Modified Nursing Program to Improve Health Condition Asthmatics Older Adult

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Abstract

Asthma is a serious and common global health problem among older adult; can cause serious health problems if untreated properly. **Aim** of the present study was to evaluate the modified nursing program to improve health conditions among asthmatics older adult. **Research design:** A quasi-experimental design (one group pretest post-test) was used in this study. **Setting:** The study was carried out in three (3) outpatient clinics affiliated Chest Qena Hospital, Qena, Egypt. **Subjects:** A convenient sample was composed of 97 older adult's diagnostic asthmatic. The study covers a period of 8 months from the beginning of September 2018 until the end of April 2019. **Tools:** Five tools were used to collect study data: **Tool I:** patients' assessment questionnaire**:** includes four parts; **Part 1.** Demographic characteristics **Part II.** Medical history **Part III.** Medical Research Council dyspnea scale. **Part IV:** Older adults' knowledge regarding to asthma. **Tool II:** Observational checklist older adult patients' practice. **Tool III:** Asthma Control Test. **Tool IV:** Medication Adherence Reporting Scale. **Tool V:** Patients' self-care strategies. **Results**: Findings of this study revealed that more than half of the studied subjects were males and had asthma with statistical significance improvement in grades of asthma after the implementation of the modified nursing program, statistically significant improvement in the level of knowledge , and practice and self care strategy post program, highly statistically significant improvement in the study participants' asthma control test and medication adherence, significant positive correlations between MRC dyspnea scale and medication adherence among asthmatic old age. **Conclusions:** This study concluded that the asthma modified nursing program is effective for improving' health conditions among asthmatics older adult. **Recommendation:** The study recommended for further modifing nursing program to be conducted on larger number of older adult's patients to improve their knowledge, practice, and self-care strategies.

Keyword: Asthma, Old Adults, Medication Adherence, modified nursing program

Introduction

Aging is a slow and inevitable process, leading to various functional, biochemical and psychological changes that to increase vulnerability to and the incidence of pathological processes in the body. Older adults patients experiencing worsening health conditions (e.g., cardiac, respiratory or cerebrovascular problems, urinary infections, diabetes and fall-related injuries) **(Goes et al., 2020)** Respiratory diseases are one of the main causes of death worldwide. Asthma and chronic obstructive pulmonary disease (COPD)

affect up to 10% of the population **(Maricoto et al., 2019)**. Asthma is a major global health concern and faces a major global health and socioeconomic burden. . The prevalence of asthma differs geographically and varies ranging from 4% to 13% in older adults. Asthma in older adults is associated with higher morbidity and mortality than asthma in younger subjects **(Liu et al., 2020)**.

Asthma in older adults is associated with higher morbidity and mortality than asthma in younger subjects. In Egypt, there are 7%-15% of older adults with asthma; this included the first attack in old age and who had been affected by the disease at long life **(Alagamy et al., 2019)**.

Asthma is a complex chronic condition that is mostly under-diagnosed and undertreated in old adults. This can increase the morbidity and mortality rates among them **(Lee et al., 2019).**

The diagnosis of asthma, as with many other disorders, depends on a thorough history and physical examination.

Once the characteristic signs and symptoms of asthma are identified, the diagnosis can be confirmed by demonstration of variable expiratory airflow limitations **(Chupp et al., 2017)**.

Older adults with asthma are at risk of developing persistent fatigue due to respiratory infections such as influenza and pneumonia; consequently, they become frail and they lose their independence in performing daily living activities **(Herscher et al., 2017)**.

Treatment is complicated among old adult patients with asthma due to misunderstanding of asthma as a disease, the treatment regimen, poor adherence, comorbidities, decrease of cognitive or physical capabilities, and socioeconomic challenges **(Nanda et al., 2020)**. These problems can make it difficult for older adults to follow treatment instructions. In addition to, some types of asthma medications difficult to use by older adults this needs a degree of manual coordination and special skills **(Yawn and Han, 2017).**

Controlling asthma and preventing exacerbations requires particular 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 medications. Unfortunately, many patients fail to maintain adequate self-management behaviors **(Hsu et al., 2018)**.

The goal of asthma management is to control the disease and allow patients to lead a normal and healthy life that controls the asthmatic attacks. Medication adherence is a key determinant of patient health outcomes in asthmatic disease. The most common reasons for uncontrolled asthma are non-adherence to treatment, poor knowledge and skills in disease management **(Shahin et al., 2020)**.

Nursing intervention program has a prominent role in bringing about changes and obtaining anticipated result ..Many useful changes and transformations had been possible by modified nursing intervention program. Older adult's patients should participate in decisions to create a better environment and care of

themselves **(Aarabi et al., 2015)**. Modified nursing program practice is the use of empirical research findings to achieve greater reliability in successfully achieving the desired results of the intervention. Such practice depends on more than the results of studies **(Khajavikia et al., 2017).** To achieve that older adult patients should use medications correctly and maintain controls for a considerable time. This might be achieved by adult's patients receive adequate guidance on how to use medications and receive sufficient knowledge about the disease, then provide some exercises about how to use devices such as inhaler and nebulizer **(Ibrahim et al., 2019)**.

. Modified nursing program to improve asthma outcomes have rarely been observed in older patients with asthma, and self-care management services in this age group are not appropriate **(Narendra et al., 2019)**. Knowledge and skills about asthma self-care management should be a priority for future intervention programs to promote specific behavioral strategies for asthma prevention too; health education is considered an important part in the management of asthma and strongly recommended for older adults with asthma **(Freitas et al., 2020)**.

The nurse who works in primary health care and pulmonary specialty practices and deal with older adults with asthma should develop nursing program for improving health care for older adults with asthma. This program should be personalized according to the severity of symptoms, treatment regimens; asthma triggers that the patient have. All of that positively reflect on physical, functional, emotional, and social health of older adults with asthma **(Harada et al., 2020)**. Also continuing education and training sessions should be held among nurses to enhance learning, updating the concepts previously learned and integrate new knowledge and advancements in the related area **(Duncan, 2019)**.

Significance of Study:

Globally, asthma is a common chronic disease affecting 300 million people world-wide and by 2025, another 100 million will have been affected. It estimates approximately 250.000 deaths from asthma every year, mainly in low- and middle-income countries. Asthma occurs at high frequency in young and older adults **(Tageldin et al., 2015)**. Despite all advances in the management of asthma, the morbidity and mortality rates are increasing among old adult patients from complications of asthma and Low health literacy may be a contributor to poor adherence among older adults and poor health outcomes.

Routine intervention-nursing program performed in primary care focused on one or two nursing directions such as knowledge and practice or self-care management strategy, and ignore other directions such as copping with problems from asthma and medication adherence **(Ahmed et al., 2018)**.

