

# The Effect of School Based Intervention for Teachers and Adolescents on Reducing Bronchial Asthma among Adolescents

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**Abstract:** Asthma is a serious challenge to public health. Its direct and indirect costs are high, but the costs of not treating asthma are even higher. The Egyptian guidelines for asthmatic child documented that, asthma is being increasingly diagnosed among Egyptian children. Aim of the study: is to examine the effect of school based intervention in reducing bronchial asthma among adolescents. Study design: A quasi experimental design (pre-post test) was used. Setting: the study was done in Shebin El-Kom district public schools. Study sample: A convenience sample of 67 asthmatic adolescents and 108 teachers were selected from 35 public schools. Tools: Asthma Knowledge Questionnaire used to assess the adolescents and teachers asthma knowledge. Results: the mean score of the adolescents and teachers asthma knowledge post-intervention was higher than the pre-intervention scores. The adolescents' school absenteeism rate was significantly decreased post intervention. Conclusion; this study findings approved the research hypothesis and assured that, the implementation of school-based intervention of asthma succeed in making improvement in the participants' asthma knowledge. Recommendation; implementation of asthma intervention for asthmatic adolescents and teachers within schools may reduce asthma among adolescents.

**Keywords:** asthma knowledge, asthmatic adolescents, teachers.

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## 1. INTRODUCTION

Asthma is a chronic inflammatory disease usually begins in childhood and is characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from one person to another [11]. Asthma has been recognized for more than 3000 years but it is only in the last three to four decades that it has become a serious public health concern. Studies from English-language countries in the 1990s reported increases in asthma prevalence from the 1980s, and therefore continuing increases in prevalence were expected, and found that asthma in children was on the increase in many countries from 1993 to 2003.

Asthma is not just a public health problem for high income countries: it occurs in all countries regardless of level of development. Over 80% of asthma deaths occur in low- and lower-middle income countries [27]. A recent study estimated medical expenses associated with asthma were \$3,259 per person per year during 2002—2007, and the total direct and indirect costs of asthma to society in the United States was \$56 billion in 2007, and in 2012 the combined charges for ED visits and hospitalizations with asthma listed as the primary diagnosis exceeded one billion dollars (\$1,085 million) [10].

Living with asthma can impact many other adolescents' health and social outcomes as well, and asthma, particularly severe asthma, has been found to be co-morbid with several developmental, emotional and behavioral problems [13]. Students with asthma are at increased risk for poor mental health and depression [10]. Adolescents with asthma are almost twice as likely to have depression and/or anxiety disorders compared with those who do not have asthma [16].

There is no accurate, official, documented proportion of school students with asthma in Egypt [23]. The Egyptian guidelines for asthmatic child by the Egyptian Pediatric Association documented that asthma is being increasingly diagnosed among Egyptian children. Of major concern is a 10% annual increase in mortality [24]. Few studies evaluated asthma prevalence in Egypt. Bronchial asthma is a significant health problem among children and adolescents in Egypt. Wider scale multi-center studies in Egypt are needed to outline the profile of bronchial asthma among children and adolescents [1].

There are five types of asthma: allergic asthma, non-allergic asthma, late-onset asthma, asthma with fixed airflow limitation, and asthma with obesity. Allergic asthma is the most recognized. Allergic asthma; this asthma type accounts for nearly 60 % of all asthma [6]. Studies through puberty have shown a greater incidence of asthma among adolescent and young adult females and a greater proportion of males with remission of asthma. Before age 12, boys have more severe asthma than girls, with higher rates of admission to hospital [20]. Asthma disease has multiple genetic markers that affect the triggering of symptoms and the progression and pharmacological control of an episode [4]. Children from lower socioeconomic status are more likely to have asthma as well as adverse asthma-related events, such as hospitalizations. Asthma can be caused by an allergic condition, such as atopic dermatitis (eczema) or allergic rhinitis (hay fever) [3]. Sinusitis and polyposis are frequently associated with asthma and need to be treated [12]. Cigarette smoke irritates the airways. Smokers have a high risk of asthma (American Lung Association, 2018). Environmental factors play a crucial role in asthma epidemics. Exposure to indoor and outdoor allergens contributes to asthma development, aggravations and exacerbations [9].

