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Original Research Article

Effect of an Educational Intervention Program on Improving Self Care Practices of Asthmatic Children

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Abstract: ***Background:*** Asthma is the most common chronic disease of childhood, it is a chronic inflammatory disorder of the airways characterized by recurrent reversible airway obstruction leads to airway hyper reactivity, which causes the airways to narrow. The present study aimed to evaluate the effect of an educational intervention program on improving self-care practices of asthmatic children. A quasi experimental study was utilized. The study was conducted at pediatric Emergency Department and pediatric Outpatient Clinic at Suez Canal University Hospitals. The study subject included purposive sample of school aged children (40) with their accompanying mothers. Two tools were used; A structured interview questionnaire sheet, and observational checklists to assess children's knowledge and self-care practices regarding bronchial asthma. ***Results*:** Regarding knowledge and self-care practices of the studied children about bronchial asthma, the results showed that all children had unsatisfied knowledge and self-care practices pre-test that improved at post and follow up intervention phase where most of them had either satisfied level or partial satisfied level. The study concluded that implementation of the educational intervention program improved knowledge of the studied children about bronchial asthma, enhanced self-care practices, reduced frequency of asthmatic attack and reduced school absence days. The study recommended continuous educational intervention program based on actual need assessment for improving self-care practices of asthmatic children.

Keywords: Bronchial asthma - Educational intervention program- self-care practices.

INTRODUCTION

Asthma, the commonest long-term condition among children that causes repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing due to inflammation of the airway causing hyperresponsivness, mucosal edema, and mucus production (Ramdzan *et al*., 2021).

Asthma affected an estimated 262 million people in 2019 and caused 461000 deaths and the primary cause of school absences, and the third leading cause of hospitalization in children younger than 15 years old (WHO, 2021).

The underlying causes of childhood asthma aren't fully understood. A combination of complex and incompletely understood environmental and genetic interactions, these factors influence both its severity and its responsiveness to treatment. It is believed that the recent increased rates of asthma are due to changing epigenetics (heritable factors other than those related to the DNA sequence) and a changing living environment (Zubair *et al*., 2018).

There's no cure for asthma in children, the main goals of asthma management are to optimize control of asthma symptoms and reduce the risk of asthma exacerbations, while minimizing medication adverse effects. There are two main types of asthma medications; Quick-relief medications; help with sudden symptoms and taken for fast help during an asthma attack. In addition to long acting medication to prevent airway inflammation and keep asthma under control (Hansa, 2021).

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A child with well-controlled asthma should be able to participate in work, school, play, and sports without limitation due to breathing. The four essential components of asthma management are; pediatric patient education, control of asthma triggers, monitoring for changes in symptoms or lung function, and pharmacologic therapy (Hockenberry *et al*., 2018).

Orem's self-care model is one of the most comprehensive self-care theories that provide a good clinical guide for planning and implementing the principles of good self-care. According to Orem, the nurse's role has been introduced as a facilitator and agent of change (Borji *et al*., 2017).

Education is the cornerstone for asthma management and has recommended by national and international guidelines. Self-care educational programs for asthmatic children improve and maintain quality of life, so that children with asthma can live normal lives without obstacles in carrying out daily activities (Agustiyaningsih *et al*., 2023).

Significance of the study:

According to Mohammed *et al*., (2020), the morbidity and mortality rates of asthma in childhood demonstrate an alarming increase in the prevalence of asthma and its complication. Moreover, bronchial asthma has become a leading reason for pediatric hospital admissions as the prevalence of asthma among school age children is 12.5%. Many studies on self-management for asthmatic children had significant impact on controlling their disease, so this study was conducted to evaluate the effect of an educational intervention program on improving self-care practices of asthmatic children.

The aim of the study:

Evaluate the effect of an educational intervention program on improving self-care practices of asthmatic children.

Objectives:

1. Assess children's knowledge regarding bronchial asthma.
2. Identify children self-care practices regarding bronchial asthma.
3. Construct and implement an educational intervention program based on actual need assessment of children related to bronchial asthma.
4. Evaluate the effect of an educational intervention program on improving self-care practices of asthmatic children.

SUBJECT AND METHODS

Study design: A quasi experimental design (pre, post and follow up).

The sample of the study:

A purposive sample of school aged children (40) with their accompanying mothers or caregiver who were selected from the previously mentioned settings within 6 months' period under the following.