So the nurse and older adults patients play a fundamental role in the under treatment and mismanagement of asthma. This causes concern in the field of asthma care. Unless the patient possesses a basic knowledge about asthma and its management, there is no likelihood to make the best use of the available facilities. However, nurses play

a vital role in preventing asthma attacks or decreasing its severity, focusing on approach for the prevention and control of asthma to reduce disability and mortality. Thus, there's serious need for modified nursing program, which includes Multinursing direction to provide basic patients' knowledge, practice, Medication Adherence and dealing with common health problem from asthma.

Aim of the Study

This study was done to evaluate the modified nursing program to improve health conditions among asthmatics older adult.

Research hypothesis

Modified nursing program will improve health condition among asthmatic older adults.

Modified nursing program will improve the level of knowledge and practices among asthmatic older adults

Materials and Methods

Research Design

A quasi-experimental design (one group pretest post-test) was used in this study.

Study setting

The study was conducted in three (3) outpatient clinics affiliated Chest Qena Hospital, Qena, Egypt.

Subjects

A convenient sampling was used to achieve the aim of the study. It composed of 97 older adults diagnosed with asthma of both sexes, attending the above-mentioned and the patients were selected according to the following criteria:

- Aged 60 years and above both genders.
- Diagnosed with asthma with previous attacks.
- Able to communicate effectively.
- Agree to participate in the study.

Exclusion criteria:

- Older adult's patients with debilitating diseases such as heart failure, renal failure and lung cancer.
- Older adult's patients with communication problems (vision or hearing problems)
- Older adult's patients who had previously shared any educational program about asthma

Sample size:

Based on data from literature **Alagamy, et al. (2019).** Considering the level of significance = 5%, Power = 80%, Type of test = two-sided

Formula of calculating sample size is

$n = [2(Z_{\alpha/2} + Z_{\beta})^2 \times p (1-p)]/ (difference)^2$ where

n = sample size required.

p = pooled proportion/2

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

Z_{β}: This depends on power, for 80% this is 0.84. Hence,

$n = [2(1.96 + 84)^2 \times 0.5625 (1–0.5625)]/ (0.20)^2 = 96.5$

Therefore, the sample size required in

97 patients with asthma.

Tools for Data Collection: Five tools were used to collect study data:

Tool I- Patients' assessment questionnaire: developed by the researchers based on reviewing relevant literature, and scientific references and included four parts to cover the following data:

Part 1: Demographic data, which included ten items regarding age**,** sex**,** educational level**,** marital status**,** residence**,** occupation**,** smoking condition, living condition**,** monthly income

Part II: Medical History Include presence of chronic disease, type of disease, pervious hospital admission in the past 6 months, the duration of asthma, frequency of attack/week, pulmonary function test and asthma severity.

Part III: Medical Research Council (MRC) dyspnea scale adopted from Bayomi, et al., [17]. The scale assessed the severity of dyspnea and graded the effect of dyspnea on daily activities using a MRC grading scale from I-V. Patients were asked to best describe their condition and level of activity. Responses ranged from Grade I or no impact on daily living to Grade V or almost complete incapacity.

Part IV: Older adults' knowledge regarding to asthma. This tool was adapted from **Mohamed, 2013** and **Hansen et al. (2016).** It was used to assess the knowledge of the study older adults**,** which included ten items related to meaning of asthma, cause, risk factors, seasons increased asthma worse, asthma triggers, signs & symptoms, complications, the impact of asthma on older adults' health, treatment and exercises for asthma.

Knowledge scoring system:

For each question the score was graded as "1" for correct answers, and "0" incorrect answers. The score have been compiled and translated into a percentage

The total score is divided into the following:

Level of Knowledge	**Scores:**
Poor knowledge	< 50%
Fair knowledge	50% - < 75%
Good knowledge	≥ 75%

Tool II: Observational checklist older adult patients' practice: This tool was adapted from **(El-fadl et al., 2019)** to assess patients' practice. It was concerned with patient's practice about using inhaler (12 items), It includes 7 steps in the use of the devices, respectively, covering the essential elements of use from the preparation of the devices to their actuation and delivery of the medications. The steps for inhaler are 1) Shake inhaler well and remove the protective cap, 2) Hold inhaler upright, 3) Breathe out gently away from inhaler, 4) Place mouthpiece between lips and teeth without biting and close lips to form good seal, 5) Start to breathe slowly through the mouth and at the same time press down firmly on canister, 6) Continue slow and deep inhalation, 7), Remove inhaler from mouth when inhalation complete, and 8) Hold breath 5–10 seconds.

Practice Scoring system: For each step the score was graded as (1) = done, and (zero) = not done, and the total practice score totaled and converted into a percentage as ≥ 75% satisfactory level of practice, while, less 75% as unsatisfactory level of practice.

Tool III: Asthma Control Test (ACT): It is a commonly used tool to assess asthma control. This tool was developed by **Rojano, et al. (2019).** The assessment of asthma control is a simple, validated, questionnaire.

It consists of five elements, including movement restriction, shortness of breath, and occurrence of symptoms at night, use of rescue medication, and overall disease control rating over the past 4 weeks. The ACT score is the total of the five questions, each of which is scored from 1 (worst) to 5 (best), resulting in a maximum 25th best score.

The level of asthma control is categorized into

Level of Control	**Score**
Uncontrolled	<16
Partially controlled	16–19
Controlled	≥20

Tool IV: Medication Adherence Reporting Scale (MARS)

This scale was developed by **Alex, et al. (2010)** and it was adopted by **Alagamy et al. (2019).** MARS comprises ten (10) items describing non-adherent behavior. It was used in this study to measure the study older adults' adherence to asthma controller medications. Older adults with asthma are asked to score their own behavior regarding the frequency of the different aspects on the following response scales:

The older adults under study' response score	
Always	0
Sometimes	1
Never	2

The total score ranging between 0 and 20 points, a higher score indicates higher adherence to the prescribed asthma controller medications

Tool V: Patients' self-care strategies: It was concerned with self-care strategies used by patients to manage common problems. It consisted of (17) items regarding chest pain, controlled cough technique, and coping with dyspnea. Scoring system of self-care strategies: The cumulative score was determined for each issue based on the amount of self-care strategies used to manage each one. . It consisted of two options (yes or no). Yes take graded as (1) while No take graded as (zero).

The total score was graded as ≥ 75% was considered satisfactory, while less than 75% was considered unsatisfactory

Methods:

An official letter was issued from the Faculty of Nursing, Qena University and forwarded to the director of Chest Qena Hospital for Pulmonary and Allergy Diseases, Qena, Egypt to obtain the permission to attend the clinics. Then, the purpose of the study and the data schedule were explained.

