

Knowledge, Attitude and Perception of Community About Asthma in Eastern Province of Saudi Arabia.

Sakinah A. Almashhed¹, Fatimah N. Alobaidi¹, Esraa Atef¹, Hassan K. Althabet², Eman Hassan^{3,4}, Hashmeya Alshakhori¹, Aymen A. Alqurain^{5*}

1 Department of Respiratory Therapy, Mohammed Al-Mana College for Medical Sciences, Dammam 34222, Saudi Arabia

2 Department of Respiratory Therapy, Batterjee Medical College, Aseer, Saudi Arabia

3 Department of Nursing, Mohammed Al-Mana College for Medical Sciences, Dammam 34222, Saudi Arabia

4 Medical Surgical Nursing Department, Faculty of Nursing, Cairo University, Cairo City, Egypt

5 Department of Clinical Practice, Faculty of Pharmacy, Northern Border University, Rafha 91911, Saudi Arabia

** Corresponding author:*

Dr. Aymen Ali Alqurain

Assistant Professor of pharmacology and therapeutics Department of Clinical Practice Faculty of pharmacy Northern Border University Rafha 91911, Saudi Arabia Email: aymen.alqurain@nbu.edu.sa

Abstract

Background. The hallmark of bronchial asthma, a chronic inflammatory airway disease, is a reversible airway blockage brought on by bronchial hyperresponsiveness. It is among the most prevalent long-term diseases. Asthma affects two million persons in Saudi Arabia, yet limited data describing the community awareness about Asthma in the Eastern Province is available.

Objective. This study aimed to measure the knowledge, attitude, and perception towards asthma among the community in the Eastern Province, Saudi Arabia.

Methods. A description, cross-sectional, online survey was conducted in the Eastern Province of Saudi Arabia. Asthma knowledge, attitude, and perception scores across different demographic groups were generated from surveyed data. Descriptive statistical analyses, Mann-Whitney U test compared total knowledge and perception scores among gender, and Kruskal-Wallis test comparing groups' knowledge and perception. The level of significance was considered at $p < 0.05$.

Results. 56% of our participant were female individuals, 57% were married, 75% were nonsmokers, 53% were working in non-medical field, and majority were within age group between 18-29 years (41%). The analysis revealed a high level of knowledge about asthma among the general population regarding the differences between asthma and other allergic diseases, triggers, symptoms, and medication of asthma. Interestingly 95% recommended educative programs to increase asthma between school students. Comparison analysis revealed a significant difference in knowledge score between female and male participants. Additionally, a significant difference in knowledge and perception scores between age groups and education levels groups was observed.

Conclusion. Ongoing educational community campaigns and programs are necessary to enhance awareness of asthma.

Keywords. knowledge, Attitude, Perception, Asthma, Saudi Arabia

1. Introduction

Asthma is a multifactorial disease with a complex interplay of genetic, environmental, and lifestyle factors contributing to its development. A family history of asthma or other allergic conditions increases the likelihood of developing asthma, with certain genetic variations linked to heightened susceptibility (1). Environmental factors such as exposure to allergens (pollen, dust mites, pet dander), air pollution, smoking tobacco, and occupational hazards significantly contribute to asthma's prevalence, with urbanization and industrialization exacerbating these risks (2). Viral respiratory

infections, particularly in early childhood, can damage the airways and enhance immune responses that favor asthma development (3). Additionally, lifestyle factors like obesity, diet, and physical activity play crucial role in asthma's prevalence and severity, with obesity linked to increased inflammation and decreased lung function, exacerbating asthma symptoms (4).

Bronchial asthma often coexists with conditions like allergic rhinitis, hay fever, and skin allergies, while its association with smoking remains less significant(5). Physicians must possess comprehensive knowledge concerning asthma diagnosis, treatment modalities, and ongoing care, given its diverse symptomatology and potential severity. The Saudi Ministry of Health identifies various triggers for asthma, including viral respiratory infections, allergens like pollen and dust mites, as well as environmental factors such as smoking and certain foods (6).

