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RESEARCH ARTICLE

ASSESSMENT OF KNOWLEDGE ABOUT BRONCHIAL ASTHMA AND AFFECTING FACTORS AMONG PRIMARY SCHOOL TEACHERS IN SABYA CITY, SAUDI ARABIA 2017

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ABSTRACT

Background: Bronchial asthma is one of the most common chronic diseases among children, which has a high prevalence in Saudi Arabia. The assessment of knowledge about asthma among schoolteachers is important to provide early diagnosis for students who suspected to have bronchial asthma. **Objectives:** To assess the knowledge of teachers working at primary schools about bronchial asthma among school students. **Subjects and methods:** A cross-sectional study was conducted among a random representative sample of primary school teachers in Sabya city, Saudi Arabia. Multstage sampling technique was adopted. A structured self-distribution questionnaire was applied to collect the study data. **Results: with** response rate91.2% of study population 393 responded .All were Saudis half of them (50.6%) were males. 42.7% of them their age ranged between 40 and 49 yearsMajority of the teachers knew that parental smoking may make the child`s asthma worse (85.7%) and children with asthma have abnormally sensitive air passages in their lungs (85.5%). However, only 18.8% of them could recognize that coughing, wheezing and shortness of breathing are the three main symptoms of asthma. Only 11% of teachers knew that Ventolin doesn`t damage the heart and 13.8% could recognize all the asthma triggers. Majority of teachers did not know the possible reason for failure of a medicine to relieve the symptoms of an acute attach of asthma (95.2%) as well as the ways that can prevent attacks of asthma during exercise (86.5%). The highest level of knowledge was concerning general knowledge subscale (47.5%) the lowest was concerning acute attack recognition, triggers, and management (18.8%). The overall Newcastle asthma knowledge score was 31.9%). Teachers with personal or family history of asthma were more knowledgeable. **Conclusion:** The knowledge of primary school teachers in Sabya city regarding bronchial asthma among children is overall suboptimal, particularly regarding recognition, triggers, and management of acute attack of asthma. Frequent false myths and beliefs were identified among them.

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INTRODUCTION

According to WHO bronchial asthma defined as a disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. This condition is due to inflammation of the air passages in the lungs and affects the sensitivity of the nerve endings in the airways so they become easily irritated. In an attack, the lining of the passages swell causing the airways to narrow and reducing the flow of air in and out of the lungs (WHO, 2001). Bronchial asthma is one of the most common chronic diseases among children, which has a high prevalence in Saudi Arabia and worldwide, in one cross-sectional study was done in Alkhobar city, Saudi Arabia about the prevalence of asthma among school student and estimate the prevalence rate ranged between 8% and 9.5% (Al-Dawood, 2001).And in one recent epidemiological cross-sectional study in Jazan region, Saudi Arabia showed the prevalence of bronchial asthma in children was 17.7% (Khawaji, 2017). In previous two studies conducted in Saudi Arabia, the prevalence of asthma was estimated as high, so with this high prevalence rate of bronchial asthma, asthma can affect the daily activity and school performance which increase the absence days of students from school due to bronchial asthma, in study was done in South Wales, United Kingdomabout achieving treatment goals for school children with asthma and showed 17% of students absent from school due to asthma during one term, with an average of 9 days of school days are lost per asthmatic student each term (Fillmore, 1997). In Jazan region the asthma attack increased in season of dust which usually happened in summer, so dust storm can affect on asthmatic patients as triggers and increase the chance of acute attack, in study was done in Turkey showed dust storms may deteriorate the quality of life of asthmatic patients[5]. Additionally, dust storms increase the chance of hospital admission in asthmatic patients, in study was done in Kuwait about the impact of dust storms on hospital admissions due to asthma over a period of 5 years in Kuwait and showed hospital admissions due to asthma is significant increase in the dust storms days[6], so with these data bronchial asthma need more awareness and provide a good preventive care for asthmatic patients. The assessment of knowledge about asthma among schoolteachers and its triggers is important to provide early diagnosis for students who suspected to have bronchial asthma, treatment and good preventive care.

Aim: The aim of this study is to assess the knowledge and influencing factors about bronchial asthma among primary school teachers

Objectives

- To assess the knowledge about bronchial asthma among primary schoolteachers.
- To determine the primary school teachers approach toward asthmatic students in schools.

- To determine factors associated with better bronchial asthma knowledge among primary school teachers.