Asthma severity is assessed retrospectively from the level of treatment required to control symptoms and exacerbations. It is important to distinguish between severe asthma and asthma that is uncontrolled, e.g. due to incorrect inhaler technique and/or poor adherence [11]. Although the majority of asthma can be classified as mild, these patients remain at risk of an asthma exacerbation. In contrast, severe uncontrolled asthma occurs in about 5–10% of patients but drives about 50% of the cost of asthma. An asthma control survey of patients showed that only 5% of the patients were controlled, 31% were partially controlled, and 64% were uncontrolled [22].

Each person's asthma is unique. Some people with asthma take medicine daily. Others take it only as needed. Treatment of asthma has changed to focus on "control" of symptoms rather than "management" of severity [4]. The primary therapies for exacerbation to relieve airflow obstruction and hypoxemia are: repetitive administration of rapid-acting inhaled  $\beta_2$ -agonist bronchodilator, early introduction of systemic glucocorticosteroids, oxygen supplementation and (in the school) use of rescue inhalers (Albuterol). The clinician can decide if antibiotic therapy is appropriate [11].

#### **Significant of study:**

Bronchial asthma is a significant health problem among children and adolescents in Egypt. The Egyptian guidelines for asthmatic child documented that, asthma is being increasingly diagnosed among Egyptian children. Few studies were done to explore and manage this problem in Egypt [2]. Wider scale multi-center studies in Egypt are needed to outline the profile of bronchial asthma among children and adolescents [1]. So this study was done to examine the effect of implementing a school-based intervention for teachers and adolescents to reduce asthma among Egyptian asthmatic adolescents.

#### **Aim of the study:**

The aim of this study is to examine the effect of school based intervention for teachers and adolescents in reducing bronchial asthma among adolescents.

#### **Research Hypothesis:**

1. Asthma knowledge of teachers and adolescents who will receive school based intervention may be improved post intervention.
2. The school absenteeism rate due to bronchial asthma of the participated adolescents may be decreased post intervention.

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### 2. METHODOLOGY

**Design:** - A quasi experimental design (pre-post test) was used.

**Settings:** The study was conducted at Shebin El-Kom district public schools in Menoufia Governorate, thirty five public schools (twenty three urban & twelve rural).

**Sample:** A convenience sample of 67 asthmatic adolescents and 108 teachers from the selected public schools (35).

**Inclusion criteria:**

- The adolescents were diagnosed with bronchial asthma.
- Aged 12 – 17 years.

**Data collection instrument:**

**Asthma Knowledge Questionnaire (AKQ):-**

The tool has been adopted from Newcastle Asthma Knowledge Questionnaire (NAKQ). It includes three parts:

**Part one:**

- The socio demographic data of adolescences and teachers such as (sex, age, residence, school place and ect.....).
- The studied adolescents' medical history data.
- The studied adolescents' school absenteeism days.

**Part two:** Questions to assess the adolescents and teachers knowledge about bronchial asthma as (asthma nature & definition, asthma causes and triggers`, asthma' sings & symptoms and ect ....).

**Scoring:**

The questionnaire contained knowledge assessment items each was three points Liker scale (0 – 2) as (0) for “don’t know”, (1) for “incorrect answer”, and (2) for correct answer. The total score of each adolescents and teacher was categorized arbitrary into “inadequate knowledge” when the participant achieved less than or equal  $\leq 50\%$ , and adequate knowledge was considered when the participant achieved more than  $> 50\%$ .

### 3. METHOD

**Approval:**

- The researcher contacted undersecretary of the Ministry of Education at Menoufia Governorate and sent a formal letter and a copy of the research' tool to obtain the agreement to conduct the research. The agreement was obtained. Before starting the data collection, the agreements and the aim of the study were explained to each school manager.
- Teachers and adolescents parents' consent obtained before starting collecting data. Approval from the ethics committee also was obtained to carry out this study.