Assessment of asthma severity involves evaluating symptom frequency, nocturnal awakening, healthcare utilization patterns, medication use, and impact on daily activities. The condition is classified based on control level and severity, with factors such as pulmonary function tests and clinical courses informing these classifications (6). Notably, mortality risk in asthma patients increases with certain indicators like frequent hospitalizations, use of specific medications, and psychiatric comorbidities (6). Despite asthma's lower mortality rate compared to conditions like chronic obstructive pulmonary disease, its uncontrolled symptoms can lead to fatal outcomes, as evidenced by global mortality statistics (5). Understanding the physiological impact of asthma is crucial, given its effect on the lung airways(7).

In Saudi Arabia, asthma represents a significant health concern, with a prevalence of approximately 11.3% in Riyadh alone (8). Over the past four decades, both morbidity and mortality rates among asthma patients have shown a concerning rising trend(9). With projections suggesting a global burden affecting around 400 million individuals, effective management and public health initiatives remain paramount(10). Epidemiological surveys indicate a prevalence rate of 6.5% among adults aged 15 years and above in Saudi Arabia(5). More recent data indicate a growing prevalence, particularly in urban areas, attributed to increasing environmental pollutants and lifestyle changes (11).

The results of the current research will clarify the misconceptions of asthma among the community and to confirm good knowledge, that can be used to direct the health policies makers and improve patient outcomes and practices among healthcare providers in the region. The study aimed to measure the knowledge, attitude, and perception of asthma among the community of the Eastern Province in Saudi Arabia.

2. Methods

2.1. Design and Setting

A descriptive, cross-sectional online survey study design was conducted from January 2024 to April 2024 to assess the community knowledge, attitude, and perception towards asthma.

2.2. Sample size

The estimated population of the Eastern Province of Saudi Arabia was determined to be 4.9 million(8). The sample size was calculated using the calculator (<https://www.calculator.net/sample-size-calculator.html>). The calculator estimated that the minimum sample size for this study was 666 participants. With a prediction that there will be a 20% drop rate, the total sample required for this study will be 800 participants(12). The participants were recruited randomly from the general population of the Eastern region.

2.3. Inclusion and exclusion criteria

The inclusion criteria include all the individuals residing in the Eastern Province, Saudi Arabia who had voluntarily signed the informed consent before participation and their age were above 18 years old. Participants who did not meet these criteria were excluded.

2.4. Survey Tools

A questionnaire was used for data collection with information obtained through closed-ended questions. This survey was adapted and modified from a validated Questionnaire and Assessment of the Level of Asthma Awareness among Parents of Children with Asthma in Saudi Arabia (1). The questionnaire consisted of three main sections: demographic data, knowledge and attitude, and perceptions. The demographic data section is composed of questions asking for the age, sex, working status, marital status, educational level, nationality, residency, smoking history, asthma history, and family history. The second section is composed of eight questions aimed at assessing the participants' knowledge and attitude of asthma. The last section is composed of eight questions to evaluate the participants' perception of asthma self-management and medications. The questions were written in two languages, Arabic and English. The questionnaire had been proved reliable and valid in the English version. Assessment of the reliability of the Arabic Asthma Knowledge Questionnaire (AAKQ) was performed through two different steps which were: I) Test-retest intra-class correlation and II) Cronbach Alpha score (13). A score of more than 0.7 is commonly accepted for Cronbach alpha. Interclass correlation between the individual items was used to further back up the reliability of the tool, as poor and negative correlation reflects weak reliability of the questionnaire. To enhance the questionnaire's validity, a pilot study with 30 responses was conducted, but pilot data was not included in the final analysis.

2.5. Data Collection

Researchers conducted a self-administered online survey among the Eastern Province population, using various social media platforms. Participants were recruited with their voluntary informed consent. The primary objectives were to comprehend the research goals and secure informed consent from participants.

2.6. Data analysis

The gathered data were coded before being entered into a database using Microsoft Excel 2010 software (Microsoft Corporation, Redmond, Washington, United States). Descriptive analysis, including mean, frequencies and percentages for each variable, is carried out on Statistical Package for Social Sciences (SPSS) V.21. For comparison, Man-Whitney test and Kruskal-Wallis tests were used to compare between groups. The level of significance was considered at $P < 0.05$.

