

# Awareness of asthma and its management in primary school teachers in Eastern Province

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## ABSTRACT

**Introduction:** Asthma is one of the most common chronic respiratory disease affecting young children. It is estimated that 14% of the world's children have had asthmatic symptoms, according to the International Study of Asthma and Allergies in Childhood (ISAAC). Schools represent "home" for most children as they spend about a third of their waking hours in school each weekday. Also, schools are significant sources of exposure to asthma-triggering allergens. Therefore, school personnel, including teachers, face all the issues of asthma management that the family meets at home. The aim of this study is to assess the levels of knowledge about asthma and its management among primary school teachers in Eastern Province; Saudi Arabia. **Methods:** 396 primary school teachers answered an electronic questionnaire about asthma. This questionnaire contained different questions which assessed teacher's knowledge about symptoms of asthma, and its management. Also, the survey can determine the teacher's attitude and practice regarding asthmatic students. **Results:** Overall, 59.6% of teachers had a high level of asthma knowledge as they were able to answer  $\geq 75\%$  of the knowledge questions correctly. Teachers' level of asthma knowledge was not significantly associated with age, but significantly associated with years of teaching experience, educational level and contact with an asthmatic individual. Most of the respondents were at a high level of awareness concerning asthma symptoms, triggering and treatment (73.2%, 60.9%, 60.7%), respectively, while only 19.4% had high knowledge level about sport and asthma. **Conclusions:** The primary school teachers are not well informed about asthma and its management. Future educational efforts should seek to provide teachers with accurate information about asthma with particular concern for sport and asthma. This will have a significant impact on the management of this chronic respiratory disorder.

**Keywords:** Asthma, awareness, management, primary school teachers

## Introduction

Asthma is a chronic inflammatory disease of airways with symptoms of a cough, wheezing, chest tightness and difficulty in breathing. These symptoms are on and off in nature depending on the presence of triggering factors.<sup>[1]</sup> Approximately, there are 235 million people suffering from asthma according to WHO.<sup>[2]</sup> Based on the global burden (GBD 2010), asthma accounts as one of the highest top 30 burden diseases.<sup>[3]</sup> The International Study of Asthma and Allergies in Childhood (ISAAC) estimates that about 14% of the world's children have had asthmatic

symptoms.<sup>[4]</sup> Asthma ranks 19<sup>th</sup> in term of disability-adjusted life years and 26<sup>th</sup> in term of deaths in Saudi Arabia.<sup>[5]</sup> AlFaryh AR had a study about prevalence in Saudi Arabia, which showed an increase in asthma prevalence in children from 8% to 23% over 9 years interval.<sup>[6]</sup> In Saudi Arabia, Eastern province has the highest prevalence of asthma estimated as 33.7%, in comparison to central region 17.7% and western region 14.1%.<sup>[7]</sup>

Asthma is one of the common chronic diseases in childhood causing child disability.<sup>[8]</sup> It accounts for more school absenteeism than any other childhood conditions and has an average of 9.7 absence days per year.<sup>[9,10]</sup> This prolonged absence disrupts the process of learning and affects child academic performance.<sup>[10]</sup> Children spend about 8 to 9 hours per day each weekday at

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school, and it accounts as a second home for them.<sup>[11]</sup> Studies found that there is a relationship between school environment and the incidence of asthma.<sup>[12]</sup> Therefore, school plays an important role in triggering asthma symptoms as it has many allergens such as dust, fumes, chalk dust and paper. In Saudi Arabia, there is still some schools unprepared will, some of them are old houses, having old windows and air conditioners that make the class environment dustier. Also, the classes are crowded with students, and these factors may lead to asthma exacerbation.

In the United States (US), a study was undertaken to investigate asthma deaths in schools and the circumstances surrounding these deaths. It showed some deaths from asthma occurred because of delayed response or difficulty in deciding by school staff to manage a child with asthma symptoms.<sup>[13]</sup> In Saudi Arabia, there is no school nurse available who can deal with emergency cases and guide the school staff. Thus, teachers have a crucial role to play in the care of asthmatic school children in order of identifying the risk factor, symptoms of an exacerbation and dealing with an emergency.