**Reliability of the tool :**

Reliability was applied by the researcher for testing the internal consistency of the tool by administration of the tool to the same subjects before collecting the data actually to assess clarity and simplicity of the questions. Reliability was estimated among 15 participants by using test retest method with two weeks apart between them .The correlation coefficient was calculated between the two scores. Then correlation coefficient was calculated between the two scores for each of the three types of participants. Correlation coefficient was 0.76 for students' questionnaire and 0.81 for teachers, which indicate that, the questionnaires are reliable to detect the objectives of the study.

**Validity the Tool:**

The questionnaire was tested for its content by jury of two experts in the field of Community Health Nursing to ascertain relevance and completeness. Validity of the questionnaire was assessed using content validity by an Expert. The relevancy, clarity, fluency and simplicity of each component in the questionnaire were examined by the expert and she found the questionnaire is useful and helpful.

**Pilot study:**

A pilot study was carried out on (10 teachers and 5 adolescents) to test the content of the questionnaire as well as to estimate the time needed for data collection and the necessary modifications was done. Those who shared in the pilot study were excluded from the study sample.

**Ethical consideration:**

Protection of human rights was maintained to all subjects that the participation in research is voluntary. Anonymity and confidentiality of the responses were respected. All subjects have a freedom to refuse participating in the research and to withdrawing at any time.

**Procedure and data Collection:**

- Data Collection started on September 2016 and lasted until May 2017.
- Before starting the data collection, the agreements and the aim of the study were explained to each school managers to gain their cooperation.
- The school based intervention was done by development and implementation of asthma educational sessions for the participants (adolescents and teachers). The materials for these sessions were taken from National Guidelines.
- The researcher initiated data collection by interviewing each participant for assessing adolescents and teachers' socio-demographic data. The researcher distributed and filled the pre-test AKQ to all the adolescents and teachers.
- Most of time, the participants filled the questionnaire by themselves. Filling in the pretest questionnaire took about 20-30 minutes.
- After 3 months follow up test; a copy of AKQ was filled by each participant for assessing the effectiveness of the developed educational intervention on the asthma knowledge of all the participants and on the adolescents' school absenteeism rate due to asthma.

**Statistical analysis:**

Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics were done using Excel program. Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed using student t-test for comparison between two means. Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square ( $\chi^2$ ) test. However, if an expected value of any cell in the table was less than 5, Fisher Exact test was used Level of significance was set as P value <0.05 for all significant tests.

#### 4. RESULTS

Table (1) showed the distribution of socio-demographics of studied adolescents. The table revealed that, 61.2 % of the adolescents were females, 50.7 % of adolescents were aged from 15 to 17 years, 59.7% of the studied adolescents were from the urban regions, 40.3% of the adolescents' fathers and 46.3% of their mothers had diploma or above, followed by 26.9% of the fathers with university education and 22.4% illiterate mothers with respectively, 41.8% of the adolescents' fathers were hand workers.

Figure (1): this figure showed the percent distribution of the studied adolescents according to the duration of suffering from bronchial asthma. The figure showed that, 46.3% of the studied adolescents suffered from bronchial asthma (0-5 years), followed by more than one third 35.8% of adolescents who suffered from bronchial asthma (6-10 years).

Figure (2): showed the percent distribution of the studied adolescents according to other family member sick with asthma and family member smoking. The figure illustrated that, 55.2% of the studied adolescents had not other family member sick with asthma, 65.7% of the studied adolescents had a smoker family member.

Table (3) showed the distribution of socio-demographics of studied teachers. The table demonstrated that, the percent of the teachers' females and males was 50%, 41% of teachers were aged 31-, followed by 40% who aged 46 - and 55.6% were from rural area and 70.4% had university educational level, 29.6 % of the studied teachers had experience years from 6 to 10 years, followed by 28.7% teachers who had experience less than 5 years, 67.6% of the participated teachers were not smokers.

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Table (4) showed mean score of adolescents' knowledge scores pre and post intervention. The table revealed that, the total mean scores of the adolescents' knowledge post –intervention was significantly higher than the corresponding mean scores of pre-intervention  $33.3 \pm 4.7$ vr  $20.9 \pm 7.0$  (P=0.000).