3. Results

A total of 1053 participants from Eastern Province, Saudi Arabia were included. As seen in Table 1, 41% of the participants were aged between 18 – 29 years, 56% were female individuals, 57% were married, 53% were working as non-medical profession, 47% were holding a bachelor's degree, 75% of them were non-smokers, 91% were not diagnosed with asthma, and 33% had a family history of asthma and 84% were living in urban areas.

Table 1: Sociodemographic characteristics and special habits of the study participants (n = 1053)

Variable	Category	Frequency	Percentage
Age	< 18	89	9 %
	18 – 29	430	41 %
	30 – 39	172	16 %
	40 – 49	190	18 %
	> 49	172	16 %
Gender	Male	467	44 %
	Female	586	56 %
Working status	Student	299	28 %
	Medical	196	19 %
	Non-medical	558	53%
Marital status	Married	595	57 %
	Non- Married	458	43 %
Educational level	Intermediate school	50	5 %
	High school	278	26 %
	Diploma	166	16 %
	Bachelors	500	47 %
	Master	40	4 %
	Not mentioned	19	2 %
Residency	Urban	883	84 %
	Rural	152	14 %
	Industrial area	18	2 %
Smoking Status	Yes	213	20 %
	No	785	75 %
	Ex-smoker	55	5 %
Diagnosed with asthma	Yes	89	9 %
	No	964	91 %
Family history of Asthma	Yes	347	33%
	No	706	67%

Table 2 presents that most of the participants (88%) knew that asthma is a chronic disease, and 73% can differentiate between asthma and chest allergy. Shortness of breath was the commonly identified symptom by the participants (91%), then chest tightness (74%) and wheezing (51%) (Table 2). Most of our study participants considered exposure to perfumes, incense, or paint fumes (81%), direct or indirect exposure to cigarette smoke (79%), and exposure to dust mites (82%) were the most common triggers of asthma (Table 2). Table 2 shows that Ventolin (81%) was a medication to treat asthma, followed by 42% reported Pulmicort and Atrovent. Table 2 shows that 97% of the participants agreed that it's preferred not to smoke near asthmatic patients, and 95% recommend providing educative programs for schools, aiming to increase awareness about asthma.

Table 2: Asthma-related knowledge among study participants (n = 1053)

Variable		Frequency	Percentage
Asthma is a chronic disease with sudden deterioration on exposure to allergens.	Yes	922	88 %
	No	26	2%
	I don't Know	105	10%
There is a difference between asthma and chest allergies.	Yes	764	73 %
	No	100	10 %
	I don't Know	189	17%
Symptoms of asthma	Wheezing	536	51 %
	Night coughing	401	38%
	Chest tightness	775	74 %
	Shortness of breath	961	91%
Triggers of asthma	Viral respiratory infections	551	52%
	Pollens	492	47 %
	Dust mite, molds	864	82%
	Animal dander	605	57%
	Cold weather	491	47 %
	Food (Egg, seafood & peanuts)	267	25%
	Direct or indirect exposure to cigarette smoke	829	79 %
	Exposure to perfumes, incense, or paint fumes	851	81%
Medications to treat asthma	Ventolin	852	81 %
	Pulmicort (Corticosteroids)	445	42%
	Atrovent	410	39 %
It's preferred not to smoke near asthmatic patients	Yes	1023	97%
	No	7	1 %
	I don't Know	23	2%
Asthma could lead to increased school absenteeism	Yes	861	82 %
	No	62	6 %
	I don't Know	130	12%
There is a need to create educational programs for schools, aiming to increase awareness about asthma	Yes	1001	95%
	No	16	2 %
	I don't Know	36	3%

As participants could have chosen more than one option concurrently, they may be included into each selection.

Table 3 shows that the participants' perception of asthma. 73% of them agreed that severe asthma might lead to hospitalization in the ICU or death, 45% agreed that asthma medication is limited to symptoms, 46% disagreed with stopping medications when symptoms disappear, 31% agreed to use the medication without a spacer, and 39% agreed that medication leads to side effects if used without asthma. In addition, 26% - 36% of the participants had uncertain, neutral responses to medication questions, where 41% agreed that it is better to go to the emergency department with mild asthma symptoms (Table 3). The majority of participants (81%) agreed that specialized centers raise community awareness, whereas 49% disagreed that asthmatic patients should avoid physical activities and exercise (Table 3).