Several studies have been conducted in India, New York City, Spain, Turkey, and Bahrain showed inadequate knowledge and practised towards the management of asthma in children. The level of awareness should be raised by training programs to meet the needs of children and to decrease school absenteeism.<sup>[14-18]</sup>

In Australia, a 2013 study was conducted on primary school teachers to assess the knowledge of asthma and confidence in management showed that teachers were confident in managing and assisting children with asthma, and this result was influenced by community camping which was conducted over the previous 20 years.<sup>[19]</sup>

In a study done in Riyadh in 2015 about Asthma Education for primary school teachers in Saudi Arabia, the researchers measured the level of knowledge of the primary school teachers pre-education program and after education program. This research concludes that a school-based asthma education program expands knowledge, skills, and confidence of school teachers in assisting asthmatic children.<sup>[20]</sup>

Most studies of asthma in Saudi Arabia are focused on asthma prevalence, morbidity and risk factors. No studies were done on teachers' awareness of asthma. As the teachers play an important role in identifying and managing asthma in schools, it is important to assess their knowledge to prevent asthma complications.

## Method

An analytical cross-sectional descriptive study to assess the level of awareness of asthma and its management among teachers from Primary schools in Eastern Province Saudi Arabia during the years 2017-2018. The study was conducted in male and female public primary schools in Dammam, Qatif, and Khobar, Eastern Province - Saudi Arabia.

The study sample was selected from teachers who work in public primary schools in Dammam, Qatif and Khobar cities.

Teachers who have regular classroom responsibilities and are working in public primary school in Dammam, Qatif, and Khobar, Eastern Province - Saudi Arabia were included in the study.

Multistage sampling technique was conducted among the school teachers who employed in public primary schools in Dammam, Qatif, and Khobar, Eastern province – Saudi Arabia.

Stage 1: cluster sampling of the cities.

Stage 2: systematic random sampling by selecting the schools according to the number of schools' proportions between the selected cities.

Stage 3: all selected school teachers from stage 2 will be included.

The sample size was calculated after getting a registry of all primary schools in Dammam, Qatif and Khobar cities provided by the Department of Education using [www.raosoft.com](http://www.raosoft.com) with marginal error 0.05, CI = 95. The sample size will be adjusted by 10% to compensate for missed questionnaires or data.

## Data collection

Using self-administrated electronic questionnaire collected from 3 validated questionnaires including three sections:

Section A: demographic data of participants.

Section B: assessment of teacher knowledge about asthma and its management.

Section C: Teachers' Attitudes About Children with Asthma.

**Table 1: Socio-demographics characteristics of the participants**

	Description (n=396)
Age	
<30 year	37 (9.3)
30-50 year	320 (80.8)
>50 year	39 (9.8)
Region	
Dammam	172 (43.4)
Alkhobar	130 (32.8)
Qatif	94 (23.7)
Educational level	
Bachelor degree	324 (81.8)
High school	32 (8.1)
Others	40 (10.1)
Years of experience	
≤5 years	62 (15.7)
>5-10 years	126 (31.8)
>10 years	208 (52.5)

**Table 2: Description of different variables**

	Yes	No
Are you asthmatic?	33 (8.3)	363 (91.7)
Are you a mother of an asthmatic child?	67 (16.9)	329 (83.1)
Do you have a 1 <sup>st</sup> -degree asthmatic relative?	203 (51.3)	193 (48.7)
Do you have an asthmatic child in class?	164 (41.4)	232 (58.6)
Have you ever had any training on asthma?	25 (6.3)	371 (93.7)
Do you think you have enough knowledge about asthma?	72 (18.2)	324 (81.8)
Do you allow your asthmatic children to keep their medications with them in school?	374 (94.4)	22 (5.6)
Do you remind asthmatic children to take their medication?	377 (95.2)	19 (4.8)
Do you supervise asthmatic children using their inhalers?	343 (86.6)	53 (13.4)
Have you ever had contact with a parent about his/her child's asthma?	72 (18.2)	324 (81.8)