- Each older adult was interviewed individually after explaining the purpose and method of the study and to obtain his/her permission to engage with confidentiality

- Tool I & Tool II was developed by researchers based on thorough systematic review of relevant literature then; tool III, tool IV and tool V were translated by researchers into Arabic.
- Content validity of the tool was tested by a panel of five experts three in geriatric Nursing, two in Community Health Nursing field and corrections were done accordingly based on their responses.
- The reliability of tools II - V was tested on 20 older adults with asthma order to measure the internal consistency of these tools by using Cornbrash's alpha test. r= 0.815, 0.864 knowledge and practices, respectively, for tool II, r= 0.922 for tool III. r= 0.838, 0.828 for tool IV& tool V respectively.

A pilot study was conducted on 10 older adult patients with asthma; they were excluded from the study participants. It was done to test the clarity and applicability of the tools, test wording of the questions and estimate the time needed for the interview. Also, to find any challenges or difficulties that may occur in the collection of data.

- The modified nursing program developed by the researchers based on reviewing the most recent related literature.

The assessment phase and fieldwork

- Permissions for data collection were generated from the hospital directors and head managers of the Chest Qena Hospital, and by the submission of a formal letter from the Faculty of Nursing, Qena University.
- Once the researcher was granted approval and older adults fulfilled the inclusion criteria were interviewed individually by the researchers with face-to-face interviews in the waiting area of the clinics the modified nursing program was developed based on a review of related literature and assessment tool (pretest).
- Before conducting the study, an exploratory visit was done to outpatient clinics at Chest Qena Hospital to evaluate the rate of admission and suitable time for collecting data. Moreover, personal communication was done with nurses and physicians to explain the purpose of the study and gain their best possible cooperation.
- The interview took approximately 30–45 min according to the interviewers' level of understanding and comfort. This phase covers a period of three months from the beginning of September 2018 until the end of November 2018.
- The numbers of telephone all old adult patients under study or caregivers were taken to arrange for program sessions.

The planning and implementation phase:

- The proposed program in a hospital's day started from 9 .00 a.m. to 12.30 p.m. The older adults were organized into 8 groups. in total. All groups included 12 older adults with asthma, except one group include 13 older adults with asthma. 30–45 minutes/session, twice/month, four groups/ day. The sessions were performed in the training unit with the permission of the responsible supervisor nurse. The total number of sessions was 24 sessions, 6 sessions per group.
- This phase covered a period of 3 months from the beginning of December 2018 till the end of February 2019.

The General Objective of the modified nursing program: was to improve health conditions among asthmatics older adult.

Before the conduction of the program session, the researchers prepare the environment to be calm and comfortable for each member of the groups, well ventilated and have adequate lighting.

- The researchers were distributing the designed manual booklet on each participant to clarify the desired knowledge and skills. This booklet contains the illustrative colored pictures and the main points of each session of modified nursing program as follows.
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Session1: Takingintoconsiderationtheuseofsimplelanguageaccordingtotheeducationallevel.	Welcoming and introduction Goal setting What is asthma mean? What are asthma signs & symptoms? What are the complications & impact of asthma on older adults' health? What are the treatment and exercises for asthma? What is modified nursing program mean? What are its principles?
Session 2 A standardized checklist of steps in the proper use of inhaler.	Welcoming Summary about the previous session Teach the participants the correct 7 steps during use of inhaler Demonstrate technique to inhaler
Session 3 Self-monitoring of asthma control	Welcoming Summary about the previous session self-administered questionnaire to assess asthma control
Session 4 Discussion, motivation and reinforcement during program/media used/ session were used to enhance learning	Welcoming summary about the previous session Medication Adherence : Describing the 10 items of non- adherent behavior Demonstrating the prober technique of medication adherence.
Session 5: self-care strategies used by patients to manage common problems	Welcoming Summary about the previous session Teach the participants how to manage common problems regarding chest pain
Session 6: Patients' control cough technique, and coping with dyspnea.	Welcoming Summary about the previous session Teach the participants the correct cough technique and How to coping with dyspnea. Discussion and negotiation Obtain feedback from the participants

Teaching methods included group discussion, role-playing, demonstration and re-demonstration, models, and pictures (inhaler use).

Action plan calendar were prepared and given to each participant to identify obstacles hindering the achievement of needed goals.

Evaluation/follow up phase

To evaluate the effectiveness of the proposed program, a reassessment of each participant was done after the implementation of the program. This took 2 months evaluation from Mars 2019 to the end of April 2019.

The total period of data collection, including the three phases of the program covered a period of 8 months from the beginning of September 2018 April 2019.

Ethical Consideration:

- Written consent was obtained from each patient enrolled in the study after explaining the purpose of study.
- The researcher ensured that the privacy and confidentiality of the data was maintained
- Secrecy, anonymity and the right to withdraw were guaranteed at any moment.

Statistical analysis:

The collected data were coded and analyzed using the statistical package for social sciences (SPSS version 21). Tabulated frequency and percentages were calculated. The chi-square test was used for testing the relationship between categorical variables. Pearson correlation (r) was used to discover the correlation of two quantitative variables. If $P \leq 0.05$, the difference was considered significant

Results

Table 1.Shows the distribution of the study sample according to sociodemographic data. The data in this table reveal that the study sample were 97, 75.3% of older adult patients' age were within the age group of 60-69 years with a mean age of 67.4 ±6.3years, 64.9% of them were males. While 39.2% of the study participants were Illiterate, 80.4% were married and 67.0% of them from rural residence. Concerning occupation 56.7% were working, 53.6% of older adults were Ex-smoker, 86.6% of them were living with the family and76.3 % reported that their monthly income was not enough.

Table 2. Shows that 37.1% of the study participants have chronic disease. 58.3% of them have hypertension disease, while 13.9% had renal diseases. Older adults were not admitted to the previous hospital admission in the past 6 months. 60.8% of the study participants had asthma since 6 – 10 years. 16.5% of them reported once attack.

Table 3. Reflect that there was statistical significance improvement in grades of asthma among study participants after the implementation of the modified nursing program compare before the program ($p<0.001$)*.

Figure 1. It was obvious from this figure reveals that 16.5% only of study participants had good knowledge pre-program implementation, while 33.0% had good knowledge post –program implementation. This figure also portraits that there statistically significant improvement in the level of knowledge. ($X^2= 11.996$ and $p =0.002$).