Literature Review

Bronchial asthma is one of the most common chronic non-communicable diseases in children worldwide, according to the World Health Organization (WHO) the burden of bronchial asthma globally was estimated 383 000 deaths due to bronchial asthma in 2015 (WHO, 2017). More than 10 million of children in the US under age of 18 years (14%) have diagnosed with bronchial asthma, and 6.8 (9%) million still have bronchial asthma, so the prevalence of bronchial asthma in children was estimated 9.3% in the US (Center for Health Statistics, 2012). Additionally, the asthma symptoms were estimated in children 5% to 35% in different regions of the world, which more in developed countries compared to developing countries (Masoli, 2004). The prevalence of bronchial asthma is Saudi Arabia is significantly increased from 8% in 1986 to 23% in 1995 in different parts of Saudi Arabia (Al Frayh, 2001). In one recent study was conducted in Madinah, Saudi Arabia estimated the prevalence of bronchial asthma symptoms was 10.2% in primary school children (Nahhas, 2012). Additionally, in one recent epidemiological study in Jazan region, Saudi Arabia showed the prevalence of bronchial asthma in children was 17.7% (Khawaji, 2017). As students in primary school spend almost one third of the day in their school around 30% of the day, the student's may have exposed or experience to acute attack of bronchial asthma or even to life-threatening asthma exacerbations at school (Olympia *et al*., 2005). The impact of bronchial asthma on asthmatic children's quality of life and school performance is considerable. Inadequately controlled and managed of bronchial asthma in children that will negatively interfering on child's quality of life, daily activities and child's school performance and attendance (Schmier, 2007). The diagnosis of bronchial asthma in children needs to take a complete history and physical examination. History should include the current, past, family, exposures, allergy, and medication histories. Current history of wheeze, shortness of breath and cough is usually present in patients with bronchial asthma and characterized by recurrent of these symptoms (Chang, 2012). The goal of management and control of bronchial asthma is to improve the quality of life, reducing the mortality and morbidity from asthma, and decrease the cost of management (Chang, 2012). Additionally, the successful management should decrease the recurrent of symptoms, number of exacerbation and its severity, improve the school performance and attendance, and decrease the emergency and extra clinic visits (Chang, 2012). The management of bronchial asthma in addition to the medication, the management should include environmental control of exposures and self-management education, bronchial asthma medications divided into two groups, quick-relief medication and long-term control medication, quick-relief medication group include short- acting beta-agonists with or without oral or intravenous corticosteroids which are used to treat acute bronchial asthma symptoms and exacerbations and long-term control group include inhalation corticosteroids, long-acting beta-agonist, leukotriene inhibitors, and cromolyn sodium which are used to control bronchial asthma symptoms in chronic asthmatic patients (Townshend, 2007). According to The National Heart, Lung, and Blood Institute (NHLBI) asthma management guidelines have the following recommendations for classroom teachers; "(1) Awareness of bronchial asthma policies and procedures; (2) Awareness of school teachers role in student's bronchial asthma management; (3) Collaborating with the student and his/her family in handling missed schoolwork; (4) Encouraging student's participation in physical activity; (5) Awareness of asthma triggers for specific students; (6) Help in reducing allergens and irritants that can provoke an asthma attack in the classroom; and (7) Educating all students to be more tolerant with classmates with asthma." (Nhlbi, 2014).

METHODOLOGY

Study design: A cross-sectional design wasused in this study to assess the knowledge of asthma among primary school teachers in Sabya city, Saudi Arabia

Study population: The study was conducted among primary school teachers in Sabya city, Saudi Arabia. total number of primary schools in Sabya city is 27 (14 male school and 13 female school). The number of teachers is around 18-25 teachers in each school.

Inclusion criteria

- All teachers working in primary school, regardless their age, nationality, duration of service, or occupational position.

Exclusion criteria

- Teachers who were serving the students with special need, because they are already trained and educated about health diseases of their students.
- Teachers who were not willing to participate in the study
- Teachers who were not attend in the data collection days.

Sample size: There no previous study estimated the prevalence of asthma knowledge among primary school teachers. To detect a knowledge level (P) of 50% with 5% confidence limit (d) among primary school teachers with 95% confidence level (1- α/2), the sample size was estimated to be (N) 384 primary school teachers, according to the following equation:

$$N = \frac{(z)^2 * \mathrm{p} * (1 - \mathrm{p})}{(d)^2}$$

Where Z is a constant = 1.96, the knowledge level (P) = 50%, and the confidence limits (d) = 5%. This sample size was increased by 10% to 420 primary school teachers in order to compensate for possible non-response.

Sampling technique: Multistage sampling technique was used in this study.

Data collection tool: A structured self-administered questionnaire was used to collect the study data. The Newcastle Asthma Knowledge Questionnaire originally developed by Fitzclarence and Henry (Fitzclarence, 1990) and has been translated into Arabic language and used in the study.

Statistical analysis: Dataentry and statistical analysis were performed using the Statistical Package for Social Science (SPSS) version 25. Since all variables were categorical, they were presented as frequencies and percentage. Multiple linear regression was performed with overall score of Newcastle asthma knowledge as a dependent variable and demographic characteristics as independent variables. Statistical significance was set at p value < 0.05.

Ethical consideration: The research was conducted after approved from local ethical committee in Jazan region. And administrative approval from Sabya education administration

RESULTS

As showed in Table 1. Almost half of respondent (50.6%) were males. The age of 42.7% of them ranged between 40 and 49 years and that of 7.4% was ≥50 years. All were Saudis and majority of them (87.5%) were married. Minority of them (1.3%) reported history of asthma whereas 23.9% had family history of asthma.

Teachers` knowledge regarding bronchial asthma

General knowledge: Table 2 shows that majority of the teachers knew that parental smoking may make the child`s asthma worse (85.7%) and children with asthma have abnormally sensitive air passages in their lungs (85.5%). Almost two-thirds of the participants (62.4%) could recognize that asthma usually more of a problem at night than during the day. On the other hand, only 18.8% of them could recognize that coughing, wheezing and shortness of breathing are the three main symptoms of asthma and 39.7% didn`t know any of the three (Figure 1). Only 10.7% knew correctly that the best way to measure the severity of child asthma is not to listen to his chest by the doctor.

Table 1. Demographic characteristics of primary school teachers in Sabya City, Saudi Arabia 2017

Characteristics	Number	percentage
Total	393	100.0
Gender		
Male	199	50.6
Female	194	49.4
Age		
<30	57	14.5
30-39	139	35.4
40-49	168	42.7
≥50	29	7.4
Nationality		
Saudi	393	100
Non-Saudi	0	0
Marital status		
Single	49	12.5
Married	344	87.5
Children number		
0	65	16.5
1-5	252	64.1
6-10	69	17.6
>10	7	1.8
Working years		
<10	171	43.5
10-19	101	25.7
≥20	121	30.8
Personal history of asthma		
No	388	98.7
Yes	5	1.3
Family history asthma		
No	299	76.1
Yes	94	23.9

Table 2. Shows that majority of the teachers knew that parental smoking may make the child`s asthma

