



Prevalence of Compliance on Asthma Action Plan Among Asthmatic Children in PSMC and Associated Factors with Good and Poor Compliance

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DOI: 10.31080/ASMS.2022.06.1247

Received: February 21, 2022

Published: April 18, 2022

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Abstract

Background: Asthma is the most common long-term condition in children, and impact the quality of life of children and their parents. A Written Asthma Action Plan is a set of written instructions kept by patients or their caregivers to help with asthma management. The current study is to assess the prevalence of compliance to asthma action plans among asthmatic children in prince sultan military medical city and the associated factors with good and poor compliance.

Methods: A quantitative observational descriptive cross-sectional study among Saudi parents having asthmatic children aged 6- 12 years and followed up in PSMC. Data were collected by a questionnaire developed and validated by the study authors to fulfill the study objectives. Parents who accepted to participate were given a written asthma action plan and it was explained to them, and they were informed that their contact number is needed to follow up with them after 6 months to check for compliance. Consent were obtained from all participants in this study, confidentiality is ensured and participants' information are used for this study and will not be disclosed, IRB approval from research. Ethics committee was obtained and permitted to conduct the study. Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA).

Results: A total of 366 parents with asthmatic children participated in the current study, 52.2% of the children were males with a mean age of 8.70(\pm 2.04) years. The compliance to asthma action plan was significantly correlated with gender(males were more compliant to the asthma action plan compared to females at 66.7% vs. 33.3%, respectively), the number of children in the family, and compliance (the number of children in compliance families was significantly lower than non-compliant ones at 4.57(\pm 2.66) vs. 5.69(\pm 1.89)). A positive significant ($P < 0.001$) association between each of fathers' and mothers' educational level, economic status, and having a sibling with asthma, and compliance to the asthma action plan was reported.

Conclusion: The compliance rate to asthma action plan reported in the current study among parents with asthmatic children aged 6-12 years at 13.93% is considered very poor. The compliance rate was positively significantly associated with the educational level and economic status of the participants.

Keywords: Asthma; National Health Interview Surveys (NHIS); Saudi Arabia

Introduction

Asthma is the most common long-term condition in children, with prevalence rates ranging from 5% in Albania to 21% in the

United Kingdom among 6-7-year-olds [1]. As per the U.S. Centers for Disease Control and Prevention (CDC)'s 2019 National Health Interview Surveys (NHIS), 25.1 million people, including 5.1 mil-

lion children, have asthma [2]. In Saudi Arabia, asthma affects 2 million people (about 6% of the population) [3]. The prevalence of asthma in Saudi Arabia varies among different cities throughout the kingdom, the highest was reported in Alhofuf (33.7%) and the lowest in Abha (9%) [4].

Frequent asthma attacks have a negative impact on the quality of life of children and their parents, are associated with accelerated loss of lung function, and can be fatal [5]. As a result, the Global Initiative for Asthma (GINA) was founded in 1989 to raise public awareness about asthma [6]. Healthcare appointments with regular follow-up, consistent asthma education, and written action plans are specifically recommended for better disease control in asthmatics, particularly those with a more severe disease course [7]. Locally, and in response to the region's high prevalence of asthma, an asthma awareness campaign was held in Saudi Arabia in 2014, during which a Structured Asthma Knowledge Questionnaire was developed to assess 1039 randomly selected participants [8]. This preliminary study concluded that general population asthma knowledge needs to be improved. Another survey conducted in 2019 showed that the majority of people in Saudi Arabia are aware of asthma as a chronic disease entity, its fatality and that genetic, hereditary, and environmental factors play a role in the progression of asthma [9].

Asthma morbidity in children is clearly reduced by guided self-management, which includes self-monitoring and an asthma action plan [10,11]. A Written Asthma Action Plan is a set of written instructions kept by patients or their caregivers to help with asthma management. As a result, the purpose of this study was to assess the prevalence of compliance to asthma action plans among asthmatic children in PSMMC and find the reasons and associated factors with both good and poor compliance to improve the management and prognosis of asthma in PSMMC.

Methods

This was a quantitative observational descriptive cross-sectional survey study. The study population was Saudi parents having asthmatic children who presented to the ER and pediatric clinics at Prince Sultan Military Medical City (PSMMC).

The inclusion criteria for the current study were Saudi parents having asthmatic children aged 6- 12 years and followed up in PSMMC.

