

# Structured Self-learning Package for Bronchial Asthma Patients to Control Acute Exacerbation of Asthma

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**Abstract:** An important part of treatment of bronchial asthma is the control of the disease and assessment of patients' needs. Poor prognosis of asthma is contributed by patients' inadequate education and poor adherence to prescribed medications. So, asthma education is therefore considered by current structured self-learning package to be an important part in management of bronchial asthma. **Aim:** the aim of this study was to evaluate the effect of structured self-learning package for bronchial asthma patients to control the acute exacerbation of asthma. **Design:** A quasi- experimental research design was used. **Setting:** The study was conducted at both in- and out-patient pediatric and adult medical departments in Sayed Galal Hospital affiliated to El-Azhar University and Helwan General Hospital. **Sample:** A purposive sample of 120 adolescent and early adulthood patients with asthmatic. **Tools:** Tool I: A structured designed interviewing questionnaire which covers three parts: a)- Demographic characteristics of studied sample. b) Medical and family history of disease. c) Knowledge of studied sample about bronchial asthma. Tool II: An observation checklist which covers four parts: a) Observation checklist for using Nebulizers b) Observation checklist for using Metered-dose inhalers. c) Observation checklist for breathing and coughing exercises and d) Monitoring lung function. **Results:** The study sample had poor knowledge score (56.7%) about asthma at pre structured self-learning package which improved to be 67.5% having good knowledge at post self-learning package intervention, also this study showed improvement in all practice items post intervention of structured self-learning package. **Conclusion:** Self learning package had improved knowledge, practices, and compliance as well as controlled the exacerbation of asthma and improved patient follow up. **Recommendations:** Developing materials and/or a training program for patients with bronchial asthma to improve knowledge and practices about asthma and also increase compliance with the treatment and further research study is needed to examine the self-management behavior of bronchial asthma over time, as well as during various stages of development.

**Keywords:** Bronchial Asthma, Exacerbation, Self-Learning Package.

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## 1. INTRODUCTION

Asthma is a common chronic disorder of the airways characterized by variable and recurring symptoms, bronchial hyperresponsiveness, airflow obstruction and an underlying inflammation (**National Asthma Education and Prevention Program, 2018**)<sup>(1)</sup>. During an asthma episode, the lining of the bronchial tubes swell, lead to airways to narrow and decreasing the flow of air into and out of the lungs. Recurrent asthma symptoms repeatedly cause daytime fatigue, sleeplessness, decreased activity levels and school and work absenteeism. Asthma has a relatively low fatality rate compared to other chronic diseases (**WHO, 2017**)<sup>(2)</sup>

Bronchial asthma can be a very important problem in the life of the patient who suffers from this disease, in many instances it can cause serious significant limitations in the lifestyle of the person. This situation is especially

important in the child population, since the conditions can reach deficiencies both at the academic level and social level, with the serious consequences that the deficiencies can come to mean in childhood and the future development of the patient (Fernández-Rodríguez & Miralles, 2015)<sup>(3)</sup>. In addition, bronchial asthma is a major public health problem due to its economic price (Melerio et al. 2017)<sup>(4)</sup>

Asthma cannot be cured, but could be controlled. The intense risk factors for developing asthma are exposure, to indoor allergens (such as domestic mites in bedding, filled furniture and carpets, cats and cockroaches) and a family history of bronchial asthma or allergy. Exposure to chemical irritants and tobacco smoke in the workplace are extra risk factors. Other risk factors include certain drugs (aspirin and other non-steroid anti-inflammatory drugs), low birth weight and respiratory infection and the weather (cold air) (WHO, 2019)<sup>(5)</sup>.

Acute asthma exacerbations are episodes of worsening asthma symptoms of shortness of breath, cough, wheezing or chest tightness and progressive decrease in lung function; they can be the presenting manifestations of asthma or occur in patients with a known asthma diagnosis in response to a “trigger” such as; viral upper respiratory infection, allergen or irritant exposure, lack of adherence to controller medication, or an unknown stimulus (Bloom et al., 2019)<sup>(6)</sup>.

Severe asthma attacks may require hospitalization to control symptoms. Relieving medication may need to be given using a nebulizer (inhaled in a fine mist of oxygen via a specialized mask or mouthpiece) or intravenously (as an infusion into a drip in the hand or arm). Intravenous corticosteroids may also be given (Asthma and Respiratory Foundation, 2019)<sup>(7)</sup>. Studies in both children and adults are emphasized that effective strategies for patient follow-up after an asthma exacerbation that lead to improved clinical outcomes and decreased rates of subsequent exacerbations.

The management of worsening asthma and exacerbations is part of a continuum, from self-management by the patient with a written asthma action plan; through to management of more severe symptoms in primary care, the emergency department and in hospital (Global Strategy for Asthma Management and Prevention (2018)<sup>(8)</sup>

Effective control of bronchial asthma exacerbation can occur through avoiding or reducing exposure to triggers, the patient's ability to know bronchial asthma symptoms, and adherence to prescribed treatment. Subsequently, nurses should give patients education to avoid triggers can help reduce symptoms and the frequency of asthma exacerbations, in addition to education about the importance of awareness for symptoms of worsening asthma as night waking, breathlessness or difficulty speaking on exertion, also appropriate medication to use and the importance of follow up. (Elbanna et al., 2017; Asthma and Respiratory Foundation, 2019)<sup>(9,7)</sup>.

Well-structured asthma education with reinforcing by the health care professional is the key to achieve effective self-care management of asthma. Learning is the transformation of experience into knowledge, skills, and behaviors. Knowledge is also an integral part of life which results in changing of behavior (WHO, (2019)<sup>(5)</sup>

Self-Learning package (SLP) is one of the most suitable teaching methods for learners. It is an individualized method of learning that gives learners chance to work individually according to their special needs. Face to face teaching is disappearing and distance mode of education is becoming popular. Self-learning package (SLP) are designed where the learner is free to choose what, how, when and where to learn. This flexibility is an important characteristic in open learning process. The learner is getting familiar more and more to non-formal mode of education thereby shifting the preference to self-learning methods (Sequeira, 2012; Kheder, 2018)<sup>(10,11)</sup>

### Significance of the study

Bronchial asthma is one of the most common causes for intensive care unit visits and admissions for medical seeks each year. The WHO estimates that 235 million people currently suffer from asthma. Asthma is the most common non communicable disease among children, which occurs in all countries regardless of the level of development (WHO, 2017)<sup>(2)</sup>

Overall, the adjusted prevalence of asthma, in the adult general population over 18 years of age, in the countries studied was 6.4%. This ranged from 4.4% in Turkey, to 6.7% in Egypt and 7.6% in the Gulf cluster. In Egypt, the highest prevalence was documented in Greater Cairo/North Egypt, and the Canal region, followed by Upper Egypt (Tarraf et al. 2018)<sup>(12)</sup>. As well in Egypt, many school-based studies estimated that the prevalence of BA among school children ranged from 6.2% in Assiut City in Upper Egypt up to 46.1% in Cairo (Al Dhduh et al., 2015)<sup>(13)</sup>

The human and economic loads associated with this condition are severe. The costs of asthma to society could be lowered to a large extent through concerted international and national actions. World-wide, the economic costs related to asthma are estimated to exceed those of TB and HIV/AIDS combined (WHO (2019)<sup>(5)</sup>.

Asthma may be pivotal if the patient is not able to control the severity of disease or symptoms or does not know the right treatment. A structured education is one of the pillars for proper asthma management. An evaluation of patients' knowledge help to screen the problems in management and improve the therapeutic outcomes. The asthmatic patients should be aware about the positive attitude towards treatment, which is needed for good disease management (Chetna et al., 2016)<sup>(14)</sup>. So, this study was conducted to provide asthmatic patients with evidence to improve knowledge and skills about asthma management and control asthma exacerbation.

### Aim of this study

This study aimed to evaluate the effect of structured self-learning package for bronchial asthma patients to control the acute exacerbation of asthma.

### Hypotheses

- 1- Self-learning package intervention will control in exacerbations of asthma.
- 2- Self-learning package will improve knowledge and practices of studied patients with bronchial asthma as indicated by difference between pre and posttests' scores.

## 2. SUBJECTS AND METHODS

### I- Technical design

#### i -Research design

A quasi-experimental research design was utilized in this study.