Table (5) showed mean score of teachers' knowledge scores pre and post intervention. The table highlighted that, the total mean score of teachers' knowledge post –intervention was significantly higher than the corresponding pre-intervention scores  $34.7 \pm 4.9$  vr  $24.3 \pm 7.4$  (P=0.000).

Figure (3); this figure showed percent distribution of school absenteeism related to adolescents' sex pre & post-intervention. The figure showed that, in pre intervention male adolescents missed the schools more than females 73.1% and 70.7% respectively. While, in post intervention the females missed the schools more than males 65.9% and 61.5% respectively.

Table (6) showed some socio demographic data of the adolescents distributed by school absenteeism rate in the last 4 weeks pre and post-intervention. The table illustrated that, the absenteeism rate among the participated adolescents pre intervention was decreased post intervention 71.6%, 64.2% respectively. In pre and post intervention, the highest rate of school absenteeism was among the adolescents who aged 15 to 17 years 82.4%, 82.4% respectively. In pre and post intervention, the highest rate of school absenteeism was among the adolescents from urban area 82.5%. There was no statistical significant difference between sex, age and residence regarding pre and post intervention school absenteeism (P>0.05 for each).

**Table (1) Socio demographic data of the studied adolescents (N=67)**

Socio demographic data	freguancy	Percent
<b>Gender:</b>		
Male	26	38.8
Female	41	61.2
<b>Age group:</b>		
12-	33	49.3
15-17 years	34	50.7
<b>Residence:</b>		
Rural	27	40.3
Urban	40	59.7
<b>Types of school:</b>		
Elementary school	9	13.4
Preparatory school	32	47.8
Secondary school	26	38.8
<b>Father education:</b>		
Illiterate	9	13.4
Basic education	13	19.4
Diploma or above	27	40.3
University education	18	26.9
<b>Mother education:</b>		
Illiterate	15	22.4
Basic education	10	14.9
Diploma or above	31	46.3
University education	11	16.4
<b>Father work:</b>		
Does not work	6	9
Hand work	28	41.8
Office work	17	25.4
Others	16	23.9
<b>Total</b>	<b>67</b>	<b>100</b>

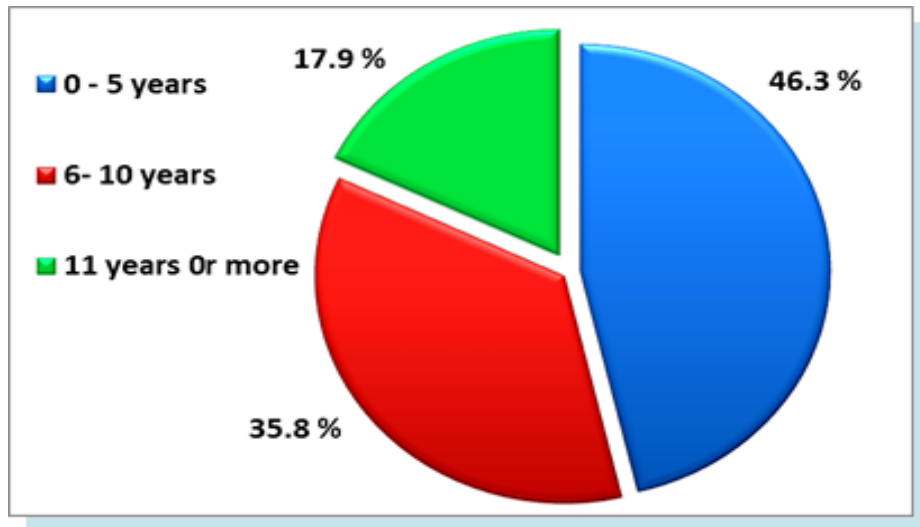


Figure (1) Percent distribution of the studied adolescents according to the duration of suffering from bronchial asthma

