

The role of an educational program in improving the quality of life of asthmatic teenager students in Erbil city: a quasi-experimental study

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Abstract

Background and objective: Asthma is a common respiratory disease that affects people all over the globe. WHO estimates that nearly 300 million people around the globe suffer from asthma. In 2025, experts predict there will be 400 million of them, with a yearly mortality rate of 250,000. The aim of this study is to examine the role of an educational program in improving the quality of life of asthmatic teenager students in Erbil city.

Methods: In the school year of 2021-2022, 70 students with asthma aged 12 to 19 years from Erbil city participated in quasi-experimental research. Sydney Asthma Quality of Life Questionnaire (AQLQ-S) and the Juniper Asthma Quality of Life (AQLQ-J) were the study instruments used (after modifications) to assess the asthma quality of life.

Results: The majority (62.9%) of the students were between the ages of 15 and 17 years. More than half of the sample were females, 82.9% were from urban areas, and the majority were in intermediate school. The results revealed that before the educational program was implemented, 31.4 % of the asthmatic students had a low quality of life, while 68.6 percent had a moderate quality of life. Quality of life and asthma control both showed substantial gains from the educational strategy.

Conclusion: An educational intervention implemented in the classroom can significantly improve asthma outcomes, including a decrease in the number and severity of asthma symptoms and an increase in the ability to keep asthma under control.

Keywords: Asthma; Educational program; Quality of life; Quasi experimental study.

Introduction

Asthma is a common respiratory disease that affects people all over the globe. WHO estimates that nearly 300 million people around the globe suffer from asthma. In 2025, it is predicted to reach 400 million, with a yearly mortality rate of 250,000.^(1,2) Teenagers often suffer from asthma, a chronic disease characterized by bouts of abrupt exacerbation, including loss of breath, chest tightness, coughing, and wheezing.^(3,4) It has a major effect on the quality of life and causes substantial mortality among the 6.1 million children affected by it worldwide.⁽⁵⁾ Numerous psychological and physiological variables contribute to the poor quality of life that asthma patients experience. Because of

this, numerous writers have analyzed the effects of these variables and identified the best tools for improving quality of life.⁽⁶⁾ Activity restrictions, disease severity, emotional well-being, social support, ambient triggers, and asthma management are all measured by the Asthma Quality of Life Questionnaire (AQLQ). The Asthma Quality of Life Questionnaire (AQLQ) has been verified and translated into over 40 languages; a teen-specific variant (AQLQ-A) is also available.⁽⁷⁾ The difficulty of putting this theory into practice has prompted a number of studies looking for the most important contributors to QoL in both children and adults. Reduced quality of life was strongly linked to the prevalence of symptoms, particularly chest discomfort

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and difficulty breathing. Physical and emotional capacities and overall health state were the most seriously diminished of the measured categories.⁽⁸⁾

Asthma's negative effects on quality of life aren't limited to the physical realm. The AS-Physical Concerns factor of anxiety sensitivity significantly predicted asthma control and influenced all domains of asthma-related QoL (symptoms, activity limitations, emotional functioning, social, environmental stimuli, and asthma control) in adults after adjusting for gender, age, and number of co-morbid medical problems.⁽⁹⁾

Part of his job includes educating the customer. Patients suffering from chronic conditions need constant monitoring, so the implementation of instructional initiatives is more important than ever.⁽¹⁰⁾ Each of the aforementioned aspects is susceptible to asthma education, as has been shown in numerous global studies evaluating the impact of patient education.⁽¹¹⁾

Patient instruction has thus become an essential part of asthma treatment for people of all ages.⁽¹²⁾ Asthma has become more widespread, patients have gained more tools for self-management, and academics have taken a keener interest in learning theories, all of which have bolstered the effectiveness and significance of educational and behavioral methods to the disease. In all areas of medicine, patient instruction has been a crucial measure for decades. Patient education has two main goals.⁽¹³⁾

To increase patients' understanding of their health and to empower them to take an active part in managing their own treatment.

