Effect of an Educational Program Regarding Self-Care Strategies for Patients with Bronchial Asthma on Their Knowledge and Practice

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Abstract: *Asthma is a chronic inflammatory lung disease characterized by airway obstruction, airway hyperresponsiveness, and airway inflammation, all of which are variable among patients and variable in time within any specific patient.*
The study aimed *to evaluate the effect of an educational program regarding self-care strategies for patients with bronchial asthma on their knowledge and practice.*
Research design: *A quasi-experimental research design was utilized in this study.*
Setting: *The current study was performed in the chest department at Benha University Hospital.*
Subjects: *The study included (100) adult patients with bronchial asthma over a period of 6 months.*
Tools of data collection: *Three tools were used for data collection: Tool I- Patients' assessment questionnaire which includes two parts.* **a)** *Patients' sociodemographic characteristics & health history,* **b)** *Structured knowledge questionnaire to assess patients' knowledge regarding the disease, Tool II-Observational checklist to assess patients' practice, and Tool III) patients' self-care strategies used to control physiological problems.*
Results: *Revealed that the majority of patients had poor knowledge and practice regarding self-care strategies before implementation of the program, which improved post program implementation.*
Conclusion: *The results had shown many areas of deficit in patients' knowledge and practice prior application of the program which reflects a need for further continuous education which will provide patients with some directions that will help to manage complications.*
Recommendations: *The study recommended for further continuous educational programs to be conducted for patients to improve their knowledge and practice regarding self-care strategies.*
Key words: *Bronchial asthma, Self-care strategies, Patients' knowledge & practice.*

I. Introduction

Asthma is a common long-term inflammatory disease of the airways of the lungs. It is characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm *(Lancet, 2015).* Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath. These episodes may occur a few times a day or a few times per week *(Yawn, 2008).* Depending on the person, they may become worse at night or with exercise *(WHO, 2013).*

Asthma may be caused by a combination of genetic and environmental factors. Environmental factors include exposure to air pollution and allergens. Other potential triggers include medications such as aspirin and beta blockers. Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry. Asthma is classified according to the frequency of symptoms to forced expiratory volume in one second (FEV1), and peak expiratory flow rate *(Yuan, 2008).* It may also be classified as atopic or non-atopic, where atopy refers to a predisposition toward developing a hypersensitivity reaction *(Kumar, 2010).*

There is no cure for asthma. Symptoms can be prevented by avoiding triggers, such as allergens and irritants, and by the use of inhaled corticosteroids. Long-acting beta agonists (LABA) or antileukotriene agents may be used in addition to inhaled corticosteroids if asthma symptoms remain uncontrolled *(Scott, 2013).* Treatment of rapidly worsening symptoms is usually with an inhaled short-acting beta-2 agonist such as salbutamol and corticosteroids taken by mouth. In very severe cases, intravenous corticosteroids, magnesium sulfate, and hospitalization may be required *(lancet, 2013).* Status asthmaticus is severe and persistent asthma that does not respond to usual therapy; attacks can occur with little or no warning and can progress rapidly to asphyxiation *(Martin, 2016).*

Self-care is any necessary human regulatory function which is under individual control, Self-care is considered the primary form of care for patients with chronic conditions who make many day-to-day decisions,

or self-manage, their illness. Self-management is critical and self-management education complements traditional patient education in primary care to support patients to live the best possible quality of life with their chronic condition *(Taylor, et al., 2011)*.

Nursing care for asthma focuses on preventing the hypersensitivity reaction, controlling the allergens, maintaining airway patency, clearance of secretions, Absence /reduction of congestion with breath sound clear, noiseless respirations, and improved oxygen exchange, understanding of causes and therapeutic management regimen and preventing the occurrence of reversible complications *(Martin and Belleza, 2016)*.

Significance of the study:

WHO,(2013) reported that, 300 million patients suffer from bronchial asthma worldwide, while, 250000 patients died from asthma, which is expected to become the leading cause of death in the world by 2030. In 2015, 358 million people globally had asthma, up from 183 million in 1990. It caused about 397,100 deaths in 2015, most of which occurred in the developing world. It often begins in childhood. The rates of asthma have increased significantly since the 1960s. Asthma was recognized as early as Ancient Egypt *(Anandan, 2010)*.