Figure 2. Reveals that 95.9% of participants had an unsatisfactory level of practice pre-program implementation, while 54.6% of them had unsatisfactory level of practice post –program implementation. This figure also portraits that there statistically significant improvement in the level of practice. $\chi 2 = 44.292$ and p =0.002

Table 4. Clarifies that there was highly statistically significant difference between total knowledge score and total practice at p= 0.001 and statistically significant difference between patient's total knowledge and self-care strategies score p value 0.003.

Table 5. Illustrates that there was highly statistically significant improvement in the study participants' asthma control test and medication adherence after the implementation of modified nursing program compared to its level before the implementation of the program ($\chi^2 = 8.993$, P= 0.0001& $\chi^2 = 6.758$, P= 0.0001) respectively.

Fig. 3: Reveals that 27.8% of the study participants had an unsatisfactory level of self-care strategy pre-program implementation, while, 72.2% had a satisfactory level of self-care strategy post –program implementation. This figure also portraits that there statistically significant improvement in the level of self-care strategy. $\chi 2 = 9.58$ and p =0.002

Table 6. Reflects that there were significant positive correlations between MRC dyspnea scale and medication adherence among asthmatic old age at r = 0.303 p = 0.029*

Table 7. Clarifies that diabetes and bed rest were statistically significant negative predictors of asthma control test ß= --2.611, p= 0.015* & ß= -- 2.614, p 0.015* respectively. In addition, this table also shows negative predictors of asthma control test, but not statistically significant, such as hypertension, renal, admission hospital, asthma duration, asthma episodes per week and asthma severity. While pulmonary function test was positive predictors of study participants, which is not statistically significant.

Table1. Distribution of sociodemographic data from asthmatic patients

Characteristics	No	%
Age (years)		
60 – 69	73	75.3
70 – 79	18	18.6
≥80	6	6.2
Mean ±SD67.4 ±6.3		
Sex		
Female	34	35.1
Male	63	64.9
Educational level		
illiterate	38	39.2
Write and read	31	32.0
Preparatory	13	13.4
Secondary	15	15.5
Marital Status		
Married	78	80.4
Widowed	15	15.5
Divorced	4	4.1
Residence		
Urban	32	33.0
Rural	65	67.0
Smoking condition		
Never	39	40.2
Ex-smoker	52	53.6
Smoker	6	6.2
Living condition		
With family	84	86.6
Alone	13	13.4
Monthly income		
Not enough	74	76.3
Enough	23	23.7

Table 2. Distribution of medical history of the asthmatic older adult patients.

Items	No	%
Presence of chronic disease		
Yes	36	37.1
No	61	62.9
If the answer is yes, what is the disease (n = 36) #		
Hypertension	21	58.3
Diabetes	17	47.2
Renal	5	13.9
Arthritis	11	30.6
Bed-rest		
Yes	6	6.2
No	91	.893
Previous hospital admission in the past 6 months		
None	69	71.1
Once	20	20.6
Two and more	8	8.3
The duration of asthma (years)		
<5	19	19.6
6 – 10	59	60.8
11 – 15	15	15.5
>15	4	4.1
Frequency of attack /week		
Once attack	16	16.5
2-3 attack	60	61.9
>3 attack	21	21.6
Pulmonary function test		
> 80%	29	29.9
60 – 80%	64	66.0
< 60%	4	4.1
Asthma severity		
Mild	39	40.2
Moderate	49	50.5
Severe	9	9.3

more than one answer

Table 3. The distribution of the Medical Research Council (MRC) dyspnea grade pre and post program

Grades	Pre		Post		P
	No	%	No	%	
Grade I	2	2.1	5	4.6	< 0.001*
Grade II	34	35.1	43	45	
Grade III	24	24.7	29	29.7	
Grade IV	23	23.7	13	13.5	
Grade V	14	14.4	7	7.2	

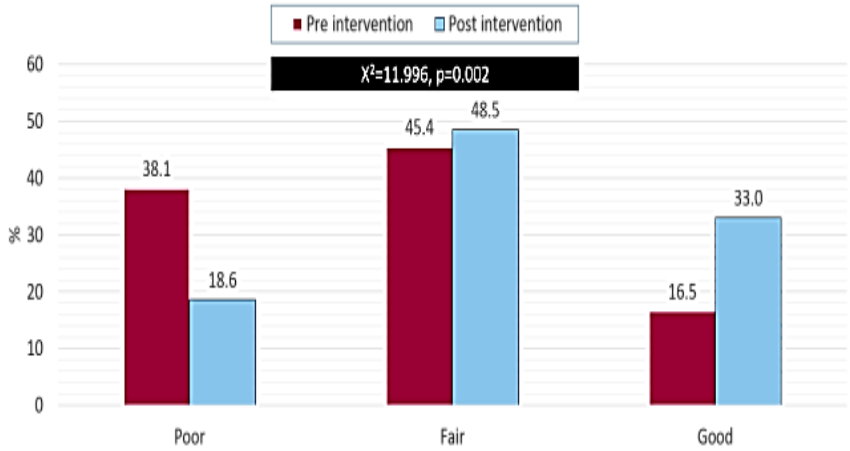

Figure 1. Comparison of knowledge of asthmatic older adult patients pre-and post-intervention

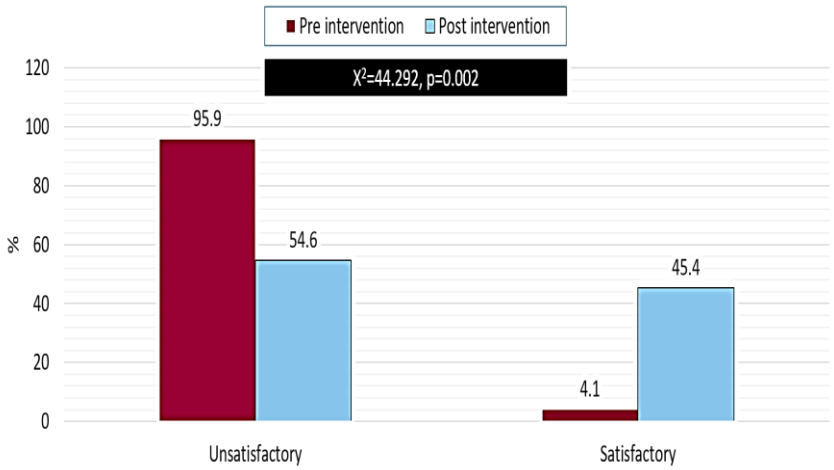

Figure 2. Comparison of practice of asthmatic older adult patients pre- and post-intervention

Table 4. Correlation between patient's total knowledge and practice and self-care strategies score pre and post program Implementation

Items	Pre-intervention		Post-intervention	
	r	p	r	p
The correlation of total knowledge score with total practice	0.288	0.004*	0.375	<0.001*
The correlation of total knowledge score with total self-care strategy	0.312	0.002*	0.303	0.003*

*****Statistically significant at $p \leq 0.05$* r= Pearson correlation

Table 5. Different between Asthma Control Test and Medication Adherence of the asthmatic older adult patients pre and post program.

