
Self-Management Educational Program for Improving Asthmatic Older Adults' Behaviors

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Abstract: Self-management can be used to live a more effective and efficient daily life. This study was designed to evaluate the effect of self-management educational program on improving the asthmatic older adults' behaviors. Design: A quasi experimental design was used. Setting: This study was conducted at chest outpatient clinics in Benha University Hospital and Benha Health Insurance Hospital. Sample: A purposive sample of 53 asthmatic older adults was chosen from total 229. Tool: A structured interviewing questionnaire to assess asthmatic older adults' socio-demographic characteristics, history of asthma, characteristics of asthma, and their knowledge related to asthma, also their self- management behaviors to manage asthma. Results: Findings of this study revealed that less than three quarters of the studied subjects were females and had asthma duration more than 10 years, their knowledge and self- management behaviors regarding asthma were improved post program with highly statistically significant differences between total knowledge and total self- management behaviors pre and post program implementation ($p < 0.001$). Conclusions: This study concluded that the asthma self- management program is effective for improving older adults' self- management behaviors regarding asthma. Recommendation: Continues of self-management program for asthmatic older adults focusing on management behaviors especially asthmatic triggers prevention, and asthma attack management. Also, the study recommended that, periodic refreshing course and training for nurses in chest outpatient clinics about chest diseases especially asthma is needed to take active role in educating asthmatic older adults how to manage and control asthma.

Keywords: Asthma, Older Adults, Self-Management, Nurses

1. Introduction

Asthma is a major public health problem worldwide with wide differences in prevalence and severity throughout the world. Significant increases in the prevalence and the severity have been noticed globally over the past few decades in certain geographical regions [1].

Asthma is a common chronic inflammatory condition of the airways which presents as episodes of wheezing, breathlessness and chest tightness due to wide spread narrowing of the airways symptoms can be triggered by viral infections, exercise, air pollutants, tobacco smoke or specific allergens. Several factors that influence the prevalence of asthma include obesity, allergic rhinitis, genetic, family history, exposure to allergens at an early age, and smoking history [2],[3],[4],[5].

Asthma is characterized by periods of inactivity punctuated by acute flares. Exacerbations may lead to utilization of urgent

care services such as emergency department visits and hospitalization, and occasionally death. Controlling asthma and preventing exacerbations requires meticulous attention to self-management, including avoidance of triggers, such as cigarette smoke and allergens, regular monitoring by a healthcare provider, and proper use of daily anti-inflammatory controller medications. Unfortunately, many patients fail to maintain adequate self-management behaviors [6].

Self-management is defined as the personal application of behavior change tactics that produces a desired change in behavior. The term self-control is also used to refer to this type of behavior change program. Self-management can be used to live a more effective and efficient daily life, break bad habits and acquire new ones, accomplish difficult tasks, and achieve personal goals. Learning and teaching self-management skills have many advantages and benefits to the individual actually learning or implementing the skills, those teaching it, and others who may benefit from the individual's

use of the skills [7].

Nurses play a vital role in asthma management. The public relies on nurses to be accessible, well informed and reliable. It is the nurse's duty to give correct and current information and remove barriers to care. Nurses have a responsibility to assess symptom control, safe medication use and correct any erroneous information [8].

1.1. Magnitude of the Problem

Globally, asthma is one of the most common chronic diseases affecting 300 million people world-wide and by 2025, another 100 million will have been affected. It estimates about 250,000 deaths from asthma every year, mainly in low- and middle-income countries. Asthma occurs at high frequency in young and older adults [5], [9], [10].

Self-management is important for any patient with a chronic disease. Asthma self-management education is essential to the control of asthma. If asthma symptoms are controlled, the patient should have fewer exacerbations, a higher quality of life, lower costs, and slower progression of airway remodelling from inflammation, less morbidity, and lower risk of death from asthma. Education directed toward asthma self-management behaviors emphasizes patient participation in symptoms monitoring and control. The asthma educator should use a collaborative education that encourages the patient to take responsibility for his or her own care [11]. Asthmatic older adults should know how to prevent and manage these episodes. Optimal self-management includes self-monitoring (symptoms or symptoms and peak flow), regular medical review [12].