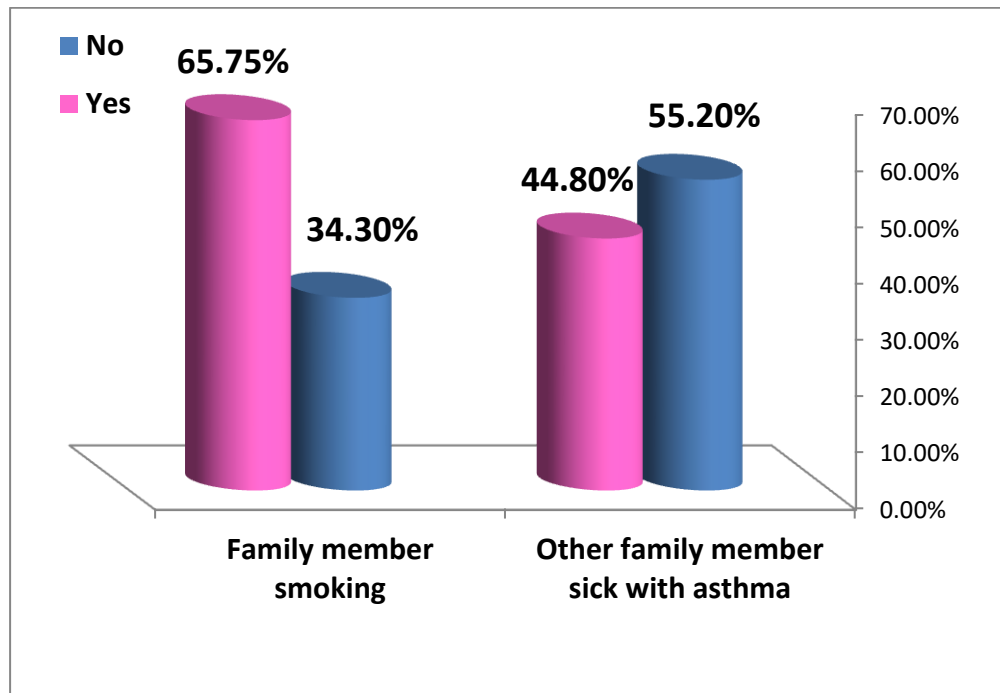


Figure (2) Percent distribution of the studied adolescents according to other family member sick with asthma and family member smoking.

Table (3) The Socio demographic data of the studied teachers (N=108)

Socio-demographic data	freguancy	Percent
<b>Gender:</b>		
Male	54	50
Female	54	50
<b>Age group:</b>		
≤30 -	23	21
31 -	45	41
46 -	40	40
<b>School site</b>		
Rural	60	55.6
Urban	48	44.4

Socio-demographic data	frequency	Percent
<b>Level of education:</b>		
Diploma	18	16.7
University education	78	70.4
Master degree	11	10.2
Doctorat degree	3	2.8
<b>Experience years</b>		
≤ 5	31	28.7
6 -	32	29.6
11 -	27	25
>20 -	18	16.7
<b>Smoking</b>		
No	73	67.6
Yes	35	32.4
<b>Total</b>	108	100

Table (4): Mean score of adolescents' knowledge scores pre and post intervention (N=67)

Intervention	Inadequate knowledge (0 - 23) Mean ±SD	Adequate knowledge (24 - 46) Mean ±SD	Total Mean ±SD	P value
<b>Pre intervention:</b>				
Mean ±SD	16.1±3.9	27.3±4.6	20.9 ± 7.0	t1=10.7,P=0.000HS
Range		23 -35		
Number	38	29	67	
<b>Post intervention:</b>				
Mean ±SD	22.7 ± 0.5	32.8 ±4.4	33.3 ± 4.7	t2=3.9,P=0.000HS
Range	22 - 31	28 - 40	22 - 40	
Number	3	64	67	

Paired t test= comparison between total mean score of adolescents' knowledge pre and post intervention.= P=0.000.

t1 = Comparison between mean knowledge score of inadequate and adequate knowledge adolescents pre intervention.

t2 = Comparison between mean knowledge score of inadequate and adequate

Table (5): Mean score of teachers' knowledge scores pre and post intervention (N=108)

