Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/5316
DOI URL: http://dx.doi.org/10.21474/IJAR01/5316

RESEARCH ARTICLE

THE IMPACT OF HEALTH EDUCATION INTERVENTION ON KNOWLEDGE AND PERCEPTION OF FEMALE PRIMARY SCHOOL TEACHERS ABOUT FIRST AID OF ASTHMA EXACERBATION AMONG PRIMARY SCHOOL CHILDREN IN MAKKAH AL-MOKARRAMAH CITY, 2016.

Hadeel Safi Mujallid[1] and Sarah Saleh[2].

1. M.B.B.S, Family Medicine Resident.
2. Family Medicine Consultant.

Manuscript Info

Manuscript History

Received: 03 July 2017
Final Accepted: 05 August 2017
Published: September 2017

Abstract

Introduction:-

Asthma is the most common chronic illnesses of childhood.[1, 2] Uncontrolled asthma may considerably decrease the quality of life for patients and their families.[2] Some reports suggested that the prevalence of asthma is increasing globally.[1]

The prevalence of asthma across all the Middle East, especially the Gulf region is also increasing.[3] Saudi Arabia took the lead, with a rate of 24%, this high rate might be attributable to a rapid change in lifestyle and rapid spread of urbanization.[3]

Uncontrolled Asthma cause about 235-300 million people worldwide suffers from asthma, which can be fatal. This enormous number is increasing – especially among children – and by 2025 it is expected to be up to 100 million.[3]

Studies suggest crowded environments expose children to a high number of asthma triggers and may affect immune system development.[3]The prevalence of asthma symptoms in students aged 16 to 18 years in Saudi Arabia as lifetime wheeze and physician-diagnosed asthma was 25.3%.[4]The prevalence of exercise-induced wheezing was 20.2%and coughing during the night was 25.7%.[4]

Prevalence of asthma among schoolchildren between the ages of 8 and 16 year in the Kingdom of Saudi Arabia in the comparison of data between Riyadh versus Hail (inland desert dry environment) and Jeddah versus Gizan (coastal humid environment) revealed that the prevalence of asthma in the similar populations increased significantly from 8% in 1986 to 23% in 1995. [1]The study also revealed increased exposure to environmental factors such as tobacco smoke and indoors animals in Saudi houses. It seems that the continuing changes in contemporary life may well have contributed to the increased prevalence of asthma in the country.[1]

Corresponding Author:- Hadeel Safi Mujallid.
Address:- M.B.B.S, Family Medicine Resident.

Bronchial asthma patients in Makkah city who exposed to dusty environment due to broken mountains were more worsen clinically, functionally and as response to anti-asthmatic therapy than the other group who were not exposed to dusty environment.[5]

This study aimed to assess the knowledge and Perception and to determine associated factors about first aid in asthma exacerbation (AE) of primary school teachers and evaluate the impact of health education intervention.

Methodology (Materials and Methods):-

Pre and post interventional study design (Quasi-experimental) conduct among the governmental and privet female primary school teachers in Makkah Al-Mokarramah city during the study period (2016). All deaf , mute and handicap teachers or working in international schools and Night – time schools were excluded from the study.

The expected sample size was generated from EPITOOL website to calculate required sample sizes to estimated proportion and to detect significant differences two proportions with assuming:

- Proportion of Population 1 is the sample before the education intervention
- Proportion of Population 2 is the sample after the education intervention
- The estimated Response Rate of the education intervention (which was tested by pilot study) is around 30% Confidence level 95% Power 80
- The recommended sample size = **23 Teachers.**
- The researcher recruited + 20% of the sample extra to increase sample size
- So the end sample size = 23 +5 = **28 teachers.**

The researcher utilized self-administered questionnaire after validating it (face and content validity) by three consultants. It includes three essential items:

- **First part**: Demographic feature and associated factor that might be affecting the knowledge about AE.
- **Second part**: Questions to assess the knowledge of Asthma and its trigger factors.
- **Third part**: Questions to assess the knowledge of first aid in AE including practical part of using the inhaler correctly.

The collecting of the data were conducted through three levels:

Level 1: The researcher distributed the questionnaire in the schools on the teachers to be filled in resting hour and then returned it.

Level 2: After collecting the questionnaire, the researcher conducted a lecture for 15 minutes flowed by a workshop about first aid in AE for 5 minutes, then distributed brochures including the main information about AE . Assessment of the intervention by using the same questionnaire was performed immediately (short term).

Level 3: Was conducted after four weeks (long term) as the researcher distributed the questionnaire in the schools on the teachers to be filled in resting hour and then returned it.

Taking consideration of keeping on same participant teachers over three levels was followed.

Data were analyzed by using the statistical package for social sciences (SPSS V.22). For continues variables (such as age, knowledge score), descriptive statistics in the form of mean and standard deviation were reported. For categorical variable (such as marital status, family history of asthma), frequency and percentage were reported. The student`s t-test was used to compare mean knowledge score between 2 groups whereas ANOVA test was applied to compare means of knowledge score between more than two groups of independent variables. The frequency of correct answers before, immediately after, and four weeks after an educational intervention were compared by McNemar test. Percentage of knowledge before the intervention was compared with that immediately and four weeks after intervention using paired t-test. The level of statistical significance was p-value <0.05.

All ethical approvals were obtained (Research committee , The Joint Program of Family Medicine in Makkah , General Administration of Education in Makkah Al-Mokarramah for girls' , Local or institutional and approval from primary school managers).

Also an written consents from all participants were obtained before start answering the questionnaire and this consent in the first page of the questionnaire.

Results:-

Baseline characteristics:-

The study included 28 female teachers. The response rate was 100%. Age was available in 24 of them. It ranged between 28 and 50 years with a median of 42. All were Saudis. Table 1 presents their remaining background characteristics. Most of them 75%(21 teachers) were married whereas 14.3% (4 teachers) were singles. About two-thirds of them 64.3% (18 teachers) had children. The experience in teaching was available for 24 teachers (85.7%). It ranged between 2 and 29 years with a mean of 14.6 and standard deviation of 8.8 years. More than half of them (17 teachers) 58.4% had an experience of more than 10 years in teaching. (Table 1)

Four teachers (14.3%) reported the previous working as a health guide for students, 5 teachers representing 17.9% of the participants mentioned a personal history of bronchial asthma.

