Non adherence to inhaler therapy and associated factors among Sudanese patients with bronchial asthma

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Abstract

Background: Uncontrolled asthma is a major health problem resulting in an increased morbidity, mortality, healthcare utilization, and costs. Adherence to asthma inhaler medications has a major role in the control of the disease.

Objective: To study non adherence to inhaler therapy and associated factors among patients with bronchial asthma.

Method: This was descriptive cross-sectional hospital-based study. It was conducted at Alshaab Teaching Hospital from December 2021 to March 2022. The study has included 82 asthmatic patients who fulfilled the inclusion criteria of the study. Data was collected using questionnaires that was filled by interviewing the patients. An informed consent was obtained from all participants. Adherence to asthma inhalers was measured using Morisky Medication Adherence Scale.

Results: The level of adherence was low in 53 patients (64.6%), medium in 16 candidates (19.5%) and high in the remaining 13 patients (15.9%). The factors associated with low adherence were unavailability (69.8%), unaffordability (67.9%), fear of side effects (54.7%), a belief that they don't need the inhaler (37.7%), lack of proper education (30.2%), a belief that the drug doesn't help (24.5%), concerns about social stigma (13.2%) and miss-understanding of doctor's instructions (9.4%), (P value < 0.05). High level of adherence to asthma inhalers significantly associated with age 35 - 65 years, female gender, secondary level of education, duration of asthma 1-5 years and use of short acting beta agonist and inhaled corticosteroids (P value < 0.05).

Conclusion: The study concluded that the proportion of non-adherent patients is more than that of adherent patients. Moreover, the most common factors associated with none-adherence were unavailability, unaffordability and lack of proper education about the inhalers.

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Categories: Pulmonology, Therapeutics, Health Policy

Keywords: short acting beta-agonist, long-acting β2-agonist (LABA), corticosteroids, Alshaab teaching hospital, inhaler therapy, bronchial asthma, non-adherence

Introduction

Chronic inflammatory illness of the airways known as asthma is characterized by recurring attacks of chest tightness, coughing, and wheezing [1]. The World Health Organization (WHO) estimates that 235 million people worldwide have asthma, and that its prevalence has grown by 50% every ten years [2]. Additionally, it is placed 27th in low- and middle-income nations and 28th overall among the main sources of disease burden [3]. Asthma is responsible for around 180,000 fatalities worldwide each year [4]. Although there is currently no cure for asthma, it may be managed with long-term medicines and avoidance of triggers.

Bronchodilators, corticosteroids, leukotriene modifiers, mast cell stabilizers, and immune-modulators are some of the drugs used to treat asthma. A very important element of managing asthma is using inhaled medicines (ICS +/- bronchodilators). Inhaled corticosteroids (ICS) are used continuously in therapy to reduce chronic airway inflammation and enhance quality of life. According to estimates, using ICS regularly might cut asthma hospitalizations by as much as 80%. [4,5]. It is acknowledged that inhaled corticosteroids in particular and adherence to an asthma treatment plan in general play a significant role in lowering morbidity, mortality, and resource consumption in individuals with asthma [6]. Adherence is characterized as a patient's actions in response to advice from a healthcare professional [7]. For the efficient management of asthma, variables associated to adherence to asthma controller medication must be identified. There are purposeful (perceptions of asthma severity, self-managing therapy, fear of side effects) and unintentional (forgetting, expense, lack of counseling, and

misconceptions) factors that might contribute to nonadherence [8]. In practice, adherence monitoring strategies are used to assess the efficacy of inhaled treatment. However, each method has benefits and drawbacks. Medication event monitoring systems (MEMS), electronic devices, prescription refill tracking, and canister weighing treatment are examples of objective techniques [9]. However, self-reporting is an arbitrary approach to gauge adherence. The use of validated adherence assessments or questionnaires is an illustration of this methodology. These scales are employed often [10]. The WHO formerly said that among patients with chronic illnesses in industrialized nations, the average percentage of medication adherence was around 50%. This average percentage of adherence is anticipated to be significantly lower in underdeveloped nations where access to healthcare and medications is constrained [11].

