

Effect of an Educational Training Program on Quality of Nursing Care Provided to Children having Asthma

Sheren Mohammed Ibrahim Metwally⁽¹⁾, Amal Mohamed El-Dakhkhny⁽²⁾,
Osama Taha Amer⁽³⁾ & Samah El- Awady Bassam⁽⁴⁾

⁽¹⁾ Msc, In Pediatric Nursing, ⁽²⁾ Professor of Pediatric Nursing, Faculty of Nursing ,Zagazig University, ⁽³⁾ Professor of Pediatric, Faculty of Medicine Zagazig University ⁽⁴⁾ Assist professor of Pediatric Nursing, Faculty of Nursing, Zagazig University

Abstract

Background: Asthma is a common condition that leads to coughing, wheezing, tightness of the chest and breathlessness in about 1 in 10 children. Low quality of care can cause permanent damage to the airways for this reason. **Aim of the study:** The aim of the study was to identify the effect of an educational training program on quality of nursing care provided to children having asthma. **Subjects and methods: Research design:** A quasi-experimental design was used in the study. **Setting:** The study was conducted at outpatient Pediatric chest clinic and pediatric inpatient chest unit at Zagazig University Hospital, outpatient chest clinic at Chest Hospital and pediatrics unit at El-Ahrar Hospital. **Subjects:** A convenient sample of 50 nurses who provided direct care to children having asthma. Two tools were developed. **Tools of data collection:** a Tool one was structured interview questionnaire sheet and tool two was an observational checklist. An educational training program was developed to educate the studied nurses about care provided to children having asthma. **Results:** indicated that the studied nurses' practice had been improved significantly after implementation (high quality of care was 92% posttest Vs 2% pretest) of the educational training program. **Conclusion:** it was concluded that the educational health program improved the quality of care that was provided to children having bronchial asthma. **Recommendations:** It was recommended that nurses should attend formal training programs that use the same methods of teaching for the management of children having bronchial asthma

Key words: Bronchial asthma, quality of nursing care, educational training program

Introduction

Bronchial asthma is the most prevalent chronic disease of childhood. Asthma constituting a serious public health problem all over the world, despite many changes in therapy of bronchial asthma, there is an increase in the number of hospitalization and asthma related death. The incidence and severity of asthma are increasing. This might be related to increased urbanization, increased air pollution, poor access to medical care, and/or under treatment⁽¹⁾.

Asthma, which occurs in adult and pediatric patients, is a chronic inflammatory disorder of the airways characterized by an obstruction of airflow. Asthma is the most common long-lasting (chronic) disease of childhood. It usually develops before age of five. Many children who have allergies get asthma⁽²⁾, but not all and not every child with asthma have allergies. Among children and adolescents aged 5-17 years, asthma accounts for a loss of 10 million school days annually and costs caretakers \$726.1 million per year because of work absence^(3 & 4).

Also in Egypt, the bronchial asthma is a significant health problem among school children, and the prevalence was 7.7% (5). Moreover (6), it was reported that approximately 500,000 annual hospitalizations (34.6% in individuals aged 18 y or younger) are due to asthma.

Common risk factors for asthma symptoms include exposure to allergens (such as those from house dust mites, animals with fur, cockroaches, pollens, and molds), occupational irritants, tobacco smoke, respiratory (viral) infections, exercise, strong emotional expressions, chemical irritants, and drugs (such as aspirin and beta blockers)⁽⁷⁾

Symptoms of an asthma attack include wheeze (noisy breathing when breathing out), a dry cough (often at night, early morning and during exercise of play), chest tightness and shortness of breath⁽⁸⁾. Pharmacologic therapy is used to prevent and control asthma symptoms, reduce the frequency and severity of

asthma exacerbations, as well as reverse airway obstruction. Stepwise approach to pharmacologic therapy is recommended, with the type and amount of medication dictated by the severity of asthma, for example, children with mild intermittent asthma usually require medication only when they have an acute exacerbation. Children with persistent asthma (mild, moderate, and severe) may require daily long-term medication in addition to medication to treat acute exacerbations⁽⁹⁾.