Aim of the study:

This study was done to evaluate the effect of an educational program regarding self-care strategies for patients with bronchial asthma on their knowledge and practice.

It was done through:
1. Assessing knowledge and practice regarding self-care strategies for patients with bronchial asthma.
2. Designing and implementing an educational program regarding self-care strategies for patients with bronchial asthma.
3. Evaluating the effect of the program on patients' knowledge and practice.

Research hypothesis:

The implementation of the program will have a positive effect on increasing knowledge and practice regarding self-care strategies for patients with bronchial asthma.

II. Subjects and Methods

Research design:

A quasi experimental design was utilized in this study.

Study setting:

This study was conducted in chest department at Benha University Hospital.

Study Sample:

Purposive sampling technique was used to select the samples. The sample size was calculated based on the previous year census report of admission in outpatient clinics *(Benha Teaching Hospital Census, 2017)*. The total number of subjects comprised 100 patients with gout attending the study settings utilizing the following formula *(Yamane, 1967)*

$$n = \frac{N}{1+N(e)^2}$$

Where:
n= sample size
N= total population (135)
e= margin error (0.05)
The patients had been selected according to the following criteria:

Inclusion criteria:

1- Adult patients, from both genders.
2- Conscious, diagnosed with bronchial asthma with previous attacks.
3- Willing to participate, and able to communicate with others.

Exclusion criteria:

1-	Patients with lung cancer.
2-	Patients with physical or mental handicapped

Tools for Data Collection:
Three tools were used to collect study data:
Tool I- patients' assessment questionnaire: developed by the researcher based on reviewing relevant literatures, and   scientific references. It was designed to assess patients' knowledge, and included two parts to cover the following data:

Part I (a- Socio demographic data sheet which included eight items regarding age, sex, marital status, educational level, occupation, residence, number of family members and smoking.

(b- Health history it aimed to assess patients' medical history which included six items related to onset of disease, use of bronchodilators, change work, drug sensitivity, food sensitivity, and following drug instructions.

Part II- Patients' knowledge Questionnaire: It was adapted from *(Mohamed, 2013),* It aimed to assess patients' knowledge regarding the disease, which included six items regarding definition of bronchial asthma, causes, signs & symptoms, complications, laboratory investigations, and measures to decrease asthma attacks.

Knowledge scoring system: for each question the score was graded as (1) for correct answer, and (zero) for incorrect answer, and the total knowledge score was graded as $\leq$ 70% satisfactory level of knowledge, while,70% or less as unsatisfactory level of knowledge.

Tool II: Patients' observational checklist:

It aimed to assess patients' practice during asthma attacks. It was adapted from *(Black, (2009) and Elkin & Perry, (2007).* It was concerned with patient's practice during performing deep breathing & coughing exercises (6 items), during using nasal spray (6 items), during using nebulizer (16 items), and also during performing oral care (13 items).

Practice Scoring system: For each step the score was graded as (1) = done, and (zero) = not done, and the total practice score was graded as$\leq$ 70% competent level of practice, while, 70% or less as incompetent level of practice.

Tool III: Patients' self care strategies: It was concerned with self care strategies used by patients for managing their physiological problems. It was adapted from *(Shetaia, 2016).* It was consisted of (14) items regarding dyspnea, orthopnea, cough, cyanosis, chest pain, smoking, actions used to avoid smoking, hypotension, hypertension, tachycardia, headache, fatigue, insomnia, and fever.

Self care strategies scoring system: For each problem the total score was calculated depending on the number of self care strategies used for managing each one. It consisted of two options (yes or no). Yes means that the patient used it and it was graded as (1) while, no means that the patient didn't use it and it was graded as (zero). Total score was graded as$\leq$ 70% was considered satisfactory, while, less than 70% was considered unsatisfactory.

Self care strategies booklet:
Consisted of two parts, theoretical and practical part:

A-Theoretical part covered: introduction about the disease, anatomy and physiology of respiratory system, definition of bronchial asthma, asthma triggers, signs and symptoms, complications, prevention, medication, actions during asthma attacks.