The data collection tool for the current study was a written asthma action plan and a questionnaire that was developed and validated by the study authors to fulfill the study objectives. The questionnaire includes questions asking if the participants heard about the asthma action plan, the number of children they have, parents' educational level and their economic status if any of the child's siblings are asthmatics and the number of ER visits due to asthma exacerbation during the last month. The aims and objectives of the study were explained to the parents and they were informed that their contact number is needed to follow up with them after 6 months to check for compliance. Parents were informed that their data will be kept confidential and will be used for research purposes only. Parents who accepted to participate and give their contact number were asked to sign a consent form and to fill up the questionnaire. Consent were obtained from all participants in this study, confidentiality is ensured. Participants' information and contact numbers are used for this study and will not be disclosed, IRB approval from research. Ethics committee was obtained and permitted to conduct the study.

Statistical analysis

Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean \pm standard deviation. Categorical variables were expressed as percentages. t-test was used for continuous variables. Chi-square was used for categorical variables. A p-value <0.05 was considered statistically significant.

Results

A total of 376 parents with asthmatic children accepted to participate in the current study, while when we came to the follow up after 6 months 10 (2.65%) of them did not answer our phone call, and they were dropped out from the study leaving a total of 366 for whom data were analyzed, giving a response rate of $>97\%$ which is very high.

More than half of the participated sample were males at 52.2%. The mean (\pm SD) age of the children was 8.70(\pm 2.04) years. The mean (\pm SD) of the number of children in the families of the participated parents was 5.53(\pm 2.03), and the highest percentage (19.4%) of the participated children ranked the second in their family. Only 10.9% of the participated parents reported that they have previous knowledge about the asthma action plan, while the

majority (89.1%) reported "no". The educational level of both the participated fathers and mothers was mostly high school at 38%, and 50.8%, respectively. The socioeconomic status of the participants was mostly "good" at 68.9%, and 26.2% of the participants

reported having an asthmatic sibling. The results showed that the prevalence of compliance to asthma action plans among asthmatic children was 13.93% (51 out of 366), which is considered a very poor compliance rate. Data is shown in table 1.

		Number	%
Gender	Male	191	52.2
	Female	175	47.8
Age (Mean, SD)		8.70	2.04
Number of children in family (Mean, SD)		5.53	2.03
Previous knowledge of asthma action plan ?	Yes	40	10.9
	No	326	89.1
Rank of child	1 ST	62	16.9
	2 ND	71	19.4
	3 RD	45	12.3
	4 TH	68	18.6
	5 TH	53	14.5
	6 TH	37	10.1
	7 TH	15	4.1
	8 TH	9	2.5
Education level of father	10 TH	6	1.6
	Primary	16	4.4
	Intermediate	74	20.2
	High school	139	38.0
Education mother	Bachlor	137	37.4
	Primary	20	5.5
	Intermediate	83	22.7
	High school	186	50.8
Socioeconomic status	Bachlor	77	21.0
	Good	252	68.9
Any asthmatic sibling?	Average	114	31.1
	Yes	96	26.2
	No	270	73.8

Table 1: Characteristics of the asthmatic children and their parents (n = 366).

The relation between the characteristics of the asthmatic children and their parents and using asthma action plan is shown in table 2. There was a statistically significant difference in the use of asthma action plan by gender, where a statistically significant

higher percentage of males were compliant to the asthma action plan compared to females at 66.7% vs. 33.3%, respectively, with a P-value of 0.026. Similarly, there was a significant (P 0.006) association between the number of children in the family and compliance,

as it was found that the mean of the number of children in compliance families was significantly lower than non-compliant ones at 4.57(±2.66) vs. 5.69(±1.89). A significantly lower percentage (39.2%) of participants with previous knowledge about asthma action plan reported using the asthma action plan compared to those

with no previous knowledge at 60.8%, with a p-value of <0.001. Asthma action plan use was also significantly inversely correlated with the rank of children, being the highest among the 1st at 35.3%, and decreased with increasing the children's rank.

		Using Asthma action plan				P value
		Yes		No		
		Number (n = 51)	%	Number (n = 315)	%	
Gender	Male	34	66.7	157	49.8	0.026*
	Female	17	33.3	158	50.2	
Age (Mean, SD)		8.22	1.84	8.78	2.06	0.066
Number of children in family (Mean, SD)		4.57	2.66	5.69	1.87	0.006*
Previous knowledge of asthma action plan ?	Yes	20	39.2	20	6.3	<0.001*
	No	31	60.8	295	93.7	
Rank of child	1 ST	18	35.3	44	14.0	0.001*
	2 ND	12	23.5	59	18.7	
	3 RD	8	15.7	37	11.7	
	4 TH	8	15.7	60	19.0	
	5 TH	1	2.0	52	16.5	
	6 TH	1	2.0	36	11.4	
	7 TH	0	0.0	15	4.8	
	8 TH	1	2.0	8	2.5	
Education level of father	Primary	2	3.9	14	4.4	<0.001*
	Intermediate	4	7.8	70	22.2	
	High school	9	17.6	130	41.3	
	Bachlor	36	70.6	101	32.1	
Education mother	Primary	1	2.0	19	6.0	<0.001*
	Intermediate	4	7.8	79	25.1	
	High school	21	41.2	165	52.4	
	Bachlor	25	49.0	52	16.5	
Socioeconomic status	Good	42	82.4	210	66.7	0.025*
	Average	9	17.6	105	33.3	
Any asthmatic sibling?	Yes	26	51.0	70	22.2	<0.001*
	No	25	49.0	245	77.8	

* Significant p value

Table 2: Relation between the characteristics of the asthmatic children and their parents and Using Asthma action plan.