The central focus of care for a child of any age experiencing asthma symptoms is airway assessment and management. Pediatric nurse must be confident in assisting a child who is experiencing wheezing, coughing, and asthma symptoms. Rapid assessment of the child's clinical status including, respiratory rate, severity of symptoms, need for transport to a higher level of care, and signs of hypoxemia and hypoxia is the priority⁽¹⁰⁾.

To provide a high quality of care, health care providers must play an important role in imparting the knowledge of asthma and the correct usage of inhaler technique. Nurses being one of the important members of healthcare team and are available in all tiers of health facilities and communities, play a significant role in providing care and education to affected children. Nurses' knowledge about asthma and its management could positively affect the treatment outcome⁽¹¹⁾.

Significance of the study:

Bronchial asthma is a chronic condition that need long term care, nurses who are involved with children in home, clinic, or practitioner's office, play an important role in helping children and their families; learn; to live with the condition so, the nurse must provide parents with a written plan about the care provided to their children to ensure the properness of this care to help the parents follow the program successfully, allow them feel comfortable with caring for their children and to enhance children's health and increase their survival rate.

The aim of the study was:

To identify the effect of an educational training program on quality of care provided to children having asthma.

Research hypothesis:

Nurses who receive an educational training program will provide higher quality of care to having asthma on posttest than pretest

Subjects and Methods:

Research design:

A quasi – experimental design was used.

Study Setting:

The study was conducted at the following settings:

1. Inpatient chest unit of Pediatric hospital at Zagazig University Hospitals (25 nurses).
2. Pediatric outpatient chest clinic at Zagazig University Hospitals (2 nurses).
3. Outpatient clinic at Chest Hospital (10 nurses)
4. Pediatric unit at El-Ahrar Hospital (13 nurses)

Study Subjects:

The study was conducted on 50 nurses working in the previous setting.

They have fulfilled the following criteria:

- Provide direct care to children having asthma.

Tools of data collection:

Tool I: A structured Interview Sheet

A structured interview sheet was developed by the researcher to collect data about personal characteristics of the studied nurses such as age, sex, years of experience, training course and qualification

Tool II: Observational checklist

An observational checklist was developed by the researcher to evaluate nurses' care provided to asthmatic children each correct step took one point.

Scoring system

Total score of practice was 74 marks distributed as follows:

Nursing Role in Child admission (10 marks)

Nursing Role in Provided Medication

Nebulizer therapy (12 marks)

PMDI with spacer (14 marks)

Dry powder inhaler (Diskus) (8 marks)

Oxygen therapy (9 marks)

Nursing Role in Measuring Vital Signs

Body temperature (axillary) (9 marks)

Pulse (radial pulse) (4 marks)

Respiratory rate (8 marks)

Scoring system

The total score of nurses' practice was classified as follows:

Poor (< 50.0%)

Fair (50.0 -< 75.0%)

Good (≥ 75.0%)

Validity and reliability:

The structured interview sheet and observational checklist were developed after a thorough review of the related literature and then reviewed by 5 experts (two professors of pediatric nursing, two professors of pediatrics medicine and one assistant professor of community health nursing).

Reliability for the tools:

Calculating Cronbach's alpha and test re-test to measure reliability of the tools, using SPSS version 16.0, conducting on a pilot study (10.0% of the study sample). The results are the following:

Tools	Cronbach's alpha	(test re-test)- r P
Nurses' knowledge about bronchial asthma	0.736	r = 0.692, P 0.001
Practical observational tool	0.887	r = 0.7169, P 0.001

Field work:

After identifying the nurses who fulfilled the criteria of the study, they were requested to participate in the study. The purpose of the study was explained briefly to nurses who were willing to participate. They were interviewed by the researcher at the end of each shift at their available time (after providing nursing activities of

the unit) from 3 pm and 7 pm. The researcher was available 4 days weekly. This study was carried out in 6 months during the period from March to August 2017.