	Question	Correctanswer	True	False	Don'tknow	Correct
Q1	What are the here main symptoms of asthma?	Coughing, wheezing, shortness of breathing	70 (17.8%)	167 (41.5%)	156 (39.7%)	70 (17.8%)
Q2	More than 1in10children will have asthma at some time during their childhood.	True	178 (45.3%)	35 (8.9%)	180 (45.8%)	178 (45.3%)
Q3	Children with asthma have abnormally sensitive air passages in their lungs.	True	336 (85.5%)	15 (3.8%)	42 (10.7%)	336 (85.5%)
Q25	Swimming is the only suitable exercise for asthmatics.	False	56 (14.2%)	103 (26.2%)	234 (59.5%)	103 (26.2%)
Q26	Parental smoking may make the child's asthma worse.	True	337 (85.8%)	12 (3.1%)	44 (11.2%)	337 (85.8%)
Q28	The best way to measure the severity of a child's asthma is For the doctor to listen to his chest	False	208 (52.9%)	41 (10.4%)	144 (36.6%)	41 (10.4%)
Q29	Asthma is usually more of a Problem at night than during the day.	True	243 (61.8%)	32 (8.1%)	118 (30.0%)	243 (61.8%)

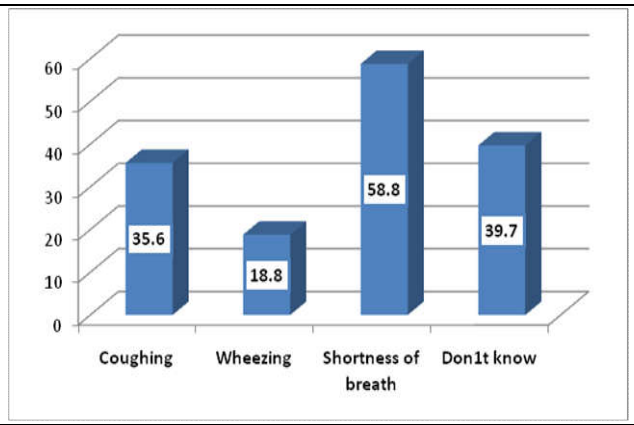

Figure 1. Teacher`s knowledge regarding the main symptoms of asthma

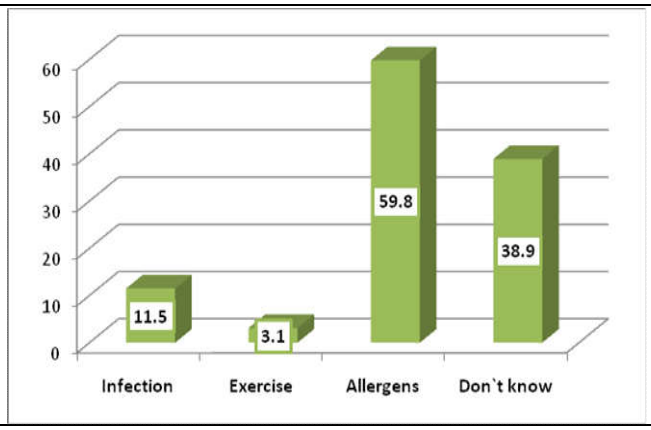

Figure 2. Teacher`s knowledge regarding the triggers of asthma

Recognition, triggers, and management of acute attack of asthma: Table 3: Recognition, triggers, and management of acute attack of asthma among primary school teachers in Sabya city, Saudi Arabia 2017. About half of the teachers (50.2%) knew that during an attack of asthma, the wheeze might be due to muscles tightening in the wall of the air passages in the lungs. Nearly one-third of them (36.7%) knew that inhaled medications for asthma have fewer side effects than tables.

On the other hand, only 9.3% of the teachers could recognize that if a person dies from an asthma attack, this doesn't usually means that the final attack must have begun so quickly that there was no time to start any treatment. Only 11% of teachers knew that ventolin doesn`t damage the heart. Only 13.8% of teachers could recognize all the asthma triggers (Table 3). More than one third of them (38.9%) did not recognize any of the triggers as shown in Figure 2.

Table 3. Recognition, triggers, and management of acute attack of asthma among primary school teachers in Sabya city, Saudi Arabia 2017

	Question	Correctanswer	True	False	Don'tknow	Correct
Q6	Write down all the things you know that	Allergens, colds, and exercise	50	190	153	50
	Cause asthma(sometimes called trigger factors).		(12.7%)	(48.4%)	(38.9%)	(12.7%)
Q7	During an attack of asthma ,the wheeze	True	193	14	186	193
	May be due to muscles tightening in the wall of the air passages in the lungs.		(49.1%)	(3.6%)	(47.3%)	(49.1%)
Q8	During an attack of asthma ,the wheeze	True	97	37	259	97
	may be due to swelling in the lining of the air passage in the lungs.		(24.7%)	(9.4%)	(65.9%)	(24.7%)
Q11	What are three asthma treatments	Two of short-acting beta2-adrenergic	99	31	263	99
	(medicines),which are useful during an attack of asthma?	preparation, ipratropium bromide, oral corticosteroids, and oxygen	(25.2%)	(7.9%)	(66.9%)	(25.2%)
Q15	If a person dies from an asthma attack,	False	149	36	208	36
	This usually means that he final attack		(37.9%)	(9.2%)	(52.9%)	(9.2%)
	must have begun so quickly that there was no time to start any treatment.					
Q18	Inhaled medications for asthma (e.g.	True	144	52	197	144
	Ventolin puffers) have fewer side effects than tablets.		(36.6%)	(13.2%)	(50.1%)	(36.6%)
Q19	Short courses of oral steroids (such as prednisolone) usually cause significant side effects.	False	124(31.6%)	40 (10.2%)	229 (58.3%)	40 (10.2%)
Q20	Some asthma treatments (such as Ventolin) damage the heart.	False	89(22.6%)	39(9.9%)	265(67.4%)	39(9.9%)
Q21	A5yearoldboyhasanattackofasthma and takes two puffs of Ventolin from a puffer (metered dose inhaler). After 5 Min he is no better .Give some reasons why this might have happened.	Two from: the medication has expired, inhaler is empty, poor technique, insufficient dosage	5 (1.3%)	157(39.9%)	231(58.8)	5(1.3%)
Q22	During an attack of asthma which you are managing at home your child is Requiring the nebulizer (mask)every2h. he/she is gaining benefit but is breathless after 2 h. provided that he/she doesn't get any worse ,it is fine to continue with 2 h treatment.	False	100 (25.4%)	79(20.1%)	214(54.5%)	79(20.1%)
Q23	Write down ways of helping to prevent attacks of asthma during exercise.	Two out of :warm-up exercises ,short-action beta-2 agonists or chromones prior to exercising, managing asthma More carefully ,breathing through the nose, warm and humid environment.	22 (5.6%)	0 (0%)	371 (94.0%)	22(5.6%)