Inclusion Criteria; Asthmatic children from both genders, their age ranged from 6-12 years, with confirmed diagnosis of bronchial asthma.

Exclusion criteria: Children with cystic fibrosis and other chest diseases, and free from other physical or mental diseases.

Study setting: The study was conducted at Pediatric Emergency Department and Pediatric Outpatient Clinic in Suez Canal University Hospitals.

Tools of data collection:

Tool I: A structured interview questionnaire sheet

It was developed by the researchers, based on scientific literature and included three parts:

***Part one*:** Concerned with characteristics of the studied children (it included: age, gender, child ranking, school level and history and duration of illness), their mother's characteristic (level of education, occupation), housing condition (residence, type of floor.

Part two: Child's knowledge related to bronchial asthma.

Scoring system

The scoring system was developed by the researchers each correct answer was scored 1 point and zero for uncorrected one. The total score of child's knowledge was classified as follows: Satisfactory ≥ 50% and Unsatisfactory < 50%.

***Part three*:** Reported self-care practices questionnaire to assess children reported self-care practices.

Scoring System

The scoring system was developed by the researchers, Independent reported self-care practices was scored two points, partial independent reported self-care practices was scored one point and dependent reported self-care practices was scored zero point.

Tool (II): Observational checklists

Observational checklists were adopted from GINA, (2016) and Abdel – Naeem *et al*., (2014), to evaluate children' actual self-care skills by direct observation individually regarding inhaler and nebulization procedure.

Scoring system

The scoring system was developed by the researchers each correct step that done completely took

two points, done incompletely took one point and zero for not done or done incorrectly

Children's self-care skills classified as; satisfactory self-care skills more than 65 %, partial satisfactory self-care skills 50-65 % and unsatisfactory self-care skills < 50 %.

Validity of the study tools*:*

The study tools were tested for its face and content validity, comprehensiveness and applicability. Also, determine whether the included items were comprehensive, understandable, applicable, clear and suitable to achieve the aim of the study by 5 expertise from the Pediatric Nursing and Medicine Departments at Suez Canal University.

Reliability of the study tools*:*

It was done using Cronbach's alpha coefficient test to assess the internal consistency of the tools and its value was (0.86) for knowledge items (structured interview questionnaire), (0.91) for self -care practices items (observational checklists).

Pilot study

A pilot study was carried out after the development of the study tools before starting the data collection, including 10% of the sample size (4 children). It was carried out to check the validity, clarity and applicability of the study tools. Based on the results of the pilot study, the necessary modification was done namely, ambiguous items were omitted, other items were added and others were modified and the final form was developed according to the subject's responses. The pilot study subjects were excluded from the study sample.

Fieldwork:

Data collection was conducted through four phases (assessment, planning, implementation and evaluation phases).

A. Assessment Phase: -

Pre-test tools were given to the studied children through the interview and the Researchers was ready to reply to any explanations from the studied children. During pre -test phase, the researchers gave rest periods when observed that children had difficulty in concentration for a period of time. The researchers used tool I and II for pre -test.

B. **Planning phase:**

Based on the actual need assessment of the studied children, the researchers designed the educational intervention program through reviewing relevant literature and based on recent evidence based guidelines for bronchial asthma in children.

The educational intervention program was developed by the researchers; detected needs, requirements, deficiencies were translated to aim and objectives. Moreover, teaching materials were prepared (e.g. real object, PowerPoint presentation, booklet that helped in covering theoretical and practical information.

The educational intervention program was covered the theoretical and practical skills related bronchial asthma in children. Booklet was designed by the researchers and it was written in simple Arabic language and supplemented by photos and illustrations to help studied children understand the content.

C. Implementation phase

The educational intervention program of this study was implemented through seven sessions (five theoretical &two practical). The teaching session started from 9 am to 12 pm for 4 days/week (Saturday, Monday, Wednesday and Thursday.

Children interviewed individually for practical session and in groups 3-5 children for theoretical session according to their availability. The length of each session differed according to the content and children's responses and ranged 30-45 minutes.

D-Evaluation of program:

Children's knowledge, reported and actual self-care practices were evaluated twice. Immediately post educational intervention program (post- test) using same pre-test and after 3months later, the children of the studied sample reassessed for their knowledge and self-care practices (follow up).