The Studies from various geographical regions have assessed the prevalence of ICS nonadherence among asthma patients in both developed and developing nations. In the US, asthma patients' reported adherence rates ranged from 22% to 50%. [12]. In the Middle East, 25% of patients visiting adult pulmonary clinics in Oman reported adhering to ICS [13]. Additionally, 55% of adult patients

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with asthma who visited three private clinics in Iran reported having poor adherence [14]. Patients with asthma in Egypt had a 21% ICS adherence rate [15]. Saudi Arabia has a 2019 adherence rate of 27.4% for asthma inhalers [16]. In Africa, 59% of Ethiopians had poor adherence that year [17].

Materials and Methods

This descriptive cross sectional hospital based study was conducted in Alshaab teaching hospital, at Khartoum, Sudan. Alshaab Teaching Hospital is the cardio-respiratory center in Khartoum State, located in the center of Khartoum city and receive all referred respiratory cases from other Sudan states. It has a busy ER department and there are daily respiratory referral clinics. It comprises four respiratory general wards in addition to Asthma care unit and respiratory intensive care unit. It was conducted from December 2021 to March 2022.

Target population was all patients older than 18 years and diagnosed with bronchial asthma presenting to Alshaab teaching hospital's referral clinic. Patients included in study were those diagnosed with bronchial asthma who are older than 18 years, and did not include Asthmatic patients who are not on inhaler medications, patients who are too distressed to participate in the study, patients who refused to participate in the study. Sample size was calculated to be 82 . The researcher interviewed the participants and data was collected using the Morisky scale which is validated scale designed to estimate the risk of medication non adherence, since its publication in 1986 it has been used for many different diseases such as hypertension, hyperlipidemia, asthma, and HIV [18] and Pre designed structured questionnaire. Dependent variables were factors like patient's beliefs about the inhalers, availability and affordability. Independent variable is low adherence.

Data was sorted then coded and analyzed using statistical program of social science for computers SPSS. The results were presented in tables and figures. The level of significance was considered if P. value <0.05.

Approval was obtained from Ethical committee the research Unit EDC. A permission to conduct the study was obtained from the administration of the Hospital. Written consent was taken from all patients to participate in this study. Patient's details were kept confidential. Data was anonymous names and identities were replaced by codes and personal data was protected.

Results

The patients aged 35 - 65 years were 43(52.4%), between 18 - 35 years 20(24.4%) and above 65 years were

19(23.2%) (Figure 1).

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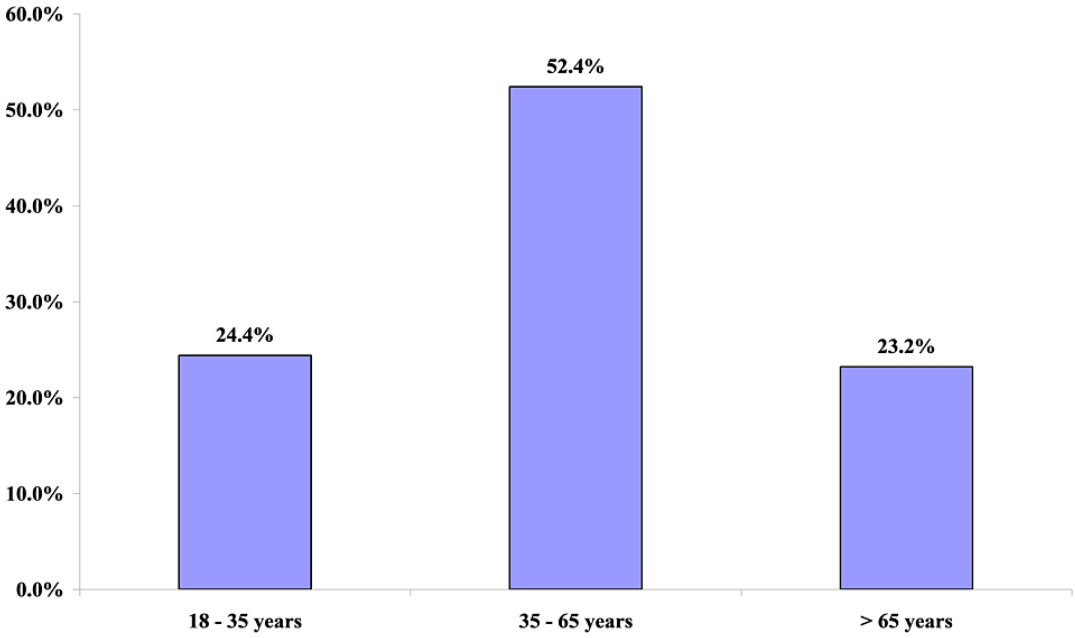