Educational training program Development

Educational training program was developed to educate nurses about care provided to children having asthma.

General objective of the program:

The educational training program aimed to improve nurses' performance to provide satisfactory care for asthmatic children.

Specific objectives of the program:

At the end of this educational training program, nurses would be able to;

- 1- Perform the steps of child admission and nebulizer therapy.
- 2- Perform the steps of pressurized metered-dose inhalers (PMDI) with spacer, dry powder inhaler (Diskus) and oxygen therapy
- 3- Perform the steps of vital signs measurement.

Phases of the educational program: It contained four phases.

Assessment Phase:

The educational training program was partially constructed for the assessment of nurses' practices related to assessment of quality of care provided to children having asthma. The assessment was performed before the implementation of educational program by interviewing each nurse individually to assess their practices (pre-test) by using tool I & tool II.

Planning Phase:

Based on the results obtained from the interview sheet and observational checklist (from pilot study and assessment phase) as well as reviewing the related literature, the educational training program was developed by the researcher. The contents of the educational health program were selected on the basis of identified needs.

Teaching methods were selected to suite teaching in small groups in the form of lectures, group discussion, demonstration and re-demonstration.

Teaching materials were prepared such as colored posters and handouts that covered theoretical and practical information.

Implementation Phase:

The educational training program of this study was implemented through three sessions in which nurses were divided into small groups to facilitate the learning process. The length of each session differed according to the content and nurses' responses. It ranged 30 – 45 minutes.

First about child admission and nebulizer therapy **Second** session was about pressurized metered-dose inhalers PMDI with spacer, dry powder inhaler (Diskus) and oxygen therapy. **Third** session contained vital signs. Each session started with a summary of the previous sessions and objectives of the new one taking into consideration the use of the Arabic language and some English terms that suits the level of nurses' education. Motivation and reinforcement during each session were used in order to enhance nurses' learning.

Evaluation Phase:

- In this phase, every nurse in the studied sample was interviewed individually immediately after implementation of the educational health program to assess their practices (post-test).
- After 3 months, nurses were reassessed for their practices (follow-up) using tool II.

Pilot study:

A pilot study was conducted on 10% about (5 nurses) to evaluate the content of the tools, their clarity as well as to estimate the time needed for filling the sheets during data collection.

Ethical consideration and administrative design:

An official permission was obtained using proper channels of communications prior to pilot study. The agreement for participation of subjects was taken after the explanation of the aim of the study. They were given opportunity to refuse to participate, they were notified that they could withdraw at any stage of the research; also they were assured that

information would be confidential and used for research purpose only.

Statistical analysis:

Collected data were coded, computed and statistically analyzed using SPSS (statistical package of social sciences), version 16. Data were presented as frequency and percentages (qualitative variables) and mean \pm SD (quantitative continuous variables). Chi square (χ^2) was used for comparison of categorical variables, and was replaced by Mont Carlo Exact test if the expected value of any cell was less than 5. Student's t test was used for comparison of continuous quantitative variables (two groups) and one way ANOVA (F test) was used for comparison of continuous quantitative variables (more than two groups). Correlation between two quantitative continuous variables was done by using Pearson's correlation. The difference was considered significant at $P < 0.05$.

Results:

Table 1: illustrated the personal characteristics of studied nurses. It was found that 58% of the studied nurses ranged between 20 to 30 years, with mean age 30.04 ± 5.60 years. Regarding years of experience, 36% of studied nurses had less than 5 years of experience, while 32% had more than 10 years of experience in chest unit.

As regards to education, it was found that 48% of the studied nurses had diploma, while 10% had a bachelor of nursing. Regarding attending training courses, the results revealed that 90% didn't have any training courses related to bronchial asthma compared to 10% who attended training course.