The purpose of this research was to examine the role of an educational program on asthmatic adolescent students in Erbil, Iraq, ranging in age from 12 to 19 years old; to assess the quality of life of the students; and to determine the impact of asthma on daily life in terms of symptoms, environment, emotions, restricted activities, social status, and asthma control.

Methods

A quasi-experimental study (pre-posttest) was carried out in Erbil city, Iraqi Kurdistan region. The study was carried out from the 1st of November 2021 to the 1st of October 2023.

The study was approved by the research ethics committee of college of medicine of Hawler Medical University and a facilitation letter was obtained from the general directorate of education in Erbil city. Only verbal consent was taken from the students before starting the interview, no written consent was obtained from the parents of students because the study did not contain any intervention.

In a previous study of the authors, 30 intermediate and secondary schools have been chosen randomly out of 100 schools,²² and then 10 schools have been chosen by convenience sampling method, putting into consideration the number of asthmatic students in that school and willingness to participate in the educational program.

The pre-test was conducted from the 1st of January 2022 to the 1st of May 2022. During this period 70 asthmatic students were educated regarding the asthma disease and taught about non-pharmaceuticals management of asthma and the importance of physiotherapy and regular daily exercise in decreasing the number and severity of asthma attack. The Educational program consisted of four lectures as follows: causes of asthma, triggering factors of asthma, management of asthma and importance of physiotherapy.

The second stage (post-test) was conducted from the 1st to the 30th of October 2022, to evaluate the role of educational program in improving the quality of life.

The questionnaire format was originally developed in English language and translated to Kurdish. The Kurdish translation was validated by an independent translator holding bachelor degree in English language through

conducting back translation to English to ensure accuracy.

The study instrument (questionnaire) was developed by the researcher through proper utilization of available relevant literature (Sydney Asthma Quality of Life Questionnaire (AQLQ-S) and the Juniper Asthma Quality of Life (AQLQ-J).¹⁴ The questionnaire consisted of two parts. The first one was the sociodemographic characteristics variables and that consisted of 15 questions such as (age, gender, residency, years of education, father's educational level, mother's educational level, father's occupation, mother's occupation, house ownership, income, car ownership, number of rooms in the house, having a private room, and smoking status). The second part consisted of asthma quality of life main domain. Asthma Quality of life main domains consisted of six domains. There are eight items in the domain 'Symptoms', six items in the domain 'limitations of activity', nine items in the domain 'emotional', three items in 'environmental' also three items in the domain 'asthma control', five items in the domain 'social'.

The items have been rated and scored according to the following pattern: Three-point Likert scale was used for rating the items as always, sometimes, and never. Zero (0) score was given for always, 1 score for sometimes, and 2 scores for never, in all items. The higher the score, the better the QoL. The total number of questions was 34, and the maximum score for each question was 2. Accordingly, the total maximum score of QoL was 68. It was divided into three equal parts, so that the asthmatic QoL was categorized into low, medium, and high.

The statistical package for social sciences (SPSS version 25) was used for data entry and analysis. Categorical variables were presented in the form of frequencies and percentages. McNemar test was used to compare the proportions (of the same sample) before and after the educational program. A *P* value of ≤ 0.05 was

considered as statistically significant.

Results

The largest proportion (62.9%) of students were aged 15-17 years old. More than half of the sample (57.1%) were females, and 82.9% were residing in urban areas. Concerning the educational level, the highest percentage (65.7%) was for intermediate school. Around one third (34.3%) of the teenager father's educational level was intermediate school, and 31.4% of the mother's educational level was also intermediate school. More than half of the fathers (58.6%) work as non-manual workers, while 58.6% of the mothers were housewives. The majority (70.0%) of the students lived in owned houses (by their parents) and 74.3% of the families had a car. Around half of the teenagers (58.6%) did not have a private room, and 64.3% were suffering from smoking inside the home by parents. Regarding monthly income, the highest percentage (68.6%) of the students mentioned that it is sufficient income (Table 1).