B-Practical part covered: using inhalers or nebulizer, breathing and coughing exercise, oral care, and also self care strategies in case of any related problems as: dyspnea, orthopnea, cough, cyanosis, chest pain, smoking, actions used to avoid smoking, hypotension, hypertension, tachycardia, headache, fatigue, insomnia, and fever.

Methods
Ethical Consideration

The participants' approval was taken after informing them that their participation is optionally, and that they have the right to withdraw at any time without any consequences. Then, verbal consent was obtained from each patient enrolled into the study. The researcher assured maintaining anonymity and confidentiality of data.

Pilot study:

A pilot study was carried out on (10) patients suffering from bronchial asthma in a selected setting recruited to test the clarity and applicability of tools and the necessary modifications were done prior data collection. Patients who participated in the pilot study were excluded from the main study.

Fieldwork:

♦ Permissions for data collection were generated from hospital directors and head managers of the chest department at Benha university hospital and by the submission of a formal letters from the Faculty of

Nursing, Benha University. Once the researcher was granted approval, the knowledge sheet, the observational checklist & the self-care strategies sheet were adapted.

♦ Before conducting the study, an exploratory visit was done to chest department at Benha university hospital in order to estimate the rate of admission and suitable time for collecting data. Besides, personal communication was done with nurses and physicians to explain the purpose of the study and gain their best possible cooperation.

♦ Data for the current study were collected through the period from beginning of September 2017 till beginning of February 2018 (for pre-test and application the program) then it was completed for post-test (immediately after finishing application of the program) from February 2018 till June during morning and afternoon shifts.

♦ An oral consent was obtained from patients after explaining the purpose of the study (explaining the purpose of each sheet, and meaning of each one).

♦ The process of data collection was achieved through two phases:
• The first phase (pre-test): before implementation of the program to have baseline assessment about patients' level of knowledge and practice.
• The second phase (post-test): immediately after implementation of the program to evaluate the effect of the program.

Statistical analysis
The collected data were tabulated and statistically analyzed using an IBM computer and the statistical package for social science (SPSS) advanced statistics, version 20 (SPSS Inc., Chicago, IL). Numerical data were expressed as mean and standard deviation. Qualitative data were expressed as frequency and percentage. Chi-square test was used to examine the relation between qualitative variables. Spearman-rho method was used to test correlation between numerical variables. Linear regression was used for multivariate analyses on circumferential differences in patients with bronchial asthma regarding their knowledge & practice as dependent factor. Also Cronbach's alpha test was used to test the reliability of the tools. The observed differences and associations were considered as the following: Not significant (NS) P>0.05, Significant (S) P< 0.05*, High significant (HS) P<0.001**

III. Results
Table 1: describes socio-demographic characteristics as: the majority (80%) of patients' age was within age group of (40-50 years with a mean age of 47.29±4.87 years). Less than three quarters of them (71, 73, 72%) were males, illiterate, and their family number ranged from (6-11) members respectively. while, more than half (71, 56%) working manual work, and were smokers respectively. All of them (100%) were married, whereas, the majority of them (82%) lived in rural areas.

Table 2: It was obvious from this table that: more than half (59%) of the studied patients suffered from the disease for more than 5 years, while, the majority (97.0%,90.0%, 96.0%, 81.0%, and 94.0%) take bronchodilator , did not change their work, were not drug sensitive, but they were food sensitive, and followed drug instructions respectively.

Figure (1): Shows that more than half of the studied group (64%) had unsatisfactory knowledge pre-program implementation, while, more than three quarters of them (76%) had satisfactory knowledge post – program implementation.

Figure (2): Shows that more than half of the studied group (56%) had incompetent level of practice pre-program implementation, while, more than three quarters of them (76%) had competent level of practice post –program implementation.

Figure (3): Shows that, three quarters of the studied group (75%) had unsatisfactory level of self care pre-program implementation, while, more than three quarters of them (81%) had satisfactory level of self care post –program implementation.

Table 3: Shows that, there were highly statistically significant relations between patients' total knowledge and their sociodemographic characteristics pre and post-program implementation.