Intervention	Inadequate knowledge (0 - 26) Mean ±SD	Adequate knowledge (27 - 52 ) Mean ±SD	Total Mean ±SD	P value
<b>Pre intervention:</b>				
Mean ±SD	19.3 ± 3.9	32.3 ±4.2	24.3 ± 7.4	t1=12.3,P=0.000HS
Range	11 26	27 - 41	11 41	
Number	67	41	108	
<b>Post intervention:</b>				
Mean ±SD	25.0 ± 0.6	35.4 ±4.4	34.7 ± 4.9	t2=9.2 ,P=0.000HS
Range	24 - 26	28 - 56	24 - 56	
Number	7	107	108	

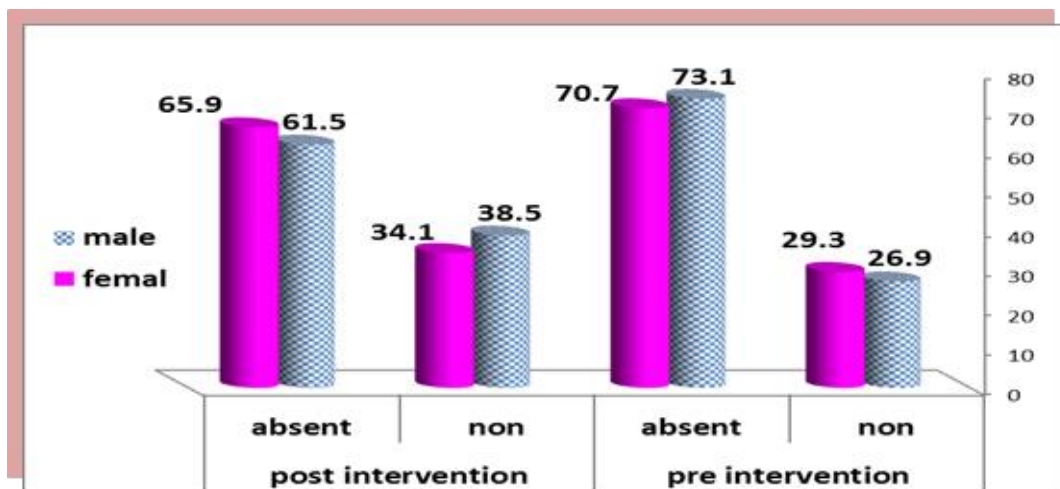
Paired t test= comparison between total mean score of teachers' knowledge pre and post intervention.= P=0.000.

t1 = Comparison between mean knowledge score of inadequate and adequate knowledge teachers pre intervention.

t2 = Comparison between mean knowledge score of inadequate and adequate knowledge teachers post intervention.

**Table (6): Some socio demographic data of the adolescents distributed by school absenteeism rate of the last 4 weeks pre and post-intervention (N=67)**

Some socio-demographic data of the adolescents	pre intervention absenteeism				post intervention absenteeism				P Value
	Non No.	Absent %	No. %	Absent %	Non No.	Absent %	No. %	Absent %	
<b>Age groups:</b>									
• 12- Years	13	39.4	20	60.6	18	54.5	15	45.5	$X^2=1.5, P=0.22$ NS
• 15- 17 Years	6	17.6	28	82.4	6	17.6	28	82.4	$X^2=0.0, P=1.0$ NS
<b>Residence :</b>									
• Rural	12	44.4	15	55.6	14	51.9	13	48.1	$X^2=0.29, P=0.58$ NS
• Urban	7	17.5	33	82.5	10	25	30	75	$X^2=0.66, P=0.41$ NS
<b>Total</b>	19	28.4	48	71.6	24	35.8	43	64.2	$X^2=0.48, P=0.35$ NS



**Figure (3) Percent distribution of school absenteeism related to adolescents' sex pre & post- intervention**

### 5. DISCUSSION

Adolescence is an ideal time to teach asthma management because cognitive gains and psychosocial developments made during this developmental period should make it possible for adolescents to assume management of their illness [7]. In fact, the most promising advance in asthma treatment is educating the students in how to manage their asthma. By teaching students how to identify triggers and how their body reacts to the different medications, students are able to customize their therapy to manage the triggers they come in contact with in their day to day life [21]. School based interventions offer unique opportunities to deliver interventions that are easily accessible and cost-effective especially to higher risk populations that may have limited access to health care and minimizing parental scheduling obligations [8]