Items	Pre intervention		Post intervention		Chi-square test	
	N	%	N	%	χ^2	p
Asthma Control Test						
Uncontrolled	82	84.5	28	28.9		
Partially controlled	7	7.2	33	34.0		
Controlled	8	8.2	36	37.1	61.227	<0.001
Total score (mean ±SD)	13.3 ±3.6		18.2 ±3.9		8.993*	<0.001
Medication Adherence						
No adherent	53	54.6	16	16.5		
Adherent	44	45.4	81	83.5	30.793	<0.001
Total score (mean ±SD)	9.0 ±4.4		13.5 ±4.8		6.758*	<0.001

*****Statistically significant at $p \leq 0.05$*

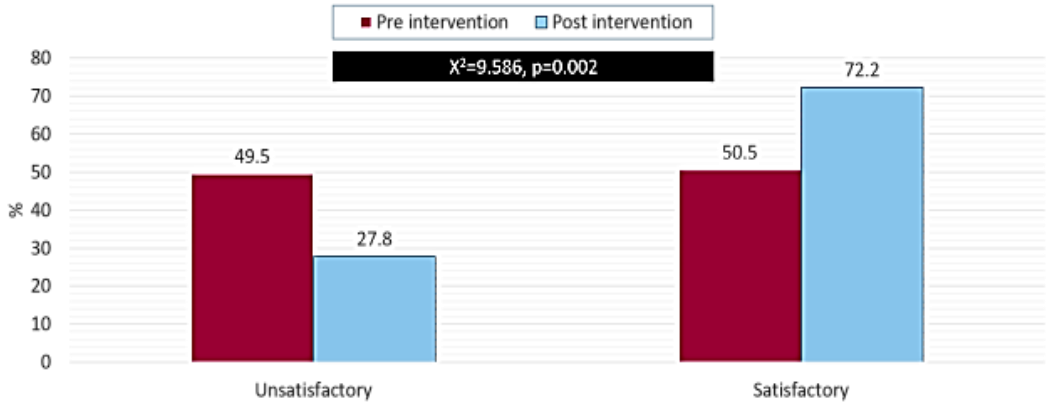

Figure 3. Comparison of self-care of asthmatic older adult patient's pre-and post-program.

Table 6. Correlation between MRC dyspnea scale and medication adherence among asthmatic old age

Items	Medication non adherent		Medication adherent		Test of significance	
	N	%	N	%	r	p
MRC Dyspnea Scale						
Breathless only with strenuous exercise	3	5.7	11	25.0		
Short of breath when hurrying on the level or up a slight hill	11	20.8	12	27.3		
Slower than most people of the same age on a level surface or Have to stop when walking at my own pace on the level	14	26.4	10	22.7		
Stop for breath walking 100 meters or After a walking few minutes at my own pace on the level	2	3.8	0	0.0		
Too breathless to leave the house	23	43.4	11	25.0	0.303	0.029*

***Statistically significant at $p \leq 0.05$ r= Pearson correlation*

Table 7. Regression analysis model for the factors associated with the asthma control test score and medical history pre-and post-intervention

Items	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	15.826	5.287		2.994	0.006
Hypertension	-0.287	1.309	- 0.032	-0.219	0.828
Diabetes	-2.609	0.999	- 0.296	-2.611	0.015#
Renal	-2.700	1.974	- 0.212	-1.368	0.184
Arthritis	1.615	1.035	0.169	1.560	0.131
Admission hospital	-2.186	1.190	- 0.215	-1.836	0.078
Bedrest	4.903	1.875	0.415	2.614	0.015#
Asthma duration	-0.741	1.266	- 0.109	-0.585	0.564
Asthma episodes per week	-1.599	1.237	- 0.194	-1.292	0.208
Asthma Respiratory function	0.033	1.185	0.005	0.028	0.978
Asthma severity	-1.653	1.156	- 0.273	-1.429	0.165

**Statistically significant at $p \leq 0.05$*

Discussion

Aging is considered as one of the factors in worsened asthma control. Asthma in older adult's patient can cause serious health problems if untreated appropriately **(Dunn et al., 2018)**.Comorbidities in older adults are associated with higher mortality, more frequent hospitalizations, poor adherence to therapy, medical costs and a significantly reduced quality of life **(Maricoto et al., 2020)**. So that, the modified nursing program should improve health condition among older patients. Who needs extra consideration to the disease process, diagnostic measures and treatment regimen **(Battaglia et al., 2016)**. Therefore, the current study evaluated the modified nursing program to improve health conditions asthmatics older adult.

The findings of this study revealed that more than half of older adults'

patients were aged between 60 and 69 years old with a mean age of 67.4 ±6.3years, this result may be related to respiratory system undergoes various structural, physiological, and immunological changes with age. Thus, asthma worse and subsequently increases older adult's hospital admission. This finding is in accordance with **Hanania, et al. (2011)** & **Baptist, et al. (2018),** who study title " Asthma in the elderly: current understanding and future research needs- The South Florida National Institute on Aging study found that asthma occurs at an advanced age and often has significant clinical and physiological consequences **(Hanania et al., 2011)** and **(Baptist et al., 2018)**. Also supported with **Abd El Gawad, (2015)**, in study title" Self-Management Educational Program for Improving Asthmatic Older Adults & Behaviors" who study in Benha who, mentioned that physiological changes among elderly in respiratory functions, the decline linked with aging in their immunity, and other common disorders among old adult **(Abd El Gawad, 2015)**.

Regarding gender, the results of this study showed that less than of two thirds of study participants were male. This finding is in accordance with **El-fadl& Sheta, (2019)** who study "Effect of an Educational Program Regarding Self-Care Strategies for Patients with Bronchial Asthma on Their Knowledge and Practice" in Benha, who reported male more than female. This may be to that most male were workers and exposed to asthma triggers **(El-fadl et al., 2019)**. However, this finding is in contrast with **Matalqah, et al. (2018),** who conducted a study on "Factor associated with health-related quality of life among bronchial asthma in Northern Jordan" found that three quarters of the participants were female **(Matalqah et al., 2018)**.

The results of the current study revealed that more than half of the study elderly had ex -smoker, this result disagrees with **El-wahab et al., (2016)** who studied was conducted at Egypt who reported that only approximately one-fifth of the study participants stopped smoking (Ex-smoker). This difference between studies due to the difference in the study age group, young age suffering from anxiety and psychological disorders leads to smoking more old age, while old age stop smoking with advanced age due to comorbidities and fear from incidence complications and death **(El-wahab et al., 2016)**.

