

Outcome of An Educational Program on Bronchial Asthma Self-Management

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ABSTRACT

Background: Bronchial asthma is a highly prevalent chronic respiratory disease that affects over 300 million persons worldwide with a mortality rate of approximately 250,000 annually. Instructing asthma patients about their illness is significant and the principle accentuation is to build patients' information and to elevate patients' adherence to medication plans. The absence of data about self-management had prompted reluctance of asthmatic patients to disease management activities. **Objective:** To improve bronchial asthma control in asthmatic patients. This study arranged and executed the bronchial asthma instructive program and assessed and elevated the level of information about asthma self-management strategy of inhaler use and asthma control after training program among adult asthmatic patients. **Patients and Methods:** An intervention study was conducted on 97 asthmatic patients attended Chest Hospital at Menoufia Governorate. All studied patients were evaluated through four questionnaires titled socio-demographic characteristics, Asthma Self-Management Questionnaire (ASMQ), GINA-2017 criteria of asthma control and a checklist to assess technique of inhaler use. All participants were subjected to health education program. **Results:** The results revealed that there was a statistically significant difference between patients' knowledge of asthma self-management, accuracy of inhaler use technique and asthma control before and after the educational program where $P < 0.001$. **Conclusion:** Based upon the results of this study, it could be concluded that implementation of educational program had a positive effect on improvement of the patients' knowledge, practices and self-care strategies post program implementation compared to pre-program implementation.

Keywords: ASMQ, Educating, GINA, Inhaler.

INTRODUCTION

Educating the patient is a necessary part of his service. With the increase in numbers of population with the chronic diseases, the application of educational programs has become even more necessary than before because these patients need follow up continuously⁽¹⁾.

Asthma is one of chronic respiratory diseases worldwide. According to World Health Organization (WHO), asthma prevalence is nearly 300 million patients all over the world. It is expected in 2025 to be 400 million by^(2, 3), with mortality about 250,000 annually⁽⁴⁾. In Egypt, asthma is estimated to be 8.2% and 6.7% among children and adults respectively, being more predominant in males than females (1.2:1)^(2, 3).

Most patients still experience a high rate of morbidity. Most of the morbidity from asthma is assumed to be attributed to causes such as denying a chronic disease, inadequate knowledge on the disease process and medication use, insufficient awareness of inhaler use and inadequate self-management⁽⁵⁾.

Many studies worldwide have evaluated the effect of patient education and indicated that each of the above components is amenable to asthma education^(6, 7). Thus, the task of patient education has become a key component of asthma management for asthma patients at all age groups⁽⁸⁾. The efficacy and importance of educational and behavioural approaches to asthma have strengthened because of increased commonness of asthma, improved knowledge of self-management and growing interest in learning theories. However, the effectiveness of patient education for asthma in Egypt

is not investigated enough⁽⁹⁾. We performed this study to assess results on adult asthma patients from the bronchial asthma education program.

SUBJECTS AND METHODS

This study was an interventional study carried out in Chest Hospital at Meit Khalaf Village, Shebin El-Kom District, Menoufia Governorate. Meit Khalaf Chest Hospital is under the supervision of Directorate of Health Affairs in Shebin El-kom, Ministry of Health. The hospital is distinguished by containing intensive care units, Bronchoscopy and pulmonary function tests. The asthma clinics are three, one for men, second for women and the last one for children. The study population included adults with asthma who were registered and attended the Outpatient Clinic at the place of study.

Ethical approval:

The study was certified by the Faculty of Medicine's Research Ethics Committee, Menoufia University and the included participants signed a written informed consent.

The target populations were:

Target population were asthmatic patient having mild to moderate bronchial asthma, over 18 years old, without significant co-morbidity and being non-smokers. The sample size was estimated based on the bronchial asthma prevalence among Egyptian adults that was 6.7%⁽³⁾. Considering the confidence interval 95% and the power of the study 80%, the calculated



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sample was 97 patients. It was increased to 110 patients to avoid dropout of the participants.