Table 4. Maintenance treatment of asthma among primary school teachers in Sabya city, Saudi Arabia 2017

	Question	Correctanswer	True	False	Don't know	Correct
Q10	Write down two asthma treatments (medicine), which are taken every day on a regular basis to prevent attacks of asthma from occurring.	Tow of inhaled corticosteroids, chromones, montelukast, long-acting beta-2- adrenergic agonist combinations	4 (1.0%)	49 (12.5%)	340 (86.5%)	4 (1.0%)
Q12	Antibiotics are an important part of treatment for most Children with asthma.	False	136 (34.6%)	97 (24.7%)	160 (40.7%)	97 (24.7%)
Q14	Allergy injections cure asthma passages in their lungs.	False	77 (19.6%)	79 (20.1%)	237 (60.3%)	79 (20.1%)
Q19	Short course of oral steroids (such as prednisolone) usually cause significant side effects.	False	124 (31.6%)	40 (10.2%)	229 (58.3%)	40 (10.2%)
Q27	With appropriate treatment most children with asthma should lead a normal life with no restrictions on activity.	True	245 (62.3%)	43 (10.9%)	105 (26.7%)	245 (62.3%)
Q31	Children with frequent asthma should have preventive drugs.	True	282 (71.8%)	21 (5.3%)	90 (22.9%)	282(71.8%)

Table 5. Table False myths of asthma among primary school teachers in Sabya city, Saudi Arabia 2017

	Question	Correct answer	True	False	Don't know	Correct
Q4	If one child in a family has asthma then all his/her brothers and sisters are almost certain to have asthma as well.	False	17 (4.3%)	303 (77.1%)	73 (18.6%)	**303 (77.1%)**
Q5	Most children with asthma have	False	83 (21.1%)	39 (9.9%)	271 (69.0%)	**39 (9.9%)**
	an increase in mucus when they					
	drink cow's milk.					
Q9	Asthma damages the heart.	False	206 (52.4%)	33 (8.4%)	154 (39.2%)	**33 (8.4%)**
Q13	Most children with asthma should	False	56 (14.2%)	97 (24.7%)	240 (61.1%)	**97 (24.7%)**
	not eat dairy products.					
Q16	People with asthma usually have	False	145 (36.9%)	63 (16.0%)	185 (47.1%)	**63 (16.0%)**
	'nervous problems'.					
Q17	Asthma is infectious (i.e. you can	False	27 (6.9%)	299 (76.1%)	67 (17.0%)	**299 (76.1%)**
	catch it from another person).					
Q24	Children with asthma become	False	174 (44.3%)	82 (20.9%)	137 (34.9%)	**82 (20.9%)**
	addicted to their asthma drugs.					
Q30	Most children with asthma will	False	33 (8.9%)	215 (54.7%)	145 (36.9%)	**215 (54.7%)**
	have stunted growth.					

More than one-quarter (27.1%) could recognize two of the medicines used in the treatment of acute attacks of asthma. The most frequent known was beta agonist (26.9%), followed by oxygen (28.2%). Figure 3 Figure 4 shows that majority of teachers (95.2%) did not know the possible reason for failure of a medicine to relieve the symptoms of an acute attach of asthma.

False myths of asthma: From Table 5, it is realized that most of teachers (77.6%) knew correctly that if one child in a family has asthma then not all his/her brothers and sisters are almost certain to have asthma as well and asthma is not infectious (76.9%). More than half of the participants (56.4%) could recognize that most children with asthma will not have stunted growth. On the other hand, less than one fifth of them knew that people with asthma usually haven`t nervous problems (17.4%), most children with asthma haven`t an increase in mucus when they drink cow`s milk (11%) and asthma doesn't damage the heart (9%).

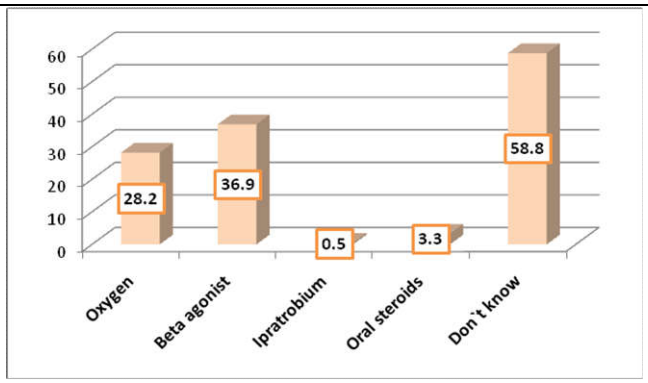

Figure 3. Teacher`s knowledge regarding medicine used in treatment of acute attacks of asthma