Table 3: Perceptions toward asthma among study participants (n = 1053)

Variables	Strong Agree	Agree	Neutral	Disagree	Strong Disagree
1. Asthmatic patients could have severe asthmatic attacks that lead to hospitalization or admission to the intensive care unit (ICU) or death	549 (52%)	232 (21%)	164 (17%)	42 (4%)	66 (6%)
2. Asthma medications					
Should be limited to patients who show symptoms (coughing, nasal congestion, wheezing)	246 (23%)	233 (22%)	316 (30%)	131 (13%)	127 (12%)
Should be terminated after the patient stops coughing	146 (14%)	145 (13%)	282 (27%)	201 (19%)	279 (27%)
Preferred to be used without the spacer for the medication to deposit directly in the lungs	159 (15%)	171 (16%)	299 (29%)	151 (14%)	273 (26%)
Can cause dangerous side effects if used without an acute asthma attack	203 (19%)	212 (20%)	380 (36%)	142 (13%)	116 (12%)
3. It's preferred to take the patient to the emergency room even if the patient shows mild asthmatic symptoms	220 (21%)	212 (20%)	292 (28%)	177 (17%)	152 (14%)
4. For a better treatment of asthma, specialized centers are required to provide education and awareness to the patients and the community	655 (62%)	200 (19%)	121 (12%)	28 (3%)	49 (4%)
5. Asthmatic patients should be avoided doing physical activities or exercises.	130 (12%)	119 (11%)	297 (28%)	223 (22%)	284 (27%)

The total knowledge and perception scores were examined for their normality. The Shapiro-Wilk test indicated that both knowledge ($W = 0.993$, $P < 0.001$) and perception ($W = 0.986$, $P < 0.001$) deviated from normal distribution. For that, the Mann-Whitney U test will be employed to compare variables that consisted of only two groups. The Kruskal-Wallis test will be employed to compare variables that contain three or more categories.

The analysis revealed significant differences between the gender groups (males and females) in total knowledge scores ($U = 111841$, $P = 0.001$) and no difference between the two groups in the perception scores ($U = 133484$, $P = 0.494$). Table 4 presents that female participants expressed more knowledge than the male participants (Median 14 vs 12, $P < 0.001$).

Table 4: Total knowledge and perception scores difference among gender

	Group	N	Median	P-value
Total knowledge	Female	586	14	< 0.001
	Male	467	12	
Total Perception	Female	586	27	0.05
	Male	467	27	

P-value was calculated using Mann Whitney U Test.

Table 5 presents significant differences between gender groups, education level groups, and smoking groups in their total knowledge scores. The 18 – 39 age groups reported a higher knowledge level compared to other age groups (Table 5). The PhD group expressed greater knowledge than those with lower educational levels, and the nonsmokers were more knowledgeable compared to the smoker groups (Table 5). Additionally, the analysis documented that the total perception scores were significantly different among different age and education level groups (Table 5).

Table 5: Total knowledge and perception scores difference among gender

	Subgroups	Total knowledge	P-value	Total Perception	P-value
Age (n, median)	< 18	89 (13)	< 0.001	89 (26)	0.002
	18 - 29	430 (14)		430 (27)	
	30 - 39	172 (14)		172 (27)	
	40 - 49	190 (13)		190 (27)	
	> 49	172 (11)		172 (26)	
Education levels (n, median)	Intermediate school	50 (12)	< 0.001	50 (26)	< 0.001
	High school	278 (13)		278 (26)	
	Diploma	166 (11)		166 (27)	
	Bachelors	500 (14)		500 (28)	
	Masters	40 (15)		40 (28)	
	PhD	19 (18)		19 (30)	
Smoking Status (n, median)	Smoker	213 (12)	< 0.001	213 (27)	0.3
	No	785 (13)		785 (27)	
	Ex-smoker	55 (13)		55 (26)	

P-value was calculated using Kruskal - Wallis Test.

4. Discussion

The purpose of the study was to evaluate the level of knowledge, attitude, and perceptions of community in regard to asthma in the Eastern Province of Saudi Arabia. Participants' educational level, smoking status, age, and gender have been addressed as factors that influence knowledge and perceptions about asthma.