FIGURE 1: Distribution of asthmatic patients according to age

Females were 56(68.3%) and males were 26(31.7%) (Figure *2*).

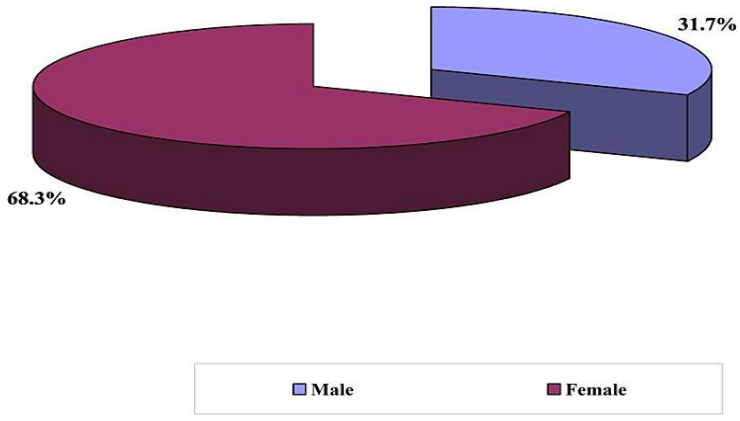

FIGURE 2: Distribution of asthmatic patients according to gender

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Illiterate patients were 47(57.3%), patients with secondary education 16(19.5%), university 11(13.4%) and primary education 8(9.8%) (Figure *3*).

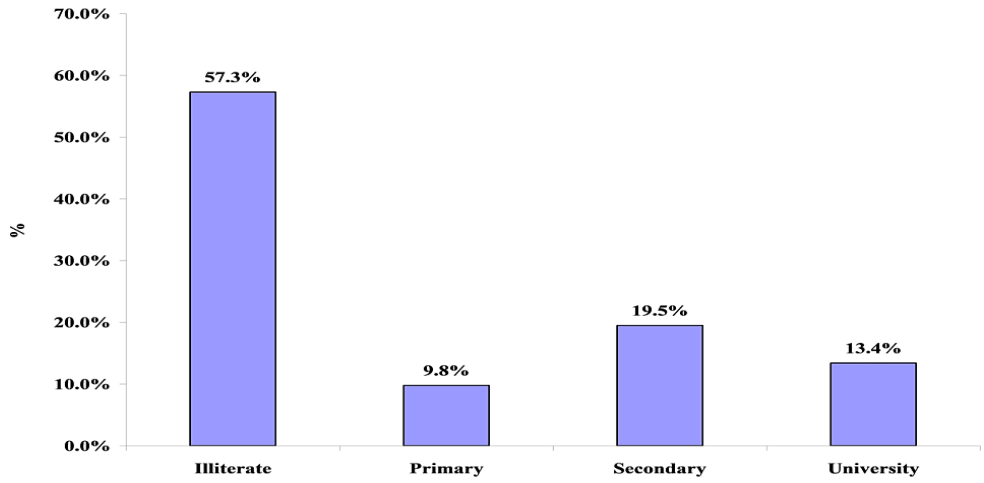

FIGURE 3: Distribution of asthmatic patients according to educationallevel

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The patients who had health insurance were 49(59.8%) and 33(40.2%) did not have health insurance (Figure 4).