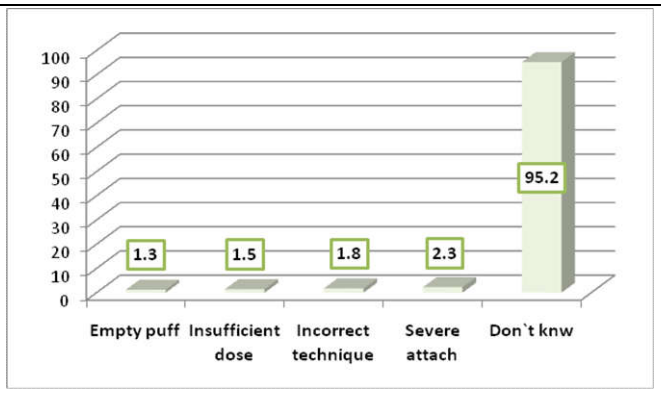

Figure 4. Teachers` knowledge about reasons of failure of a medicine to relieve the symptoms of acute attack of asthma

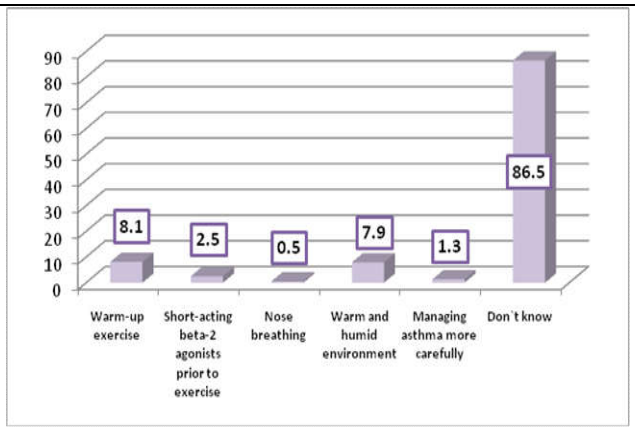

Figure 5. Teachers` knowledge regarding ways that can prevent attacks of asthma during exercise

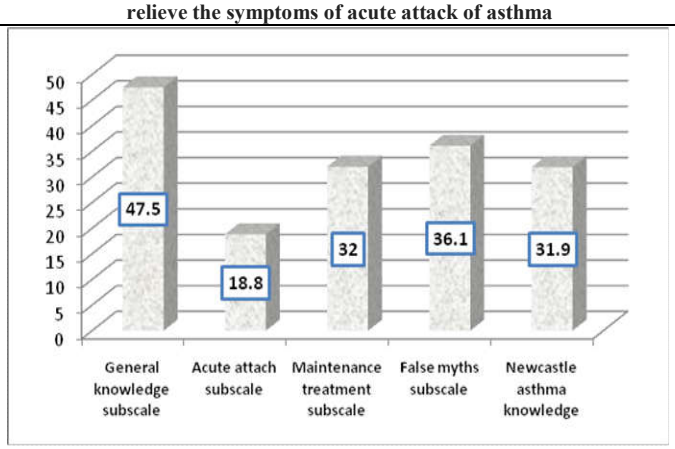

Figure 6. Overall and subscale scores of Newcastle asthma knowledge score among primary school teachers in Sabya City, Saudi Arabia 2017

Table 6. Association between primary school teachers' demographic characteristics and percentage of overall and subscale Newcaste asthma knowledge score, Sabya 2017

	Newcastle asthma knowledge score	General Knowledge subscale	Acute attack subscale	Maintenance treatment subscale	False myths subscale
Gender					
Male	31.4±14.0	45.0±20.9	19.9±15.1	31.3±20.5	35.3±19.3
Female	32.4±13.0	50.1±16.9	17.7±15.4	32.6±17.2	37.0±20.0
p-value	0.455	0.008	0.144	0.489	0.396
Age (years)					
<30	27.5±12.3	40.4±17.9	15.5±12.9	27.5±19.0	32.7±19.2
30-39	32.4±14.2	48.5±19.7	19.6±16.7	31.4±19.4	36.8±19.6
40-49	32.8±13.6	49.3±19.1	18.7±14.9	33.7±19.0	36.9±20.5
≥50	33.0±10.4	46.8±17.0	22.3±13.9	33.3±15.4	35.3±14.6
p-value	0.064	0.019	0.203	0.177	0.527
Marital status					
Single	28.8±13.6	44.0±20.8	15.2±13.9	29.6±19.6	33.7±17.9
Married	32.3±13.4	48.0±18.9	19.3±15.4	32.3±18.8	36.5±19.8
p-value	0.089	0.170	0.078	0.346	0.349
Children number					
0	30.8±13.0	46.6±19.9	16.8±14.0	31.5±19.3	35.8±17.5
1-5	32.0±14.0	47.7±19.3	19.1±1536	32.3±19.7	35.9±20.5
6-10	32.2±12.4	47.6±18.9	19.6±15.4	30.1±15.9	37.1±19.3
>10	34.4±8.8	51.0±13.9	19.5±12.2	38.1±15.9	37.5±7.2
p-value	0.872	0.940	0.698	0.765	0.966
Working years					
<10	30.2±13.7	46.1±19.8	16.9±14.9	28.8±19.2	35.7±19.2
10-19	32.6±13.2	47.8±19.0	19.6±15.4	33.7±19.0	36.3±20.7
≥20	33.7±13.2	49.4±18.4	20.8±15.5	35.0±17.9	36.6±19.4
p-value	0.087	0.361	0.081	0.014	0.937
Personal history of asthma					
No	31.7±13.5	47.2±19.0	18.7±15.2	31.9±19.0	36.1±19.7
Yes	44.4±8.4	71.4±20.2	30.9±13.8	40.0±9.1	42.5±14.3
p-value	0.037	0.005	0.074	0.341	0.466
Family history of asthma					
No	30.5±13.4	46.1±19.3	17.5±14.6	31.0±19.3	34.5±19.5
Yes	36.2±13.0	52.1±18.2	22.9±16.6	35.1±17.4	41.4±19.0
p-value	<0.001	0.008	0.003	0.066	0.003

As emonstrated from Figure 6, the highest level of knowledge was concerning general knowledge subscale (47.5%) the lowest was concerning acute attack recognition, triggers, and management (18.8%). The overall Newcastle asthma knowledge score was 31.9%).