Ethical Considerations

All ethical issues by Scientific Research Ethical Committee at Faculty of Nursing in Suez Canal University were taken into consideration during all phases of the study; the researchers maintained an anonymity and confidentiality of the subjects. The inclusion of children in the study was voluntary. The aim of the study was explained to all mothers with their children before participation and obtained their informed consent and assent from studied children.

The children were notified that they could withdraw at any stage of the research; also, they assured that the information obtained during the study would be confidential and used for the research purpose only.

Statistical design:

The collected data was coded, organized, tabulated and analyzed using Statistical Package for the Social Sciences (SPSS version 20). The suitable statistical tests were used according to the type of data. Chi Square test (X2) was used for categorical data. Correlations were used to test relationships between different variables. P value was set at <0.05 for significant results.

The following statistical techniques were used:

- Percentage
- Mean score degree ($\bar{x}$)
- Standard deviation (SD)
- Paired t test
- Proportion probability of error (P- value)

RESULTS

Table (1) illustrates that more than half of the studied children (62.5%) were males, most of them (85.0%) aged 6 - <9 years and 55.0% of them were the first child. Majority of them (90.0%) at primary school level.

Table (2) shows that bronchial asthma was diagnosed among 90% of studied children at age less than 4 years. Great majority of them (97.5%) suffered of asthma since ≥3 years. Frequency of occurrence of asthma attack was every two weeks among 65% of them, while 60% of the studied children asthma attack occurs mainly at winter. Most of them (85.0%) admitted at hospital before and were absent from school due to asthma attack.

Table (3) shows that family members ranged from 5-6 among 72.5% of children's families and 55% of the studied children had family history for bronchial asthma; fathers, mothers and grandparents had bronchial asthma among 27.5%, 12.5 and 15% of the studied children respectively

Table (4) shows studied children's total knowledge level about bronchial asthma through three phases of educational intervention program, it demonstrates that all of the studied children had un satisfactory level pre intervention phase compared with 95% of them had satisfactory level post educational intervention program. But the studied children's total knowledge level declined at follow up phase as only more than half (60%) of them had satisfactory level. These improvements were statistically significant difference (p <.001).

Table (5) shows that total reported self-care practices level of studied children about bronchial asthma pre, post and follow up phases of educational intervention program, it clarifies that great majority of the studied children (95%) and 70% of them had satisfactory total level of reported self-care practices at post and follow up intervention phase respectively compared with all studied children had unsatisfactory reported self-care practices level about bronchial asthma pre intervention phase. These improvements were statistically significant difference (p <.05).

Fig (1) illustrates that there was a statistically significant difference between the studied children's total actual self-care skills regarding usage of inhalation treatment for bronchial asthma pre, post and follow up educational intervention program ((p< 0.001)) where all studied children had unsatisfactory total actual self-care skills level pre intervention phase ($\bar{x}$± SD, 5.25±3.32). compared with 92.5% and 37.5% of them had satisfactory total actual self-care skills post and follow up educational intervention program respectively. In addition to 7.5 % and 37.5% of them had partial satisfied total actual self-care skills level post and follow up educational intervention program respectively.

Table (6) shows that there was a statistically significant difference regarding frequency of the studied children's hospitalization and school absenteeism due to asthma attack (p<0.001) where all studied children's admitted hospital due to asthma attack pre- intervention phase. Compared with 70.0%, 62.5 % of them post and follow up educational intervention program respectively. As same as children's school absenteeism due to asthma attack the same table shows that all studied children were absent from school pre intervention phase. Compared with 77.5%, 70% of them post and follow up intervention phase respectively due to frequency of asthma attack.

Table (7) shows that there was positive correlation between total children's knowledge score and their total actual self-care practice post and follow up educational intervention program (r= 0.228 and 0.273 respectively) with a statistically significant at follow up phase (p= 0.044).