Table 1 Distribution of the studied sample according to socio-demographic characteristics

Variables. n=2000	No.	(%)
Age (years)		
12-14	22	(31.4)
15-17	44	(62.9)
18-19	4	(5.7)
Gender		
Male	30	(42.9)
Female	40	(57.1)
Residency		
Urban	58	(82.9)
Rural	12	(17.1)
Stage		
Intermediate	46	(65.7)
Secondary	24	(34.3)
Father's educational level		
Illiterate	12	(17.1)
Read & write, and primary	16	(22.9)
Intermediate	24	(34.3)
Secondary	6	(8.6)
College and above	12	(17.1)
Mother's educational level		
Illiterate	11	(15.7)
Read & write, and primary	15	(21.4)
Intermediate	22	(31.4)
Secondary	14	(20.0)
College and above	8	(11.4)
Father's occupation		
Unemployed	5	(7.1)
Unskilled manual worker	2	(2.9)
Skilled Manual workers	7	(10.0)
Non-manual workers	41	(58.6)
High level occupations	15	(21.4)
Mother occupation		
Housewife	41	(58.6)
Unskilled manual worker	2	(2.9)
Skilled Manual workers	3	(4.3)
Non-manual workers	16	(22.9)
High level occupations	8	(11.4)
House ownership		
Rented and others	17	(24.3)
Partially owned	4	(5.7)
Owned	49	(70.0)
Income		
Not sufficient or marginally sufficient	5	(7.1)
Sufficient for daily needs	48	(68.6)
Exceeds daily needs	17	(24.3)
Car ownership		
No	18	(25.7)
Yes	52	(74.3)
Do you sleep alone in private room?		
No	41	(58.6)
Yes	29	(41.4)
Is there any person smoking inside the house?		
No	25	(35.7)
Yes	45	(64.3)
Total	70	(100.0)

It is evident in Table 2 that there was marked improvement in all items that are related to the quality of life of asthmatic students where it's evident in the table that the students either feel symptoms all the

times or sometimes before the program, but none of them had no symptoms; while after the educational program, none of them had the symptoms all of the time and the majority had no symptoms.

Table 2 Pre and post-test asthma quality of life symptoms domains

Variables n =70	Pre -test quality of life			Post -test quality of life			P-value *
	Never	Some times	Always	Never	Some times	Always	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
1.Do you feel shortness of breath as a result of asthma?	0 (0.0)	51 (72.9)	19 (27.1)	25 (35.7)	45 (64.3)	0 (0.0)	NA
2.Do you feel bothered by cough?	0 (0.0)	29 (41.4)	41 (58.6)	42 (60.0)	28 (40.0)	0 (0.0)	NA
3.Have you experienced a feeling of chest tightness or chest heaviness?	0 (0.0)	36 (51.4)	34 (48.6)	38 (54.3)	32 (45.7)	0 (0.0)	NA
4.Have you difficulty getting a good night's sleep as result of asthma?	0 (0.0)	59 (84.3)	11 (15.7)	48 (68.6)	22 (31.4)	0 (0.0)	NA
5.Have you experienced a wheezy chest?	0 (0.0)	46 (65.7)	24 (34.3)	49 (70.0)	21 (30.0)	0 (0.0)	NA
6. Have been troubled by wheezing attack?	0 (0.0)	39 (55.7)	31 (45.3)	52 (74.3)	18 (25.7)	0 (0.0)	NA
7. Have you been troubled tightness in the chest?	0 (0.0)	53 (75.7)	17 (24.3)	50 (71.4)	20 (28.6)	0 (0.0)	NA
8. Do you have difficulties to fall asleep during the past three months?	0(0.0)	39 (55.7)	31 (44.3)	51 (72.9)	19 (27.3)	0 (0.0)	NA

NA. (not applicable) because both variables haven't identical values of categories, never in pretest 0(0.0) while always in posttest 0(0.0).

Regarding the environment domain, it is evident in Table 3 that the majority of students had problem with environmental variables all the time or sometimes while

after the educational program the majority of them either never had problem or sometimes suffer from problem.