1.2. Aim of the Study

This study aimed to evaluate the effect of self-management educational program on improving the asthmatic older adults' behaviors through:

- 1) Assessing older adults' knowledge and self-management behaviors needs regarding asthma.
- 2) Developing a self-management educational program according to asthmatic older adults' needs
- 3) Evaluating the improvement degree of asthmatic older adults' knowledge and self-management behaviors regarding asthma.

1.3. Research Hypothesis

Asthmatic older adults' knowledge and self-management behaviors regarding asthma will improve after implementation of educational program.

2. Subjects and Methods

2.1. Research Design

A quasi experimental research design was used to carry out this study.

2.2. Setting

The study was conducted at Chest Outpatient Clinics at Benha University Hospital and Benha Health Insurance Hospital.

2.3. Sample

A purposive sample of all older adults who attended to the previously mentioned setting within three months, from beginning of December 2014 to the end of February 2015, accounting for a total number of 53 asthmatic older adults were chosen. 33 asthmatic older adults (out from 120) from Chest Outpatient Clinic at Benha University Hospital and 20 asthmatic older adults (out from 109) from Chest Outpatient Clinic at Benha Health Insurance Hospital. They were chosen according to the inclusion criteria; the older adults were already diagnosed as asthmatic patients, their age over 60 years and able to provide care for themselves, and free from other chronic diseases.

2.4. Tool of Data Collection

A structured interviewing questionnaire developed by the researchers after reviewing of related literature and experts opinions. It was written in a simple Arabic language, and composed of five parts:

Part I: Socio-demographic characteristics of older adults', which included: age, sex, level of education, marital status, occupation, and source of information.

Part II: Older adults' history of asthma which included: duration of asthma, additional allergic diseases, family history, and degree of kinship (if there is a family history).

Part III: Asthma attack characteristics, it included; signs and symptoms that felt by older adults, average occurrence of attack during a month, occurrence of attack during/ day and seasonal occurrence of attack.

Part IV: Included older adults' knowledge regarding to asthma as meaning, causes, signs and symptoms, complications, impact of asthma on older adults' health, asthma triggering factors (nutritional triggers, psychological, environmental, respiratory infection, activities or additional efforts and house animals' factors), and treatment

2.4.1. Knowledge Scoring System

The score of knowledge was divided into three levels:

Good knowledge: 75% or more

Average knowledge: 50 < 75%; and

Poor knowledge: < 50%.

Part V: Included asthmatic older adults' self-management behaviors through asking question to avoid attack occurrence and to care themselves during asthma attack, it included:

A: Asthmatic older adults' self-management behaviors to protect themselves from attack occurrence such compliance with taking prescribed medication, avoid exposure to air draft, avoid exposure to environmental triggering factors (as dust), avoid excessive muscle efforts, avoid certain kinds of food that lead to asthma attack, perform breathing exercise and follow-up regularly.

B: Older adults' self-management behaviors during attack occurrence as take prescribed medication immediately, sit in a good position during attack (semi sitting), take warm fluids during attack, providing complete relaxation and complete bed rest, if asthma persist take medication again, if it still persist go to hospital or doctor for treatment.

2.4.2. Self-Management Behaviors Scoring System

The score of self-management behaviors were divided into two levels:

≥60%, they considered satisfactory level and <60% are unsatisfactory level.

2.5. Statistical Design

Collected data were categorized, coded, entered, analyzed and tabulated using the Statistical Package for Social Sciences (SPSS) version 18. The analyses carried out included descriptive statistics. The level of statistical significance was set at p-value < 0.05.

2.6. Ethical Consideration

The researchers emphasized to asthmatic older adults that the study was voluntary and anonymous. Asthmatic older adult had the full right to refuse to participate in the study or to withdraw at any time without giving any reasons.

2.7. Pilot Study

A pilot study was carried out on 10% of asthmatic older adults attending to the Outpatient Clinic at the Benha University Hospital and Health Insurance Hospital in order to test the applicability of tools and clarity of the included questions as well as to estimate the average time needed to fill in the sheets. Those who shared in the pilot study were excluded from the main study sample.