Table 4: Shows that, there were highly statistically significant relations between patients' total practice and their sociodemographic characteristics pre and post-program implementation.

Table 5: Shows that, there were highly statistically significant relations between patients' total self care strategies score and their sociodemographic characteristics pre and post-program implementation.

Table 6: Shows that, there were high statistically significant positive correlations between patients' total knowledge and their total practice pre & post program implementation.

Table 7: Shows that, there were high statistically significant positive correlations between patients' total knowledge and their total self care pre & post program implementation.

Table 8: Shows that, there were high statistically significant positive correlations between patients' total self care and their total practice pre & post program implementation.

Table (1) Frequency and percentage distribution of the studied patients according to their socio-demographic characteristics (n=100).

Socio Demographic Data / Frequency	No	%
* Age (in years)		
41-50 years	80	80.0
51-60 years	20	20.0
- Mean ± SD	**47.29±4.87 v**	
*Sex:		
Male	71	71.0
Female	29	29.0
* Educational level		
Illiterate	73	73.0
Read and write	27	27.0
* Occupation		
Manual work	71	71.0
Housewife	29	29.0
* Residence		
Rural	82	82.0
Urban	18	18.0
* Marital status		
Married	100	100.0
* Number of family members		
1-5	28	28.0
6-11	72	72.0
*Smoking		
Yes	56	56.0
No	29	29.0
Previous smoker	15	15.0

Table (2): Frequency and percentage distribution of studied patients related to present health history (n=100).

Disease history / Frequency	No	%
* Duration of disease		
Less than I Year	11	11.0
1-3 Years	15	15.0
3-5 Years	15	15.0
More than 5 years	59	59.0
Mean ±SD= 6.23±4.01		
* Bronchodilators:		
1) Yes		

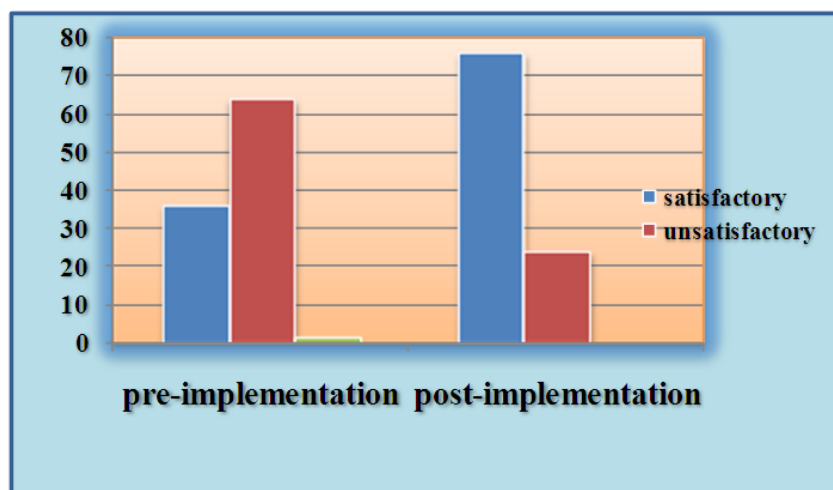|		
Yes	97	97.0
No	3	3.0
* Change work **1) Yes**		
Yes	10	10.0
No	90	90.0
* Drug sensitivity		
Yes	4	4.0
No	96	96.0
* Food sensitivity		
Yes	81	81.0
No	19	19.0
*Follow drug instructions		
Yes	94	94.0
No	6	6.0