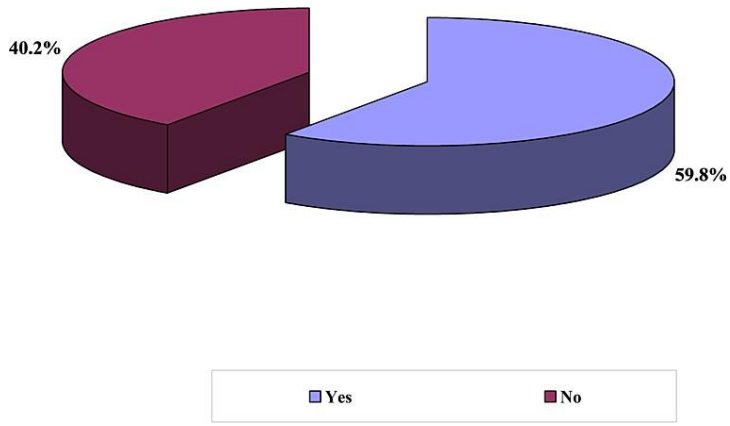

FIGURE 4: Distribution of asthmatic patients according to status ofhealth insurance

The majority of the patients 63(76.8%) were not smokers. 11(13.4%) were currently smokers and 8(9.8%) were ex-smokers (Figure 5).

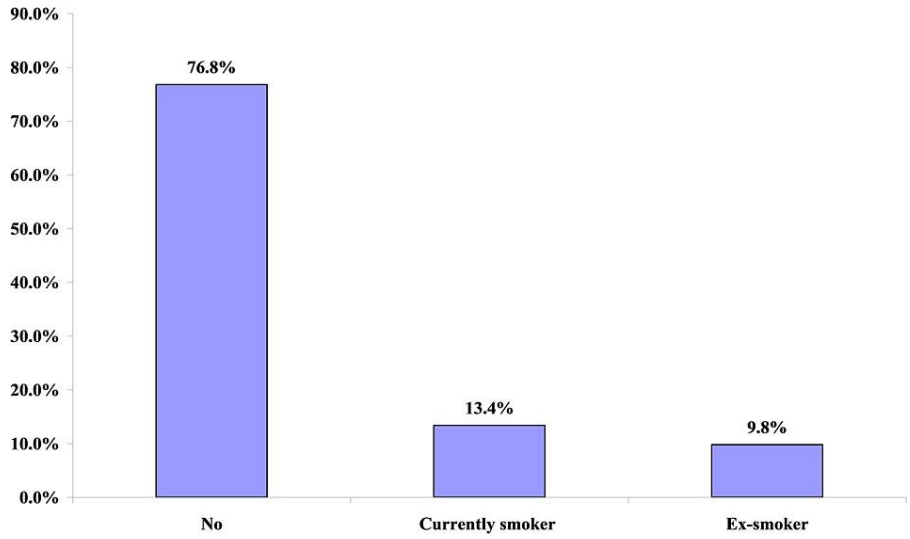

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FIGURE 5: Distribution of asthmatic patients according to smoking

The hospitalization due to asthma in last year reported in 33(40.2%) and 49(59.8%) did not have admissions of asthma (Figure *6*).