Factors affecting the overall and subscale Newcaste asthma knowledge score: Female teachers had higher general knowledge subscale score percentage compared to male teachers (50.1±16.9 versus 45.0±20.9, p=0.008, teachers with family history of asthma had higher overall Newcastle asthma knowledge score and general

Table 7. Predictors of overall score of Newcastle asthma knowledge among primary school teachers in Sabya City, Saudi Arabia 2017

Variables	*Beta*	*SE*	*t-test*	*p-value*	*95% confidence interval*	
					Lower bound	*Upper bound*
Gender (reference: males)	-0.128	0.438	-0.292	0.771	-0.989	0.734
Age (reference: <30)	0.006	0.059	0.102	0.919	-0.110	0.122
Marital status (reference: single)	0.600	0.764	0.785	0.433	-0.903	2.102
Number of children (reference: none)	0.067	0.118	0.567	0.571	-0.164	0.298
Working years (reference: <10)	0.020	0.047	0.430	0.667	-0.072	0.112
Personal history of asthma (reference: No)	-4.476	1.921	-2.330	0.020	-8.253	-0.699
Family history of asthma (reference: no)	-1.907	0.513	-3.718	<0.001	-2.915	-0.898

r-square=0.06; Model ANOVA: F=3.327, p=0.002

knowledge subscale score compared to those without such history (36.2±13.0 versus 30.5±13.4, p<0.0001 and 52.1±18.2 versus 46.1±19.3 p=0.008), respectively. In addition, teachers with family history of asthma had higher false myths subscale score compared to those without such history (41.4±19.0 versus 34.5±19.5, p=0.003).

Predictors for asthma knowledge: Multiple linear regression analysis: As shown in Table (7), after control for confounding, teachers with personal history of asthma and those with family history of asthma were more knowledgeable about the diseases than those with no such histories (p-0.020 and <0.001, respectively). All factors were responsible for 6% variability of the Newcastle knowledge score (r-square=0.06). Teachers` gender, age, marital status, number of children and working years were not significantly associated with Newcastle knowledge score.

DISCUSSION

It is an crucial issue to teachers working in primary schools to know and be aware of early asthma symptoms and signs among their students, its aggravated factors, when they need medical help and to take decisions regarding practicing physical activity (Jaramillo, 2015). In the current study using the Newcastle asthma knowledge score, 31.9% of the teachers were knowledgeable about bronchial asthma. This figure is lower than that reported in a similar study recently done in Riyadh, KSA (45.4%) (Alshaikh, 2017). Also, in another study carried out in Riyadh, only 35% of the school staff had a good general knowledge about asthma while 40.1% had good knowledge regarding management practice (Abdel Gawwad, 2007). This limited level of knowledge observed among primary school teachers in the present study agrees with findings of other studies carried out in New York city, United State of America, (Bruzzese, 2019) UK (Bevis, 1990) and Spain (Opez-Silvarrey). In a study carried out in Bahrain, the correct answer about asthma symptoms, triggers and management ranged between 24% and 82%. (Latif Alnasir, 2004). In Malaysia, the correct answer about asthma knowledge and triggers ranged between 7.5% and 78.5% (Fitzclarence, 1990) while in Turkey, it ranged between 38% and 94% (Ones, 2006). However, in some studies carried out in developed countries, higher levels of asthma knowledge were reported among primary school teachers. In USA, rates of 69% and 75% were observed (Lucas, 2012; Unikel, 2010). In Australia, the rate was very high (85%) (Al-Motlaq, 2013). In Spain, it was 58% (Rodriguez Fernandez-Oliva, 2010). In agreement with others in Riyadh (used the same tool), (Alshaikh, 2017) knowledge concerned with acute attacks` recognition, triggers and management was the worst (18.8%). This figure is even lower than that reported in Riyadh`s study (35%), indicating lower level of knowledge among primary school teachers about asthma in Sabya city compared to those in Riyadh. This figure is alarming findings necessitate great effort to improve it. The same finding was observed also in other international studies as in Turkey, primary school teachers had poor knowledge regarding triggers and management of acute attacks of asthma (Ones, 2006). In South Africa, knowledge among primary school teachers was poorest regarding symptoms and medication management of severe acute attacks of asthma attack (Govender, 2012). In Malaysia, most of primary school teachers had misunderstanding about the effect of asthma triggers (Bahari, 2003). It is not surprising to find that teachers with personal or family history of asthma were more knowledgeable regarding the disease and its management as they mostly gained additional during the management received by themselves or a family member during asthma attacks. The same has been reported in a previous Saudi study carried out in Riyadh, (Alshaikh, 2017) where teachers with family history of asthma were more knowledgeable about the disease. In the present study and in agreement with other studies carried out in Riyadh (KSA) (Alshaikh, 2017), Turkey (Ones, 2006), South Africa (Govender, 2012) and Australia (Al-Motlaq *et al*., 2013), demographic characteristics of the teachers were not associated with their knowledge about asthma. However, female and relatively older teachers (40-49 years) were more knowledgeable regarding general information of asthma than male and young (<30 years) teachers. Health education of primary school teachers regarding asthma and management of its acute attaches has proved to be effective in numerous studies carried out in different areas of the world in increasing their self-confidence to deal with emergency cases in a proper way (Rodehorst, 2003). Health education provided to teachers have proven an improvement in their knowledge regarding asthma of the asthma knowledge among primary school teachers (American Lung Association, 2015; Henry, 2004; Korta Murua, 2012; Sapien, 2004). Furthermore, in one study, health education had both direct and indirect beneficial impacts on asthma control at schools that sustained for five years (Henry, 2004).