#### ii -Research setting

The study was conducted at both in-and out-patient pediatric and adult medical departments in Sayed Galal Hospital affiliated to El-Azhar University and Helwan General Hospital.

#### iii- Sample

A purposive sample composed of 120 asthmatic adolescence and early adulthood who were attending the above mentioned settings over a period of four months, with *inclusion criteria* namely; asthmatic adolescents and early adulthood aged from 12 – 30 years, from both gender with confirmed diagnosis of bronchial asthma for at least 6 months, mild and moderate asthma, regardless their social classes. *Exclusion* of adolescents and early adults suffering from mental problems or other chronic medical diseases such as chronic obstructive pulmonary disease, diabetes, renal failure, congenital or acquired cardiovascular diseases and patients admitted to the intensive care unit (ICU) who require intubation, ventilator support or are in impending respiratory arrest.

### Sample technique

This is a controlled randomized trial which proposes to evaluate the effectiveness of a peer-led asthma self-management program. Based on data from literature (Rhee et al., 2011)<sup>(15)</sup> considering level of significance of 5%, and power of study of 80%, the sample size was calculated using the following formula:

$$n = [(Z_{\alpha/2} + Z_{\beta})^2 \times \{2(SD)^2\}] / (\text{mean difference between the two groups})^2$$

Where

SD: standard deviation

$Z_{\alpha/2}$ : This depends on level of significance, for 5% this is 1.96

$Z_{\beta}$ : This depends on power, for 80% this is 0.84

Therefore,

$$n = [(1.96 + 0.84)^2 \times \{2(21.53)^2\}] / (7.77)^2 = 120.3$$

#### **iV- Study tools and technique of data collection**

##### **Tool I: A structured designed interviewing questionnaire:**

It was designed by the researchers after reviewing related literature. It was written in simple Arabic language and it includes the following:

**a-** Demographic characteristics of studied asthmatic adolescence and early adulthood patients such as: age, gender, level of education and residence.

**b-** Medical and family history of disease: This includes family history of bronchial asthma, history of symptoms leading to seek medical advice, duration of disease, time of attack occurrence, season variation and regular follow up (**Global Strategy for Asthma Management and Prevention, 2018 ; Asthma and Respiratory Foundation, 2019**)<sup>(8,7)</sup>.

**c-** Knowledge about bronchial asthma It consisted of 20 questions related to bronchial asthma such as: definition, causes and predisposing factors, signs and symptoms, triggering factor, complication, management of bronchial asthma and well controlled bronchial asthma criteria, function of medication in bronchial asthma control, when and how to deal with worsening bronchial asthma. The questions included open questions, multiple choice and true/false questions.

##### **Scoring system for knowledge:**

Knowledge obtained from studied subjects was checked with a model key answer. The open questions scored as the following: Complete correct answer takes "two", while the incomplete answer takes "one" and a wrong answer or don't know takes "zero". For each closed question a score of "one" was given for every correct answer and score of "zero" was given for every wrong answer. The total score was converted into percentage and interpreted as follows: < 50% is considered poor, 50 - < 75% is considered fair and  $\geq 75\%$  is considered good.

**Tool II: An observation checklist**, filled in by the researchers, it was used to assess patient's practices.

**a. Observation checklist for using Nebulizers:** It consists of 18 steps, developed by **Lynn and LeBon (2011)**<sup>(16)</sup>.

**b. Observation checklist for using Metered-dose inhalers:** It consists of 11 steps was developed by **Pilkington 2017**)<sup>(17)</sup>.

**c- Observation checklist for breathing and coughing exercises:** it was developed by **Alberta Health Services (2019)**<sup>(18)</sup>.

##### **Scoring system for practices:**

The correct complete practice was scored "two", while the incomplete correct was scored "one" and an incorrect or not done scored "zero". The total practices were considered adequate if the total score was 60% or more and inadequate if the total score was less than 60%.

#### **D-Monitoring lung function**

Lung function monitoring was acquired from patient's medical record performed during patient' visit with this/her healthcare provider.

#### **II- Operational Design**

##### **a- Preparatory phase**

This phase included reviewing the available literature and the different studies related to bronchial asthma to cover various aspects of the research problem using books, articles, magazines and internet search to develop the study tools for data collection.

##### **- Validity of tools**

The study tools were tested for validity by a panel of 5 experts from the Faculty of Medicine (Pediatric and Adult Medicine), the Faculty of Nursing (Pediatric and Adult Nursing) and statistics.

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### - Reliability of tools

The researchers assessed reliability of the study tools, the patient's knowledge tool and practices an observation checklist, were testing using Cronbach's Alpha, these were 0.872 and 0.894 respectively.

### - Ethical considerations

The agreements of the bronchial adolescents and their parents as well as those the early of adulthood to patients participate in the study were taken verbally. Participants were confirmed that the information taken from them would be treated confidentially and used for the research purpose only. Participants' anonymity, confidentiality, privacy, safety and protection were secured.

### b- Pilot study

A pilot study was carried out on 10 % (12 patients) of the studied subjects to test tools for clarity, applicability and the time needed for filling in the tools. Data from the pilot study were analyzed and accordingly the necessary modifications on the study tools were done; those who participated in the pilot study were excluded from the main study sample.

### c- Field work

The Data collection took 4 months, the actual field work started from first February, 2019 to end of May 2019, where the researchers were available in the study settings twice/week from 9.00 am to 12.00 pm. The researchers introduced themselves and explained the aim of the study to bronchial asthma adolescents and their parents and to the early adult patients before their enrollment in the study, verbal consents were obtained; each of them was interviewed using the previously mentioned study tools.

### d. Implementation phase

A pretest was carried out, for identification of studied subjects needs using the previously mentioned study tools. Each studied subject took approximately 30 minutes to complete filling in the forms. An analysis of the obtained pretest data was then done to help with the design of the structured self-learning package intervention. Based on the findings, an illustrated structured self-learning package was prepared by the researchers based on related literature to satisfy the actual need of the studied subjects for knowledge and practices and control the exacerbation of asthma.

The self-learning package covered the required basic knowledge about bronchial asthma and the action plan to quickly recognize and cope with early warning signs of an asthma attack. This phase included clear instructions on how to use medication, track long-term asthma control, recognize and treat an asthma attack, take action based on peak flow readings, when to seek emergency care and how to prevent asthma triggers, explained the right dosage and usage and the effect and side effect of the medication, also provided with education regarding the method of controlling medication dosage based on their symptoms and lung function.

Exercise is an exception to the general rule about trigger avoidance. Exercise is encouraged for all children and adults, including those with asthma. The structured self-learning package also included steps to prevent and treat exercise-related symptoms.

After that, distribution to all participants, both hard and soft copy, a handbook of information and exercises, an e-mail and telephone number were given to all participants for any additional explanation. This self-learning package was delivered through regular workshops and presented to the study subjects to provide additional information.

Evaluation was done immediately after intervention by comparing the changes in studied subject's levels of knowledge, and practices through applying the same tools of pretest as posttest.

### III- Administrative Design

The present study was carried out after taking an official permission from the administrators of both Sayed Galal Hospital and Helwan General Hospital, upon letters issued from the Dean of the Faculty of Nursing, Helwan University. The aim and expected outcome of the study were explained clearly.

#### IV- Statistical Design

Data were analyzed using the Statistical Package for Social Sciences (SPSS), version 20. The first part of data, i.e. descriptive data were revised, coded, tabulated and statistically analyzed using the proportion percentage, arithmetic means, standard deviation; variables were compared using Chi-square test. The second part of data dealt with correlation between different variables, Spearman rank correlation analysis was used for the assessment of the interrelationships among scored and ranked variables. Degrees of significance of the results were: Non significant (NS) if  $P > 0.05$ , Significant (S) if  $P \leq 0.05$ , Highly Significant (HS) if  $P \leq 0.001$ .

### 3. RESULTS

Table (I) shows that the mean age of study subjects was  $19.6 \pm 5.1$  and for less than half (45.0%) of them between the age was  $12 < 19$  years, while for the rest of the study subjects 37.5% were between the age  $19 < 25$  years and 17.5% were between the age  $25 \leq 30$  years. In relation to gender, less than three fifth (58.3%) were female, while 41.7% were male. As regards their level of education more than two fifth (42.5%) of them were secondary school education. The same table also showed that about two third (65%) of the study subjects live in urban areas.