2.8. Field Work

- Official letters from the Faculty of Nursing, Benha University were forwarded to the Director of each Hospital. Each Director was informed about the time and date of data collection.
- Each older adult was interviewed individually after explaining the purpose and method of the study and obtaining his/ her approval to participate in the study with confidentiality.
- Content validity of the tool was tested by a panel of five experts in Community Health Nursing field and corrections were done accordingly based on their responses.
- A pilot study was conducted on 10% of older adults, who were excluded from the main study sample, to test the applicability and clarity of the tool.
- The self-management educational program was developed based on review of related literature and assessment tool (pretest).
- Data were collected during the period from the beginning of December 2014 to the end of May 2015. Time plan was established and the older adults were organized into 10 groups (5-7 older adults).
- The program in a hospital's day started from 9 .00 a.m. to 12.30 p.m. Each older adult attended 5 sessions (2 sessions for knowledge and 3 sessions for self-management behaviors).
- The duration of each session was 30-45 minutes according to the presented items. Each session was followed by a summary of the essential asthmatic items discussed.

2.9. Asthma Self-Management Program Construction: It Included 4 Phases

1. A pre-program assessment tool using an interview for data collection during attending to the outpatient clinics. A review of current and past, local and International related literature on different aspects of problems facing asthmatic older adults was done using textbooks, articles, periodicals, internet, and magazines.

2. The asthma self management program was designed by the researchers based on results obtained from pre-program assessment tool; the content was revised and modified according to the related literature, it included

2.9.1. The General Objective of the Self-management Educational Program Was to

Improve the asthmatic older adults' knowledge, and self-management behavior to control asthma.

2.9.2. Contents of the Asthma Self Management Program

- Meaning of asthma and asthma attack.
- Meaning of self-management
- Classification of asthma.
- Types of asthma categories.
- The triggering factors for asthma attack.
- Signs and symptoms of asthma.
- Symptoms that refers to the worsen asthma.
- Asthma treatment.
- Types and doses of asthma medication.
- The nutritional requirements
- Older adult's self-management behaviors to avoid and manage asthma attack
 - Measures to avoid or limit exposure to asthma triggers factors
 - Measures to avoid excessive muscle efforts,
 - Avoid certain kinds of food that lead to asthma attack,
 - Importance of regular follow-up
 - How to handle signs and symptoms of worsening asthma
 - When and where to seek care
 - Breathing exercise
 - Deep breathing
 - Coughing exercises

3. Implementation of the asthma self-management educational program was done in the outpatient clinics in the waiting area before the older adults have been examined by physician. The program was applied in five sessions, two sessions for knowledge and three sessions for self-management behaviors; using the educational methods of discussions, role play, followed by demonstration and redemonstration. As well, audiovisual aids were used such as posters, a simplified and comprehensive booklet with illustrated pictures including information about asthma and its' management was written in a simple Arabic language to suit understanding level of studied subjects.

4. Evaluation of the self management program was done immediately after the implementation of the program by using the same pre-program format.

3. Results

Table (1): This table shows the socio-demographic characteristics of studied subjects, 73.6% of the studied subjects were females and 39.6% were aged 65 years or more with mean age 65.72 ± 5.74 , and 71.7% of them were illiterate. As regards marital status, 67.9 % of the studied subjects were married. Regarding to occupation, 67.9% of the studied subjects didn't work.

Fig. (1): Illustrates that 62.3% studied subjects their source of information regarding asthma were doctors while, only 5.7% of them acquired their information from nurses.

Table (2): Reveals that 73.6% of studied subjects had history of asthma duration more than 10 years and 81.1% of them had nasal allergy. As regards family history of asthma, 62.3% of the studied subjects had positive family history involving first degree relative.

Table (3): Indicates that 64.2% of studied subjects had once attack per month while 39.6% of them asthma attack lasted more than 30 minutes, 49.1% of them asthma attack occurred at the evening and 41.5% of them attacked by asthma at the spring.

Fig. (2): Illustrates that signs and symptoms felt by studied subjects during attack, 83.1% of older adults suffered from cough, while 37.7% of them suffered from chest pain during attack.

According to the research hypothesis: The findings revealed a significant improving in studied subjects' knowledge and self-management behaviors regarding asthma after implementation of self-management educational program (table 4, 5, 6, and 7)

Table (4): Shows that studied subjects' knowledge regarding asthma was improved post program implementation. The obvious improvement was observed regarding causes of asthma (34.0 % versus 58.5%) followed by signs and symptoms of asthma (32.1% versus 62.3) respectively post program. Over all, the results had highly statistically significant difference in relation to basic items of knowledge between pre and post program implementation ($p < 0.001$).