Table 3 Pre and post-test asthma quality of life environment domains

Variables n =70	Pre -test quality of life			Post -test quality of life			P*
	Never	Some times	Always	Never	Some times	Always	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
1.Do you feel bothered by or having to avoid dust in environment?	0 (0.0)	37 (52.9)	33 (47.1)	46 (65.7)	24 (34.3)	0 (0.0)	NA
2.Do you feel bothered by or having to avoid cigarette smoke in environment	0 (0.0)	59 (84.3)	11 (15.7)	46 (65.7)	24 (34.3)	0 (0.0)	NA
3.Do you feel bothered by or having to avoid going outside because of weather or air pollution?	0 (0.0)	42 (60.0)	28 (40.0)	44 (62.9)	26 (37.1)	0 (0.0)	NA

NA. (not applicable) because both variables haven't identical values of categories, never in pretest 0 (0.0) while always in posttest 0(0.0).

Dramatic improvement was observed regarding emotion domain, as presented in the Table 4, where it is evident that the majority of students feel emotional problems all the time or some time but after the educational program none of them had problem all the time, the majority of them either never had problem or have problem some time.

Table 4 Pre and post-test asthma quality of life emotion domains

Variables n =70	Pre -test quality of life			Post -test quality of life			P*
	Never	Some time	Always	Never	Some time	Always	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
1.Do you feel frustrated as a result of asthma?	0 (0.0)	51 (72.9)	19 (27.1)	25 (35.7)	45 (64.3)	0 (0.0)	NA
2.Do you feel afraid of not having asthma medication available?	0 (0.0)	49 (70.0)	21 (30.0)	53 (75.7)	17 (24.3)	0 (0.0)	NA
3.Do you feel concerns about asthma?	0 (0.0)	56 (80.0)	14 (20.0)	50 (71.4)	20(28.6)	0 (0.0)	NA
4.Do you have worries about asthma shorting the life?	0 (0.0)	59 (84.3)	11 (15.7)	48 (68.6)	22 (31.4)	0 (0.0)	NA
5.Having felt depend-ent on asthma sprays?	0 (0.0)	43 (61.4)	27 (38.6)	45 (64.3)	25 (35.7)	0 (0.0)	NA
6.Have been worried about present or future life because of asthma?	0 (0.0)	57 (81.4)	31 (18.6)	84 (68.6)	22 (31.4)	0 (0.0)	NA
7.Do you feel tired or a general lack of energy?	0 (0.0)	50 (71.4)	20 (28.6)	51 (72.9)	19 (27.1)	0 (0.0)	NA
8.Having felt sad or depressed?	0 (0.0)	48 (68.6)	22 (31.4)	53 (75.7)	17 (24.3)	0 (0.0)	NA
9.Having felt anxious, under tension or stressed?	0 (0.0)	47 (67.1)	23 (32.9)	46 (65.7)	42 (34.3)	0 (0.0)	NA

NA. (not applicable) because both variables haven't identical values of categories, never in pretest 0 (0.0) while always in posttest 0(0.0).

It is evident in Table 5 that the majority of students had problems, before the program, with activities variables all the time or some time while after the

educational program the majority of them either never had problems or some time suffer from problems (Table 5).

Table 5 Pre and post-test asthma quality of life limited activates domains

Variables n =70	Pre -test quality of life			Post -test quality of life			P*
	Never	Some times	Always	Never	Some times	Always	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
1.Having limited in doing strenuous activates (such as , hurrying, exercising, running up chairs, sports) as result of asthma?	0 (0.0)	60 (85.7)	10 (14.3)	49 (70.0)	21 (30.0)	0 (0.0)	NA
2.Having limited in doing moderate activates (such as, walking, house working, gardening, shopping, climbing stairs) as result of asthma?	0 (0.0)	49 (70.0)	21 (30.0)	54 (77.1)	16 (22.9)	0 (0.0)	NA
3.Having limited in doing social activities (such as, talking, playing with pets, children, visiting friends or relatives)?	0 (0.0)	60 (85.7)	10 (14.3)	49 (70.0)	21 (30.0)	0 (0.0)	NA
4.Having limited in doing work –relates activities?	0 (0.0)	55 (78.6)	15 (21.4)	53 (75.7)	17 (24.3)	0 (0.0)	NA
5.Having been restricted in walking down the street or level ground or doing light house work because of asthma?	0 (0.0)	57 (81.4)	13 (18.6)	46 (65.7)	24 (34.3)	0 (0.0)	NA
6.Having been restricted in walking up hills or doing heave house work because of asthma?	0 (0.0)	50 (71.4)	20 (28.6)	50 (71.4)	20 (28.6)	0 (0.0)	NA

NA. (not applicable) because both variables haven't identical values of categories, never in pretest 0 (0.0) while always in posttest 0(0.0).