Table 1: Distribution of the studied children according to their characteristics, (n=40)

Children's characteristics	No.	%
Gender		
Male	25	**62.5**
Female	15	37.5
Age (in years):		
6 - <9	34	**85.0**
9 - ≤12	6	15.0
$\bar{x}$ ± SD	7.55±1.56	
Child Ranking:		
First	22	**55.0**
Second	14	35.0
Third	4	10.0

Children' school level		
Primary	36	**90.0**
Preparatory	4	10.0

Table 2: Distribution of the studied children according to history of their bronchial asthma, (n=40)

Variables	**No.**	**%**
Child's age when symptoms of asthma appear in years		
<4	36	**90**
≥4	4	10
Duration of the child's asthma in years		
<3	1	2.5
≥3	39	**97.5**
Frequency of occurrence of asthma attack		
Two weeks	26	**65.0**
One month	12	30.0
Once at two months	2	5.0
Timing of asthma attack occurs		
At night	6	15.0
Any time	34	85.0
Seasons of asthma attack occurs		
Winter	24	**60.0**
Winter and spring	16	40.0
Previous hospitalization for child due to asthma attack		
Yes	**34**	**85.0**
No	6	15.0
Number of previous hospitalization (n= 34)		
Once	**23**	57.5
Twice	**8**	20.0
Thrice	**3**	7.5

Table 3: Distribution of the studied children according to their family history of bronchial asthma, (n=40)

Variables	**No.**	**%**
Family members		
3-4	9	22.5
5-6	29	**72.5**
> 6	2	5.0
Family history of bronchial asthma:		
Yes	22	**55.0**
No	18	45.0
Family member's affected:		
Father	11	27.5
Mother	5	12.5
Grand parents	6	15.0

Table 4: Distribution of the studied children's total knowledge level about bronchial asthma pre, post and follow up phases of educational intervention program, (n= 40)

Children's total knowledge	**Time**						**Freidman Test (*P*- value)**	**P1**	**P2**	**P3**
	pre		**post**		**Follow up**					
	No.	**%**	**No.**	**%**	**No**	**%**				
Un satisfactory	40	**100.0**	2	5	16	40	75.79 (<.001)	<.001	<.001	<.001
Satisfactory	0	0.0	38	**95**	24	**60**				
x̄ ± SD	20±5.97		67.23±9.83		54.63±5.14					
Range	13-30		50-91		43-62					

For pairwise comparisons, P1 before and after intervention; P2 before and follow up intervention; P3 after and at follow up phase, and P value is significant <.05

Table 5: Distribution of the studied children's total reported self-care practices level about bronchial asthma pre, post and follow up phases of educational intervention program, (n= 40)

Children's total reported self-care practices	Time						Freidman Test (P- value)	P1	P2	P3
	Pre		post		Follow up					
	No.	%	No.	%	No	%				
Un satisfactory	40	100.0	2	5	5	30	75.79 (<.001)	<.001	<.001	.008
Satisfactory	0	0.0	38	**95**	35	**70**				
x̄± SD	8.76±2.19		**30.92±3.22**		**26.84±2.58**					
Range	6-15		26-40		19-35					

For pairwise comparisons, P1 before and after intervention; P2 before and follow up intervention; P3 after and at follow up phase, and P value is significant <.05