Table (5): Reveals that studied subjects' self-management behaviors to protect themselves from asthma occurrence were improved post program implementation. The obvious improvement was observed regarding to avoid environmental triggers factors (as dust) 84.9% compared by 56.6% pre program and 73.6% of them performed breathing exercises post program compared by 30.2% pre program. Also this table shows there was statistically significant difference between pre and post program implementation for basic items of self-management behaviors to protect themselves from asthma occurrence except the compliance with taking prescribed medications

Table (6): Shows that the studied subjects' self-management behaviors to control asthma during attack were improved post program. There was statistically significant difference in relation to if asthma persists the studied subjects take medications again (9.4 % versus 73.6%), sit in semi sitting position during asthma (58.5% versus 73.6%) and go to the doctor or hospital immediately if asthma persists (56.6 % versus 84.9%) between pre and post program

implementation. However, there was no statistically significant difference in relation to take medication immediately, take warm fluids and rest in bed between pre and post program implementation.

Table (7): Reveals that studied subjects' total knowledge scores were improved post the program implementation as 8.35 ± 2.52 compared by 3.00 ± 3.000 preprogram while the self-management behaviors improved as 10.16 ± 1.94 compared by 6.73 ± 2.23 preprogram, there was highly statistically significant relation between total knowledge and total self-management behaviors pre and post program implementation.

Table 1. Frequency distribution of studied subjects regarding their socio-demographic characteristics.

Demographic characteristics items	No	%
Sex		
Female	39	73.6
Male	14	26.4
Age		
60-	11	20.8
65-	21	39.6
70-	16	30.2
75+	5	9.4
Mean \pm SD = 65.72 ± 5.74		
Education level		
Illiterate	38	71.7
Read and write	2	3.8
Basic education	7	13.2
High educated	6	11.3
Marital status		
Single	4	7.5
Married	36	67.9
Widow	11	20.8
Divorced	2	3.8
Occupation		
Working	17	32.1
Not working	36	67.9

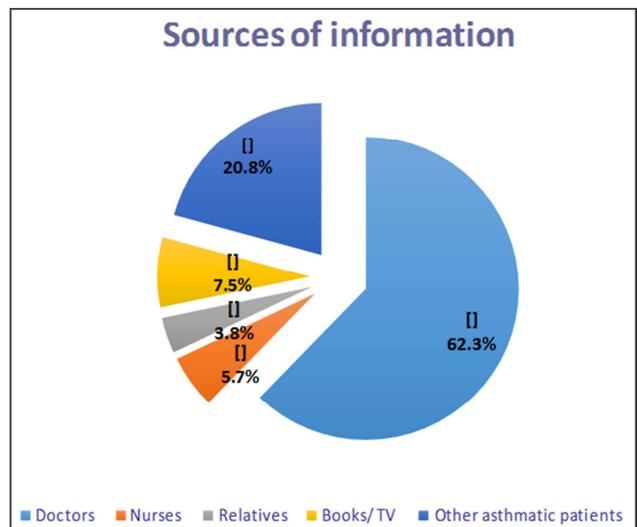


Fig. 1. Frequency distribution of studied subjects regarding their sources of information about asthma.

Table 2. Frequency distribution of studied subjects regarding their history of asthma.

History of the asthma items	No	%
Duration of asthma		
<5 years	7	13.2
5-10 years	7	13.2
>10 years	39	73.6
Additional allergic diseases		
Nasal allergy	43	81.1
Skin allergy	8	15.1
Allergic conjunctivitis	2	3.8
Family history of bronchial asthma		
Present	33	62.3
Not present	20	37.7
Degree of kinship		
First degree	20	60.6
Second degree	8	24.3
Third degree	5	15.1

Table 3. Frequency distribution of studied subjects regarding their characteristics of asthma attack.