The same can be applied regarding social domain as presented in Table 6 where it's evident that the majority of students feel social problems (before the educational program) all the time or some time but after

the educational program none of them had problems all the time, the majority of them either never had problem or have problem some time (Table 6).

Table 6 Pre and post-test asthma quality of life social domains

Variables n =70	Pre -test quality of life			Post -test quality of life			P*
	Never	Some times	Always	Never	Some times	Always	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
1. Having felt that asthma is preventing one from achieving what one wants in life?	0 (0.0)	57 (81.4)	13 (18.6)	46 (65.7)	24 (34.3)	0 (0.0)	NA
2. Having been limited in going to certain place because they are bad for one's asthma?	0 (0.0)	50 (71.4)	20 (28.6)	50 (71.4)	20 (28.6)	0 (0.0)	NA
3. Having been limited in going to certain place because of having been afraid if getting an asthma attack and not being able to get help?	0 (0.0)	53 (75.7)	17 (24.3)	51 (72.9)	19 (27.1)	0 (0.0)	NA
4. Have felt restricted in the sport, hobbies or other recreation one can engage in because of one's asthma?	0 (0.0)	61 (87.1)	9 (12.9)	52 (74.3)	18 (25.7)	0 (0.0)	NA
5. Having felt asthma is controlled one's self?	0 (0.0)	54 (84.3)	11 (15.7)	51 (72.9)	19 (27.1)	0 (0.0)	NA

NA. (not applicable) because both variables haven't identical values of categories, never in pretest 0 (0.0) while always in posttest 0(0.0).

Regarding to asthma control domain, it's evident in Table 7 that the majority of the students had problems with asthma control variables (before the educational program)

all the time or some time while after the educational program the majority of them either never had problems or some time suffer from problems (Table 7).

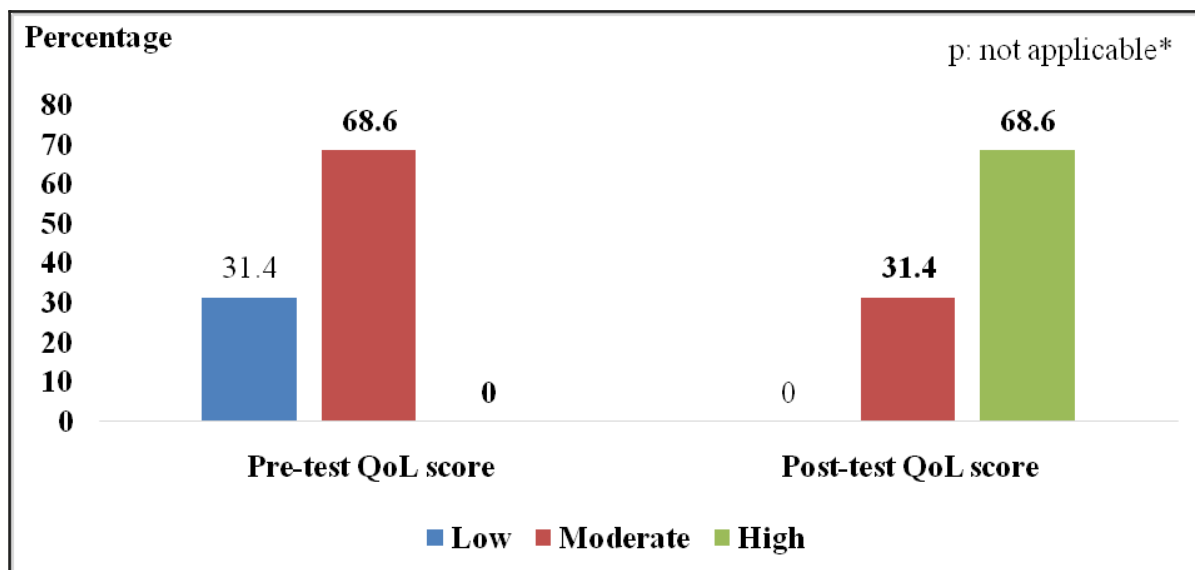
Table 7 Pre and post-test asthma quality of life asthma control domains