**Table 3: Awareness and knowledge of asthma with details of awareness questionnaire**

	Description (n=396)
General asthma knowledge	
High ( $\geq 75\%$ )	222 (56.1)
Low ( $< 75\%$ )	174 (43.9)
Symptoms of knowledge	
High ( $\geq 75\%$ )	290 (73.2)
Low ( $< 75\%$ )	106 (26.8)
Triggers knowledge	
High ( $\geq 75\%$ )	241 (60.9)
Low ( $< 75\%$ )	155 (39.1)
Treatment knowledge	
High ( $\geq 75\%$ )	276 (69.7)
Low ( $< 75\%$ )	120 (30.3)
Sport knowledge	
High ( $\geq 75\%$ )	77 (19.4)
Low ( $< 75\%$ )	319 (80.6)
Asthma awareness (Overall)**	
High ( $\geq 75\%$ )	236 (59.6)
Low ( $< 75\%$ )	160 (40.4)

\*\*Calculated from the questionnaire in table 4

#### • Independent variables:

Age, gender, Educational level, Years of experience, family history of asthma, history of asthma and asthmatic student in the class.

#### • Dependent variables:

Awareness of asthma and its management among teachers from primary schools in Eastern Province - Saudi Arabia.

### Data analysis

Data was recorded in SPSS v22. Appropriate static tools will be used after the collection of data. Then all statistical tests were performed at the 0.05 level of significance.

### Ethical consideration

The research was conducted after IRB approval and after the acceptance of general directorate of Education in Dammam, Qatif and Khobar. Written informed consent was attached to the questionnaire to ensure anonymity and confidentiality.

All participants should fill the questionnaire once.

## Results

The socio-demographics characteristics of the respondents are presented in Table 1. The age of most participants ranged from 30 to 50 years (80.8%). Also, most of the participants had a high educational level; Bachelor degree (81.8%). Nearly half of the selected teachers reported having more than 10 years of teaching experience (52.5%).

Although only 33/396 (8.3%) reported that they were asthmatic, 51.3% had a 1<sup>st</sup>-degree asthmatic relative. Only 72 (18.2%) respondents thought that they had enough knowledge about asthma with 25 (6.3%) reported that they had received training on asthma. Nearly all the participants allow their asthmatic students to keep their medications with them in school, remind them to take it and supervise them using their inhalers, but only 72 teachers had contact with a parent about his/her child's asthma as showed in Table 2.

Table 3 presents the distributions for knowledge about asthma among participants. Overall, more than half of participating teachers (59.6%) had a high level of asthma awareness ( $\geq 75\%$  correct answers for the asthma Awareness questionnaire), and 160 (40.4%) of them had low knowledge about asthma ( $< 75\%$ ). Regarding specific knowledge of asthma, most of the respondents were at a high level of awareness concerning asthma symptoms, triggering and treatment (73.2%, 60.9%, 60.7%), respectively. It is a concern that only 19.4% had high knowledge level about sport and asthma.

Table 4 shows the responses obtained concerning general knowledge statements about asthma, the symptoms of severe asthma attacks, the trigger factors that exacerbate asthma and exercise of an asthmatic child. The majority of the participants (79.5%) knew that asthma is a common respiratory disease in children worldwide.

It is a concern that nearly a quarter of the participating teachers don't know or unsure that agitation and drowsiness both are asthmatic symptoms. More than a third of the teachers knew that exercise could trigger an asthma attack and the remainders don't know or unsure.