Characteristics of attack items	No	%
Average of attack/month		
Once attack	34	64.2
2-3 attack	6	11.3
>3 attack	13	24.5
Duration of attack		
<15 min	17	32.1

Table 4. Frequency distribution of studied subjects regarding their knowledge about asthma pre and post program.

knowledge Items	Score level	Pre program		Post program		Z test	P value
		No	%	No	%		
Meaning of asthma	Poor	41	77.4	6	11.3	3.80	<0.001
	Average	0	0.0	28	52.8		
	Good	12	22.6	19	35.8		
Causes of asthma	Poor	29	54.7	6	11.3	3.451	<0.001
	Average	18	34.0	31	58.5		
	Good	6	11.3	16	30.2		
Signs and symptoms	Poor	30	56.6	6	11.3	3.422	<0.001
	Average	17	32.1	33	62.3		
	Good	6	11.3	14	26.4		
Complication	Poor	31	58.5	6	11.3	5.171	<0.001
	Average	22	41.5	35	66.0		
	Good	0	0.0	12	22.6		
Impact of asthma on adult's life	Poor	36	67.9	0	0.0	5.213	<0.001
	Average	9	17.0	40	75.5		
	Good	8	15.1	13	24.5		
Asthma triggering factors	Poor	42	79.2	4	7.5	6.214	<0.001
	Average	11	20.8	32	60.4		
	Good	0	0.0	17	32.1		
Treatment	Poor	37	69.8	3	5.7	5.522	<0.001
	Average	14	26.4	38	71.7		
	Good	2	3.8	12	22.6		

A highly statistical significant difference ($p \leq 0.001$)

Characteristics of attack items	No	%
15- 30 min	15	28.3
>30 min	21	39.6
Occurrence of attack during the day		
At the morning	21	39.6
At the afternoon	4	7.5
At the evening	26	49.1
At any time during the day	2	3.8
Seasonal occurrence of attack		
Winter	9	17.0
Summer	1	1.9
Autumn	13	24.5
Spring	22	41.5
During seasonal changes	8	15

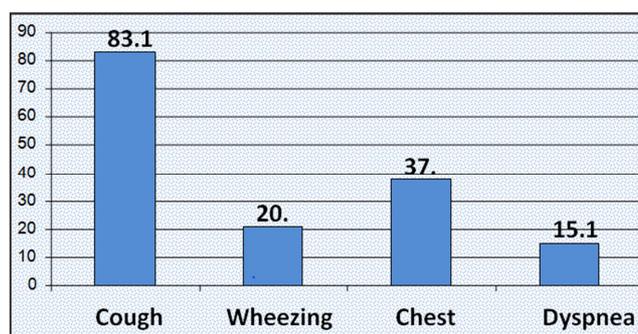


Fig. 2. Frequency distribution of signs and symptoms felt by asthmatic older adults during attack.

Table 5. Frequency distribution of studied subjects regarding their self-management behaviors to protect themselves from asthma occurrence pre and post program.

Self-management behaviors items	Score level	Pre program		Post program		Z test	P value
		No	%	No	%		
Compliance with taking prescribed medication	Unsatisfactory	13	24.5	10	18.9	0.775	>0.05
	Satisfactory	40	75.5	43	81.1		
Avoid air draft	Unsatisfactory	18	34.0	8	15.1	1.961	<0.05
	Satisfactory	35	66.0	45	84.9		
Avoid environmental triggering factors (as dust)	Unsatisfactory	23	43.4	8	15.1	3.128	<0.05
	Satisfactory	30	56.6	45	84.9		
Avoid excessive muscle efforts	Unsatisfactory	38	71.7	12	22.6	5.099	<0.001
	Satisfactory	15	28.3	41	77.4		
Avoid certain kinds of food that lead to asthma attack	Unsatisfactory	31	58.5	16	30.2	2.611	<0.05
	Satisfactory	22	41.5	37	69.8		
Perform breathing exercises	Unsatisfactory	37	69.8	14	26.4	4.796	<0.001
	Satisfactory	16	30.2	39	73.6		
Follow up regularly	Unsatisfactory	24	45.3	6	11.3	3.530	<0.001
	Satisfactory	29	54.7	47	88.7		

Statistical significant difference ($P < 0.05$), A highly statistical significant difference ($p \leq 0.001$)

Table 6. Frequency distribution of studied subjects regarding their self-management behaviors during attack to control of asthma pre and post program.