Table (1) also shows that almost two third (65.8%) of study subjects had positive family history of bronchial asthma. Regarding time of attack occurrence more than half (54.2%) had nocturnal attack, also for 36.7% and 30.0% of the study subjects, asthma occurs in spring and winter respectively, while 25% and 8.3% occur in autumn and summer respectively. It was noticed that 39.2% of the study subjects reported that cyanosis was the first symptoms that lead to seek medical advice, followed by dyspnea and wheeze (20.8% & 12.5 % respectively), while occurrence of cough represented 27.5%.

**Table (2):** Represents the studied subjects' characteristics of bronchial asthma, the results reported that regarding to the severity of asthma, 60% and 31.7 of the studied subject were having moderate and mild asthma in pre learning package which changed to 33.3% and 61.7% respectively in post learning package. Also, the table shows that 46.7% of studied subjects having recurrence of episode every 2 weeks which changed to 9.1% in post learning. The same table shows that 62.5% and 69.16% of the studied subjects were not regular in attendance for follow up and did not avoid of triggering factors, which improved to 89.16% and 71.7% had regular attendance and avoid of triggering factors respectively in post learning package.

**Figure (1)** illustrates that 40% of the studied subjects had poor housing condition, while 47.5% and 12.5% had average and good housing condition respectively.

**Figure (2)** represents that 40.8% were having triggering factor from 8 – 10 triggers while 34.2% 5 – 7 triggers, and 25% were having triggering factor from 2-4.

**Table (3)** reveals the results of comparisons between knowledge at pre/post application of self-learning package regarding definition, causes and predisposing factors, clinical picture, warning signs, complications, prevention of complications and management it were noticed from this table, there were improvements from incorrect in pre intervention regarding the previous mentioned items as revealed by 58.3%, 50%, 53.3%, 55%, 55.8%, 70% and 54.2 respectively to correct in post intervention as revealed by 74.2, 63.3%, 56.7%, 77.5%, 70%, 80% and 53.3% respectively. There were highly statistically significant differences between pre/post interventions in all the previous items ( $p < 0.001$ ).

**Figure (3)** illustrates that statistically significant differences between total knowledge of study subjects about asthma at pre/post intervention representing 16.7% good, 26.7% fair, 56.7% poor knowledge pre intervention and improved post intervention which represented 67.5% good 20.8% fair and 11.7% poor knowledge ( $\chi^2=73.262$  at  $p < 0.001$ ).

**Table (4)** indicates that there were statistically significant differences at all items regarding to practices of study subjects about asthma at pre/post intervention ( $p < 0.001$ ).

**Table (5)** reveals statistically significant correlations between the total knowledge score and total practice score pre and post intervention ( $r=0.393$  &  $0.759$  respectively with  $p < 0.001$ ).

**Table (6)** shows statistically significant associations between the total knowledge score and the sociodemographic characteristics of the patients under study pre and post intervention as regards all items which include age, gender, level of education and residence at  $p < 0.001$ ,  $0.001$ ;  $p = 0.041$ ,  $0.002$ ;  $0.027$ ,  $0.019$ ;  $0.036$  and  $0.001$ . respectively.



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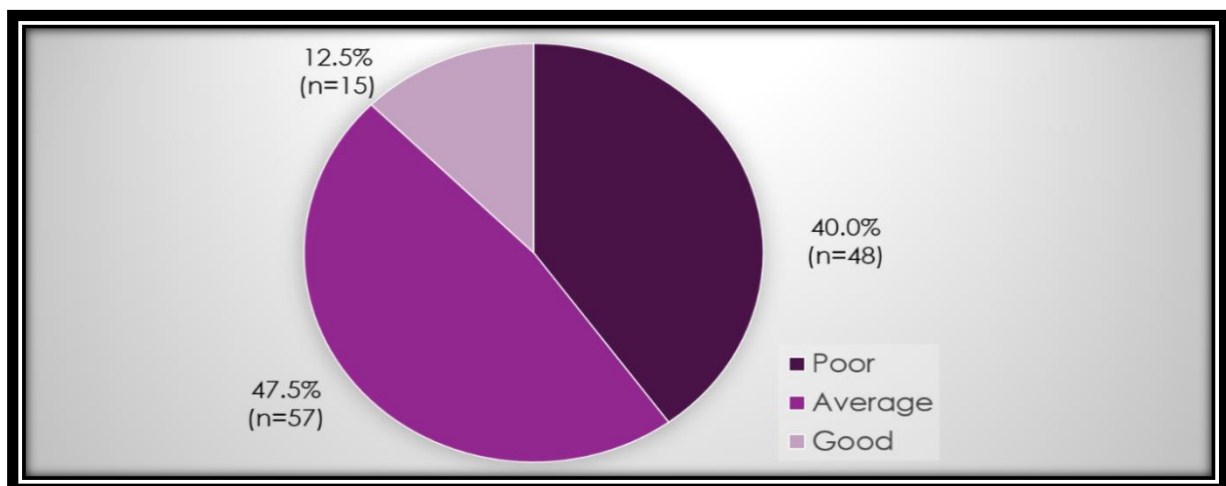
**Table (7)** indicates that there are statistically significant associations between the total practices score and the characteristics of asthma pre and post intervention regarding previous family history, time of attack occurrence, and regular follow-up at  $p = 0.032, 0.043; 0.016, 0.025; 0.033$  and  $0.007$  respectively, and there is statistically significant association post intervention only regarding season variation at  $p < 0.001$ .

**Table 1. Characteristics of the Study Subjects and History of Disease (n=120)**

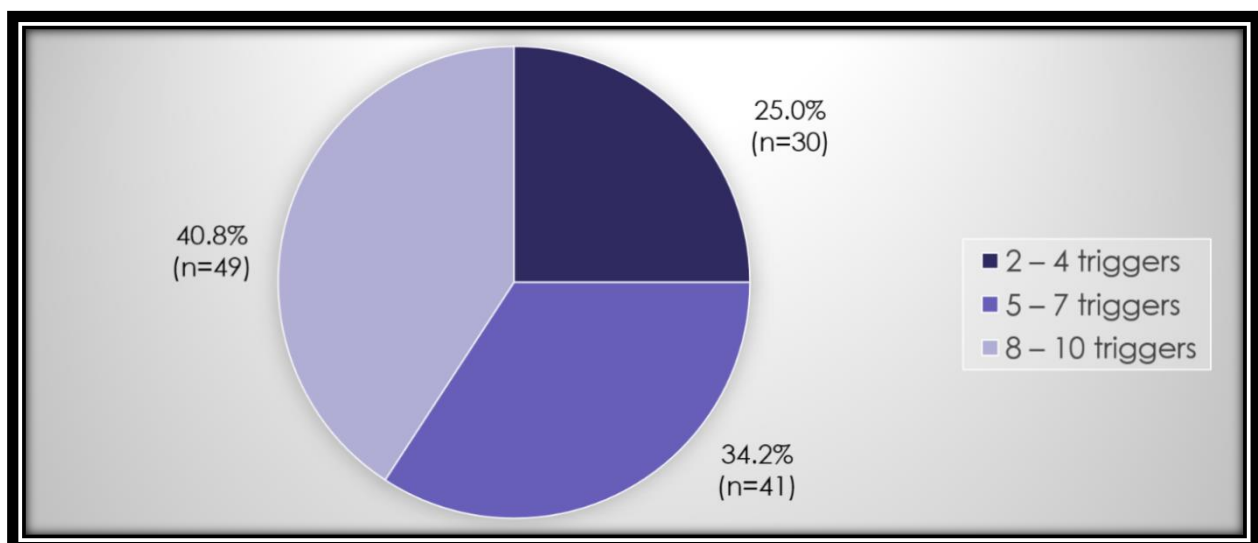
Characteristics	No	%
Age in years		
12 <-19	54	45.0
19 <-25	45	37.5
25 - 30	21	17.5
Mean $\pm$ SD	19.6 $\pm$ 5.1	
Gender		
Male	50	41.7
Female	70	58.3
Level of education		
Illiterate	19	15.8
Read and write	30	25.0
Secondary school	51	42.5
High education	20	16.7
Residence		
Rural	42	35.0
Urban	78	65.0
Previous family history		
Negative	41	34.2
Positive	79	65.8
Time of attack occurrence		
Nocturnal	65	54.2
Diurnal	20	16.7
At any time	35	29.1
Season variation		
Winter	36	30.0
Autumn	30	25.0
Spring	44	36.7
Summer	10	8.3
Symptoms occur leading to seek medical care		
Cyanosis	47	39.2
Dyspnea	25	20.8
Wheeze	15	12.5
Cough	33	27.5
Action taken when asthma occur		
Go to hospital	53	44.2
Go to doctor	20	16.7
Take medication	47	39.1