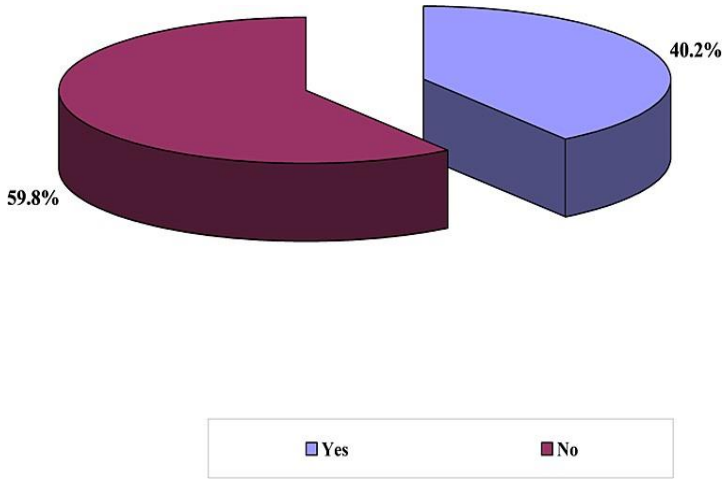

Figure 6: Distribution of asthmatic patients according to hospitalization due to asthma last year

The level of adherence was low in 53(64.6%), medium in 16(19.5%) and high in 13 (15.9%) (Figure *7*).

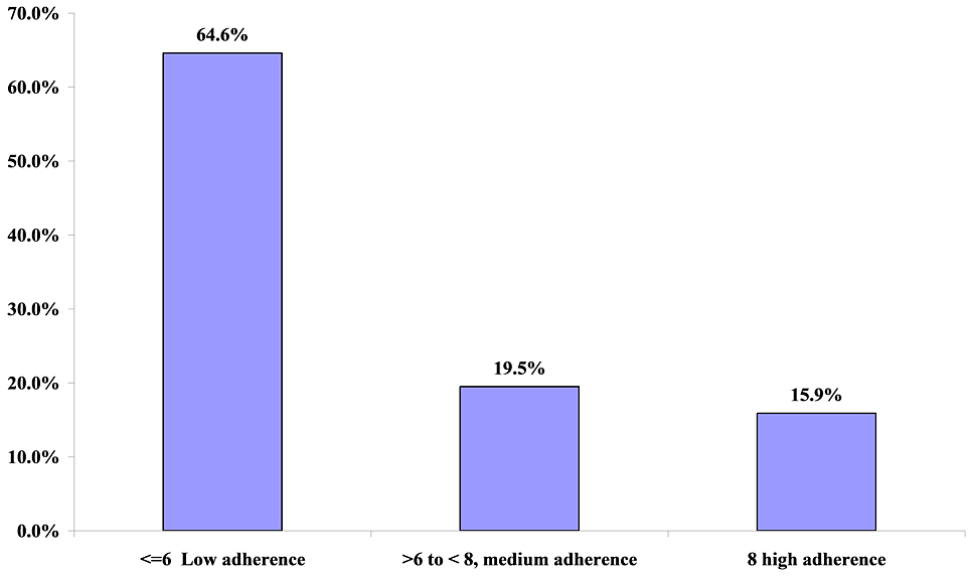

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FIGURE 7:

The co-morbidities were gastro esophageal reflux disease 26(31.7%), sinusitis-rhinitis 25(30.5%), hypertension 19(23.2%), diabetes mellitus 15(18.3%) and cardiac disease 8(9.8%) (Table *1*).

TABLE 1: Distribution of asthmatic patients according to co-morbidities

Co-morbidities	Yes		No		Total	
	N	%	N	%	N	%
Gastro esophageal reflux disease	26	31.7	56	68.3	82	100.0
sinusitis-rhinitis	25	30.5	57	69.5	82	100.0
Hypertension	19	23.2	63	76.8	82	100.0
Diabetes mellitus	15	18.3	67	81.7	82	100.0
Cardiac disease	8	9.8	74	90.2	82	100.0

The types of inhalers were short acting beta agonist+ inhaled corticosteroid 29(35.4%), long acting beta agonist+ inhaled corticosteroid 21(25.6%), short + long acting beta agonist+ inhaled corticosteroid 18(22%), short acting beta agonist 8(9.8%) and inhaled corticosteroid 6(7.3%) (Table *2).*

Table 2: the types of inhalers:

Type of inhaler	N	%
Short acting beta agonist	8	9.8
Inhaled corticosteroid	6	7.3
Long acting beta agonist+ inhaled corticosteroid	21	25.6
Short acting beta agonist+ inhaled corticosteroid	29	35.4
Short+ long acting beta agonist+ inhaled corticosteroid	18	22.0
Total	82	100.0

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The factors associated with low adherence (53) were unavailability 37(69.8%), unaffordability 36(67.9%), fear of side effects 29(54.7%), a belief that they don't need the inhaler 20(37.7%), lack of enough education about the correct use 16(30.2%), a belief that the drug doesn't help 13(24.5%), concerns about social stigma 7(13.2%) and misunderstanding of doctor's instructions 5(9.4%) (P value < 0.05) (Table *3*).

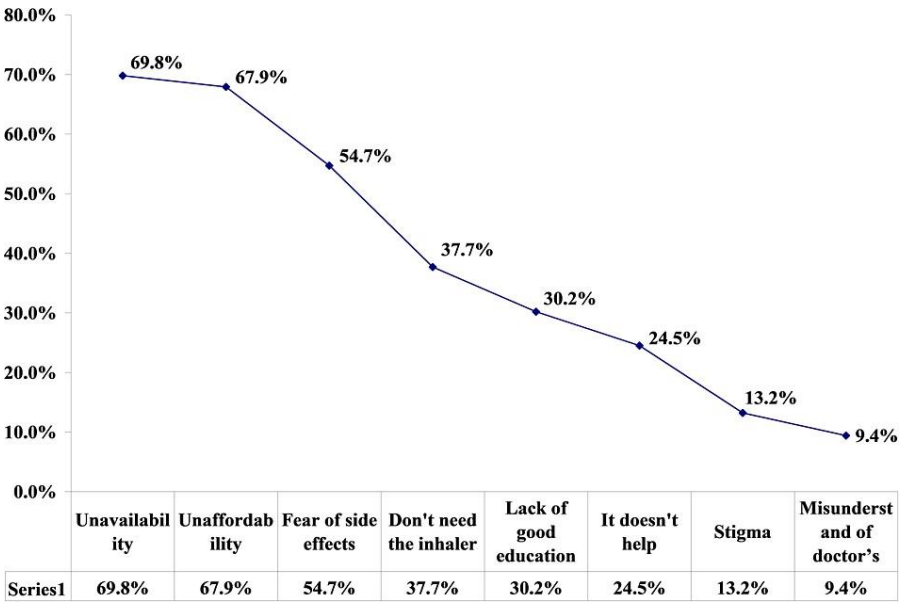

FIGURE 8: Distribution of asthmatic patients according to Factors associated with non- adherence

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TABLE 3: Distribution of asthmatic patients according to Factors associated with non-adherence

Factors	Adherence					
	<=6 Low adherence		>6 to < 8 medium adherence		8 high adherence	
	N	%	N	%	N	%
Unavailability	37	69.8	6	37.5	2	15.4
Unaffordability	36	67.9	12	75.0	1	7.7
Fear of side effects	29	54.7	3	18.8	0	0.0
Don't need the inhaler	20	37.7	7	43.8	0	0.0
Lack of good education about the correct use	16	30.2	6	37.5	0	0.0
It doesn't help	13	24.5	2	12.5	0	0.0
Stigma	7	13.2	0	0.0	0	0.0
Misunderstand of doctor's instructions	5	9.4	0	0.0	1	7.7

Among patients with low adherence, co-morbidities were reported in 39(73.6%) (P value < 0.05) (Table *4*). P value = 0.029

TABLE 4: Distribution of asthmatic patients according to level of adherence in relation to age. P value = 0.029

Age	Adherence					
	<=6 Low adherence		>6 to < 8 ,medium adherence		8 high adherence	
	N	%	N	%	N	%
18 - 35 years	13	24.5	2	12.5	5	38.5
35 - 65 years	26	49.1	10	62.5	7	53.8
> 65 years	14	26.4	4	25.0	1	7.7
Total	53	100.0	16	100.0	13	100.0

High level of adherence to asthma inhaler significantly associated with age 35 - 65 years, female gender, secondary level of education, duration of asthma 1 - 5 years and

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use of short acting beta agonist inhaled corticosteroids (P value < 0.05) (Tables *5*, *6* and *7*).