Figure (1): Distribution of total knowledge pre, and post program implementation (n=100).
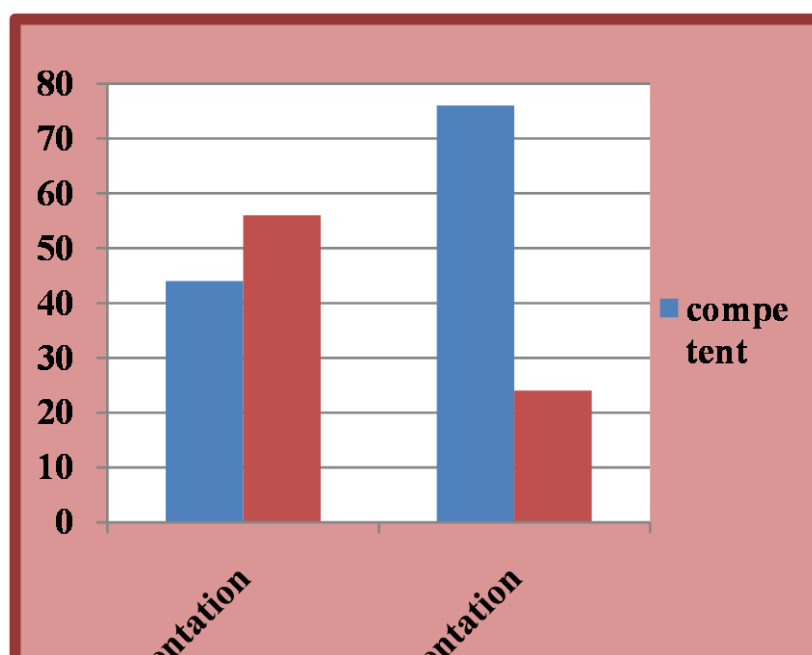

Figure (2): Distribution of total practice pre, and post program implementation (n=100).
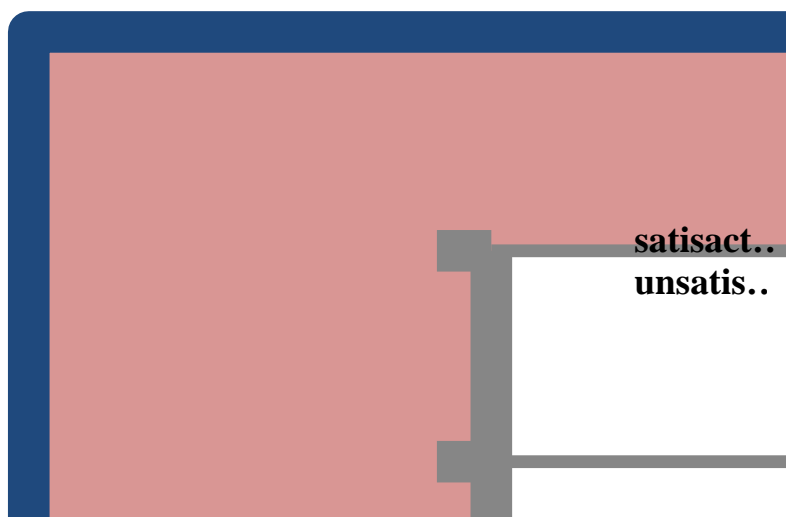
Figure (2): Distribution of total self care strategies pre, and post program implementation (n=100).

Table (3) Relation between patients' socio-demographic data and total knowledge score pre and post program implementation (n=100).

Socio-demographic characteristics	Total knowledge score			
	Pre-program		Post-program	
	R	P value	r	P value
Age	38.24	<0.001**	6.64	<0.05*
Sex	50.63	<0.001**	11.39	<0.05*
Educational level	38.04	<0.001**	8.86	<0.05*
Occupation	50.63	<0.001**	11.39	<0.05*
Residence	19.75	<0.001**	6.64	<0.05*
Family members	50.63	<0.001**	11.39	<0.05*
Smoking	72.55	<0.001**	22.45	<0.05*

*Statistically significant at p ≤0.05   **High statistically significant at p ≤0.001

Table (4) Relation between patients' socio-demographic data and total practice score pre and post program implementation (n=100).

Socio-demographic characteristics	Total practice score			
	Pre-program		Post-program	
	R	P value	r	P value
Age	25.70	<0.001**	12.87	<0.05*
Sex	34.10	<0.001**	22.07	<0.05*
Educational level	26.19	<0.001**	17.17	<0.05*
Occupation	34.10	<0.001**	22.07	<0.05*
Residence	13.58	<0.001**	5.72	<0.05*
Family members	34.10	<0.001**	22.07	<0.05*
Smoking	55.18	<0.001**	50.29	<0.05*

*Statistically significant at p ≤0.05   **High statistically significant at p ≤0.001

Table (5) Relation between patients' socio-demographic data and total self care strategies score pre and post program implementation (n=100).