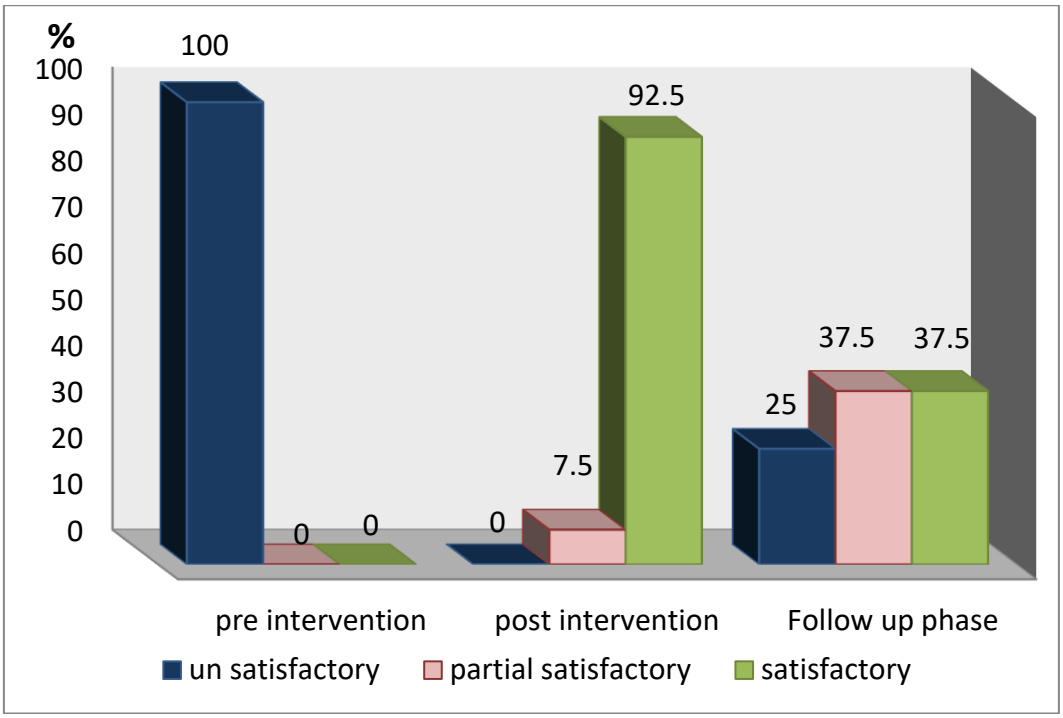

Figure (1) Percentage distribution of the studied total mean score of the studied children's actual self- care skills in using inhalation treatment for bronchial asthma pre, post and follow up phases of educational intervention program (n = 40)

Table 6: Distribution of the studied children's hospitalization and school absenteeism due to bronchial asthma attack pre, post and follow up phases of educational intervention program, (n = 40)

Variables	Time						^^p-value
	pre		Post		follow up phase		
	No.	%	No.	%	No.	%	
Frequency of child's admission to hospital due to asthma attack	40	100	28	**70.0**	25	**62.5**	<0.001
Frequency of child's school absenteeism due to asthma attack	40	100	31	**77.5**	28	**70**	<0.001

^^Cochran Test (pre & post p <0.001) (post &follow up p>0.05)

Table 7: Correlation between total knowledge score of studied children and their total actual self-care skills related to asthma, (n= 40)

Children's total self-care skills regarding asthma	Time of intervention	Total knowledge score	
		(r)	P
	Post	0.228	0.079

	Follow up	0.273	0.044

(r) Correlation coefficient, significant at P value<.05 (one-tailed test)

DISCUSSION

Childhood asthma is a common and potentially life-threatening condition and a leading cause of child admission to acute care and emergency services. Despite several decades of advancement in the control and management of asthma, it remains a common worldwide health and socio-economic problem (Al-Atawi, 2017)

Concerning the characteristics of the studied children, the present study revealed that the majority of studied children aged 6 - <9 years, and more than half of them were males. These findings agree with a study done by Fouda *et al.*, (2015) which entitled ‘‘Effect of Family Empowerment on the Quality of Life of School-Aged Children with Asthma Attending Pediatric Outpatient Clinics of Tanta University and El-Mehalla El- Koubra Chest Hospital’’ where the $\bar{x} \pm$ SD of the age of the children was 8.91 ± 2.52 and more than half of them were males. This is explained by Fuseini and Newcomb (2017), who mentioned that males have an increased allergic inflammation and serum IgE level compared to females. Males also have dysanapsis, smaller airway diameters relative to lung volumes compared to females, making males more likely to have asthma symptoms than females.

These findings are incongruent with those of El-Morshedy (2014), who carried out a study entitled “Quality of Life for Children Suffering from Bronchial Asthma” and found that, more than one third of the studied children aged less than five years and more than half of them were females. These results might be due to the differences in the study setting and subjects.

The present study finding showed that most of studied children begun asthma symptom at age less than 4 years, this nearly similar to Hassan and Hagrass (2017), who found in their study about "Prevalence of Bronchial Asthma in Primary School Children" that approximately 70.2% of children with asthma begun symptoms before 2years age.

Moreover, the present study revealed that duration of illness for great majority of the studied asthmatic children was more than three years. This matching with Kocaaslan and Akgün Kostak, (2019). Who found in their study about ‘‘Effect of Disease Management Education on the Quality of Life and Self-Efficacy Levels of Children with Asthma” that mean duration since disease diagnosis was 4.46 ± 2.38 years.

Current study findings illustrated that more than half of studied children had frequency of asthma attack every two weeks, this was incontrary with Sommanus *et al*., (2022), who studied "Effects of an Asthma Education Camp Program on Quality of Life and Asthma Control among Thai Children with Asthma: A Quasi-Experimental Study” and found that Most studied children had moderate persistent asthma followed by mild persistent asthma. Theses might be due to differences in sample size.