Variables n =70	Pre -test quality of life			Post -test quality of life			P*
	Never	Some times	Always	Never	Some times	Always	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
1. In the past 4 weeks, did your asthma keep you from getting as much done at work, school or at home?	0 (0.0)	51 (72.9)	19 (27.1)	51 (72.9)	19 (27.1)	0 (0.0)	NA
2. During the past 4 weeks, did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?	0 (0.0)	57 (81.4)	13 (18.6)	53 (75.7)	17 (24.3)	0 (0.0)	NA
3. During the past 4 weeks, have you used your rescue inhaler or nebulizer medication (such as albuterol)?	0 (0.0)	51 (72.9)	19 (27.1)	51 (72.9)	19 (27.1)	0 (0.0)	NA

NA. (not applicable) because both variables haven't identical values of categories, never in pretest 0 (0.0) while always in posttest 0(0.0).

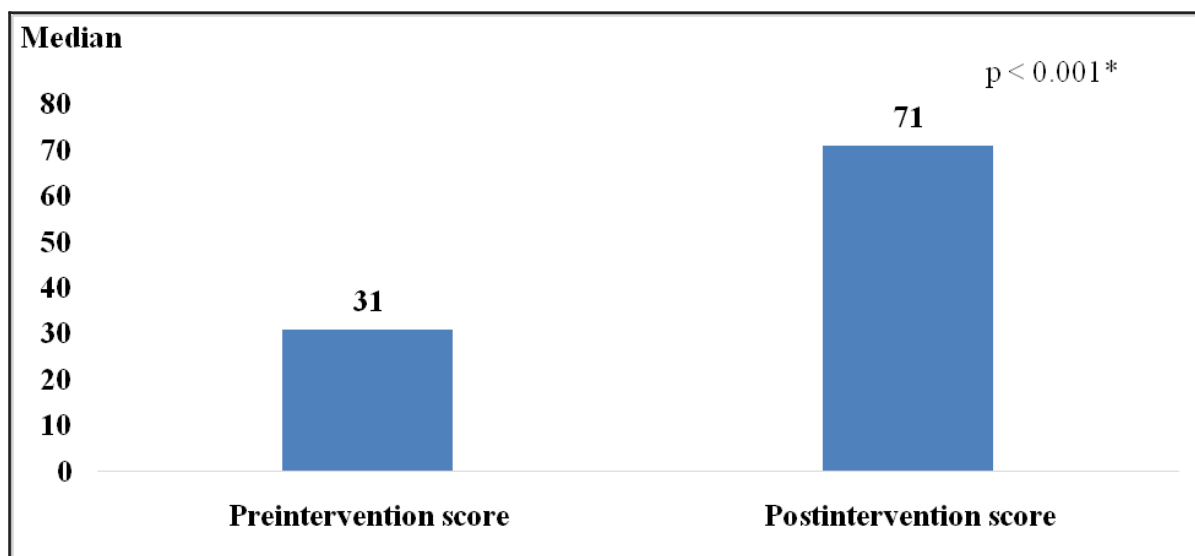
It is evident in Figure 1 that 31.4% of asthmatic students had low level QoL, and 68.6% had moderate level QoL before conducting the educational program. But after the program, none of the students had low level of QoL, 31.4% had moderate level of quality of life and 68.6% of the asthmatic students had high level of QoL. (Figure 1).

It is evident in Figure 2 that the median of asthmatic students had 31% before conducting the educational program. While the median 71% after conducting the educational program and that refer to improved marked in quality of life among asthmatic student.



*McNamara test was used to compare the categories before and after the program. *P* was not applicable because 0% had low scores after the program.