TABLE 5: Distribution of asthmatic patients according to level of adherence in relation to age. P value = 0.029

Gender	Adherence					
	<=6 Low adherence		>6 to < 8 ,medium adherence		8 high adherence	
	N	%	N	%	N	%
Male	19	35.8	4	25.0	3	23.1
Female	34	64.2	12	75.0	10	76.9
Total	53	100.0	16	100.0	13	100.0

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TABLE 6: Distribution of asthmatic patients according to level of adherence in relation to gender

P value = 0.017

Gender	Adherence					
	<=6 Low adherence		>6 to < 8 ,medium adherence		8 high adherence	
	N	%	N	%	N	%
Male	19	35.8	4	25.0	3	23.1
Female	34	64.2	12	75.0	10	76.9
Total	53	100.0	16	100.0	13	100.0

Table 7: Distribution of asthmatic patients according to level of adherence in relation to type of inhaler. P value = 0.027

Type of inhaler	Adherence					
	<= 6 Low adherence		>6 to < 8 medium adherence		8 high adherence	
	N	%	N	%	N	%
Sort acting beta agonist	7	13.2	0	0.0	1	7.7
Inhaled corticosteroid	5	9.4	0	0.0	1	7.7
Long acting beta agonist+ inhaled corticosteroid	13	24.5	6	37.5	2	15.4
Short acting beta agonist+ inhaled corticosteroid	18	34.0	5	31.3	6	46.2
Short+ long acting beta agonist+ inhaled corticosteroid	10	18.9	5	31.3	3	23.1
Total	53	100.0	16	100.0	13	100.0

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TABLE 8: Distribution of asthmatic patients according to level of adherence in relation to duration of asthma

Duration since diagnosis	Adherence					
	<=6 Low adherence		>6 to < 8 medium adherence		8 high adherence	
	N	%	N	%	N	%
< 1 year	6	11.3	5	31.3	4	30.8
1 - 5 years	16	30.2	8	50.0	7	53.8
> 5 years	31	58.5	3	18.8	2	15.4
Total	53	100.0	16	100.0	13	100.0

The admission to hospital in last year and possession of health insurance were found to be not significantly associated with neither low nor high adherence to use of inhalers (P value > 0.05)

Table 9

Health insurance	Adherence					
	<=6 Low adherence		>6 to < 8 medium adherence		8 high adherence	
	N	%	N	%	N	%
Yes	31	58.5	11	68.8	7	53.8
No	22	41.5	5	31.3	6	46.2
Total	53	100.0	16	100.0	13	100.0

Discussion

Globally, asthma is a serious health issue that contributes significantly to morbidity and mortality. The cornerstone of therapy is the use of inhaler drugs,

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and strong inhaler adherence is crucial for both symptom control and bettering health outcomes. Identification of adherence-related variables and obstacles is crucial so they may be targeted in order to increase adherence to asthma treatments. In order to investigate non- adherence to inhaler medication and related variables among patients with bronchial asthma, a total of 82 asthmatic patients were included in the study. According to our study, the degree of adherence was low in 53 patients (64.6%), medium in 16 patients (19.5%), and high in 13 patients (15.9%), indicating that there are more non-adherent patients than adherent patients. This research further emphasizes the need to improve asthmatic patients' adherence. Co-morbidities are observed in 39 patients (73.6%) of those with inadequate adherence (P value 0.05). This high percentage may be explained by the fact that patients with many co- morbidities must take more medications, which raises the likelihood that they may forget to take them. And contemporary technology might be used to solve this issue. The following factors contributed to the patients' tendency to have low adherence (53%): unavailability of the medication (37,69.8%), unaffordability (36,67.9%), fear of side effects (29,54.7%), belief that they don't need the inhaler (20,37.7%), inadequate instruction on proper use (16,30.2%), belief that the medication doesn't work (13,24.5%), worries about social stigma (7,13.2%), and confusion over the doctor' 5 (or 9.4%) (P 0.05). Our findings are consistent with a research done in Kenya by Hellen K et al., which indicated that the availability and affordability of drugs were substantially related to non-adherence [19]. This closeness can be linked to how similarly both countries' economies are doing today. A systematic evaluation revealed that stigma is one of the elements linked to decreased adherence to the usage of asthma inhalers. The systematic review revealed that felt social stigma is a significant influence, and 22% of studies found that humiliation contributed to poor adherence, therefore their rate is greater than the rate in our study [17].