The asthmatic patients who attended the Chest Hospital Clinic from 10:00 am till 2:00 pm daily for 3 days per week during the period from the 1st of November 2019 till the end of December 2019 and fulfilled the inclusion criteria for participation in the study. The total number of attendees during the period of study (above 18 years old) was 460. The number of populations, which were asthmatic and met the requirements for inclusion, was 120 subjects, Except 10 subjects for the pilot study, and the study was performed on 97 patients after the drop-out of cases through the study.

This study was conducted in three phases, first phase was a pre-test evaluation of asthmatic patient using a predesigned questionnaire followed by implementation of an educational program (second phase) and the third phase is the post-test evaluation.

Tools of the study:

A. A predesigned structured questionnaire included the following four main parts:

The first part: For socioeconomic norm evaluation using *Fahmy et al.*⁽¹⁰⁾. Socioeconomic scoring method. The questionnaire counted in ten domains: mother and father education, mother and father occupation, computer use, family size, crowding index, refuse disposal, per capita income and sewage disposal.

The second part: For evaluation of asthma control using GINA-2017 criteria, which consist of four items asking patients about daytime and night-time asthma symptoms, activity limitation and use rescue medication. This category divided the patients into three asthma control groups:

One: Uncontrolled asthma: those with scores from (3-4), 2: partially controlled asthma: those with scores from (1-2) and 3: controlled asthma: those with score zero.

The third part:

The Asthma Self-Management Questionnaire (ASMQ) was used to assess a patient's level of self-management of asthma. It consisted of 16 optional questions measuring protective awareness, proper use of inhalers, medicines (rescue and control), and the use of peak flow meters (it takes about 5 minutes when self-administered, or 8–10 minutes when questioned). However, because peak flow meters are not in common use in Egypt, thus the two items related to use of this device were removed. Therefore, we had 14 questions only. The scores for the tool were calculated as follows: one point was assigned to each preferred response, all the points were summed to generate the raw score range 0–14 and the raw score was transformed to range from 0 to 100, with higher scores showing a more self-management understanding of asthma. The awareness, as in previous studies, was classified into the following levels: a. Good (ASMQ > 75 transformed), b. adequate (transformed ASMQ = 50–75) and c. Poor (transformed ASMQ < 50).

The fourth part: Using the last question of the Inhaler adherence evaluation questionnaire. It included a checklist used by healthcare professional to test presence of critical mistakes of using the inhaler after asking the patient to demonstrate the technique of inhaler use. 1 or 2 points (poor or good inhalation technique) scored the question. Therefore, the technique of inhalation use was divided into good and poor technique according to presence or absence of critical mistakes. An initial technique to decide the validity and reliability of questionnaires changed into performed previous to its use. Three Egyptian experts in the fields of chest medicine, family medicine, and community medicine were asked to determine the extent to which items are important in the questionnaires. The next step was to pre-test the questionnaire on ten asthma patients who were subsequently excluded from the study sample.

B. An educational program:

The health education program was held at four sessions per month at the rate of one session per week of one hour to an hour and a half in Chest Hospital in Menoufia Governorate. The educational program was applied for them in five groups. Each group included nearly 19 patients. The main topics of the program were knowledge about self-management of asthma, methods of avoidance of asthma triggers, technique of inhaler use and importance of adherence to medication use. Methods of teaching were lectures, group discussion and demonstration with use of visual aids. Tools included also booklet & coloured posters. Evaluation of the program was three months later. Post-test was applied for the participants to evaluate their knowledge of self-management, asthma control and inhaler use using the same pre-test questionnaires that were evaluated according to the same method of scoring that was used before application of the program.

Statistical analysis

A personal IBM computer with version 23 of the Statistical Package for Social Science (SPSS) was used. The data were gathered, tabulated and statistically analyzed. For quantitative results mean and standard deviation (SD) was used. Qualitative data were presented in numbers and percentages and analysed using a Chi-square test. Student t-test was used to test the difference between two quantitative variables if parametric. P-value ≤ 0.05 was considered statistically significant.

RESULTS

The results showed that 97 asthmatic patients about half of them (52.6%) were males. More than half of patients were living in urban areas. Less than half of the studied patients (43.3%) were in the low socioeconomic standard. More than half of patients (66%) did not have family history of bronchial asthma or other associated allergies (Table 1).