Self-management behaviors items	Score level	Pre program		Post program		Z test	P value
		No	%	No	%		
Take medication immediately	Unsatisfactory	13	24.5	10	18.9	0.775	>0.05
	Satisfactory	40	75.5	43	81.1		
Sit in semi sitting position	Unsatisfactory	22	41.5	14	26.4	2.309	<0.05
	Satisfactory	31	58.5	39	73.6		
Take warm fluids	Unsatisfactory	14	26.4	11	20.8	1.000	>0.05
	Satisfactory	39	73.6	42	79.2		
Bed rest	Unsatisfactory	30	56.6	29	54.7	0.192	>0.05
	Satisfactory	23	43.4	24	45.3		
If asthma persists, take medication again	Unsatisfactory	48	90.6	14	26.4	5.516	<0.001
	Satisfactory	5	9.4	39	73.6		
Go to doctor or hospital immediately if asthma persists	Unsatisfactory	23	43.4	8	15.1	3.128	<0.05
	Satisfactory	30	56.6	45	84.9		

Statistical significant difference ($P < 0.05$), A highly statistical significant difference ($p \leq 0.001$)

Table 7. Relation between total studied subjects knowledge scores and total self-management behaviors scores pre and post program.

Items	Pre program	Post program	T	P value
	Mean \pm SD	Mean \pm SD		
Total knowledge	3.00 \pm 3.000	8.35 \pm 2.52	8.458	<0.001
Total self-management behaviors	6.73 \pm 2.23	10.16 \pm 1.94	13.517	<0.001

A highly statistical significant difference ($p \leq 0.001$)

4. Discussion

Asthma is the most common long term chronic disease, around the globe; it was found that 100 to 150 million people of all ages suffer from asthma. Asthma is an important cause of morbidity and mortality in the elderly nowadays. In addition, the burden of asthma is more significant in the elderly than in their younger counterparts, particularly with regard to mortality, hospitalization, medical costs or health-related quality of life. It also lowers productivity and reduces participation in family life [13], [14], [15].

The results of this study revealed that less than three quarters of the studied subjects were females, illiterate and married. Regarding studied subjects' occupation, more than

two thirds of studied subjects didn't work, while less than one third was working. This may be due to the female stayed at their home most of time which exposed her to indoor pollution during cooking and other home activities rather than men. These findings consisted with Tageldin et al. [5] who found that 60% of the studied cases were females and mainly they didn't work and it is accepted that asthma is more common in women than in men. Also the same results consisted with Taha and Ali [16] who found that, two thirds of the patients were females, more than three quarters were married and illiterate, and only less than one third of the patients were employed.

Regarding source of information, less than two thirds of older adults gained their information regarding asthma from doctors while few of them gained their information from nurses. This may reflect a deficiency in nursing educational role especially in the outpatient clinics. This finding agreed with Ozturk et al. [10] who reported that, the main source of asthma knowledge was from physicians. Moreover, Qureshi, [17] said that, the majority of the studied sample learn about asthma from physician.

The results of the current study revealed that, less than three quarters of the studied subjects had duration of asthma

more than ten years and more than three quarters of them suffered from nasal allergy. These findings consisted with Ozturk *et al.* [10] who found that, the mean duration of asthma was 13.7 ± 15.4 years. These findings were congruent with Salem [18] who reported that the majority of the studied subjects with asthma had nose sensitivity.

As regards family history approximately more than three fifths of the studied subjects had family history of asthma in first degree relative. This finding agreed with Mendoza [19] who found that 87% of the studied sample had a significant positive association between asthma and family history. Also the same finding supported with Shoeib [20] who found that the majority of the studied sample had positive family history of asthma in first class relative. In this respect Liu *et al.* [21] emphasized that a family history of asthma is an important risk factor for asthma.

In the present study, result showed that less than two thirds of the studied subjects had once attack per month and less than one half was attacked by asthma in the evening. As regards signs and symptoms felt by asthmatic older adults during attack, more than three quarters of older adults suffered from cough, while more than one third of them suffered from chest pain during attack. These findings agreed with Mansour *et al.* [1] who stated that, asthma symptoms can differ from person to person, but most people experience a worsening of symptoms at night and the most common symptoms of asthma were; wheeze, cough, dyspnea, and chest tightness. In addition Refaat and Aref [22] reported that asthma clinical features include recurrent episodes of dyspnea wheezing and cough which occur more nocturnally and accompanied by chest pain

On investigating knowledge of the studied subjects about asthma, the older adults' knowledge about asthma improved after implementation of self-management educational program compared by pre program. There was highly statistically significant differences in relation to basic items of knowledge between pre and post program implementation ($p < 0.001$). This may be point out to a deficiency in the educational healthcare professional role. On the other hand the needs of older adults to gain knowledge on how to deal with asthma in simplified way forced them to acquiring the knowledge about asthma from the self-management program in spite of their low educational level. In this respect Taha and Ali [16] found that after implementation of the guidelines, patients' knowledge demonstrated significant improvement, which was confirmed through multivariate analysis. Also, Williams [23] concluded that asthma educational program is needed to increase patient's information.