The results of the current study revealed a positive significant ($P < 0.001$) association between each of fathers' and mothers' educational level and compliance to the asthma action plan, where the highest compliance rate was reported from those with a bachelor degree at 70.6%, and 49%, respectively. A similar positive correlation was found with the socioeconomic status and most (82.4%) of those with good economic level were compliant compared to 17.6% of those with average level, with a P-value of 0.025. Moreover, having a sibling with asthma showed a significantly higher asthma action plan using rate. On the other hand, there was no significant association between the participants' age and compliance to the asthma action plan as the p-value was 0.066.

Discussion

We set out this cross-sectional survey study to assess the rate of compliance to asthma action plans among parents with asthmatic children under the age of 12 years, and the results revealed an overall poor compliance rate, and that the rate of compliance is significantly associated with parents educational level, socioeconomic status, and having a sibling with asthma.

The compliance rate reported in the current study is considered even poor compared to a study conducted in Egypt in which the compliance rate among the studied mothers was 32.1% [12].

When patients stray from the recommended directions given by a healthcare practitioner, this is referred to as noncompliance. The goal of every medical therapy is to attain certain objectives. The outcome, however, is heavily dependent on patient-related factors, and despite the efforts of healthcare personnel, the expected outcomes may not be reached if patients are disobedient. There was a statistically significant correlation between parents' compliance level and socioeconomic status in this study, which is in line with a previous similar study [12]. Furthermore, McCorkle [13] and Baiardini, *et al.* [14] discovered that socioeconomic position and degree of education had a significant impact on how patients take their medication, and this is in line with the current study findings.

Medication adherence is a significant difficulty for individuals with chronic conditions. An action plan, however, prepared in a clear discussion with the patient, may help to improve adherence by eliminating confusion with multiple treatment alternatives and reminding patients about the right manner and time to use them. According to Van Staa, *et al.* asthmatic adherence to asthma control therapy is famously low, with fewer than half of patients taking

their recommended medicine regularly [15]. The results in the current study are even worse than this.

Previous studies showed that non-adherence to asthma treatments can be intentional, when patients opt not to take recommended therapy after weighing the perceived requirement for/ concerns about taking regular medication, or non-intentional when patients are misled, forgetful, or unable to pay treatment expenses [16]. Without a doubt, these findings emphasize the asthma action plan's critical role in increasing medication adherence in chronically sick patients. Unfortunately, the current study did not address the reasons for noncompliance, however, previous studies showed that the primary causes for non-adherence were forgetting to take medicine according to the prescription schedule and fear of the negative effects of corticosteroids, which led them to not use their medication or reduce its dose/frequency [16,17].

Patients' knowledge score about asthma and asthma action plans is positively correlated with compliance score [12,18,19]. This might explain the low compliance rate in the current study since only 10.9% of the participants reported having previous knowledge of asthma action plan. These findings shed the light on the urgent need for health education about asthma and asthma action plan. Asthma health education usually begins at the doctor's office. This instruction is often aimed at the parents rather than the kid and consists of a quick overview of asthma and the medicine provided to treat it [20].

As with any study, the current study has some limitations including the small sample size, the sample size was not representative of the whole kingdom, and therefore the results cannot be generalized. In addition, the reasons for noncompliance weren't addressed in the current study. Though, the study has its strengths including shedding the light on an important area with is compliance to the asthma action plan, particularly that asthma is considered prevalent in the kingdom, and this is an addition to the literature in this area where such data is considered scarce in the kingdom. Large-scale multicenter studies are required in this topic.

Statistical analysis

Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean \pm standard deviation. Categorical variables were expressed as percentages. t - test was used for continuous variables. Chi square was used for categorical variables. A p-value < 0.05 was considered statistically significant. Prevalence

of compliance on asthma action plan among asthmatic children = 13.93% (51 out of 366).

Conclusion

Overall, a very poor compliance rate to asthma action plan was reported in the current study among parents with asthmatic children under the age of 6-12 years at 13.93%. The compliance rate was positively significantly associated with the educational level and economic status of the participants. Educational programs in this regard are urgently needed.

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