Table (1): Sociodemographic characteristics of the studied asthmatic patients

Parameter	No (97)	%
Age (years)		
18–35	78	80.4
36–60	15	15.5
>60	4	4.1
Age in years	19 – 65	
Range	27.38±12.280	
Mean ± SD*		
Sex		
Male	51	52.6
Female	46	47.4
Level of education		
Illiterate/ Read And write	12	12.4
Primary/Preparatory	38	39.2
Secondary (general-technical)	40	41.2
Higher education	7	7.2
Residence		
Urban	64	65.98
Rural	33	34.02
Socioeconomic State		
Low	42	43.3
Medium	30	30.9
High	25	25.8

*SD=Standard Deviation

There was a highly significant advance in level of knowledge about asthma self-management after education than pre-education ($p < 0.001$). Before the educational program, only 27.8% had good knowledge and 37.1% of patients had poor knowledge. After program showed that majority of patients (77.3%) had good knowledge while patients that had poor knowledge were 9.3% (Table 2).

Table (2): Comparison between patients’ knowledge level about asthma self-management before and after program.

Knowledge on self-care management of asthma	Before Program (11-32)**		After Program (16 – 39)		x ²	P Value
	No	%	No	%		
Level of knowledge:						
Poor (Transformed ASMQ <50)	36	37.1	9	9.3	48.171	<0.001**
Adequate (Transformed ASMQ 50-75)	34	35.1	13	13.4		
Good (Transformed ASMQ >75)	27	27.8	75	77.3		
Mean ± SD*	22.072 ± 6.410		30.866 ± 5.812			<0.001**
Total	97	100	97	100		

ASMQ: Asthma Self-Management Questionnaire

** Highly statistically significant

Regarding the PMDI inhaler, less than half of patients (41.2%) used the inhaler in good manner before educational program, while after the program the majority of patients (82.5%) had a good technique of inhaler use. Regarding the DPI inhaler users, less than half of them (43.3%) used the inhaler in good manner before educational program, while after the program majority of patients (81.4%) had a good performance of use (Table 3). Post-education technique showed highly significant changes in inhaler usage ($p < 0.001$).

Table (3): Comparison between patients’ technique of inhaler use (PMDI and DPI inhaler) before and after program

Technique of inhaler	Before Program		After Program		X ²	P Value
	No	%	No	%		
PMDI Inhaler						
Poor technique	57	58.8	17	17.5	32.180	<0.001**
Good technique	40	41.2	80	82.5		
DPI Inhaler						
Poor technique	55	56.7	18	18.6	28.318	<0.001**
Good technique	42	43.3	79	81.4		

PMDI :- Pressurised Metered Dose Inhaler **DPI:** Dry power inhalers

** Highly statistically significant

Only 34% of patients had controlled asthma, 27.8% of patients had partially controlled asthma and 38.1% had uncontrolled asthma. While, after the program there was significant improvement in asthma control as more than two thirds of patients (75.3%) had controlled asthma, only 8.2% of patients had uncontrolled asthma. There was a highly statistically significant difference between before and after program regarding bronchial asthma control as measured by GINA-2017 score (Table 4).

Table (4): Comparison between level of asthma control before and after program using patient’s global initiative for asthma score (GINA-2017)

GINA-2017 Score	Before Program		After Program		X ²	P Value
	No	%	No	%		
Uncontrolled Asthma	37	38.1	8	8.2	36.597	<0.001**
Partially Controlled Asthma	27	27.8	16	16.5		
Controlled Asthma	33	34.0	73	75.3		
Total	97	100	97	100		

** Highly statistically significant

DISCUSSION

This study aimed to improve the health of asthmatic patients, by achieving the goals of evaluating the effect of the proposed health education program for asthmatic patients on knowledge of self-management, technique of inhaler use and asthma control using an intervention study.

Regarding to the demographic characteristics of the studied group, age ranged from 19- 65 years old with mean value 27.38 ± 12.280. Male cases were 52.6% while female cases were 47.4%. This agrees with **Elbanna et al.** ⁽⁸⁾ in which the mean age was 37.21 ± 11.99 years old and male cases were 46.43%. Another study by **Nguyen et al.** ⁽⁶⁾ that designed to evaluate information on asthma self-management among adult asthma patients showed that the mean age was 47 (range 18–91) years. Males were 34% of the participants.