Socio-demographic characteristics	Total self care strategies score			
	Pre-program		Post-program	
	R	P value	r	P value
Age	50.63	<0.001**	6.64	<0.05*
Sex	19.75	<0.001**	11.39	<0.05*
Educational level	38.04	<0.001**	8.86	<0.05*
Occupation	50.63	<0.001**	11.39	<0.05*
Residence	19.75	<0.001**	6.64	<0.05*
Family members	38.24	<0.001**	11.39	<0.05*
Smoking	72.55	<0.001**	22.45	<0.05*

*Statistically significant at p ≤0.05   **High statistically significant at p ≤0.001

Table (6) correlation between patients' total knowledge and practice pre and post program implementation (n=100).

Total knowledge score	Total practice score			
	Pre program		Post program	
	R	P-value	r	P-value
Knowledge pre	.910(**)	<0.001**	.555(**)	<0.001**
Knowledge post	.262(**)	<0.001**	.764(**)	<0.001**

***Statistically significant at p ≤0.05   **High statistically significant at p ≤0.001**

Table (7) correlation between patients' total knowledge score and total self care score pre and post program implementation (n=100).

Total self care score	Total knowledge score			
	Pre program		Post program	
	R	P-value	r	P-value
Pre program	.175	223	-	-
Post program	-	-	.453	<0.05*

***Statistically significant at p ≤0.05   **High statistically significant at p ≤0.001**

Table (8) correlation between patients' total knowledge and practice pre and post program implementation (n=100).

Total self care score	Total practice score			
	Pre program		Post program	
	R	P-value	r	P-value
Pre program	.764(**)	<0.001**	.262(**).	<0.001**
Post program	555(**)	<0.001**	.910(**)	<0.001**

***Statistically significant at p ≤0.05   **High statistically significant at p ≤0.001**

IV. Discussion

Bronchial asthma is a major public health problem not just for developed countries; it occurs in all countries regardless the level of development. Most asthma related deaths occur in low and lower-middle income countries *(WHO, 2016).* The aim of this study was to evaluate the effect of an educational program regarding self-care strategies for patients with bronchial asthma on their knowledge and practice.

The finding of present study revealed that, more than half of patients were aged between 41 and 50 years old with mean age 47.29±4.87 years, this may be due to that this period of age is the productive period, which associated with more stress. Thus make asthma worse and subsequently increase adult hospital admission. This finding is in accordance with *Mohammed (2008)* who reported the same finding.

As regard to gender, the result of the present study showed that, more than half of patients were male. This may be due to that most of them were workers and exposed to asthma triggers; this finding is in contrast with *Williams (2005),* who reported that females have asthma attacks more than males.

In relation to marital status, the study finding showed that, all of the studied subjects were married. In agreement with this finding *Mohammed (2008)* study. He found that the majority of the studied subjects were married.

Regarding residence, the results of this study revealed that, the majority of patients were from rural area; the possible explanation may be due to lack of health care centers. This finding is in accordance with *Taha & Ali (2011),* who reported that most of studied subjects were from rural areas.

Concerning the educational level of the studied subject, the majority of the patients were illiterate. This finding might be due to the majority of patients were from rural areas with less attention to education and poor level of health awareness, This finding is in agreement with *Mohamed, (2013),* who reported that more nearly half of the studied subject were illiterate, while minority of them had completed university degree.

Regarding occupation, the current study portrayed that, more than half of the studied subjects were workers, while the minority of them was retired, this may be related to the fact that about half of them were illiterate or just read and write. In addition, about one third of the studied subjects were females who are housewives. This finding is in accordance with *Bakke (2009),* who found that about two third of the studied subject were workers.

Concerning the duration of disease, the present study revealed that, more than one half of the studied subjects had bronchial asthma for more than five years; this finding may be due to the chronicity of the disease. This finding is in agreement with *Prasad et al. (2003)* who found that the mean duration of illness is 3.5 years.