**Table 4: Awareness questionnaire**

	True	False	Unsure
Asthma is a common respiratory disease in children worldwide	315 (79.5)	32 (8.1)	49 (12.4)
Allergies are associated with asthma	307 (77.5)	27 (6.8)	62 (15.7)
Asthmatic children have low IQs	8 (2)	262 (66.2)	126 (31.8)
Asthma is not curable	41 (10.4)	277 (69.9)	78 (19.7)
Asthma is controlled by appropriate medication	357 (90.2)	9 (2.3)	30 (7.6)
Asthma is an emotional disorder that needs psychological counselling	35 (8.8)	291 (73.5)	70 (17.7)
Asthma can lead to death	281 (71)	36 (9.1)	79 (19.9)
Difficulty with speech	281 (71)	45 (11.4)	70 (17.7)
Agitation	211 (53.3)	82 (20.7)	103 (26)
Drowsiness	242 (61.1)	54 (13.6)	100 (25.3)
Rapid breathing	286 (72.2)	56 (14.1)	54 (13.6)
Confusion	361 (91.2)	6 (1.5)	29 (7.3)
Blue discolouration of the lips	312 (78.8)	14 (3.5)	70 (17.7)
Smoking	381 (96.2)	2 (0.5)	13 (3.3)
Chalkdust	372 (93.9)	5 (1.3)	19 (4.8)
Exercise	148 (37.4)	134 (33.8)	114 (28.8)
Cold weather	286 (72.2)	46 (11.6)	64 (16.2)
Common cold	347 (87.6)	10 (2.5)	39 (9.8)
Emotional events	95 (24)	153 (38.6)	148 (37.4)
Pets	334 (84.3)	9 (2.3)	53 (13.4)
Laughing	111 (28)	159 (40.2)	126 (31.8)
Antibiotics are used to relieve an asthma attack	150 (37.9)	125 (31.6)	121 (30.6)
Aspirin is used to relieve an asthma attack	25 (6.3)	208 (52.5)	163 (41.2)
Ventolin or Asthavent are used to relieve an asthma attack	369 (93.2)	2 (0.5)	25 (6.3)
Preventative medication is needed for most asthmatic children	314 (79.3)	17 (4.3)	65 (16.4)
Oxygen therapy is required in very severe asthma attacks	347 (87.6)	7 (1.8)	42 (10.6)
Ventolin® can cause a rapid pulse rate, palpitations and tremors	206 (52)	36 (9.1)	154 (38.9)
Asthmatic children should avoid exercise and sports	122 (30.8)	142 (35.9)	132 (33.3)
Preventative medication can be taken by the asthmatic child before exercise and sports	207 (52.3)	30 (7.6)	159 (40.2)
Swimming is the best sport for asthmatics	89 (22.5)	60 (15.2)	247 (62.4)

**Table 5: Relation of asthma awareness to demographics**

	Asthma awareness		P*
	High (≥75%) 236 (59.6)	Low (<75%) 160 (40.4)	
Age			
<30 year	24 (10.2)	13 (8.1)	0.493
30-50 year	189 (80.1)	131 (81.9)	0.657
>50 year	23 (9.7)	16 (10)	0.934
Region			
Dammam	106 (44.9)	66 (41.3)	0.255
Alkhobar	84 (35.6)	46 (28.7)	0.155
Qatif	46 (19.5)	48 (30)	0.016
Educational level			
Bachelor degree	187 (79.2)	137 (85.6)	0.106
High school	19 (8.1)	13 (8.1)	0.979
Others	30 (12.7)	10 (6.3)	0.036
Years of experience			
≤5 years	44 (18.6)	18 (11.3)	0.047
>5-10 years	72 (30.5)	54 (33.8)	0.497
>10 years	120 (50.8)	88 (55)	0.417

\*Chi-square test

In addition to that, 31.6% of teachers incorrectly believed that an antibiotic is used to relieve an asthma attack. About half of the teachers were unsure or didn't know the side-effects of

commonly used  $\beta$ -agonist relievers (identified by their common trade names). Of particular relevance to the school setting, only 22.5% of respondents knew that Swimming is the best sport for asthmatics, while a third of schoolteachers (30.8%) thought that asthmatic children should avoid exercise and sports.

Primary school teachers' knowledge level was not significantly associated with age but significantly associated with teaching experience and educational level, Table 5. Also, asthma awareness was significantly associated with contact with an asthmatic person (mother, relative, a child in the class), Table 6. In addition to that, there was a significant difference in the level of asthma awareness among Qatif teachers, Table 5. According to Table 7, the level of asthma awareness was not significantly related to some teachers practice.