According the current study, the self-management behaviors of the studied subjects to protect themselves from asthma occurrence improved post program. The obvious improvement was observed regarding to avoid air draft, environmental triggering factors and excessive muscle efforts. This may be attributing to positive effect of self-management programs which result in changing in studied sample behaviors. These findings were congruent with Pinnock, [24] who emphasized that, people living with asthma have to accommodate their long-term condition within the context of their daily life and they may need to

avoid their triggers where possible. On the same line Yoo, *et al.* [25] mentioned that, it is necessary to avoid or reduce stimuli that may cause the acute aggravation of asthma. In this respect Mohammed, [26] found that, most of asthmatic patients had totally limited strenuous activities

Moreover, the asthmatic older adults' self-management behaviors were improved post program regarding avoiding certain kinds of food which lead to asthma attack. This may be due to that older adults knew the different types of food which may aggravate asthma attack from self-management program so they avoid it.

Concerning breathing exercises, more than two thirds of studied subjects had unsatisfactory behaviors pre program. This may reflect the unavailability of instruction guided resources about importance of breathing exercises for asthmatic older adults. This result corroborated with Mohammed, [26] who found that more than two thirds of studied subjects had unsatisfactory practice regarding breathing exercises. However, post self-management program implementation this numbers decreased to about one quarter of studied subjects who had unsatisfactory behaviors.

Additionally, the results also confirmed that, the asthmatic older adults' self-management behaviors regarding follow up regularly improved post program. This result supported by Taha and Ali [16] who documented that patients' compliance to follow-up improved post program.

There was highly statistically significant differences in relation to basic items of asthmatic older adults' self-management behaviors to protect themselves from asthma occurrence between pre and post program ($p < 0.001$). In this respect Temple [27] highlighted that asthma self-management education is essential to provide patients with the skills necessary to manage asthma and improve their health. Also this result supported with Taha and Ali [16] who proved that, patients' practices and compliance related to asthma have also improved after implementation of the study guidelines.

After implementation of educational self-management program, older adults' self-management behaviors to control asthma were improved post program. The obvious improvement was observed regarding to sit in semi sitting position, if asthma persist take medication again and go to the doctor or hospital immediately if asthma persist. In this respect Burns [28] clarified that patients with asthma exacerbation should be given initial treatment and considered for hospital admission if unresponsive to initial treatment or if they have any features of acute, severe or life-threatening asthma. Moreover Riffat *et al.* [29] highlighted that, achieving asthma control is central in optimizing patient clinical outcome.

In addition these findings were on the same line with Pinnock [24] who mentioned that, patients have to recognize when their asthma is deteriorating, and make decisions about when to adjust their medication, when to use emergency treatment and when to seek professional help. In this respect Janson *et al.* [30] concluded that the educational self-management intervention significantly improved adherence with medical treatment and perceived control of asthma.

There was highly statistically significant relation between studied subjects' total knowledge and total self-management

behaviors pre and post program. This may be due to studied subjects who had lack of knowledge about asthma unable to performed essential skills of self-management behaviors and vice versa. In this respect Abd El- Rahman [31] proved that there were highly statistically significant differences between elderly people total knowledge scores and total practices score.

5. Conclusions

According to the results and research hypothesis, this study concluded that, the studied subjects' knowledge regarding asthma was improved after the program and there was highly statistically significant difference between pre and post program implementation, also their self-management behaviors regarding asthma were improved after the program implementation. Moreover, there was statistically significant difference between pre and post program implementation. Findings from this study suggest that asthma self- management educational program was effective in improving asthmatic older adults' behaviors.

Recommendations

Based on the findings of the current study recommendations are suggested as follows

- Continues of self-management program for asthmatic older adults focusing on management behaviors especially asthmatic triggers prevention, and asthma attack management.
- Periodic refreshing course and training for nurses in chest outpatient clinics about chest diseases especially asthma is needed to take active role in educating asthmatic older adults how to manage and control asthma.
- Disseminate a simplified and comprehensive booklet with illustrated pictures including information about asthma and its' management for asthmatic older adults to improve management and control of asthma behaviors.

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