Asthma is the commonest chronic medical condition school teachers have to deal with in their students, affecting in excess of 10% of children [14] Several studies were found that underscored the impact that teachers have on the adolescent with asthma resulting in decreased asthma management behaviors [17] A study was conducted in India, 2015



about knowledge and practice on management of asthma among primary school teachers its results revealed that primary school teachers are having comparatively less knowledge and practices about the management and prevention of asthma [18] To improve this situation, teachers should be trained to recognize the main symptoms of the disease, on how to act in the event of symptoms, and the early identification of situations in which the student require health care assistance. These teachers, however, showed a significant increase in knowledge after participating in an asthma education intervention [26].

#### Answer research hypothesis no. 1:

Asthma knowledge of teachers and adolescents who will receive school based intervention may be improved post intervention .

The present study' findings supported the study hypothesis that, the mean score of the adolescents' asthma knowledge post –intervention was significantly higher than the pre-intervention scores. This result was consistent with study conducted by [28] who studied "the effects of an adolescent asthma education intervention on knowledge, intention, behavior, self-Efficacy and self-Consciousness". They documented that "there was a statistically significant improvement in asthma knowledge scores from baseline to post-intervention".

The present study' findings supported the study hypothesis that, there was an improvement of teachers' asthma knowledge post intervention. The present study' results found that, the mean score of teachers' asthma knowledge was significantly improved post-intervention  $24.3 \pm 7.4$  vr  $34.7 \pm 4.9$  respectively. And, also [5] who studied "the level of knowledge on asthma and its management among primary school teachers in penang, Malaysia" illustrated that, The mean score for asthma general knowledge was  $34.53 \pm 3.67$ . While, Govender & Gray, (2011) documented that "the mean score of knowledge of asthma was 30.3 (SD 9.3, range 2-51).

#### Answer research hypothesis no. 2:

The school abesnteeism rate due to bronchial asthma of the participated adolescents may be decreased post intervention.

The present study' findings supported the study hypothesis that, post-intervention the adolescents' school absenteeism rate was decreased. The present study finding was compatible to the study done [7] who studied "effects of a school-based intervention for urban adolescents with asthma". They found that "asthma-related school absences rate was improved after intervention". The present study' results revealed that, there was insignificant difference between sex regarding pre and post intervention school absenteeism. It was in agreement with the study' results conducted by [19] who studied" asthma in adolescence affects daily life and school attendance - two cross-sectional population-based studies 10 years apart". They found that, asthma symptoms with no differences by sex. The present study' results found that, in pre and post intervention older asthmatic adolescents (15- 17 years) are missing school more often than younger ones with insignificant difference between age and school absenteeism. This result was not consistent with the study' finding of by [15] who studied" asthma-related school absenteeism and school concentration of low-income students in california" and the study' finding of [19]. They found that "younger asthmatics were missing school more often than older ones".

The present study' findings indicated that, in pre and post intervention the asthmatic adolescents who attended urban schools missed school more than who attended rural schools with an insignificant difference between residence and school absenteeism. This finding may be related to the urban schools may had higher exposure to air pollution and traffic-related pollutants. While, [15] documented that "children attending California schools were more likely to not miss school because of asthma, and students at disadvantaged schools may had higher exposure to indoor or outdoor asthma triggers".

## 6. CONCLUSION

- The adolescents and teachers asthma knowledge were highly improved post-intervention. The mean score of the adolescents and teachers' asthma knowledge post –intervention were significantly higher than the pre-intervention scores.
- The adolescents' school absenteeism rate was slightly decreased post intervention.

## 7. RECOMMENDATION

1. Provision of asthma intervention for asthmatic adolescents and teachers within schools may reduce asthma among adolescents
2. Similar studies can be conducted on a large scale which may yield more reliable results.

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