The family history of bronchial asthma was reported by 16 teachers (57.1%) . Among them, sons representing 37.6%, brothers (12.5%) , parents (12.5%) and other persons 37.4% having a family history of bronchial asthma.

Awareness and knowledge of bronchial asthma:-

All teachers heard about bronchial asthma. More than one-third of the respondents (11 teachers) 39.3% claimed that they had enough information about bronchial asthma. Their source of information regarding bronchial asthma was mainly mass media (64%), followed by the internet (44%), friends and relatives (32%). Health institutions and schools/universities were the sources of information of 20% and 8% of the teachers, respectively.

Table 2 presents the factors that could affect the level of knowledge of teachers about bronchial asthma, before an educational intervention. Single or married teachers were more knowledgeable than divorced/widowed teachers, p=0.013. Teachers who have bronchial asthma were more knowledgeable than those without a history of bronchial asthma (77.96±6.4 versus 66.40±15.9), p=0.018. Also, teachers who have a family history of bronchial asthma were more knowledgeable than those without such history of bronchial asthma (75.43±10.2 versus 59.16±6.3), p=0.003. Teachers` age, having children, teaching experience, previous working as a health guide for students in the school and their number of sources of information were not significantly associated with knowledge regarding bronchial asthma. (Table 2)

General information about bronchial asthma:-

As shown in Table 3, there was a statistically significant improvement in a general knowledge of teachers about bronchial asthma after an educational session, both immediately and after four weeks regarding the definition of bronchial asthma, the prevalence of bronchial asthma in Saudi Arabia and the presence of treatment for bronchial asthma. Relating to the fact that bronchial asthma is not a psychiatric disease, there was only significant improvement immediately after an educational intervention (p=0.025), and regarding the fact that bronchial asthma is more prevalent among children, there was statistically significant improvement four weeks after the educational session, p=0.039. Regarding other information, there was no statistically significant improvement after educational session either immediately or after four weeks. (Table 3)

Overall, the knowledge about the general information about asthma has increased from 74.49% before an educational intervention to 88.52% (immediately after intervention), p<0.001 and 85.97% (4 weeks after an educational intervention), p<0.001. (Figure 1)

Knowledge about asthma exacerbations and signs of acute asthmatic attacks:-

From Table 4, it is evident that there was a statistically significant improvement regarding defining sports practicing and acute common cold attacks as asthma exacerbating factors, both immediately and four weeks after an educational intervention. The knowledge regarding ink pens and chalk as asthma exacerbating factors was significantly improved four weeks after the educational intervention, p=0.003. Regarding other asthma exacerbating factors knowledge, there was no statistically significant improvement after educational session either immediately or after four weeks. (Table 4)

There was a statistically significant improvement regarding recognition of drowsiness/reduced awareness and bluish discoloration of lips as signs of acute asthmatic attacks, both immediately and four weeks after an educational intervention. Regarding other signs of acute asthmatic attacks knowledge, there was no statistically significant improvement after educational session either immediately or after four weeks. (Table 4)

Overall, the knowledge about asthma exacerbating factors has increased from 68.37% before an educational intervention to 88.78% (immediately after intervention), p<0.001 and 91.84% (4 weeks after an educational intervention), p<0.001. (Figure 2)

Overall, the knowledge about signs of acute asthmatic attacks has increased from 62.50% before an educational intervention to 85.71% (immediately after intervention), p<0.001 and 82.14% (4 weeks after an educational intervention), p=0.001. (Figure 3)

Knowledge of procedures to be taken in case of acute asthmatic attacks and practicing sports:-
From Table 5, it is clear that there was a statistically significant improvement regarding knowledge that was not asking the child to lie on his back and in case of no improvement, continue giving bronchodilator spray every 20 minutes till arrival of parents or ambulance as procedures to be taken in case of acute asthmatic attacks, both immediately and 4 weeks after an educational intervention. The knowledge that the child should be asked to take deep and slow breath during the attack were significantly improved four weeks after the educational intervention, p=0.031. The knowledge that we should ask the child to sit with his back straight during the acute asthmatic attaches was improved four weeks after an educational intervention, p=0.002. Regarding knowledge of other procedures to be taken during acute asthmatic attacks, there was no statistically significant improvement after educational session either immediately or after four weeks. (Table 5) There was a statistically significant improvement regarding knowledge that asthmatic children should not avoid practicing sports, bronchodilator spray should be given half an hour before practicing sports to prevent acute attacks and swimming is the best sport for asthmatic patients, both immediately and four weeks after an educational intervention. (Table 5)

Overall, the knowledge about procedures to be taken during acute asthmatic attacks has increased from 69.05% before an educational intervention to 91.07% (immediately after intervention), p<0.001 and 92.26% (4 weeks after an educational intervention), p<0.001. (Figure 4)

Overall, the knowledge about the relationship between bronchial asthma and practicing sports has increased from 42.86% before an educational intervention to 90.47% (immediately after intervention), p<0.001 and 92.86% (4 weeks after an educational intervention), p<0.001. (Figure 5)

Knowledge of treatment used in case of acute asthmatic attacks and facilities that school environment should provide to help in caring for asthmatic children:-
There was a statistically significant improvement regarding knowledge that aspirin is not used in the treatment of acute asthmatic attacks, both immediately and four weeks after an educational intervention. Also, there was a statistically significant improvement four weeks after an educational improvement in the knowledge that it is preferred to give bronchodilator via nebulizers with oxygen, p=0.006. Regarding knowledge of other modes of acute asthmatic attacks treatment, there was no statistically significant improvement after educational session either immediately or after four weeks. (Table 6) From table 6, it is clear that there was a statistically significant improvement regarding knowledge that schools should provide spacer devices to help in caring for asthmatic children, both immediately and four weeks after an educational intervention. Regarding knowledge of other facilities that schools should provide to help in caring for asthmatic children, there was no statistically significant improvement after educational session either immediately or after four weeks. (Table 6)

Overall, the knowledge about the treatment of acute asthmatic attacks has increased from 59.52% before an educational intervention to 79.76% (immediately after intervention), p=0.002 and 83.71% (4 weeks after an educational intervention), p=0.001. (Figure 6)