Conclusion

The knowledge of primary school teachers in Sabya city regarding bronchial asthma among children is overall suboptimal, particularly regarding recognition, triggers, and management of acute attack of asthma. Teachers with personal and/or family history of asthma were more knowledgeable about the disease. Frequent false myths and beliefs were identified among school teachers in this study.

Recommendations

- Organizing educational programs at primary schools in Sabya city about asthma among children is warranted targeted mainly the primary school teachers.And False myths and beliefs should be addressed properly in these programs
- Implementing school health program at schools is highly required.

REFERENCES

Abdel Gawwad ES., El-Herishi S.2007. Asthma education for school staff in Riyadh city: effectiveness of pamphlets as an educational tool. *J Egypt Public Health Assoc [Internet]*. 82(1–2):147–71. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18217 329

Al Frayh AR., Shakoor Z., ElRab MOG., Hasnain SM. 2001. Increased prevalence of asthma in Saudi Arabia. Ann Allergy, Asthma Immunol [Internet]. Mar 1;86(3):292–6. Available from: https://www.sciencedirect.com/ science/ article/pii/S10811206 10633017

Al-Dawood KM. 2001. Epidemiology of bronchial asthma among school boys in Al-Khobar city, Saudi Arabia. *Saudi Med J* [Internet]. Jan;22(1):61–6. Available from: http://www.ncbi.nlm. nih.gov/pubmed/11255614

Al-Motlaq M., Sellick K. 2013. Primary school teachers' asthma knowledge and confidence in managing children with asthma. *Education and Health*., 31(2): 53-58.

Alshaikh AA., Alanazi KK., Alanazi MD., Al-Momen RK. 2017. Knowledge About Asthma Among Primary School Teachers in Riyadh City, Saudi Arabia. *Int J Med Res Prof.* 2017 Sept; 3(5):177-84. DOI:10.21276/ ijmrp.3.5.035

American Lung Association, Asthma and Children Fact Sheet. http://www.lung.org/lung-disease/asthma/resources/facts-and figures/asthma-children-fact-sheet.html#9 (Last accessed June 1st 2015).

Bahari MB., Nur NM., Rahman AFA. 2003. A knowledge of asthma in school children: a survey among primary school teachers. *Singapore Med J* [Internet]. Mar;44(3):131–5. Available from: http://www. ncbi.nlm. nih.gov/ pubmed/ 12953726

Barrett JC. 2001. Teaching Teachers About School Health Emergencies. *J Sch Nurs* [Internet]. Dec 15;17(6):316–22. Available from: http://journals.sagepub.com/doi/ 10.1177/ 10598 405010170060601

Bevis M., Taylor B. 1990. What do school teachers know about asthma? *Arch Dis Child* [Internet]. Jun;65(6):622–5. Available from: http://www.ncbi.nlm.nih.gov /pubmed/ 2378521

Bruzzese J-M., Unikel LH., Evans D., Bornstein L., Surrence K., Mellins RB. 2010. Asthma Knowledge and Asthma Management Behavior in Urban Elementary School Teachers. *J Asthma* [Internet]. Mar 19;47(2):185–91. Available from: http://www. tandfonline.com/doi/full/10.3109/02770900903519908

Center for Health Statistics N. Vital and Health Statistics Report Series 10, Number 258 December 2013. Summ Heal Stat US Child Natl Heal Interview Surv [Internet]. 2012; Available from: https://www.cdc.gov/nchs/data/ series/sr_10/sr10_258.pdf

Chang C. Asthma in Children and Adolescents: A Comprehensive Approach to Diagnosis and Management. Clin Rev Allergy Immunol [Internet]. 2012 Aug 29;43(1–2):98–137. Available from: http://www.ncbi.nlm.nih.gov/ pubmed/22187333

Fillmore EJ., Jones N., Blankson JM., 1997. Achieving treatment goals for schoolchildren with asthma. Arch Dis Child [Internet]. Nov 1;77(5):420–2. Available from: http://www.ncbi.nlm. nih.gov/pubmed/9487965

Fitzclarence CA., Henry RL. 1990. Validation of an asthma knowledge questionnaire. *J Paediatr Child Health* [Internet]. Aug; 26(4):200–4. Available from: http://www.ncbi.nlm. nih.gov/ pubmed/2257180

Gibson PG., Henry RL., Vimpani G V., Halliday J. 1995. Asthma knowledge, attitudes, and quality of life in adolescents. Arch of Disease Child [Internet].73:321–6. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1511323/pdf/ archdisch00620-0051.pdf

Govender D., Gray A. 2012. Knowledge of primary school teachers about asthma: a cross-sectional survey in the Umdoni sub-district, KwaZulu-Natal. *S Afr Fam Pract.,* 54(4): 347-351.

Henry R., Gibson PG., Vimpani G., Francis L., Hazell J. 2004. Randomized controlled trial of a teacher-led asthma education program. *Pediatr Pulmonol*, 38(6): 434-442.

Jaramillo Y., Reznik M. 2015. Do United States' teachers know and adhere to the national guidelines on asthma management in the classroom? A systematic review. *Scientific World Journal*. 2015:624828. doi:10.1155/2015/624828

Khawaji A., Basudan A., Moafa A., Faqihi M., Alhazmi M., Mahnashi T. *et al*. 2017. Epidemiology of bronchial asthma among children in Jazan Region, Saudi Arabia. *Indian J Allergy, Asthma Immunol* [Internet]. 2017]; 31(2):69. Available from: http://www.ijaai.in/ text.asp?2017/31/2/69/215833

Korta Murua J., Perez-Yarza EG., Pertega Diaz S., Aldasoro Ruiz A., Sardon Prado O., Lopez-Silvarrey Varela A. *et al*., 2012. Impact of an asthma educational intervention programme on teachers. An Pediatr (Barc) 77(4): 236-246.