**Table 2: Characteristics of Asthma among the Study Subjects Pre/Post Self Learning Package (n=120)**

Items	Pre self-learning package		Post self-learning package		X <sup>2</sup>	p
	No	%	No	%		
Recurrence of episodes						
Every 2 weeks	56	46.7	11	9.1		
Every 4 weeks	35	29.2	34	28.33		
>1 month	29	24.2	75	62.5	50.585	<0.001
Regular follow-up						
No	75	62.5	13	10.83		
Yes	45	37.5	107	89.16	68.971	<0.001
Severity of asthma						
Mild	38	31.7	74	61.7		
Moderate	72	60	40	33.3		
Sever	10	8.33	6	5	7.799	0.020
Avoidance of triggering factors						
No	83	69.16	34	28.3		
Yes	37	30.83	86	71.7	40.042	<0.001



**Figure 1. Frequency of Housing Condition among the Patients**

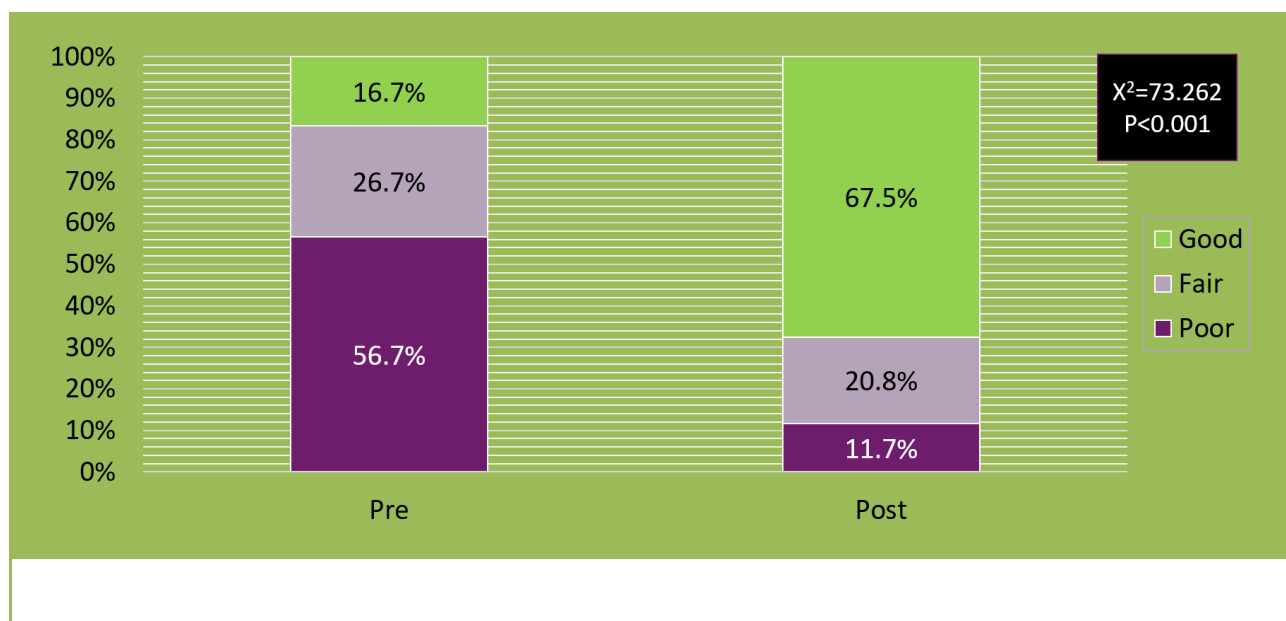


**Figure 2. Frequency of Presence of Triggering Factor of Asthma among the Studied Subjects**



**Table 3. Knowledge of Studied Subjects about Asthma at Pre/Post Self Learning Package Intervention (n=120).**

	Pre self-learning package						Post self-learning package						X <sup>2</sup>	p
	Incorrect		Incomplete		Correct		Incorrect		Incomplete		Correct			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition	70	58.3	35	29.2	15	12.5	12	10.0	19	15.8	89	74.2	98.419	<0.001*
Causes & predisposing factors	60	50.0	25	20.8	35	29.2	14	11.7	30	25.0	76	63.3	44.193	<0.001*
Clinical picture	64	53.3	34	28.3	22	18.3	15	12.5	37	30.8	68	56.7	54.030	<0.001*
Warning signs	66	55.0	43	35.8	11	9.2	7	5.8	20	16.7	93	77.5	120.736	<0.001*
Complications	67	55.8	37	30.8	16	13.3	19	15.8	17	14.2	84	70.0	80.438	<0.001*
Prevention of complications	84	70.0	23	19.2	13	10.8	8	6.7	16	13.3	96	80.0	127.241	<0.001*
Management	65	54.2	26	21.7	29	24.2	22	18.3	34	28.3	64	53.3	35.492	<0.001*



**Figure 3. Total Knowledge of Study Subjects about Asthma at Pre/Post Self Learning Package intervention (n=120)**

**Table 4. Practices of Study Subjects about Asthma at Pre/Post Self Learning Package Intervention (n=120).**

Items	Pre self-learning package				Post self-learning package				X <sup>2</sup>	p
	Inadequate		Adequate		Inadequate		Adequate			
	No	%	No	%	No	%	No	%		
Nebulizer	93	77.5	27	22.5	19	15.8	101	84.2	91.674	<0.001*
Inhaler	87	72.5	33	27.5	26	21.7	94	78.3	62.228	<0.001*
Monitor lung function and Breathing exercises	76	63.3	44	36.7	30	25.0	90	75.0	35.753	<0.001*
coughing exercises	96	80.0	24	20.0	15	12.5	105	87.5	109.969	<0.001*
Total	88	73.3	32	26.7	23	19.2	97	80.8	70.815	<0.001*

**Table 5. Correlations Between the Total Knowledge Score and Total Practice Score Pre and Post Self Learning Package Intervention**

Items	r	p
Pre intervention	0.393	<0.001*
Post intervention	0.759	<0.001*

**Table 6. Associations between the Total Knowledge Score and the Sociodemographic Characteristics of the Patients.**

Socio-demographic characteristics	Total knowledge pre intervention						Chi square test	Total knowledge post intervention						Chi square test
	Poor (n=68)		Fair (n=32)		Good (n=20)			Poor (n=14)		Fair (n=25)		Good (n=81)		
	No	%	No	%	No	%		No	%	No	%	No	%	
<b>Age (in years)</b>														
12 - <19	22	32.4	14	43.8	18	90.0		0	0.0	6	24.0	48	59.3	
19- <25	30	44.1	13	40.6	2	10.0	X <sup>2</sup> =21.316	8	57.1	10	40.0	27	33.3	X <sup>2</sup> =29.015
25 - ≤ 30	16	23.5	5	15.6	0	0.0	P<0.001*	6	42.9	9	36.0	6	7.4	P<0.001*
<b>Gender</b>														
Male	35	51.5	10	31.2	5	25.0	X <sup>2</sup> =6.403	12	85.7	10	40.0	28	34.6	X <sup>2</sup> =12.883
Female	33	48.5	22	68.8	15	75.0	p=0.041*	2	14.3	15	60.0	53	65.4	p=0.002*
<b>Level of education</b>														
Illiterate	14	20.6	3	9.4	2	10.0		6	42.9	4	16.0	9	11.1	
Read and write	18	26.5	9	28.1	3	15.0		1	7.1	8	32.0	21	25.9	
Secondary school	31	45.6	13	40.6	7	35.0	X <sup>2</sup> =14.265	7	50.0	11	44.0	33	40.7	X <sup>2</sup> =15.120
High education	5	7.4	7	21.9	8	40.0	p=0.027*	0	0.0	2	8.0	18	22.2	p=0.019*
<b>Residence</b>														
Rural	30	44.1	9	28.1	3	15.0	X <sup>2</sup> =6.666	10	71.4	13	52.0	19	23.5	X <sup>2</sup> =16.086
Urban	38	55.9	23	71.9	17	85.0	p=0.036*	4	28.6	12	48.0	62	76.5	p<0.001*