Overall, the knowledge about facilities that school environment should provide to help in caring for asthmatic children has increased from 81.12% before an educational intervention to 88.78% (immediately after intervention) and 88.27% (4 weeks after an educational intervention). However, these increases in knowledge were not statistically significant. (Figure 7)

Overall knowledge:-
Overall, the knowledge about bronchial asthma from its all aspects has increased significantly from 68.46% before an educational intervention to 87.69% (immediately after intervention), p<0.001 and 87.31% (4 weeks after an educational intervention), p<0.001. (Figure 8)

Availability of facilities that school environment should provide to help in caring for asthmatic children:-
Table 7 demonstrates that medical records for asthmatic students were present in schools according to more than half of teachers (53.6%). Other facilities were mentioned by a minority of them such as anti-asthmatic medications (3.6%), known the therapeutic plan for management of acute asthmatic attacks (3.6%) and poster for how to manage a case of acute asthma (7.2%). Spacer devices, oxygen cylinder with periodic checkup and continuous training courses for teachers as regards dealing with acute asthmatic attacks were not mentioned by any of the participants as facilities provided by schools to help in caring for asthmatic children. (Table 7)

Table 1:- Background characteristics of the teachers (n=28)

	Frequency	percentage
Marital status (n=28)		
Single	4	14.3
Married	21	75.0
Divorced	1	3.6
Widowed	2	7.1
Having children (n=18)		
No	16	88.9
Yes	2	11.1
Teaching experience (years) (n=24)		
≤5	5	20.8
6-10	5	20.8
>10	14	58.4

Table 2:- Factors associated with baseline knowledge of teachers regarding bronchial asthma

	Percentage of knowledge score (mean±SD)	p-value
Age (years)	r°=0.156	0.476
Marital status		
Single (n=4)	71.56±16.2	
Married (n=21)	71.21±10.3	0.013*
Divorced/widowed (n=3)	45.10±27.3	*
Having children		
No (n=10)	74.21±11.3	
Yes (n=18)	75.00±10.8	0.858*
Teaching experience (years) (n=24)		
≤5 (n=5)	70.30±14.3	
6-10 (n=5)	72.22±13.4	0.943*
>10 (n=14)	72.26±9.3	*
Previous working as a health guide for students in the school		
Yes (n=4)	71.43±12.2	
No (n=24)	67.97±15.9	0.682*
History of bronchial asthma among the participants		
Yes (n=5)	77.96±6.4	
No (n=23)	66.40±15.9	0.018*
Family history of bronchial asthma among teachers		
Yes (n=16)	75.43±10.2	
No (n=12)	59.16±6.3	0.003*
Source of information		
No (n=3)	52.94±28.6	
One (n=11)	66.78±15	
Two (n=11)	69.91±8.6	0.068*
>two (n=3)	84.85±6.1	*

° Pearson`s coefficient of correlation SD: Standard deviation

* Student` t test ** ANOVA test

Table 3:- Impact of educational intervention on general information about bronchial asthma

Variables	Correct responses N (%)				
	P0	P1	P2	p-value*	p-value**
Definition of bronchial asthma	11 (39.3)	24 (85.7)	24 (85.7)	0.001	0.001
Bronchial asthma is a psychiatric disease (No)	22 (78.6)	28 (100)	21 (75.0)	0.025	0.070
Bronchial asthma is a chronic disease(Yes)	22 (78.6)	27 (96.4)	25 89.3)	0.063	0.375
Bronchial asthma is a genetic disease (Yes)	19 (67.9)	24 (85.7)	25 (89.3)	0.180	0.109
Bronchial asthma is related to allergy (Yes)	27 (96.4)	28 (100)	27 (96.4)	0.813	NA
Bronchial asthma is an infectious disease (No)	26 (92.9)	27 (96.4)	28 (100)	0.702	0.610
Bronchial asthma affect specific age group (No)	23 (82.1)	25 (89.3)	21 (75.0)	0.687	0.219
Bronchial asthma is more prevalent among children	19 (67.9)	24 (85.7)	26 (92.9)	0.180	0.039
Prevalence of Bronchial asthma is Saudi Arabia is 19-24%	1 (3.6)	19 (67.9)	19 (67.9)	<0.001	<0.001
Prevalence of Bronchial asthma in Saudi Arabia is increasing	24 (85.7)	25 (89.3)	26 (92.9)	0.716	0.687
It is essential to follow up asthmatic patients periodically (yes)	26 (92.9)	28 (100)	28 (100)	0.610	0.610
There is no treatment for Bronchial asthma (No)	11 (39.3)	22 (78.6)	22 (78.6)	0.003	0.003
Bronchial asthma can be controlled through compliance with recommended therapy (Yes)	27 (96.4)	28 (100)	28 (100)	0.813	0.813
Use of preventive spray is the most effective and rapid way to control Bronchial asthma episodes (yes)	26 (92.9)	28 (100)	28 (100)	0.610	0.610

P0: Pre-intervention P1: Immediately after intervention (Short term)
P2: 4 weeks after intervention (long term) NA: not applicable

McNemar test

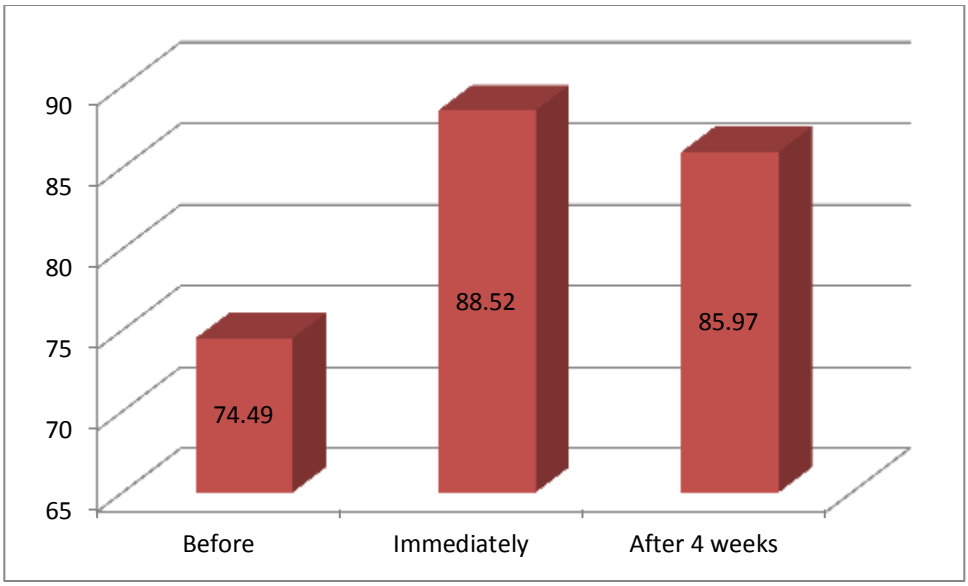

Figure 1:- General knowledge of bronchial asthma in relation to an educational intervention.