Regarding residence, the results of this study exposed that more than two-thirds of study participants were from rural areas; the explanation may be due to the lack of healthcare centers in rural areas. This result is consistent with the "Effect of Therapeutic Guidelines for Bronchial Asthma on the Knowledge, Practice, Compliance and Disease Severity " studied by **Taha and Ali (2011)** in Zagazic and reported that most study subjects were from rural areas **(Taha and Ali, 2011)**.

Concerning the educational level of the study participants, approximately two fifths of them were illiterate. This result might be due to the greater part of elderly were from rural areas with less interest in education, This finding is in agreement with **Mohamed (2013)** who conducted a study on Benha University Hospital about" Quality of life

assessment for patients with bronchial asthma' and reported that nearly half of the participants in the study were illiterate **(Mohammed, 2013)**.

The current study showed that most study participants living with family and monthly income insufficient. This result was matched to a study by **Barakat, (2017)** who conducted a study on "the effect of risk factors on bronchial asthma on elderly health-related quality of life at Assiut university hospital in Egypt" mentioned that majority of the participants were staying with families and the monthly income was not sufficient **(Barakat, 2017)**.

From the researchers' perspective, these findings may be due to low retirement incomes and high living expenses in Egypt, in addition to the absence of other sources of income that affect the quality of life of elderly people and add more financial burden on them.

Concerning to the duration of asthma, this study revealed that less than two-thirds of them have asthma since 6 – 10 years. This may be due to the chronicity of the disease and age of the onset of the disease occurs among young age than old age. This result was matched to a study done with **Marincu al. (2015)**, who conducted a study on "rates and predictors of uncontrolled bronchial asthma in elderly patients" in western Romania mentioned that elderly people were readmitted to hospital complaining of severe patients who have asthma from five to ten years **(Marincu et al., 2015)**. While, this finding disagrees with **Ozturk et al. (2015)**, who conducted a study in The Elderly, Turkey, on the "Association between Asthma Self Management Knowledge and Asthma Control." Who found that the mean duration of asthma in elderly people is 13.7±15.4 years **(Ozturk et al., 2015)**.

Concerning the severity of asthma, approximately two fifths of study participants had mild asthma and only 9.3 had severe persistent asthma. This result agrees with **Ozturk et al. (2015)**, who performed the "Association between asthma self-management knowledge and asthma control in the elderly" and found that 44% of patients had mild, 41% had moderate, and 5% had severe persistent asthma **(Ozturk et al., 2015)**.

The current study results reflect statistical significance improvement in grades of asthma among study participants after implementation of modified nursing program. This finding is in agreement with **Bayomi et al. (2018)**, who study the title "Effect of Nursing Intervention Program on Nurses Knowledge, Practices and Patients Outcomes with Bronchial Asthma" the study was conducted at Chest ICU and the Chest Department at Zagazic University Hospitals, Egypt who reported significant improvements were shown increased asthma severity and dyspnea grades compared with baseline **(Bayomi et al., 2018)**. Also this finding in the line with **Salah et al. (2013)** who conducted a study approximately "Improving breathlessness and fatigue in patients with COPD" who's revealed that near half of the study participants had dyspnea grade three before education, which decreased significantly after education **(Salah et al., 2013)**.

The Research hypothesis (1) answered through these result, which

shows that modified nursing intervention program has positive effect and improve health conditions among asthmatic older adults.

Regarding knowledge of asthmatic older adult patients, the current study portrayed that lower percentage of study participants had good knowledge pre-program implementation. There was a statistically significant progression in the patients' knowledge of the study subjects post the implementation of the program. This result agrees with **Bayoumy, et al. (2015)**, who conducted a study on "the effect on knowledge and perceived control among adult patients with asthma" in Assiut governorate, Egypt who reported that the lower of the participants had good knowledge **(Bayoumy et al., 2015)**. Also, these findings support by **Elbanna, et al. (2017)** who the study title "Effect of bronchial asthma education program on asthma control among adults" performing a study at Mansoura district who stated that most participants had good knowledge scores after the program application with a statistically significant difference in the total score of knowledge pre and post the program **(Elbanna et al., 2017)**.

The finding of this study revealed that most of the study participants had an unsatisfactory level of practice score pre-program implementation, while about three quarters of them had a satisfactory level of self-care strategy post - program implementation. This finding is in agreement with **Ahmed and Kafl, (2017)** who study title" Outcome of Self-Management Training On Quality Of Life And Self-Efficacy In Patients With Bronchial Asthma" the study conducted at Suez-Canal University Hospitals. Who found that there is a statistically significant difference between pre-program and post-program and pre-program and follow up in practice level of the study patients regarding asthma in all items **(Ahmed and Kafl, 2017).**

From the investigators view the improvement of older adult self-care strategy post - program implementation due to effectiveness of modifying nursing program, compliance and planned follow-up asthmatic older adults.

Regarding the correlation between total self-care strategies scores and total knowledge, these results exposed that there is a statistically significant correlation between patients' knowledge and self-care strategies. This result corroborated with **El-Fadl and Sheta, (2019)** who study title "Effect of an Educational Program Regarding Self-Care Strategies for Patients with Bronchial Asthma on Their Knowledge and Practice" the study conducted in Benha who reported that there is a statistical significant relation between patients' total level of knowledge and total self-care strategies **(El-fadl et al., 2019)**.

From the above mentioned results proved the research hypothesis (H2), which revealed a modified nursing program will improve the level of knowledge and practices among asthmatic older adults.

Remarkably, the present study results illustrated that the highly statistically significant improvement in the study participants' asthma control

test and medication adherence after the implementation of the modified nursing program (Table 5). This may be due to the effective training of asthmatic older adult patients and achieving better control of asthma symptoms. Indeed, this result goes in the same line with **Hansen, et al. (2016)** who study title" The Danish National Database for Asth ma:establishing clinical quality indicator s" study in Danish, who reported that the proportion of patients achieving better control of asthma symptoms increased after the implementation of the educational program [27]. Also, this result was matched to a study done with **Ban et al. (2015)** study on "Predictors of asthma control by stepwise treatment in elderly asthmatic patients" in Korea who reported high rates of asthma treatment adherence in the elderly using more precise measures of compliance **(Ban et al., 2015)**.

The current study portrayed that significant positive correlation between MRC dyspnea scale and medication adherence among asthmatic old age. From the view of researcher's medication adherence consider basic element to control disease, and improve health condition of older adults. So that implementation of the modified nursing program increased awareness of older adults and improved medication adherence grade of Medical Research Council (MRC) dyspnea scale.