**Table 7. Associations Between the Total Practice Score and the Asthma Characteristics of the Studied Subjects.**

Asthma characteristics	Total practice pre intervention				Chi square test	Total practice post intervention				Chi square test
	Inadequate (n=88)		Adequate (n=32)			Inadequate (n=23)		Adequate (n=97)		
	No	%	No	%		No	%	No	%	
<b>Previous family history</b>										
Negative	35	39.8	6	18.8	X <sup>2</sup> =4.611	12	52.2	29	29.9	X <sup>2</sup> =4.102
Positive	53	60.2	26	81.3	p=0.032*	11	47.8	68	70.1	p=0.043*
<b>Action taken when asthma occurs</b>										
Go to hospital	40	45.5	13	40.6		16	69.6	37	38.1	
Go to doctor	15	17.0	5	15.6	X <sup>2</sup> =0.386	4	17.4	16	16.5	X <sup>2</sup> =9.122
Take medication	33	37.5	14	43.8	p=0.824	3	13.0	44	45.4	p=0.010
<b>Time of attack occurrence</b>										
Nocturnal	43	48.9	22	38.8		8	34.8	57	58.8	
Diurnal	13	14.8	7	21.9	X <sup>2</sup> =8.284	3	13.0	17	17.5	X <sup>2</sup> =7.362
At any time	32	36.4	3	9.4	p=0.016*	12	52.2	23	23.7	p=0.025*
<b>Season variation</b>										
Winter	20	22.7	16	50.0		0	0.0	36	37.1	
Autumn	30	34.1	0	0.0		12	52.2	18	18.6	
Spring	29	33.0	15	46.9	X <sup>2</sup> =19.388	10	43.5	34	35.1	X <sup>2</sup> =17.843
Summer	9	10.2	1	3.1	P<0.001	1	4.3	9	9.3	P<0.001*
<b>Recurrence of episodes</b>										
Every 2 weeks	42	47.7	14	43.8		12	52.2	44	45.4	
Every 4 weeks	25	28.4	10	31.2	X <sup>2</sup> =0.157	5	21.7	30	30.9	X <sup>2</sup> =0.767
> 1 month	21	23.9	8	25.0	p=0.924	6	26.1	23	23.7	p=0.682
<b>Regular follow up</b>										
No	60	68.2	15	46.9	X <sup>2</sup> =4.545	20	87.0	55	56.7	X <sup>2</sup> =7.261
Yes	28	31.8	17	53.1	p=0.033*	3	13.0	42	43.3	p=0.007*
<b>Symptoms occurred leading to seek medical care</b>										
Cyanosis	33	37.5	14	43.8		10	43.5	37	38.1	
Dyspnea	16	18.2	9	28.1		0	0.0	25	25.8	
Wheeze	9	10.2	6	18.8	X <sup>2</sup> =7.924	2	8.7	13	13.4	X <sup>2</sup> =10.667
Cough	30	34.1	3	9.4	p=0.048	11	47.8	22	22.7	p=0.014

#### 4. DISCUSSION

Asthma is a chronic disease which encourage airway hyper-responsiveness and results in frequent symptoms such as dyspnea, wheezing and cough. The prevalence of asthma has been rising in recent years and now affects as many as 334 million people worldwide<sup>(19)</sup>. Although asthma is not curable, many studies have shown that valid diagnosis, proper treatment and long-term management of asthma can ameliorate the level of asthma control<sup>(20)</sup>

According to international guidelines, the primary goal of asthma management is to achieve and maintain asthma control defined as 'no daytime symptoms, no limitations of daily activities, no nocturnal symptoms or awakening, no need for reliever treatment, normal or near-normal lung function results and thus reduce the risk of life threatening exacerbations and long term morbidity<sup>(20)</sup>'. Therefore, this study was carried out to evaluate the effect of self-learning package for bronchial asthma patients to control the acute exacerbation of asthma.

Discussion of the study findings are categorized under the following parts:

##### *First part: Characteristics of the Studied Subjects*

The present study results revealed that less than half of the studied subjects was in the age group of 12-< 19 years (**table 1**). This result disagreed with that of **Singh, et al.,2019<sup>(21)</sup>** whose study entitled, "A Study on Knowledge, Attitude and Practice of Asthmatic Patients towards Inhaler Use", reported that more than half of the subjects (51%) between the ages of 46-60 years. This may be due to that the onset of asthma is predominantly observed in children and adolescents. As well, it may be attributed to this age group where they begin to be independent and their awareness of the disease is increased and they accepted to participate in the study to gain new knowledge about their disease and its management.

The findings of the present study indicated that less than three fifths of the studied subjects were female. This finding is to some extent similar to that of **Elbanna et al., 2017<sup>(19)</sup>**, who studied "Effect of Bronchial Asthma Education Program on Asthma Control among Adults at Mansoura District". They reported that a total of 84 patients with bronchial asthma disease 53.5% of them were female. This increase in proportion of females might be due to that females were anxious and so more concerned with their illness than males.

The present study result (**table 1**) refers to that slightly more than two fifth of the studied subjects had secondary education, while one quarter can just read and write. This study result is inconsistent with that of **Singh et al.,2019<sup>(21)</sup>**, who stated that most of their patients with asthma had primary school level education. This may be due to that the bronchial asthma can affect on their achievement at school.

The finding of the present study revealed that almost two third of the study subjects live in urban areas (**table 1**). This result was consistent with that of **Kirenga et al. 2019<sup>(22)</sup>**, whose study on the "Prevalence and Factors Associated with Asthma among Adolescents and Adults in Uganda: A General Population Based Survey in Uganda", reported higher patients with bronchial asthma in urban areas than rural areas; this may be attributed to higher surrounding air pollution and the most polluting companies and waste management plants are often located in urban areas, where green areas are often lacking or not fully accessible.

Regarding medical and family history of the disease (**Table 1**), the present study result showed that, near two third of study subjects were having positive family history of bronchial asthma. This result was to some extent concordant with that of **Banjari et al., 2018<sup>(23)</sup>**, who studied "The Relation between Asthma Control and Quality of Life in Children in Jeddah, Saudi Arabia". They reported that 75% of the sample had positive family history of asthma; this might be due to the fact that there is genetic and hereditary susceptibility for asthma.

Regarding to the time of attack occurrence, the present study finding revealed that for more than half of the study subjects having attack of asthma, it occurs at the night. (**Table 1**) This study result is similar with that of the **WHO, 2017<sup>(2)</sup>** which stated that symptoms may occur several times in a day or week in affected individuals, and for some people become worse during physical activity or at night. This may be due to lack of patients' knowledge on how to cope with asthma and sleep patient flat, this is leading to a lack of airflow in the lung and therefore the asthma increases at night, as well as may be due to lack of patients' compliance with treatment regimen which leads to increased symptoms.

The current study result also showed that two third of the study subjects having attacks of asthma they occur at spring and winter, (**Table 1**), this study finding agrees with that of **Allergy and Air (2014)**<sup>(24)</sup> entitled “How Cold Weather Can Increase Your Asthma Symptoms”, which stated that asthmatics can often tell when the weather is changing because they can feel it in their lungs. With cold weather coming on, it is important to recognize its effect on asthma and learn how to minimize that effect. This may be due to that when individuals with asthma exercise in cold weather, they are unable to warm their breath effectively before it reaches their lungs. Because the body automatically keeps the interior organs at a warm temperature, it can shock the lungs to quickly breathe very cold winter air. In response to the cold air, the lungs become inflamed, which can cause an asthma attack.

Asthma is characterized by variable symptoms of wheeze, shortness in breath, chest tightness and or cough, the symptoms can progress if untreated (**Global Strategy for Asthma Management and Prevention, 2018**)<sup>(8)</sup>.

The most common history of symptoms leading patients with asthma to seek medical advice in this study was cyanosis followed by cough, dyspnea, and the least wheeze (**Table 1**). These findings were in agreement to some extent with **Hallit et al., 2017**<sup>(25)</sup> who studied “Validation of Asthma Control Questionnaire and Risk Factors Affecting Uncontrolled Asthma among the Lebanese Children's Population”. They mentioned that poor asthma control can result in distressing symptoms including chronic cough, persistent wheezing, annoying nighttime awakenings and difficulty in performing daily activities. This may be due to that the positive family history of bronchial asthma give patients knowledge and experience about asthma and help in the early identification of symptoms and warning signs of disease.