Figure 1 Pre and post-test asthma quality of life main domain categories



*By Wilcoxon Signed ranks test

Figure 2 Pre vs. post-intervention scores

Discussion

Preparation for change highlights the significance of health education and evaluating comprehension of the underlying medical situation.⁽¹⁵⁾ Teenager ability to self-manage their health and enhance treatment efficacy was shown to increase with their knowledge of their medical situation and available therapy options.¹⁶ Triggers, exacerbation symptoms recognition, and the severity of asthma were central topics of instruction.⁽¹⁶⁾ Education about asthma and asthma management plans, along with empowerment, have the potential to enable patients with asthma to take more responsibility for their health by helping them to take more control over their lives and to identify opportunities available to them to support their health in their local communities.⁽¹⁷⁾

After participating in the educational program, patients showed signs of improvement in both their daytime and nighttime symptoms, as demonstrated by our findings. It is consistent with the findings of the studies conducted in Egypt and Brazil, both of which confirmed that patients who received instructional intervention for their asthma experienced symptoms of asthma management showing improvement earlier.⁽¹⁸⁾ Patients' comprehension of essential topics such as medications and how to manage asthma symptoms was significantly enhanced by a short educational intervention.⁽¹⁹⁾

Education about asthma led to an earlier improvement in asthma symptoms. It also seems that educational intervention led to better adherence to medications and an improved level of asthma knowledge among the patients. This is because the patients were educated in advance before the symptoms of asthma were seriously developed and before their pulmonary functions were severely lowered. In addition, the number of nighttime awakenings and nocturnal symptoms decreased substantially after the instructional intervention for asthma.

The asthma educational intervention group showed a trend toward fewer symptoms and greater levels of physical exercise.⁽⁵⁾ There was, over the course of three months after asthma education is reported, an improvement in asthma symptoms, inhaler use, and understanding of physician's instructions.⁽²⁰⁾ Intrinsic asthma triggers can take the form of psychological variables, such as anxiety, tension, or stress, that individuals with asthma experience. Controlling psychological variables may lessen the intensity of a person's symptoms and make it easier to handle their illness, according to the findings of a study.⁽²⁰⁾

Our findings revealed a significant improvement in the emotional domain with respect to feelings of anxiety, tension, or stress. These findings are in agreement with the findings of that research.⁽⁸⁾ Although it is unknown whether relaxation treatment techniques like yoga and hypnosis can help asthma patients, acknowledged that such interventions may help decrease stress, which is a known asthma trigger.⁽¹⁷⁾ In order for patients to be better able to cope with their condition, they need to have a greater awareness of their symptoms as well as the triggers that cause or exacerbate their asthma episodes.⁽¹¹⁾

Significant improvements were observed in activities categories after post-test instructional program in the study group, which aligns with the study conducted by Mishra et al which demonstrates that asthma control improved in the self-management group in terms of fewer days with restricted activity.⁽²⁰⁾ The comparative differences in quality of life QoL between (pre and post-test) in the study group, shows high clear differences in social activities between pre and post-test and that confirmed by study done by Boulet et al, this study also confirms that although assessment of social activities and asthma control and medication use can be improved by the added educational intervention, it is still difficult to address the

widespread problem of smoking and domestic animal exposure.⁽²¹⁾ The research of Rodrigues CD et al confirms that the teenager with asthma who participated in the educational program showed a significant improvement in their ability to keep their asthma under control after it was exposed to the educational program.⁽¹⁸⁾ Also, according to Elbanna et al, who conducted a research based on an individualized asthma education program, they discovered an increase in the effectiveness of the use of relievers for asthma management and a reduction in the number of visits to the emergency room.⁽¹²⁾

Limitations of the study:

This study faces some limitations and difficulties during its process:

1. Refusal of some students (20 students) in some schools especially male schools to make the interview with the researcher because they didn't have enough time and they didn't want to participate in the study.
2. Difficulty in making educational program because the asthmatic students' study in different schools and some families refuse to let their children to participate in the educational program.

Conclusion

An educational intervention applied at the school can result in significant improvements in asthma outcomes and reduction in number and severity of asthma symptoms. The level of knowledge about asthma was also improved after the educational program.

Competing interests

The author declares that he has no competing interests.

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