The current results showed that older adults with patient with diabetes had a negative effect on asthma control test. This finding is matched with **Baek, (2018)** who study title" Association between diabetes and asthma" study in Koria.

Who showed that asthma and diabetes are associated with the risk of asthma complication, emergency room visits, or hospitalizations and patients with asthma with diabetes may be associated with lower lung function among them **(Baek et al., 2018)**. For bed rest and asthma, are the same line with **Knight et al. (2019)** who study title" Effects of bed rest 2-Respiratory system, blood and mental Health" who reported that prolonged periods of bed rest are negative impact on patients' physical function and psychological well-being and decrease respiratory function among them **(Knightet al., 2019)**.

Conclusions

According to the results and research hypothesis, this study concluded that, the study participates, knowledge regarding asthma was improved after the program and there was a statistically significant improvement in the level of knowledge pre and post program implementation, also statistically significant improvement in the level of practice, highly statistically significant improvement in the study participants' asthma control test and medication adherence. Moreover, there was statistically significant improvement in the level of self-care strategy, significant positive correlations between MRC dyspnea scale and medication adherence among asthmatic old age while diabetes and bed rest were statistically significant negative predictors of asthma control test Findings from this study suggests that the modified nursing program was effective in improving the level of

knowledge and practices among asthmatic older adults.

Recommendations

In light of the findings of the current study recommendations are suggested as follows:

1- There is an urgent need to develop modified nursing program for asthmatic older adults that emphases the best care of asthma, with continuing studies to confirm improving knowledge, practice and self-care strategies to enhance asthma outcomes in this age group.

2- Further studies about asthmatic older adult's patients' practice at the chest department should be done on larger numbers of older adults' patients.

3- 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.

References

Aarabi, A., Cheraghi, M. A., & Ghiyasvandian, S. (2015). Modification of nursing education for upgrading nurses' participation: a thematic analysis. *Global journal of health science*, *7*(4), 161.

Abd El GawadAbd El MegeedYossif, H. (2015). Self- Management Educational Program for Improving Asthmatic Older Adults & apos; Behaviors. American Journal of Nursing Science, 4(6), 308. https: // doi. org/ 10. 11648/ j. ajns. 20150406. 13

Ahmed S.A, Kafl R.H, (2017). Outcome of Self-Management Training On Quality Of Life And Self-Efficacy In Patients With Bronchial Asthma, IOSR Journal of Nursing and Health Science, Volume 6, Issue 5, PP 01-11.

Ahmed, S., Steed, L., Harris, K., Taylor, S. J., & Pinnock, H. (2018). Interventions to enhance the adoption of asthma self-management behaviour in the South Asian and African American population: a systematic review. NPJ primary care respiratory medicine, 28(1), 1-20.

Alagamy, A., Hussein, H. A. E., &Hassanin, S. T. (2019). The Effect of Bronchial Asthma Self-Care Management Model on Older Adults' Coping with their Daily Living Activities. 6(1), 396–412.

Alex, K. D., Yavanian, G. J., McFarlane, H. G., Pluto, C. P., Pehek, E. A., Chou-Green, J. M., ... & Tardito, D. (2010). Reliability and validity of a new Medication Adherence Rating Scale (MARS) for the psychoses. International Journal of Psychiatry in Clinical Practice, 14(sup1), 18-40.

Baek, J. Y., Lee, S. E., Han, K., &Koh, E. H. (2018). Association between diabetes and asthma: Evidence from a nationwide Korean study. Annals of Allergy, Asthma & Immunology, 121(6), 699-703.

Ban, G. Y., Ye, Y. M., Lee, Y., Kim, J. E., Nam, Y. H., Lee, S. K., & Premier Researchers Aiming New Era in Asthma and Allergic Diseases (PRANA) Study Group. (2015). Predictors of asthma control by stepwise treatment in elderly asthmatic patients. Journal of Korean medical science, 30(8), 1042-1047.

Baptist, A. P., Hao, W., Karamched, K. R., Kaur, B., Carpenter, L., & Song, P. X. (2018). Distinct asthma phenotypes among older adults with asthma. *The Journal of Allergy and Clinical Immunology: In Practice*, *6*(1), 244-249.

Barakat, N. M. A. E. (2017): Effect of risk factors bronchial asthma on elderly health related quality of life at assiut university hospital, Egypt. International Journal of Advanced Nursing Studies, 6(1),

Battaglia, S., Benfante, A., Spatafora, M., &Scichilone, N. (2016). Asthma in the elderly: a different disease?. Breathe, 12(1), 18-28.

Bayomi R, Taha N, Zatton H and Elshora A., (2018). Effect of Nursing Intervention Program on Nurses Knowledge, Practices and Patients Outcomes with Bronchial Asthma, Journal of Nursing and Care, J Nurs Care 2018, 7:2

Bayoumy, H. M. M., & Osman, S. M. T. (2015): Development and Implementation of an Evidence-based Self-regulation Intervention: Effect on Knowledge and Perceived Control Among Adult Patients with Asthma; International Journal of Nursing & Clinical Practices, 2015.

Chupp, G., Laviolette, M., Cohn, L., McEvoy, C., Bansal, S., Shifren, A., & Kline, J. N. (2017). Long-term outcomes of bronchial thermoplasty in subjects with severe asthma: a comparison of 3-year follow-up results from two prospective multicentre studies. European Respiratory Journal, 50(2).

Duncan, D. L. (2019). Asthma: An overview of management and education. British Journal of School Nursing, 14(8), 377-381.

Dunn, R. M., Busse, P. J., & Wechsler, M. E. (2018). Asthma in the elderly and late-onset adult asthma. Allergy, 73(2), 284-294.

Elbanna, R. M., Sileem, A. E., Bahgat, S. M., &Ibrahem, G. A. (2017). Effect of bronchial asthma education program on asthma control among adults at Mansoura district. Egyptian Journal of Chest Diseases and Tuberculosis, 66(4), 561-569.

El-fadl, N. M. A., &Sheta, H. A. E. (2019). Effect of an Educational Program Regarding Self-Care Strategies for Patients with Bronchial Asthma on Their Knowledge and Practice Nehal Mahmoud Abo El-Fadl , 2 HalaAbd El-Salam Sheta. 8(1), 18–27. https: // doi. org/ 10. 9790/ 1959- 0801071827.

El-wahab, E. W. A., Farag, H. M., & El-nimr, N. A. (2016). Journal of Pulmonary Asthma Triggers and Control among Adults in an Egyptian Setting.1–10.