In relation to the family history of asthma, the current study illustrated that slightly more than half of the studied children have a familial positive history of asthma from father and grandparents. This result was similar to Fouda *et al*., (2015) and Boshra *et al.*, (2019), who conducted study on " Prevalence of Bronchial Asthma in primary School Students in Assiut " and found that there was a significant association between the presence of bronchial asthma and positive family history of asthmatic children (P value = 0.001).

Regarding the studied children’s total knowledge level about bronchial asthma. The results showed that all the studied children had unsatisfactory level of knowledge pre intervention phase and these were reversed to satisfactory level of knowledge at post and follow up intervention phase among the highest percentage of the studied children with statistically significant difference between pre, post and follow up phases (P < 0.001). These findings supported by Eissa *et al*., (2020), who studied “ Outcome of An Educational Program on Bronchial Asthma Self-Management” and reported that there was a significant difference between pre and post program (P < 0.001) as knowledge of the studied sample increased from 27.8% to 77.3 %.

Regarding total reported self-care practices of studied children about bronchial asthma, the current study reported that great majority of the studied children had satisfactory total level of reported self-care practices at post intervention phase compared with more than two thirds of them at follow up phase with statistically significant difference pre, post and follow up intervention phases. These findings supported by Kocaaslan and Akgün Kostak (2019), Who stated that there were statistically significant differences between children’s ability to independently use asthma medications and daily activities pre and post the educational intervention program.

Based on this results, it can be assured that providing educational program to children with asthma from beginning of diagnosis is important for improving self-care practices.

Considering children’s self-care skills in using inhaler treatment the present study revealed that the majority of studied children had satisfactory level post intervention phase. This improvement declined at

follow up phase. This result agreed with Eissa *et al*., (2020), who reported that there were highly significant changes in inhaler usage ($p < 0.001$)pre and post educational program as the ratio of proper use of the inhaler increased after the training from (41.2%) to (82.5%). This reflected a positive effect on improvement of the children's skills post-program compared to pre-program intervention.

Moreover, the present study findings showed that all children needed to go to the hospital when asthma attack occurs and were absent from school pre educational intervention program. This in the same line with Hassan and Hagrass (2017), who reported that 96.4% of the studied children need emergency room visit and 66.7% of hospital admission. Also, this result in an agreement of Boshra *et al.*, (2019), who reported that most of studied children admitted to hospital more than 3 times and there was no significant association between severity of asthma and number of times of hospital admission due to asthmatic attacks.

These results were improved post intervention and follow up phase where only less than three quarters and less than two thirds of studied children need hospital admission due to asthma attack respectively. This was matching with Ozlem Kackin and Kahraman (2020), in study titled " A Study on Decreasing Asthma Attacks and Hospitalization: Discharge Training and Home Monitoring By Nurses" that discharge training increased awareness and asthma knowledge and lead to decreased the number of asthma attack and the frequency of restricted life activities.

From the researchers's point of view this might be related to the positive effect of educational intervention program on the studied children' knowledge and self-care practices as improving the level of children' knowledge can influence a child's ability to handle an asthma attack.

Finally, the present study revealed that there was a positive correlation between children's total knowledge score and their total self-care practices regarding bronchial asthma post and follow up intervention program.

These results matched with Abo El Fadl and Sheta, (2019), who stated in study about " Effect of an Educational Program Regarding Self-Care Strategies for Patients with Bronchial Asthma on Their Knowledge and Practice" that there is high statistical significant correlation between patients' knowledge and self -care practices.

Furthermore, these results were interpreted in the light of the fact that self -care practices correlates linearly with knowledge and increasing knowledge helps children improve their self-care practices.

CONCLUSION

In the light of the study finding, it can be concluded that, the research hypothesis is accepted and the implementation of the educational intervention program improved knowledge and self-care practices of the studied children about bronchial asthma, enhance self-care practices, reduced frequency of asthmatic attack and reduced school absence day.

RECOMMENDATIONS

- Periodical assessment of asthmatic children's self- care practices.
- Developing educational intervention program for improving self-care practices of asthmatic children.
- Manual handout about asthma must be disseminated at asthmatic children clinic
- Further researches are required involving larger study sample of children suffering from bronchial asthma in order to generalize the results.

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