical factor in treating childhood asthma.

Limitations of Study

There are some limitations in this study. The first one is the sample size of 200. This is an ongoing study, and we hope to gather data from at least 5000 participants in Ghana, Canada, and the United States of America for a comparative analysis.

Another area for improvement is the use of participant-reported assessments of asthma severity and self-assessed expertise, which may reduce the reliability of the answers. Therefore, this study's results may be limited. Future studies must work on these limitations to make the results more relevant and general. Also, the importance of the time interval between the last visit to the physician's office or asthma educator and the completion of the questionnaire may need to be considered.

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Ethical Clearance

Approval was obtained from the University of Ghana School of Pharmacy Ethics Committee (UGSOPEC/AC2021-2022/017).

Competing Interests

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