Freitas Ferreira, E., Pascoal, A., Silva, P., Lourenço, O., Valente, S., Valente, M. J., ... & Taborda-Barata, L. (2020). Inhaler training and asthma knowledge are associated with a higher proportion of patients with correct inhaler technique in young but not in elderly asthmatic patients. Journal of Asthma, 57(5), 556-566.

Goes, M., Lopes, M. J., Oliveira, H., Fonseca, C., &Marôco, J. (2020). A nursing care intervention Model for elderly people to Ascertain General Profiles of Functionality and Self care needs. Scientific Reports, 10(1), 1-11.

Hanania, N. A., King, M. J., Braman, S. S., Saltoun, C., Wise, R. A., Enright, P., ...&Stempel, D. A. (2011). Asthma in the elderly: current understanding and future research needs—a report of a National Institute on Aging (NIA) workshop. Journal of Allergy and Clinical Immunology, 128(3), S4-S24.

Hansen, S., Hoffmann-Petersen, B., Sverrild, A., Bräuner, E. V., Lykkegaard, J., Bodtger, U., ...& Backer, V. (2016). The Danish National Database for Asthma: establishing clinical quality indicators. European Clinical Respiratory Journal, 3(1), 33903.

Harada, N., Harada, S., Ito, J., Atsuta, R., Hori, S., & Takahashi, K. (2020). Mobile Health App for Japanese Adult Patients With Asthma: Clinical Observational Study. Journal of Medical Internet Research, 22(8), e19006.

Herscher, M. L., Wisnivesky, J. P., Busse, P. J., Hanania, N. A., Sheng, **T., Wolf, M. S., &Federman, A. D. (2017).** Characteristics and outcomes of older adults with long-standing versus late-onset asthma. Journal of Asthma, 54(3), 223-229.

Hsu, J., Chen, J., &Mirabelli, M. C. (2018). Asthma morbidity, comorbidities, and modifiable factors among older adults. The Journal of Allergy and Clinical Immunology: In Practice, 6(1), 236-243.

Ibrahim, D.E., Shahin, E. S., &Abdelkadr, H. M. (2019). Effect of an Educational Program Regarding Self-Care Management Behaviors for Patients with Bronchial Asthma. Port Said Scientific Journal of Nursing, 6(2), 1-22.

Khajavikia, H., Valizadeh, L., Zarei, S., Bilan, N., &Taleschian-Tabrizi, N. (2017). The Effect of Education-Modified of Asthma Stimulants on Attitude of the Adolescents with Asthma in Respiratory Specialty Clinics of Tabriz, North West of Iran. International Journal of Pediatrics, 5(2), 4385-4393.

Knight, John, Nigam, Yamni and Jones, Aled (2019). Effects of bed rest 2-Respiratory system, blood and mental Health. Nursing Times 115 (1) , pp. 44-47.

Lee, J. J., Kim, S. H., Lee, M. J., Kim, B. K., Song, W. J., Park, H. W., & Kim, B. S. (2019). Different upper airway microbiome and their functional genes associated with

asthma in young adults and elderly individuals. Allergy, 74(4), 709-719.

Liu Q., Kan X, Wang Y, Liu K., and Zeng D., (2020). Differences in the Clinical Characteristics of Early- and Late-Onset Asthma in Elderly Patients, BioMed Research International. Volume 2020, Article ID 2940296, 7 pages

Maricoto, T., Marques Gomes, J., Correia de Sousa,J., & Taborda Barata, L. (2019). Inhaler Review in Older Adults with Asthma or COPD: A Cost-Effectiveness Study and a Perspective in Portugal. Journal of the American Geriatrics Society, 67(7), 1430-1436.

Maricoto, T., Santos, D., Carvalho, C., Teles, I., Correia-de-Sousa, J., &Taborda-Barata, L. (2020). Assessment of poor inhaler technique in older patients with asthma or copd: A predictive tool for clinical risk and inhaler performance. Drugs & Aging, 37(8), 605-

Marincu, I., Frent, S., Tomescu, M. C., Mihaicuta, S. (2015). Rates and predictors of uncontrolled bronchial asthma in elderly patients from western Romania; Clinical interventions in aging, 10, 963.

Matalqah, L. M., Radaideh, K. M., Khatatbeh, M. M., & Al Omari, O. (2018). Factor associated with health-related quality of life among population in Northern Jordan; Epidemiology, Biostatistics and Public Health, 15(1).

Mohammed, N. (2013). Assessment of quality of life for patient with bronchial asthma at Benha University Hospital. Unpublished Master's thesis, In nursing science, Faculty of Nursing, Benha University, Egypt, 91-93.

Nanda, A., Baptist, A. P., Divekar, R., Parikh, N., Seggev, J. S., Yusin, J. S., &Nyenhuis, S. M. (2020). Asthma in the older adult. Journal of Asthma, 57(3), 241-252.

Narendra, D. K., Cheema, A., &Hanania, N. A. (2019). Novel and Alternative Therapies for Asthma in Older Adults.In Treatment of Asthma in Older Adults (pp. 135-153). Springer, Cham.

Ozturk, A. B., Pur, L. O., Kostek, O., &Keskin, H. (2015). Association between asthma self-management knowledge and asthma control in the elderly. Annals of Allergy, Asthma & Immunology, 114(6), 480-484

Rojano, B., West, E., Ferdermann, E., Markowitz, S., Harrison, D., Crowley, L., &Wisnivesky, J. P. (2019). Allergen sensitization and asthma outcomes among world trade center rescue and recovery workers. International journal of environmental research and public health, 16(5), 737.

Salah M, Hamdi H, Shehta H (2013). Improving breathlessness and fatigue in patient with COPD. J Am Sci 9: 471-482.

Shahin, W., Kennedy, G. A., & Stupans, I. (2020). The Consequences of General Medication Beliefs Measured by the Beliefs about Medicine Questionnaire on Medication Adherence: A Systematic Review. Pharmacy, 8(3), 147.

Tageldin, M., a, Wagih, K., and Maher, O. (2015). Study the pattern of bronchial asthma among outpatients clinic at Sohag and Akhmeem Chest Hospitals, The Egyptian Society of Chest Diseases and Tuberculosis, 64(1): 313–323.

Taha, N and Ali, Z. (2011). Effect of Therapeutic Guidelines for Bronchial Asthma on Adult Patients' Knowledge, Practice, Compliance, and Disease Severity, Life Science Journal, 8(3):199-208.

Yawn, B. P., & Han, M. K. (2017, November). Practical considerations for the diagnosis and management of asthma in older adults.In Mayo Clinic Proceedings (Vol. 92, No. 11, pp. 1697-1705). Elsevier.