Asthma severity was measured by a longitudinal composite assessment of day and night symptoms, exacerbations and controller usage. the classification of asthma severity degree is based merely on the frequency of symptom occurrence and the findings of functional tests of the respiratory system does not consider several aspects essential to the patient as highlighted by **Pawłowski et al.,2017**)<sup>(26)</sup>.

Regarding to the severity of asthma, the result of the present study (**table 2**) showed that three fifths of the study subjects had moderate asthma before learning package intervention, which changed to approximately three fifths had mild asthma after intervention. This result is consistent with that of **Boulet et al.,2015**<sup>(27)</sup>, whose study on : “Benefits of an Asthma Education Program Provided at Primary Care Sites on Asthma Outcomes”, reported that most subjects had mild to moderate asthma. In the current study, although asthma education could have shown better results in markedly uncontrolled asthma or in moderate to severe disease, impressive potential benefits were observed even in these milder forms of asthma. This may be related to that the intervention increased the awareness about the asthma, which consequently increased the adherence with treatment and decreased the severity of the disease.

As well, this study result showed the recurrence of episodes which improved from less than half having episode every 2 weeks to more than three fifth having episode every one month after intervention (**Table 2**). This result is consistent with that of **Bhagavatheeswaran et al., 2016**<sup>(20)</sup> who stated that, the primary goal of asthma management is to achieve and maintain asthma control defined as 'no daytime symptoms, no limitations of daily activities, no nocturnal symptoms or awakening, no need for reliever treatment, normal or near-normal lung function results. This may be attributed to increased compliance with treatment which led to decrease the recurrence of episode.

The result of the present study revealed that less than two third are having irregular follow up which decreased to be only near one tenth having irregular follow-up while the majority of the study subjects are having regular follow up after intervention (**Table 2**). This result agrees with that of **Boulet et al., 2015**<sup>(27)</sup> who found that a marked reduction of unscheduled visits, probably reflecting frequent exacerbations or unstable asthma, not properly self-managed by the patient. In addition to **Singh et al.,2019**<sup>(21)</sup> reported that, 33% of the parents were visiting physicians only in case of asthma attacks, while just 13% were visiting once every month. The positive result of this study could be related to that patients by agreeing to participate in the study may be more motivated to improve their asthma control.

Several factors have been found to be associated with asthma; these factors include exposure to allergens such as, pollens and house dust mites, indoor air pollution and outdoor air pollution, tobacco smoking including second hand smoke especially in children, urban residence and viral respiratory infections (**Castro-Rodriguez et al., 2016**)<sup>(28)</sup>

The present study result showed that less than one third of patients with asthma avoid of triggering factors before intervention, which improved to be less than three quarter after intervention. This result was consistent with that of **Hallit et al., 2017**<sup>(25)</sup>, who reported that several environmental factors contribute to the exacerbation of asthma symptoms among these factors, have the sustainable exposure to triggers and lower educational status. Additionally, **Pawlowski et al., 2017**<sup>(26)</sup>, identified that patients ought to access the information on the ways of elimination of allergens and irritants to be able to detect and treat asthma exacerbation. Similarly, **Singh et al., 2019**<sup>(21)</sup> stated that lack of proper information leads to failure among asthmatic patients to identify and avoid exposure to triggers. This may be due to the intervention which increased the patients' information about the triggering factors and how to avoid them.

Regarding to housing condition, the present study findings showed that, the majority of the study subjects had poor and average housing condition. This result was in the same line with that of **Hallit et al., 2017**<sup>(25)</sup>, who identified that low education and household income are predictive factors of uncontrolled asthma.

Hence the research hypothesis (H1) which stated that self-learning package intervention will control in exacerbations of asthma, which improves asthma was justified.

### ***Second part: Knowledge and Practices of the Studied Subjects.***

Asthma control plays an important role in the management of asthma. One of the reasons of failure to control over asthma can be related to lack of knowledge of triggers and the failure to avoid them (**Bhagavatheeswaran, et al., 2016**)<sup>(20)</sup>.

As regards knowledge of the studied children about bronchial asthma, the present study finding showed that there were statistically significant decreases in poor level of studied subjects' knowledge about definition, causes and predisposing factors, clinical picture, warning signs, complications, prevention of complications and management of bronchial asthma after the application of self-learning package intervention and statistically significant increases in fair and good knowledge levels of the previous items (**Table 3 & fig.3**). This result is congruent with that of a study carried out by **Singh et al., 2019**<sup>(21)</sup>, who reported that, poor prognosis of asthma is contributed by inadequate education to patients. Many times, it is observed that even patients getting repeated exacerbations leading to hospital admission possess poor knowledge of asthma and its treatment, which leads to further exacerbations that adversely affect their lung health over time. This may be attributed to that many patients with asthma believe that their illness to be intermittent and episodic and hence refuse for a continuous treatment. Finally, lack of proper knowledge leads to treatment failure among asthmatics as patients often fail to identify and avoid exposure to triggers and to use early medical interventions that are available.

Regarding total knowledge of studied subjects, the present study result showed highly statistically significant improvements, the result revealed that less than one fifth of study sample had good knowledge pre intervention while at post intervention slightly more than two third of them had good total knowledge (**Figure 3**) This result is congruent with that of **Elbanna et al., (2017)**<sup>(9)</sup> in Mansoura District, they found highly statistically significant improvement in degree of knowledge post education than pre education ( $p = <0.001$ ). As well, there was highly statistically significant difference in hospitalization pre and post asthma education ( $p = <0.001$ ).

The poor level of total knowledge of studied subjects pre intervention may be due to that less than half of the study subjects had secondary school and may lead to lack of sources to give them information, also slightly less than on third of study subject under the age group 12-<19, this young age don't have enough knowledge about asthma and their own health condition, also may be due to poor communication with physician who is considered the main source of education about asthma.

Regarding to total practice level, the present study result revealed that, there were statistically significant differences between pre/post interventions of self-learning package regarding all practice items (Table 4). This finding was supported by those of (**Sokol 2015**)<sup>(29)</sup>, who studied "Choosing Wisely: Adherence by Physicians to Recommended Use of Spirometry in the Diagnosis and Management of Adult Asthma" They mentioned that the intervention resulted in a marked improvement of asthma control, a progressive increase in knowledge of asthma, technique and medication adherence. This result may be due to that a high percentage of the studied subjects had poor level of knowledge at pre intervention and due to lack of training about using of nebulizer inhaler.



Similarity, the current study finding agrees with that of the study of **Elbanna et al. (2017)<sup>(9)</sup>**, who found that the bronchial asthma education program improved pulmonary function. However, the previous findings disagree with **Sumino & Cabana, (2013)<sup>(30)</sup>**, who found that, the asthma education had no effect on the FEV1% and peak flow monitoring at all the measurements of intervention period.

The inadequate level of practice before implementation of self-learning package may be due to that physicians working in hospitals are often overloaded, implying that the time available for each patient is limited, this result is congruent with that of **Nair et al. (2014)<sup>(31)</sup>**, who stated that in many countries, although levels of asthma self-management are low (regarding both knowledge and practices of asthma patients), these can be improved by means of education as well regarding inhaler practice through the self-learning package. This result agrees with that of **Prasad et al. (2013)<sup>(32)</sup>** study entitled "A Study to Know the Knowledge, Attitude, and Practices of Patients of Bronchial Asthma", which reported that, the use of a metered-dose inhaler, incorrect use of this device is often reported.

So, the research hypothesis (H2), which stated that self-learning package will improve knowledge and practices of studied patients with bronchial asthma as indicated by difference between pre and posttests' scores was accepted.

### ***Third part: Correlation between the knowledge and practice of the studied subject***

Considering correlations between the total knowledge score and total practices' score (**Table 5**) this study result indicated statistically significant correlations, that were similar with those of **Anwar et al. (2014)<sup>(33)</sup>**, in Egypt, who studied the "Factors Associated with Poor Asthma Control among Asthmatic Patient Visiting Emergency Department" The improved level of knowledge was associated with significant improvement in the level of control. However, this finding doesn't agree with the study of **Gaude et al. (2015)<sup>(34)</sup>**, which showed that improved knowledge alone does not improve level of control of asthma. This may be attributed to that the improvement of practices level depended and reflected the improvement of knowledge level.