As regard to work, the finding of the present study revealed that, the majority of them didn't change their work, this may be due to the type of work not aggravating the disease and they can deal with their disease with the work. This is supported with *Piirila et al. (2005),* who mentioned that the majority of patients return to work, and also ascertained that satisfaction with life was associated with present working and with good condition of asthma and ability of being involved in activities and control of asthma.

Concerning drugs the present study portrayed that the majority of the studied subjects take bronchodilators and following drug instructions. This result may be due to fear of deterioration of their status that can interfere with activity of their daily living. The finding is in agreement with *Prasad et al. (2003)* who mentioned that most of the studied subjects take bronchodilators and follow drug instructions.

Concerning drug sensitivity, the present study illustrated that the majority of studied subjects didn't have drugs sensitivity, while more than two thirds of them have allergy to certain foods as (banana, strawberry, eggs, milk and fish). This finding could be due to increase bronchial responsiveness to histamine was significantly increased immediately after ingestion of some foods. This finding is not in accordance with *Bush (2006)* who stated that some drugs could trigger asthma for some asthma suffers.

As regarding to smoking history the finding of the present study revealed that more than half of the studied subjects were smokers. This is in line with *Osman (2008),* who found that majority of the studied subjects were smokers.

As regarding the knowledge degree, the finding of the present study revealed that most of the studied subject had unsatisfactory knowledge pre-program implementation score about bronchial asthma, this might be due to majority of sample are from rural areas with less attention to acquisition of knowledge, due to half of the patients were illiterate also due to health team overload and the neglect to provide the patients with health education and information needed for their disease. In congruence with this finding, *Rai et al. (2007),* found that the majority of the studied subject had unsatisfied knowledge score and emphasized that those patients with bronchial asthma need education, counseling and support to enable them to adjust to their chronic illness and its treatment.

The finding of present study revealed that most of studied subject had incompetent level of practice score pre- program implementation; this might be due to lack of practice and unavailability of instruction resources about the disease treatment and its effects. It reflects a deficiency in providers' educational role. This result corroborated with *Williams et al. (2010)* who reported that patient's practice about asthma was deficient, with only one third of them having satisfactory practice. This was particularly evident in relation to practice exercise, which has a lot of misconceptions among asthmatic patients.

The finding of present study revealed that three quarters of studied subjects had unsatisfactory level of total self care strategies pre- program implementation; this might be due to lack of practice and unavailability of resources. This result was in contrast with *Shetaia, (2016)* who reported that more than half of patients had satisfactory level of total self care strategies

Regarding relation between total self care strategies and sociodemographic characteristics, the results revealed that there is high statistical significant relation. This finding was in line with *Shetaia, (2016)*, who stated that is high statistical significant relation between total self care strategies and sociodemographic characteristics.

Regarding the correlation between total practice score with Knowledge, these results revealed that there is high statistical significant correlation between patients' knowledge and practice of inhaler procedure. This finding was in agreement with *Parvin et al. (2011)* who reported that there is statistical significant relation between patients' knowledge and practice

Regarding the correlation between total self care strategies score with total knowledge, these results revealed that there is high statistical significant correlation between patients' knowledge and self care strategies. This finding was in contrast with *Shetaia, (2016)* who reported that there is no statistical significant relation between patients' total level of knowledge and total self care strategies.

Regarding the correlation between total self care strategies score with practice, these results revealed that there is high statistical significant correlation between patients' practice and self care strategies. This finding was in line with *Thomas et al, (2014)* who reported that Effective strategies offer healthcare providers a range of self management behaviors to suggest to patients that will add to healthcare providers' ability to educate patients in self care to alleviate symptoms of the disease.
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V. Conclusion
Based upon the results of this study, it could conclude that, implementation educational program has a positive effect on improvement of the patients' knowledge, practices and self-care strategies post program implementation compared to pre program implementation. These results justified the research hypothesis.

VI. Recommendations

This study recommended that Periodic supervision should be provided for patients and their family members to prevent occurrence of complications and improve patients' knowledge, practice, and self care strategies. Further studies about patients' practice at chest department should be done on larger numbers of patients .Infection control programs should be provided to patients and their family members to prevent further complications.

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