Regarding the patients’ socioeconomic status, less than half of patients (43.3%) had low socioeconomic status followed by 30.9% had medium socioeconomic status? **Elbanna et al.** ⁽⁸⁾ reported that more than half of studied group (65.48%) had middle socioeconomic status.

About 34% of patients had family history of bronchial Asthma or associated allergies. It is similar to the study of **Elbanna et al.** ⁽⁸⁾ who reported that 46.43% had positive family history of bronchial asthma. Study of **London et al.** ⁽¹¹⁾ showed that early onset chronic asthma was strongly linked to a parental history of asthma and allergies.

Regarding the patients’ knowledge about asthma self-management before program, the results showed that the percentages of poor, adequate and good knowledge were 37.1%, 35.1% and 27.8% respectively. After program, the percent of good knowledge was increased to 77.3% with statistically significant difference between before and after program (P < 0.001). It agrees with **Elbur et al.** ⁽¹²⁾ who reported that overall, patient’s responses to the items of ASMQ revealed wide gaps in knowledge of asthmatic patients about the disease, the role of various medications and strategies to prevent asthma attacks. For example, the recruited patients had poor knowledge about the technique of using the inhaler with regard to the steps taken during the use of the device.

In the present study, we demonstrated that there was significant improvement in technique of inhaler use among both patients using PMDI or DPI inhaler. Regarding the PMDI inhaler, less than half of patients (41.2%) used the inhaler in good manner before educational program, which was increased to 82.5% after the educational program. It is similar to the study of **Aydemir** ⁽¹³⁾ where they reported that the ratio of proper use of the inhaler improved after the training to reach 83.7%. For DPI, the rate increased from 58.9% to 92.6%, and for PMDI, it increased from 31.1% to 45.2%. The effect of training on proper use was not different among dry powder devices.

Training resulted in a significant increase of correct use among the patients using PMDI. After the re-evaluation, reduce in the number of inhalation errors

for Diskus, Turbuhaler and PMDI was observed. This is similar to a study performed by **Altay and Çavuşoğlu** ⁽¹⁴⁾ where they stated that the self-care skills had improved in the intervention group at the last visit for medication use technique, PEF meter, maintaining a daily follow-up chart, implementation of asthma action plan and protection against triggers.

Concerning to the patients global initiative for asthma score(GINA), the results before program showed that 37 (38.1%) had uncontrolled asthma, 27 (27.8%) had partially controlled asthma and 33 (34%) had controlled asthma while after program majority of patients (75.3%) had controlled asthma with statistically significant difference between before and after program ($P < 0.001$). In comparison to the study of **Ali et al.** ⁽¹⁵⁾, regarding the impact of community education on asthma control assessed using an asthma control test (ACT score ≥ 20) according to the GINA guidelines. Asthma education had a statistically significant ($P=0.0043$) effect on the number of patients with asthma and the percent of patients with controlled asthma was 32% before education versus 50% after education ($P=0.0043$). They also found a significant decrease in the use of prescribed systemic corticosteroids from 51 patients before education to 28 patients after education ($P = 0.005$).

Finally, based upon the results of this study, it could be concluded that implementation of educational program had a positive effect on improvement of the patients' knowledge, practices and self-management post-program compared to pre-program implementation. These results justified the research hypothesis.

Limitations of the study: Some patients refused to participate in the study and it was difficult to convince them, and scheduling lectures with clinics in the hospital was very difficult in terms of time and place. Some of the participating patients were unable to read and write, we helped them to fill out the questionnaires and read the posters, and booklets and we explained it to them. Some lectures were shortened to reduce the feeling of the bored people because the aim was awareness.

CONCLUSION

Post-implementation asthma control was enhanced. The study showed that there were highly statistically significant differences in the implementation of the program before and after it with regard to all sides of the study. It showed improvement of knowledge about self-management of asthma, technique of inhaler use and asthma control in pre and post program implementation. The results of the study indicated that implementation of educational package for patients with asthma improves all aspects of self-management.

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