Table 4:- Impact of educational intervention on knowledge about bronchial asthma exacerbations and signs of acute asthmatic attacks

Variables	Correct responses N (%)			p-value*	p-value**
	P0	P1	P2		
Smoking	25 (89.3)	28 (100)	27 (96.4)	0.375	0.625
Ink pens and chalk	15 (53.6)	22 (78.6)	26 (92.9)	0.065	0.003
Sports practicing	3 (10.7)	16 (57.1)	17 (60.7)	0.002	0.001
Acute common cold attacks	18 (64.3)	27 (96.4)	28 (100)	0.012	0.008
Cold climate change	22 (78.6)	27 (96.4)	28 (100)	0.125	0.081
Dust	27 (96.4)	26 (92.9)	27 (96.4)	0.989	NA
Hair and fur of pets	24 (85.7)	28 (100)	27 (96.4)	0.173	0.375
Difficulty in breathing (Yes)	27 (96.4)	27 (96.4)	27 (96.4)	NA	NA
Excitation (Yes)	14 (50.0)	21 (75.0)	19 (67.9)	0.118	0.267
Drowsiness and reduced awareness (Yes)	9 (32.1)	22 (78.6)	20 (71.4)	0.002	0.001
Bluish discoloration of lips (Yes)	20 (71.4)	26 (92.9)	26 (92.9)	0.031	0.031

P0: Pre-intervention P1: Immediately after intervention (Short term)
P2: 4 weeks after intervention (long term) NA: not applicable
McNemar test

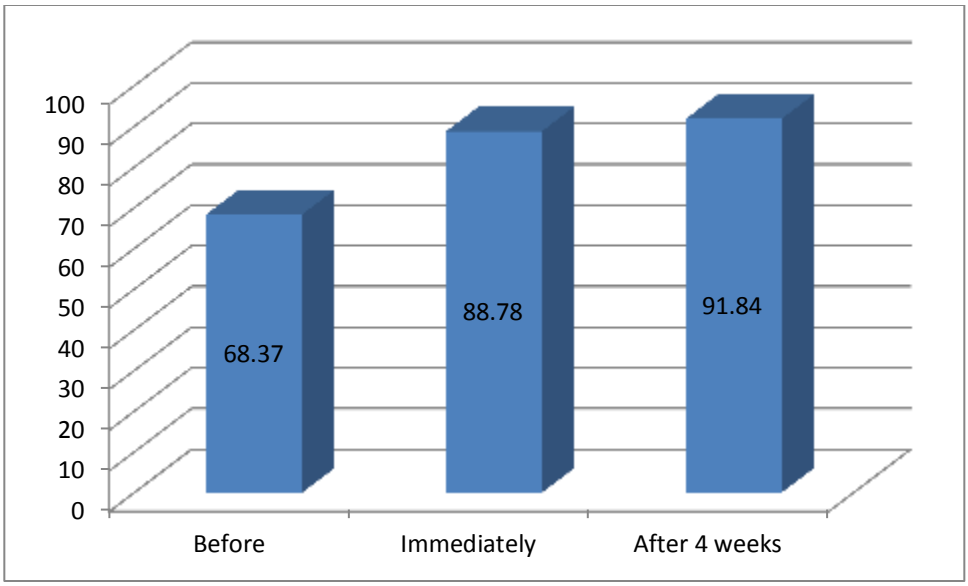

Figure 2:- Knowledge about asthma exacerbations in relation to an educational intervention.

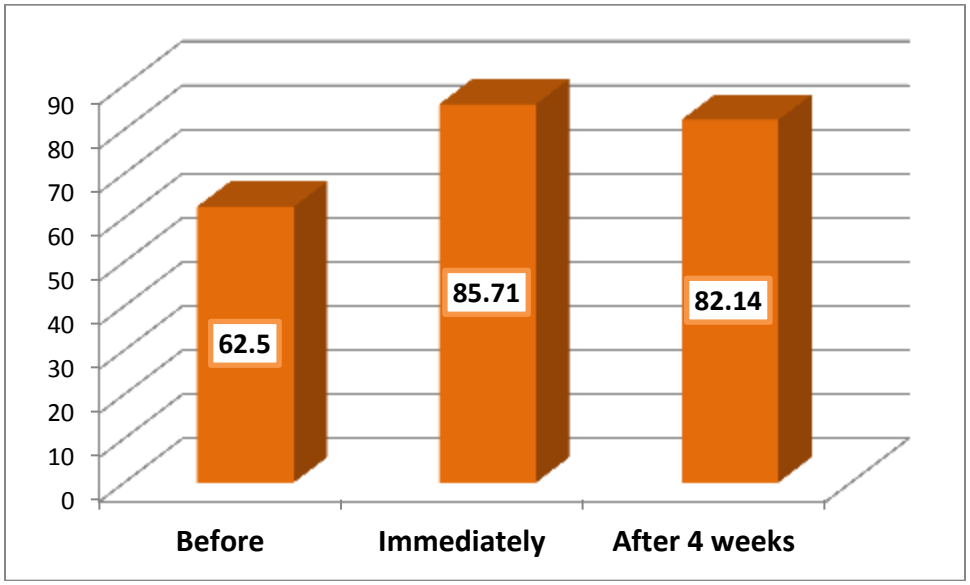

Figure 3:- Knowledge of signs acute asthmatic attacks in relation to an educational intervention.