Asthma duration of 1 to 5 years, female gender, secondary education level, and high level of adherence to asthma inhaler are significantly linked with age 35 to

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65 years in this study (P value 0.05). Education level has a significant impact on how well people take their medications. And the findings from our study, which found a correlation between secondary education and high adherence, are consistent with those of a study conducted in Kenya, which also found that education is a major factor in raising inhaler adherence [19]. Our findings on non-adherence are better than those of an investigation carried out in Kuwait by Albassam A et al., which revealed that the majority of participants (82.6%) reported low adherence to inhaled corticosteroid therapy [20]. However, compared to a research conducted in India, where only (39%) of asthmatics were found to be non-adherent to inhalers, our results of non-adherence are greater [21].

Regarding the fear of side effects as a factor linked with low adherence, our findings are comparable to those of a research conducted in India by Hassan A and Shakur AA, which discovered that patients' fears of pharmaceutical side effects were a prevalent reason for non-adherence (21%). [20]. Patient education on drugs and the proper ways to use them has a significant impact on lowering asthmatic patients' anxiety of inhaler adverse effects and boosting adherence. In our study, it was discovered that health insurance was not substantially correlated with inhaler adherence. P greater than 0.05.

Our study revealed that short acting beta agonist+ inhaled corticosteroid were related with high adherence (P value 0.05), and that drug variables are just as relevant as patient factors in influencing adherence in asthma. Contrary to the ESMMA study, a big study carried out in the Middle East and North Africa that found that Long Acting Beta Agonists and Inhaled Corticosteroids Were Associated with Good Adherence To The Use Of Asthma Inhalers [22].

We do recommend to promote knowledge and improve adherence to asthma control methods, government and non-governmental organizations should launch education and awareness campaigns on asthmaMedications and other management strategies. It is crucial to provide a clear justification for the recommended course of action that is in line with patients' views of their

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condition and addresses any concerns around false beliefs. Giving clear instructions and checklists to help medical professionals educate patients and cover all aspects of health education (knowledge, attitude and practice). The incorporation of contemporary technology (such as mobile applications and social media) in initiatives that promote illness education and adherence. In order to achieve better disease control, there is a critical need to increase access to asthma therapy and ensure the free affordability of inhalers. More studies are required to examine the impact of inhaler medication adherence on asthma management in our nation.

CONCLUSION:

The study indicated that low adherence was present in 64.6% of asthmatic patients, with the proportion of non-adherent patients being higher than the number of adherent patients. The most frequent causes of low adherence were lack of accessibility, high cost of inhalers, erroneous perceptions about the drugs, and inadequate knowledge of inhaler treatments. High adherence to asthma inhaled medicine was most commonly correlated with secondary education and the kind of inhaler being a short acting beta agonist+ inhaled corticosteroid.

Additional information:

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Ethical committee the research Unit Alshaab Teaching Hospital issued approval. Alshaab Teaching hospital ethical committee has recently reviewed your responses to the conditions placed upon the ethical approval for your project under the name Non adherence to inhaler therapy and associated factors among Sudanese patients with bronchial asthma at Al Shaab hospital. Your proposal is now deemed to meet the requirements of the national statement on ethical conduct in human research and full ethical approval has been granted.

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Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue.

Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work.

Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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