Concerning the association between the total knowledge score and the sociodemographic characteristics of the studied subjects, this study finding detected statistically significant associations regarding all items which include age, gender, level of education and residence.

Regarding to age, the present study results revealed statistically significant associations between the age and level of patients' knowledge. This result is in accordance with that of **Ozturk et al.(2015)<sup>(35)</sup>**, whose study "Association Between Asthma Self-Management Knowledge and Asthma Control in the Elderly" revealed that older patients with asthma had limited asthma self-management knowledge and worse asthma control and showed improper use of the inhaler device. As well, these study results agreed with those of **Evers et al. (2013)<sup>(36)</sup>**, who studied the "Asthma Knowledge and Perceptions of Older Australian Adults: Implications for Social Marketing Campaigns" and found that adults with diagnosed asthma had greater asthma knowledge than undiagnosed individuals and older adults reported low susceptibility to developing asthma. This result may be due to that the younger age patients need to know new knowledge and can accept change, also younger age once have good knowledge than older persons because they have ability to use social media information such as the Internet

Considering gender, there is a statistically significant correlation between the total knowledge and between gender, this study result agrees with that of the study of **Bilal, et al. (2016)<sup>(37)</sup>**, who studied "Factors Associated with Patient Visits to the Emergency Department for Asthma Therapy" and found in her study that 39.1% were male and 60.9% were female. This may be due to that the females are more affected than males with asthma, also because women care more about their health than men.

Concerning education level, this study result was supported with that the study of **Madhushani and Subasinghe (2016)<sup>(38)</sup>** entitled "Knowledge Attitudes and Practices of Asthma: Does It Associate with Demographic Factors of Adult Patients?", which stated that, many studies have demonstrated a relationship between asthma knowledge and patients' education, in which a higher education level was associated with more knowledge.

The present study finding showed statistically significant association between residence and total knowledge pre and post self-learning package intervention this means that the total knowledge of patients living in urban areas is more adequate than that of patient living in rural areas, which may be due to that about three quarter of patients under study are lived in



urban areas. They also have many methods of obtaining information as well as different behaviors from patients living in rural areas. This study disagreed with that of the very recent study of ( Singh et al. (2019)<sup>(21)</sup>, who found in their study that about 63% were residing in rural areas.

Regarding to associations between total practice score and the characteristics of asthma, this study result detected statistically significant associations as regards previous family history, time of attack occurrence, season variation and regular follow up pre and post self-learning package. This result agrees with that of the study the *World Health Organization. (2013)*<sup>(39)</sup>, which that, patients need to know how to get help from health care providers when faced with an asthma exacerbation. This may be due to that the patients became aware of the importance of follow-up and how to manage their disease

Regarding to time of attack occurrence there is statistically significant association pre and post self-learning package intervention. This study result agrees with that the (Zarei et al., 2013)<sup>(40)</sup> who studied “The Effect of Educational and Modifying Intervention on Asthma Control among Adolescents: A Randomized Clinical Trial” which mentioned that the educational interventions to modify asthma triggers were effective in improving asthma control. This may be due to the result of the patients’ commitment to treatment and following the instructions by decreasing exposure to trigger factors after self-learning package intervention which led to decrease time of attack

As regards previous family history, the present study finding showed positive family history for the studied subjects and there is a statistically significant association between total practices and previous family history. This study result is congruent with that of the study entitled “*Asthma and Respiratory Foundation (2019)*<sup>(7)</sup> “Who Gets Asthma?” which stated that asthma often runs in the family, although not everyone in the family will have it. Many people with asthma may also have hay fever or eczema, and a family history of these conditions. As well, this study result is in accordance with that of Sanya et al, (2014)<sup>(41)</sup> whose study entitled “Risk Factors for Asthma Exacerbation in Patients Presenting to an Emergency Unit of a National Referral Hospital in Kampala, Uganda” mentioned that, genetic predisposition toward the production of I g E antibodies in response to (for example) pollen, house dust mites, fungi, or animal-derived proteins, is the most important risk factor for bronchial asthma. This result may be due to that those patients have some of experience to deal with asthma.

## 5. CONCLUSION

Self-learning package implementation had improved knowledge and practices of patients with asthma, as well as controlled the exacerbation of asthma by improving patients’ follow up visits.

## 6. RECOMMENDATIONS

- Regular follow up should be carried out for patients with bronchial asthma to control exacerbation of asthma
- Develop materials and/or a training program for patients with bronchial asthma to improve knowledge and practice about asthma and also increase compliance with the treatment
- Further research study is needed to examine the self-management behavior of bronchial asthma over time, as well as during various stages of development.

## REFERENCES

- [1] *National Asthma Education and Prevention Program. (2018)*: Expert panel report III: Guidelines for the diagnosis and management of asthma. Bethesda, MD: National Heart, Lung, and Blood Institute, 2007. (NIH publication no. 08-4051) [www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm](http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm) (Accessed in June 03, 2018).
- [2] *WHO (2017)*: Asthma key facts. Available at: <https://www.who.int/news-room/fact-sheets/detail/asthma>
- [3] *Fernández-Rodríguez, J.C., & Miralles, F. (2015)*: Presence of depression in patients with asthma and its influence on their families. *Yearbook of Psychology*; 45: 361-374.
- [4] *Melero, C., Rodríguez, N., & Díaz, R. (2017)*: Adherence to treatment in asthma. Current situation. *Asthma Magazine*; 2: 13-22.

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 Vol. 6, Issue 2, pp: (1399-1416), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [5] **WHO (2019)**: Bronchial asthma, Media Centre, Fact sheet N°206 Available at: <https://www.who.int/media-centre/fact-sheets/fs206/en/>
- [6] **Bloom, C.I., Palmer, T. & Feary, J. (2019)** : Exacerbation patterns in adults with asthma in England. A Population-based Study. *Am J Respir Crit Care Med*; 199:446.
- [7] **Asthma and Respiratory Foundation. (2019)**: Asthma-symptoms, diagnosis, treatment Southern Cross Medical Library <https://www.southerncross.co.nz/group/medical-library/asthma-symptoms-diagnosis-treatment>
- [8] **Global Strategy for Asthma Management and Prevention (2018)**: Update. Available at: [https://ginasthma.org/wp-content/uploads/2018/04/wms-GINA-2018-report-tracked\\_v1.3.pdf](https://ginasthma.org/wp-content/uploads/2018/04/wms-GINA-2018-report-tracked_v1.3.pdf)
- [9] **Elbanna, R., Sileem, A., Bahgat, S., & Ibrahim, G. (2017)**: Effect of bronchial asthma education program on asthma control among adults at Mansoura district. *Egyptian Journal of Chest Diseases and Tuberculosis*, 66:561–569: [www.sciencedirect.com](http://www.sciencedirect.com)
- [10] **Sequeira, A. (2012)**: Self learning is the future: A new paradigm for the 21st Century, National Institution of Technology Karnataka, Surathkal, Available at: <http://Papers.ssrn.com/so13>.
- [11] **Kheder, M. (2018)**: The effect of self-learning package related to patient safety goals on new graduate nurses' performance. Faculty of Nursing, Zagazig University, Egypt, | *The Malaysian (Supplementary) Journal of nursing*; 9 (4):49, 50.
- [12] **Tarraf, H., Aydin, O., Mungan, D., Albader, M., Mahboub, B., Doble, A., Lahlou, A., Tariq, L., Aziz, F., & El Hasnaoui, A. (2018)** : Prevalence of asthma among the adult general population of five Middle Eastern countries: Results of the SNAPSHOT program *BMC Pulm Med*. National Center for Biotechnology Information, U.S. National Library of Medicine; 18 : 68. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5948696/>
- [13] **Al Dhduh, M.A.A., Mohamed, S. N.A., & Fouda, E.M. (2015)**: Prevalence and severity of allergic diseases among Egyptian pediatrics in different Egyptian areas. *Int J Pharm Sci Res* (1):107.
- [14] **Chetna, A., Shamkuwar, K. N., Meshram, S.H., Dakhale, G.N., & Motghare, V.M. (2016)**: Evaluation of knowledge, attitude and medication adherence among asthmatics outpatients in tertiary care teaching hospital -A questionnaire based study . *J. Young Pharm.*; 8 (1) : 39-43.
- [15] **Rhee, H., Belyea, M.J., Hunt, J.F. & Brasch, J. (2011)**: Effects of a peer-led asthma self-management. Program for adolescents. *American Medical Association. ARCH PEDIATR ADOLESC MED/VOL 165 (NO. 6), JUNE 2011*. Available at : [WWW.ARCHPEDIATRICS.COM](http://WWW.ARCHPEDIATRICS.COM) downloaded from <https://jamanetwork.com/> on 05/28/2019
- [16] **Lynn, P & LeBon, M. (2011)**: Skill checklists for Taylor's clinical nursing skills: A nursing process approach, (3rd ed. USA: Wolters Kluwer Health/ Lippincott Williams & Wilkins.
- [17] **Pilkington, M. (2017)** : Medication Administration-Metered Dose Inhaler (MDI) and Spacer Device, Centre for Prehospital Care, Issue Date: April 2009, Revision Date April 2017. Available at: [https://www.hsnsudbury.ca/Portals/23/Medication%20Administration-%20Metered%20Dose%20Inhaler%20\(MDI\)%20and%20Spacer%20Chamber.pdf?ver=2017-11-29-112755-900](https://www.hsnsudbury.ca/Portals/23/Medication%20Administration-%20Metered%20Dose%20Inhaler%20(MDI)%20and%20Spacer%20Chamber.pdf?ver=2017-11-29-112755-900)
- [18] **Alberta Health Services, Provincial Physiotherapy Professional Practice Council.(2019)**: Deep breathing, coughing, and moving after surgery. Available at: <https://myhealth.alberta.ca/Alberta/Pages/deep-breathing-coughing-after-surgery.aspx>
- [19] **Zhong, N., Lin, J., & Zheng, J. (2016)**: Uncontrolled asthma and its risk factors in adult Chinese asthma patients. *Research Article*; <https://doi.org/10.1177/1753465816663978>
- [20] **Bhagavatheeswaran, K.S., Kasav, J.B., Singh, A.K., Mohan, S.K. & Joshi, A. (2016)**: Asthma-related knowledge, attitudes, practices (KAP) of parents of children with bronchial asthma: A hospital-based study. *Ann Trop Med Public Health*; 9:23-30.