Table 5: Impact of educational intervention on knowledge about procedures to be taken in case of acute asthmatic attacks

	Correct responses N (%)			p-value*	p-value**
	P0	P1	P2		
Assurance of the child to reduce his fear (Yes)	25 (89.3)	27 (96.4)	28 (100)	0.500	0.375
Ask the child to take deep and slow breath (Yes)	19 (67.9)	23 (82.1)	25 (89.3)	0.219	0.031
Ask the child to lie on his Back (No)	12 (42.9)	22 (78.6)	23 (82.1)	0.013	0.007
Ask the child to sit with his back straight (Yes)	17 (60.7)	27 (96.4)	24 (85.7)	0.002	0.065
Giving the child bronchodilator spray through specific funnel (Yes)	25 (89.3)	28 (100)	28 (100)	0.375	0.375
In case of no improvement, continue giving bronchodilator spray every 20 minutes till arrival of parents or ambulance (Yes)	18 (64.3)	26 (92.9)	27 (96.4)	0.021	0.004
Asthmatic children should avoid practicing	11 (39.3)	23 (82.1)	24 (85.7)	<0.001	<0.001

sports (No)					
Bronchodilator spray should be given half an hour before practicing sports to prevent acute attacks (Yes)	18 (64.3)	27 (96.4)	27 (96.4)	0.004	0.004
Swimming is the best sport for asthmatic patients (Yes)	7 (25.0)	26 (92.9)	27 (96.4)	<0.001	<0.001

P0: Pre-intervention P1: Immediately after intervention (Short term)
P2: 4 weeks after intervention (long term) **McNemar test**

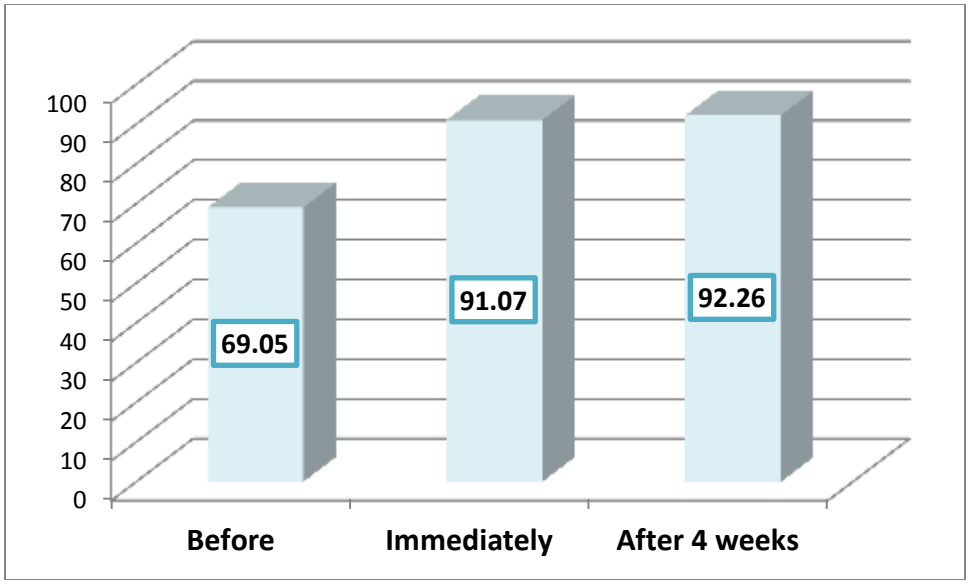

Figure 4:- Knowledge of procedures to be taken during acute asthmatic attacks in relation to an educational intervention.

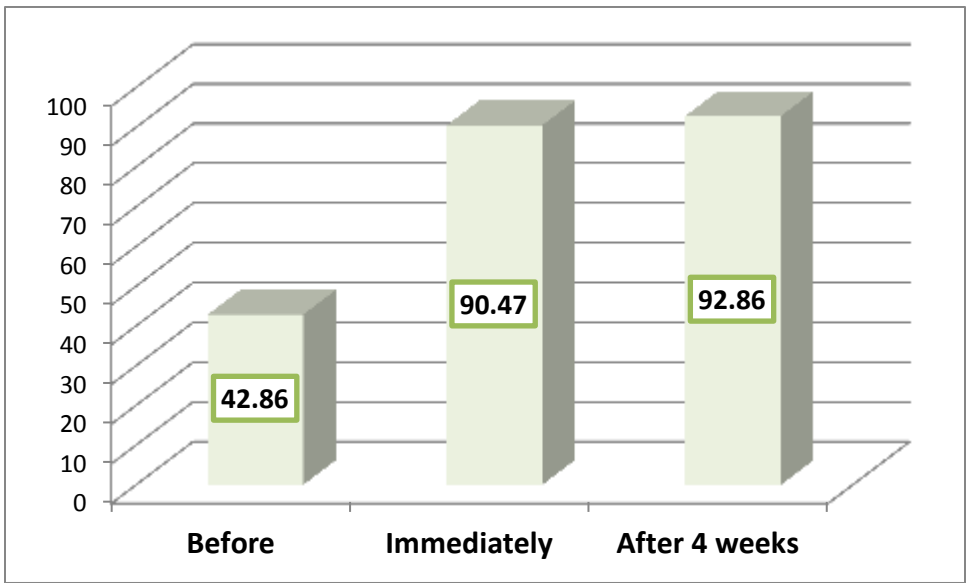

Figure 5:- Knowledge of asthmatic children and practicing sports in relation to an educational intervention.

Table 6:- Impact of educational intervention on knowledge about treatment used in case of acute asthmatic attacks and facilities that school environment should provide to help in caring for asthmatic children

	Correct responses N (%)			p-value*	p-value**
	P0	P1	P2		
Antibiotics (No)	10 (35.7)	15 (53.6)	13 (46.4)	0.227	0.549
Aspirin (No)	13 (46.4)	21 (75.0)	20 (71.4)	0.027	0.039
Bronchodilator spray (Ventolin) (Yes)	25 (89.3)	28 (100)	28 (100)	0.375	0.375
Preventive therapies are important in treating most cases of asthma (Yes)	23 (82.1)	27 (92.9)	28 (100)	0.125	0.109
It is preferred to give bronchodilator via nebulizers with oxygen (Yes)	16 (57.1)	17 (60.7)	28 (100)	0.816	0.006
Among side effects of bronchodilator, sprays are palpitation and hand tremors (Yes)	13 (46.4)	13 (46.4)	17 (60.7)	NA	0.219
Medical records for asthmatic students	28 (100)	27 (96.4)	26 (92.9)	0.813	0.610
Anti-asthmatic medications	22 (78.6)	26 (92.9)	24 (85.7)	0.289	0.754
Oxygen cylinder with periodic check up	22 (78.6)	20 (71.4)	22 (78.6)	0.754	NA
Spacer devices	11 (39.3)	25 (89.3)	23 (82.1)	0.001	0.002
Known therapeutic plan for management of acute asthmatic attacks	26 (92.9)	24 (85.7)	26 (92.9)	0.687	NA
Poster for how to manage a case of acute asthma	25 (89.3)	25 (89.3)	26 (92.9)	NA	0.912
Continuous training courses for teachers as regards dealing with acute asthmatic attacks	25 (89.3)	27 (96.4)	26 (92.9)	0.625	0.912