## Discussion

Primary school teachers constitute an essential source in the care of asthmatic children either in the form of preventive measures or management measures if they develop symptoms at school.<sup>[21,22]</sup> So this study investigated the knowledge, prevention and management behaviour, and communication regarding asthma of primary school teachers of Eastern Province.

**Table 6: Relation of asthma awareness to the history of asthma or previous training**

	Asthma awareness		P*
	High ( $\geq 75\%$ ) 236 (59.6)	Low (<75%) 160 (40.4)	
Are you asthmatic?			
Yes	25 (10.6)	8 (5)	0.048
No	211 (89.4)	152 (95)	
Are you a mother of an asthmatic child?			
Yes	58 (24.6)	9 (5.6)	<0.001
No	178 (75.4)	151 (94.4)	
Do you have a 1st-degree asthmatic relative?			
Yes	141 (59.7)	62 (38.8)	<0.001
No	95 (40.3)	98 (61.3)	
Do you have an asthmatic child in class?			
Yes	108 (45.8)	56 (35)	0.033
No	128 (54.2)	104 (65)	
Have you ever had any training on asthma?			
Yes	13 (5.5)	12 (7.5)	0.424
No	223 (94.5)	148 (92.5)	

\*Chi-square test

**Table 7: Relation of asthma awareness to some practices**

	Asthma awareness		P*
	High ( $\geq 75\%$ ) 236 (59.6)	Low (<75%) 160 (40.4)	
Do you think you have enough knowledge about asthma?			
Yes	57 (24.2)	15 (9.4)	<0.001
No	179 (75.8)	145 (90.6)	
Do you allow your asthmatic children to keep their medications with them in school?			
Yes	222 (94.1)	152 (95)	0.691
No	14 (5.9)	8 (5)	
Do you remind asthmatic children to take their medication?			
Yes	226 (95.8)	151 (94.4)	0.526
No	10 (4.2)	9 (5.6)	
Do you supervise asthmatic children using their inhalers?			
Yes	209 (88.6)	134 (83.8)	0.168
No	27 (11.4)	26 (16.3)	
Have you ever had contact with a parent about his/her child's asthma?			
Yes	49 (20.8)	23 (14.4)	0.106
No	187 (79.2)	137 (85.6)	

\*Chi-square test

The results of the current study detected that many teachers have a good overall knowledge of asthma (59.6%) despite a shortage of training (6.3%) in concordance with the result of Bahari *et al.*<sup>[22]</sup> Also, the result detected a shortage of teachers' knowledge about sport and asthma as 30.8% reported that asthmatic child should avoid exercise, and only 22.5% knew that swimming is the best sport for asthmatic. This was similar to results of Madsen *et al.* and Govender *et al.*<sup>[21,23]</sup> However, many teachers had a good knowledge of asthmatic symptoms, triggers and treatment. Most of the teachers (78.8%) could identify blue discoloration of the lips as a sign for the asthmatic attack. This was in the same line of results of Tse *et al.* and Seto *et al.*<sup>[24,25]</sup>

Regarding knowledge of the trigger factors that can exacerbate asthma in children was better than that detected in a study by Bell *et al.*<sup>[26]</sup> The results identified that about third of teachers incorrectly thought that antibiotics are used to relieve asthmatic

attack similar to Tse K *et al.* and Govender D, *et al.*<sup>[21,24]</sup> The result of a significant association of knowledge level with age was similar to the outcome of Govender D *et al.*<sup>[21]</sup> Otherwise significant association with educational degree and years of experience ( $\leq 5$  years).

## Conclusions

Teachers' knowledge about asthma and its management is not sufficient, especially in the aspect of exercise with asthma and some misconception related to treatment. Many teachers are aware that their knowledge of asthma is deficient. So, future educational efforts should seek training of primary school teachers on asthma and its management.

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## Conflicts of interest

There are no conflicts of interest.

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