Latif Alnasir FA. 2004. Bahrani school teachers` knowledge of asthma. *Middle East J Fam Med* [Internet]. 2(2). Available from: https://pdfs.semanticscholar.org/f198/5c8a790c708530c377a454 b903b294c4de5f.pdf

Leonardo Cabello MTA., Oceja-Setien EB., García Higuera Lc., Cabero MJd., Pérez Belmonte Ee G-AI. 2013. Assessment of parental asthma knowledge with the Newcastle Asthma Knowledge Questionnaire. 15:117–26. Available from: http://www.pap.es/frontoffice/ pap/front/a rticulos/ articulo/_ ixus5l_ ljpqmzm yujvnzp utkxid xj8bvjluymfobp6j9m-tmyjiilg

López-Silvarrey Varela A., Pértega Díaz S., Rueda Esteban S., Korta Murúa J., Iglesias López B., Martínez-Gimeno A. 2015. Validation of a Questionnaire in Spanish on Asthma Knowledge in Teachers. *Arch Bronconeumol* (English Ed [Internet]. Mar 1;51(3):115–20. Available from: http://linkinghub.elsevier.com/ retrieve/pii/S1579212914004170

Lucas T., Anderson MA., Hill PD. 2012. What level of knowledge do elementary school teachers possess concerning the care of children with asthma? A pilot study. *J Pediatr Nurs*., 27(5): 523-527.

Masoli M., Fabian D., Holt S., Beasley R. 2004. The global burden of asthma: executive summary of the GINA Dissemination Committee Report. *Allergy* [Internet]. 59(5):469–78. Available from: http:https://doi.org/10. 1111/j.1398-9995.2004.00526.x

Nahhas M., Bhopal R., Anandan C., Elton R., Sheikh A.2012. Prevalence of Allergic Disorders among Primary School- Aged Children in Madinah, Saudi Arabia: Two-Stage Cross-Sectional Survey. PLoS One [Internet]. Available from: https://pdfs. semanticscholar.org/741a/5b577b1757 12e5e9cb4db35eb3b79 d230509.pdf

Nhlbi. Managing Asthma: A Guide for School.; Available from: https://www.nhlbi.nih.gov/files/docs/resources/lung/asth_sch.pdf

Olympia RP., Wan E., Avner JR. The Preparedness of Schools to Respond to Emergencies in Children: A National Survey of School Nurses.; Available from: https://pdfs.semanticscholar. org/deeb/2e9148dc359bdff8a3c61744f26cc92cfc7d.pdf

Ones U., Akcay A., Tamay Z., Dogru M. 2006. Asthma knowledge level of primary schoolteachers in Istanbul, Turkey. *Asian Pac J Allergy Immunol* 24(1): 9-15. http://apjai-journal.org/wp-content/ uploads/2018/01/2AsthmaKnowledgeVol24No1March2006P9.p df

Opez-Silvarrey Varela AL., Rueda Esteban S., ertega Díaz SP., Korta Mur ua J., Rosa Rodríguez Fern andez-Oliva C., anchez Jim enez JS. *et al*., Knowledge of asthma in school teachers in nine Spanish cities; Knowledge of asthma in school teachers in nine Spanish cities. Barcelona [Internet].; Available from: http://neumoped.org/ docs/ArtPedPulmSR.pdf

Rodehorst TK. 2003. Rural elementary school teachers' intent to manage children with asthma symptoms. *Pediatr Nurs*., 29(3): 184-192.

Rodriguez Fernandez-Oliva CR., Torres Alvarez de Arcaya ML., Aguirre-Jaime A. 2010. Knowledge and attitudes of teachers on children with asthma. *An Pediatr (Barc)*; 72(6): 413-419.

Sapien RE., Fullerton-GleasonL, Allen N. 2004. Teaching school teachers to recognize respiratory distress in asthmatic children. *The Journal of asthma*, 41(7): 739-743.

Schmier JK., Manjunath R., Halpern MT., Jones ML., Thompson K., Diette GB. The impact of inadequately controlled asthma in urban children on quality of life and productivity. Ann Allergy, Asthma Immunol [Internet]. 13;98(3):245–51. Available from: http://dx.doi.org/ 10.1016/ S1081-1206(10)60713-2

Soy FK., Yazıcı H., Kulduk E., Dündar R., Gülen ŞT., Doğan S. *et al*., 2016. The effects of dust storms on quality of life of allergic patients with or without asthma. Kulak Burun Bogaz Ihtis Derg [Internet].26(1):19–27. Available from: http://www.ncbi.nlm. nih.gov/pubmed/26794331

Thalib L., Al-Taiar A. 2012. Dust storms and the risk of asthma admissions to hospitals in Kuwait. Sci Total Environ [Internet]. 1;433:347–51. Available from: http://www.ncbi.nlm.nih.gov/ pubmed/22819885

Townshend J., Hails S., McKean M. 2007. Management of asthma in children. BMJ [Internet]. Aug 4;335(7613):253–7. Available from: http://www.ncbi.nlm.nih.gov/ pubmed/ 17673768

Unikel LH., Evans D., Bornstein L., Surrence K., Mellins RB. 2010. Asthma knowledge and asthma management behavior in urban elementary school teachers. *J Asthma*, 47(2): 185-191.

WHO | Asthma. WHO [Internet]. 2017; Available from: http://www.who.int/mediacentre/factsheets/fs307/en/

WHO | Bronchial asthma. WHO http://www.who.int/ mediacentre/factsheets/fs206/en/

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