P0: Pre-intervention P1: Immediately after intervention (Short term)
P2: 4 weeks after intervention (long term) NA: not applicable
McNemar test

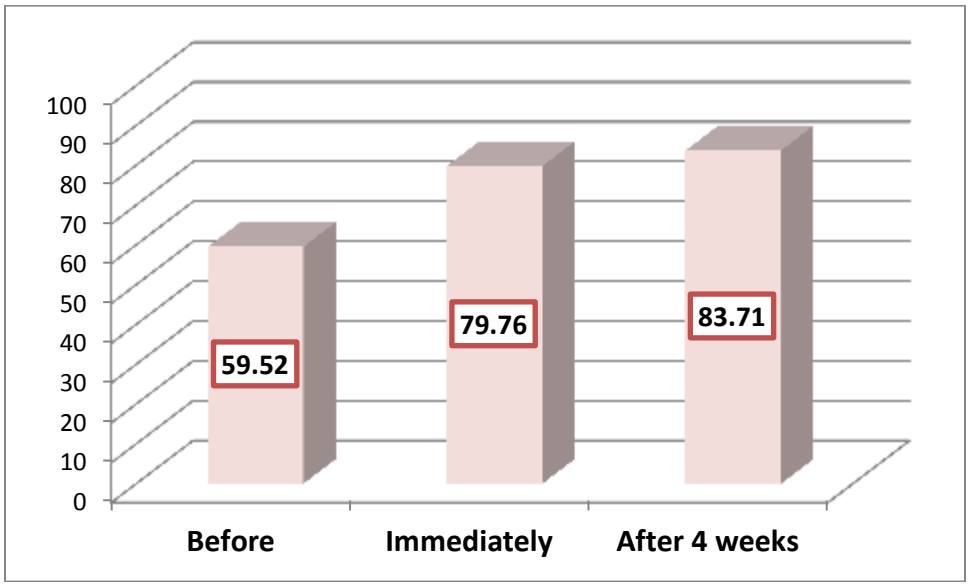

Figure 6:- Knowledge of treatment of acute asthmatic attacks in relation to an educational intervention.

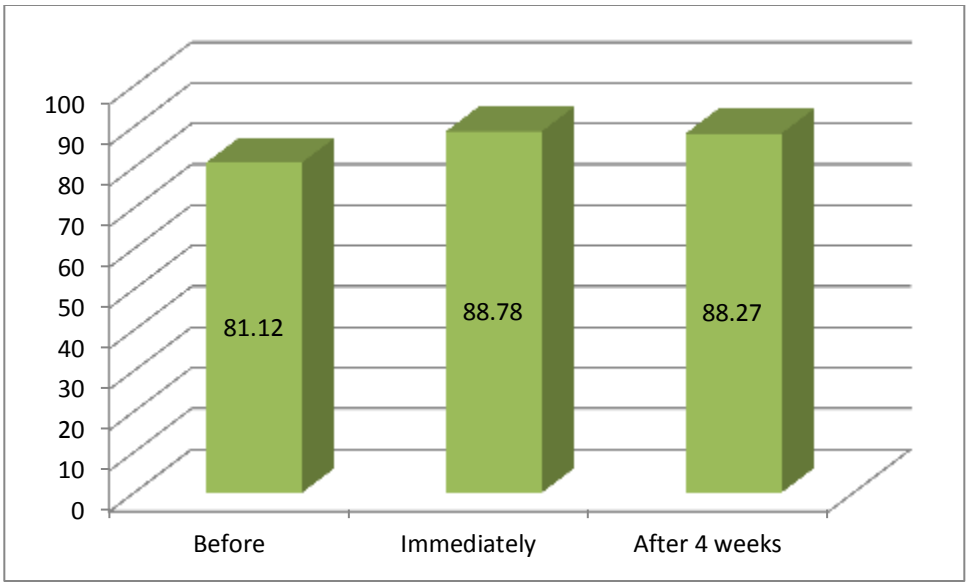

Figure 7:- Knowledge of facilities that school environment should provide to help in caring for asthmatic children in relation to an educational intervention.

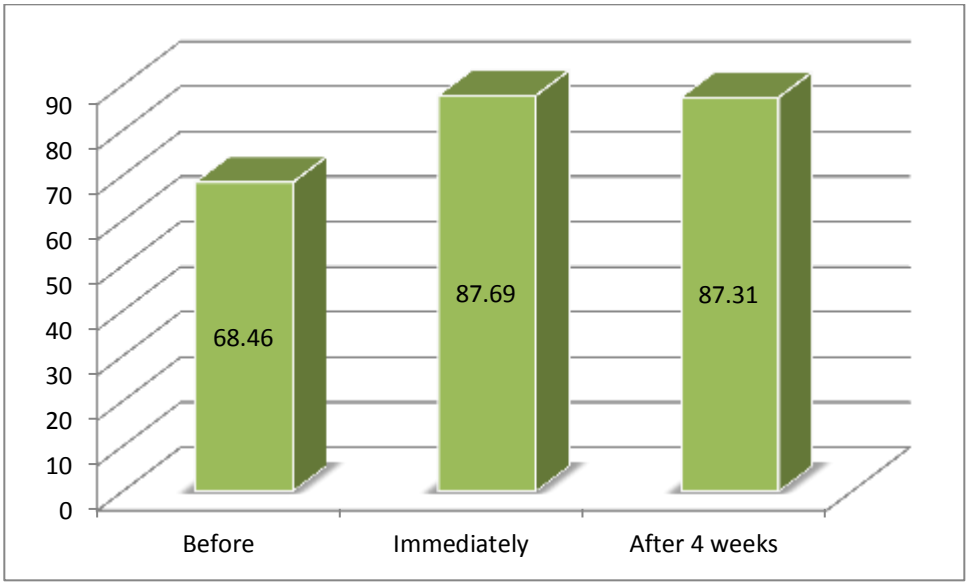

Figure 8:- Overall knowledge of bronchial asthma among primary school female teachers in relation to an educational intervention.