One significant finding of the current study is the variation in knowledge of asthma between women and men. Female participants demonstrated significantly higher level of knowledge compared to male participants. This point may be related to the fact that asthma is more prevalent in female individuals than male individuals (14). Interestingly, gender difference was reported in previous studies as female patients usually reported higher awareness towards their sickness and access the health care system more often compared to male patients (15-17). Familiarity with the disease may enhance

awareness about asthma. Contrary to the result in our study, another study reported no significant difference in asthma knowledge between male and female participants who attended the annual asthma awareness campaign(10). Furthermore, in Portugal, in 2024, Coelho and the researchers found that male and female respondents demonstrated similar level of knowledge(18).

Another significant finding from the current study is the gap highlighted in asthma knowledge between smokers and non-smokers. Our findings revealed that non-smokers had significantly higher levels of knowledge compared to smokers. Likewise, in a study carried out in Singapore, aiming to examine the understanding of smoking's effects on asthma symptoms among a total of 372 participants, including smokers and non-smokers, the researchers found that smokers showed significantly lower levels of asthma awareness than non- smokers(19).

Interestingly, this study revealed a correlation between knowledge and perception and educational attainment. Participants with PhD degrees displayed a significantly higher level of knowledge and more positive perception of asthma compared to those with lower educational qualifications. This finding is consistent with another study which investigated the practices and awareness of asthma among caregivers in Riyadh(20). The referenced study found that caregivers with higher educational levels had significantly better understanding of asthma. In alignment with the current study finding, another study surveyed 154 individuals and found that the participants' qualifications were positively associated with their awareness of asthma(18).

Most of our participants (80%) agreed that there is a need for specialized asthma centers to raise the community's awareness about asthma. This is consistent with a previous study which reported that 90% of the participants concurred that asthma centers are vital to awareness(10). Thus, efforts should be made to establish asthma centers and initiate asthma awareness campaigns to enhance perceptions and knowledge regarding asthma as well as quality-of-life and adherence to treatment.

Our findings showed that approximately half of the participants had negative perceptions about avoiding exercise. One study conducted in Zambia, revealed that 57% believed that asthmatics should avoid workouts and physical activity(21). Further, the majority of the primary school teachers in the eastern province of Saudi Arabia demonstrated lack of knowledge regarding exercise in asthmatic students (22). This misconception implies the necessity of implementing community programs to promote the benefits of exercise to asthma patients and eliminate the social and psychological barriers to exercise.

5. Conclusion

In conclusion, our study reflects that most of our participants have a good knowledge about triggers, symptoms, and medication of asthma with high recommendation of providing educative programs for schools, aiming to increase awareness about asthma. Our study highlighted that the level of asthma perception of asthma medication among respondents was neutral and there is misconception of avoiding physical activities or exercises in patients of asthma that requires implementation of community programs to raise perception, so there is still an area for improvement by a lot of work that should be done to better educate the community on the differences between asthma and other respiratory infections, how to identify environmental triggers and specific risk factors, and how to use asthma drugs correctly.

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Conflict of interest

The authors have no potential conflicts of interest that might be relevant to the contents of this manuscript.

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Ethical approval and informed consent

This study was approved by the Institutional Review Board (IRB) at Mohammed Al Mana College for Medical Science (Reference Number SR/RP/128). Written informed consent was obtained from all participants in this study. All participants were deidentified.

Data availability

The datasets analysed during the current study will be made available on reasonable request. Data will be made available for scientific purposes for researchers whose proposed use of the data has been approved by the research team.

Authors' contributions

- Conceptualization: Sakinah Abdullah Almashhed
- Methodology: Hassan Kazim Althabet
- Investigation: Hassan Kazim Althabet, Hashmeya Alshakhori
- Data Analysis: Esraa Atef
- Writing – Original Draft: Fatimah Nasser Alobaidi
- Writing, Reviewing, Editing and Approving final version: Sakinah Abdullah Almashhed, Hassan Kazim Althabet, Fatimah Nasser Alobaidi, Esraa Atef, and Aymen Alqurain
- Supervision: Eman Hassan and Aymen Alqurain

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