## International Journal of Novel Research in Healthcare and Nursing

Vol. 6, Issue 2, pp: (1399-1416), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [21] **Singh, H., Pal Singh S., Jebin, A.J., & Kaur, A.(2019):** A study on Knowledge, Attitude and Practice of Asthmatic Patients towards Inhaler Use, IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 18, Issue 4;Pp 6-10 [www.iosrjournals.org](http://www.iosrjournals.org)
- [22] **Kirenga,B.J, Jong, C.D., Katagira, W., Kasozi, S., Mugenyi, L.,Boezen, M., Molen, T.V.D., & Kamy, M.R. (2019):** Prevalence and factors associated with asthma among adolescents and adults in Uganda: A general population based survey, BMC Public Health;19:227. Available at: <https://doi.org/10.1186/s12889-019-6562-2>.
- [23] **Banjari, M., Kano, Y., Almadani, I.S., Basakran, I.A., Al-Hindi, M., &Alahmad, T. (2018):** The relation between asthma control and quality of life in children.in geddah, Saudi arabia” International Journal of Pediatrics; Article ID 6517329, pages 6, <https://doi.org/10.1155/2018/6517329>
- [24] **Allergy and Air. (2014): How cold weather can increase your asthma symptoms?** Learning Center / Allergy & Asthma Info / Available at: <https://learn.allergyandair.com/asthma-and-cold-weather/>
- [25] **Hallit, S., Raherison, C., Mirna Waked, M., & Salameh, P.(2017):** Validation of asthma control questionnaire and risk factors affecting uncontrolled asthma among the Lebanese children's population. Respiratory Medicine;122 : 51-57.
- [26] **Pawłowski , P., Łopuszyńska, M., Korpornicka, B., Jakubowska, K., & Nalepa, D. (2017):** Asthma nursing care management and study guide. Journal of Education, Health and Sport; 7(12):368-377. eISSN 2391-8306. DOI <http://dx.doi.org/10.5281/zenodo.1146589>
- [27] **Boulet, L.P., Boulay, M., Gauthier, G., Battisti, L., Chabot, V., Marie-France Beauchesne, M.F., Villeneuve, D., Patricia, Coˆte´.( 2015 ) :** Benefits of an asthma education program provided at primary care sites on asthma outcomes, Respiratory Medicine: 109, 991 – 1000.
- [28] **Castro-Rodriguez, J.A., Forno, E., Rodriguez-Martinez, C.E., Celedón, J.C., (2016):** Risk and protective factors for childhood asthma: What is the evidence? J Allergy Clin Immunol Pract.;4(6):1111 – 22.
- [29] **Sokol, K.C., Sharma, G., Lin, Y.L., Goldblum, R.M. (2015):** Choosing Wisely: adherence by physicians to recommended use of spirometry in the diagnosis and management of adult asthma. Am J Med ;128:502e8.
- [30] **Sumino, K ., & Cabana, M.D.(2013):** Medication adherence in asthma patients. Jan;19(1):49-53. doi: 10.1097/MCP.0b013e32835b117a. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/23143198>
- [31] **Nair, C.C., Ajith, B., Mathan, S. (2014):** Evaluation of the knowledge of patients’ compliance to treatment and the impact of patients’ education on asthma: A questionnaire based study on outpatient asthmatics. Int Res J Pharm; 5(5):444–448.
- [32] **Prasad, R., Kushwaha, R.A.S.& Verma, S.K.(2013):** A study to know the knowledge, attitude, and practices of patients of bronchial asthma. Int J Med Public Health; 3(3):159. Google Scholar
- [33] **Anwar, E., Ahmed, H.A.J., ; Abdullah, A.H., Mohmad, K., Yosra, A., Abdullah, A.S, Salih, A..M., Rabieh, H, (2014):** Factors associated with poor asthma control among asthmatic patient visiting emergency department, Clin. Respir. J. 431–436.
- [34] **Gaude, G., Fernandes, N ., Avuthu, S., Hattiholi, J.(2015):** Assessment of knowledge and attitude of bronchial asthma patients towards their disease. J. Evol. Med. Dent. Sci; 4 (90): 15508–15514.
- [35] **Ozturk, A.B., Ozyigit, P. L., & Kostek, O. (2015):** Association between asthma self-management knowledge and asthma control in the elderly. Available at: [https://www.researchgate.net/publication/275772763\\_](https://www.researchgate.net/publication/275772763_)
- [36] **Evers, U., Jones, S., Caputi, P., & Iverson, D. (2013):** The asthma knowledge and perceptions of older Australian adults: Implications for social marketing campaigns. Patient Education and Counseling; June, 91, (3): , 392-399. Available at <https://www.sciencedirect.com/science/article/abs/pii/S0738399113000037>

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 Vol. 6, Issue 2, pp: (1399-1416), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [37] **Bilal, M., Haseeb, A., Khan, M.H., Saad, M., Devi, S., Arshad, M.H., Alam, A., Wagley, A.M., & Javed, K.M.A (2016):** Factors associated with patient visits to the emergency department for asthma therapy in Pakistan, National Center for Biotechnology Information, U.S. National Library of Medicine , Asia Pac Fam Med. ; 15: 1 Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4736181/>
- [38] **Madhushani, H., & Subasinghe., H. (2016):** Knowledge attitudes and practices of asthma: Does it associate with demographic factors of adult patients? Asian Pac J Health Sci.;3(4S):94–99. [Google Scholar]
- [39] **World Health Organization. (2013): Asthma.** Accessed December 20, 2017 Available at: <http://www.who.int/mediacentre/factsheets/fs307/en/>
- [40] **Zarei. S., Valizadeh, L & Bilan,N. (2013):** The effect of educational and modifying intervention on asthma control among adolescents: A randomized clinical trial J Caring Sci. Mar; 2(1): 73–82. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4161110/>
- [41] **Sanya, R. , Kirenga. B. , Worodria, W., & Nwang, M.( 2014) :**Risk factors for asthma exacerbation in patients presenting to an emergency unit of a national referral hospital in Kampala, Uganda. African Health Sciences; 14(3): 707–715 Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4209652/>