Table 7:- Facilities that school environment should provide to help in caring for asthmatic children

	Yes N (%)	No N (%)	Don`t know N (%)
Medical records for asthmatic students	15 (53.6)	2 (7.1)	11 (39.3)
Anti-asthmatic medications	1 (3.6)	13 (46.4)	14 (50.0)
Oxygen cylinder with periodic check up	0 (0.0)	18 (64.3)	10 (35.7)
Spacer devices	0 (0.0)	16 (57.1)	12 (42.9)
Known therapeutic plan for management of acute asthmatic attacks	1 (3.6)	13 (46.4)	14 (50.0)
Poster for how to manage a case of acute asthma	2 (7.1)	15 (53.6)	11 (39.3)
Continuous training courses for teachers as regards dealing with acute asthmatic attacks	0 (0.0)	22 (78.6)	6 (21.4)

Discussion:-

Within the school environment, primary school teachers represent an important source for providing care to asthmatic children as students spent almost one-third of the day at schools under their supervision. Therefore, the present study was implemented to identify their knowledge about different aspects related to care of asthmatic children as well as to explore the impact of an educational intervention on their knowledge, both immediately and after four weeks.

In the present study, the percentage of correct knowledge answers at the baseline before an educational intervention was 68.46%. In another similar study carried out among primary school teachers in South Africa,[6] 61.5% of them scored more than 50% for the asthma knowledge test.

Only 14.3% of teachers participate in this study reported the previous working as a health guide for students in the school, and they didn`t express a higher level of knowledge than others. The only significant factors associated with knowledge of bronchial asthma before an educational intervention were having a lower number of children, is not divorced or widowed, having personal and/or family history of bronchial asthma.
Although the prevalence of bronchial asthma is Saudi Arabia is relatively high ranged between 19-24%,[3] only one teacher (3.6%) could recognize that high prevalence, which reflects the fact that bronchial asthma is not a prioritization in school health. In other studies carried out in Hong King[7] and Denmark,[8] 26.5% and 60.1% of teachers, respectively were aware of the prevalence of bronchial asthma in their countries.

Regarding knowledge of etiological factors, a majority of teachers in the present study (96.4) were aware of the association of asthma with allergy. This figure is higher those reported in South Africa (51.3%),[6] Western Australia (45.7%)[9] and England (30.6).[10]

Concerning knowledge of asthma exacerbating factors, the overall knowledge was acceptable as almost two-thirds of answers were correct; particularly regarding dust (96.4%), smoking (89.3%) hair and fur of pets (85.7%). In another study, only 50% of teachers in Ireland could identify two asthma exacerbating factors.[11] In a study carried out in South Africa,[6] most teachers identified smoke, chalk dust, and common colds as exacerbating factors for asthma among schoolchildren

It was expected that teachers who had previous experience as students` health guide should have better knowledge regarding different diseases than others. However, in the present study this finding was not confirmed, most probably due to a small size of teachers recruited in this study.

Concerning knowledge of teachers of asthma and practicing sports, the present study observed that almost two-thirds of teachers believed that asthmatic children should not practice sports. In another study carried out in South Africa, [6] 46.5% of primary school teachers correctly indicated that asthmatic children should engage in sports and exercise. In another study carried out in Denmark,[8] a figure of 32% has been reported in this regard. In Malaysia,[12] knowledge on exercise-induced asthma was moderate (64.0%).

School teachers should be able to handle children with acute asthmatic attacks in the school environment; therefore, they should have the ability to identify the signs of these attacks correctly. In the present study, most of the teachers (71.4%) were able to detect blue discolouration of the lips as a sign of a severe acute asthma attack. This is higher when compared to the only 36.3% in a study carried out in South Africa,[6] and 53.6% in a study conducted in Hong Kong.[7] However, it is lower than a figure reported from New Zealand (88%).[13]

Concerning treatment of acute asthmatic attacks, some misconceptions were observed in the present study. Almost two-thirds of teachers believed incorrectly that antibiotics are used in the treatment of acute asthmatic attacks. In another study conducted in Hong Kong,[7] more than half the teachers also believed that antibiotics are used to relieve asthma attacks. This incorrect knowledge among teachers can lead to an inaccurate decision and be failing to help the asthmatic child. [14]

In the current study, more than half of the teachers misbelieved that aspirin has a role in treating asthmatic children with acute attacks, despite It is well documented that aspirin may, in some asthmatic children, precipitate or worsen an attack.[15] It is also contraindicated in children for the management of even pain or fever, particularly in viral infections.[16]

On the other hand, the majority of the teachers could recognize that bronchodilator spray and preventive therapies are important in treating acute attacks. The same has been reported from other studies carried out in Hong Kong,[7] Denmark[8] and Malaysia.[12]

Regarding knowledge regarding the facilities that school environment should provide in caring for children with asthma, spacer devices were identified by only 39.3% of teachers. In another study carried out in South Africa,[6] only 22.1% could identify the spacer as a device that is used to deliver asthma medication.

Conclusively, findings of the present study before an educational intervention were alarming because they suggested the teachers' inability to help asthmatic children during an acute asthma attack, or even to correctly supervise them during the school day.

In a recent study carried out in India,[17] teachers responded favorably to having education training on asthma in their teaching curriculum. Under that, this study revealed that there was a significant increase in the percentage of correct answers among respondents immediately as well as four weeks after an educational session. In another Saudi study, the median value of the pre-educational program score was 11 (range 5–18) while that of the post-educational program was 15 (range 7–18), $p < 0.001$. Other studies confirmed the impact of education on the knowledge of teachers concerning other diseases such as epilepsy.[18-20]

In the present study, knowledge of teachers regarding different asthma aspects was assessed again immediately after the educational intervention and after four weeks to determine whether the acquired knowledge sustained after a wash out period or not. Fortunately, the present study revealed improvement in knowledge immediately and after four weeks in overall knowledge and all individual aspects of asthma except for knowledge of the services should the school's environment provides to help in caring for asthmatic children.

The WHO documented that the positive effect of obtaining the right knowledge will not only improve the relationship of teachers with affected students but also the relationship of affected students towards their peers. [21]

Study limitations:-

Some limitations of the study should be mentioned. First, the small sample size which could affect the significance and generalizability of results. However, the sample was calculated scientifically, based on the nature of the study and also selected randomly from a frame of all primary schools in Makkah. Second, a self-administered questionnaire may be biased without appropriate supervision. In this study, the researcher was present at the time of questionnaire filling, and data were collected immediately from teachers. Third, we did not inquire about the history of had receiving training in asthma management among teachers. Fourth, we did not ask about the knowledge regarding utilization of Metered dose inhaler. Finally, the inclusion of only female teachers due to cultural reasons could impact the overall results.

Despite these limitations, the study is of public health importance in exploring knowledge of teachers regarding this common health problem among children and study the role of intervention educational activities on improving their knowledge.

Conclusion:-

This study indicates the existence of serious gaps in the knowledge of primary school female teachers in Makkah city regarding bronchial asthma and its management among schoolchildren; particularly medications, and relation to practicing sports. Overall, this knowledge about bronchial asthma from its all aspects has increased significantly after an educational intervention, both immediately and after four weeks of the educational intervention. There is an apparent deficiency in the facilities that should be provided by school environment to facilitate caring for children with asthmatic attacks.

Recommendations:-

Based on the results of this study and their discussion, the following recommended:

1. Primary school teachers should receive training program, organized by MOH in asthma management.
2. Refresher seminars and courses should regularly be conducted for teachers to enhance and sustain their knowledge, and first aid management skills towards their students.

3. The school environment should provide facilities that help in caring for asthmatic children such as medical records for asthmatic students, anti-asthmatic medications, known therapeutic plan for management of acute asthmatic attacks, poster for how to manage a case of acute asthma, spacer devices, and oxygen cylinder with periodic check up.
4. Encourage teachers to allow asthmatic children to practice sports after following preventive measures.
5. Further study with a larger sample of teachers from both genders and different disciplines in Makkah is needed to have a better an overview of the situation.

References:-

1. Al Frayh AR, Shakoor Z, ElRab MO, Hasnain SM. Increased prevalence of asthma in Saudi Arabia. Ann Allergy, Asthma Immunol. 2001;86(3):292–6.
2. BinSaeed A a, Torchyan A a, Alsadhan A a, Almidani GM, Alsubaie A a, Aldakhail A a, et al. Determinants of asthma control among children in Saudi Arabia. J Asthma [Internet]. 2014;51(4):435–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24344812
3. Al-ghazawy O. The rising danger of asthma. Nature Middle East. 2013.79. Available at: Ahttp://www.natureasia.com/en/nmiddleeast/ article/ 10.1038/nmiddleeast.
4. Al Ghobain MO, Al-Hajjaj MS, Al Moamary MS. Asthma prevalence among 16- to 18-year-old adolescents in Saudi Arabia using the ISAAC questionnaire. BMC Public Health [Internet]. 2012;12(1):239. Available from: http://www.biomedcentral.com/1471-2458/12/239
5. Mohamed NA, Al-Akad G. The influence of dusty environment (Makka city broken mountains) on bronchial asthma. Egypt J Chest Dis Tuberc [Internet]. 2014;63(2):305–8. Available from: http://linkinghub.elsevier. com/ retrieve/pii/S0422763813002689
6. Govender D, Gray A. Knowledge of primary school teachers about asthma: a cross-sectional survey in the Umdoni sub-district, KwaZulu-Natal. S Afr Fam Pract 2012;54(4):347-351
7. Tse K, Yu T. Knowledge of asthma and its management: a study in primary schoolteachers in Hong Kong. Hong Kong Pract. 2002;24:4-14.
8. Madsen P, Storm K, Johansen A. Danish primary schoolteachers' knowledge about asthma: results of a questionnaire study. Acta Paediatr. 1992; 81(4):413-46.
9. French D, Caroll A. Western Australian primary school teachers' knowledge about childhood asthma and its management. J Asthma. 1997;34(6):469-475.
10. Bevis M, Taylor B. What do school teachers know about asthma? Arch Dis Child. 1990;65(6):622-625
11. Bell H, McElnay J, Hughes C, Gleadhill I. Primary schoolteachers' knowledge of asthma: the impact of a pharmacist intervention. J Asthma. 2000;37(7):545-555
12. Bahari K. The level of knowledge on Asthma and its management among primary school teachers in Penang, Malaysia. International Journal of Pharmacy Teaching & Practices 2013; 4(2):601-606
13. Seto W, Wong M, Mitchell E. Asthma knowledge and management in primary schools in South Auckland. NZ Med J. 1992;105(937):264-265.
14. Latif A. Bahraini school teachers' knowledge of asthma. Middle East J Fam Med. 2004;2(2):1-11.
15. Jenkins C, Costello J, Hodge L. Systematic review of the prevalence of aspirin induced asthma and its implications for clinical practice. BMJ. 2004;328(7437)434-437.
16. Beutler AI, Chestnut GT, Mattingly JC, Jamieson B. Aspirin use in children for fever or viral syndromes. Am Fam Phys. 2009;80(12):1472-1474.
17. Jiwane N, Wadhwa S. Assessment of knowledge, attitude, and practices of teachers regarding childhood asthma in the rural school of Maharashtra, India. Indian Journal of Applied Research 2014; 4(6):1-3
18. Eze CN, Ebuehi OM, Brigo F, Otte WM, Igwe SC. Effect of health education on trainee teachers' knowledge, attitudes, and first aid management of epilepsy: An interventional study. Seizure 2015;33; 46–53
19. Roberts RM, Aida Farhana HS. The effectiveness of a first aid information video in reducing epilepsy-related stigma. Epilepsy Behav 2010;8:474–80.
20. Bozkaya IO, Arhan E, Serdaroglu A, Soysal S, Ozkan S, Gucuyener K. Knowledge of, perception of, and attitudes towards epilepsy of school children in Ankara and the effect of an educational program. Epilepsy Bahav 2010;17:56–63.
21. WHO. The global campaign against epilepsy. Information pack for the launch of the Global Campaign's Second Phase, 12–13 February 2001. Geneva World Health Organisation; 2000.