Table (2). clarifies total score of nursing role during child admission, It was found that average score before program was 4.60 ± 2.21 which increased to 9.18 ± 1.27 after program and slightly decreased to 8.24 ± 1.10 during follow-up phase. There was a statistical significant difference between the three phases of the program ($P=0.000$)

Table (3) Showed nursing role provided to children during administration of medication (e.g. nebulizer, PMDI with spacer, dry powder inhaler (Diskus) and oxygen therapy). It was found that average score before program was 11.82 ± 6.20 it increased to 38.26 ± 2.92 after program

and slightly decreased to 33.72 ± 4.91 during follow up phase. There was a highly statistical significant difference between the three phases of the program ($P=0.000$)

Table (4) showed the total average score of nursing role in taking vital signs (body temperature (axillary), radial pulse and respiratory rate). It was found that average score on pretest was 7.42 ± 3.56 , increased to 18.42 ± 3.70 after program and slightly decreased to 16.64 ± 2.88 during follow up phase. There was a statistical significant difference between the three phases of the program, ($P=0.000$).

Impact of educational training program on nurses' total practice score was portrayed in **table (5)**. It was revealed that only 2.0% of the studied nurses had good practice score on pretest This percentage increased to 92.0% after implementation of the educational program, and decreased to 80%, during the follow-up phase. The difference was highly statistically significant ($P=0.000$).

Table (6) represents correlation between total practice score throughout the three phases. It was found that there was a strong positive highly statistically significant correlation ($r=0.914$, $P0.000$) between the total practice scores posttest and during the follow-up phase.

Discussion:

Asthma is a chronic respiratory disorder affecting all age groups. Although the revolutionary changes are noticed in the medical and technological advancements, the prevalence of asthma is still on rise worldwide. The most common reasons are non-adherence to treatments and follow-ups, in addition to poor knowledge and skills in disease management. Uncontrolled asthma and ineffective management remain a public health challenge in the developing countries Jumbe Marsden et al⁽¹²⁾.

Asthma is the most common chronic childhood illness and one of the leading reasons for children's' admissions to the hospital. The disease is manageable, and severe exacerbations were preventable. Yet, it remained an enormous burden on the health care system. United States Environmental Protection Agency. Indoor Environmental Division 2009⁽¹³⁾.

Regarding to nurses' practices related to caring for children having asthma, there was a significant improvement of nurses' practice on posttest and follow-up test. The findings suggest that nurses could be interested in learning more; about caring of children having asthma. This result was in the same line with Ashery⁽¹⁴⁾. In a study done about "Effect of Implementing Bronchial Asthma Guidelines on Nurses Performance at Mansoura University" who found that there was a statistically significant difference in pre/post and pre/follow up of the program

Bayomi et al⁽¹⁵⁾ mentioned that there was a significant improvement of nurses' practices throughout program phases. These findings go in line with the result of the present study which illustrated that the majority of studied nurses had poor performance regarding caring of children having asthma before implementation of the educational program while the majority of them had good performance post program. This poor practice may be attributed to lack of facilities, guidance, reinforcement and inadequate training educational programs about bronchial asthma.

Concerning nursing role after child admission to hospital, the present study indicated that, the studied nurses had poor practice score regarding their role after child's admission to hospital and there was a significant improvement of nurses' practices regarding child's admission to hospital throughout the three phases with total average mean score 4.60 ± 2.21 before program, increased to 9.18 ± 1.27 post program. This might be due to the success of the program, which may be attributed to the fact that the procedure was practiced under the supervision and guidance of the researcher.

Findings of the present study contradicted with Perry et al.⁽¹⁶⁾ few nurses took child's health history on pretest; this was attributed to their lack of training in this concern.

The current study found that there was a statistical significant improvement in quality of care provided to children having asthma after implementation of program this may be related to the effect of training and reinforcement.

This finding disagreed with Abdel-Aziz and Ibrahim⁽¹⁷⁾ who mentioned in a study about "Knowledge and Performance of Critical Care Nurses toward Nebulizer Therapy in the Intensive Care Unit at Assuit University Hospital" that more than four fifths of nurses had performance about nebulizer therapy at unsatisfactory level.

The current study showed that educational program improved the level of nursing practices up to 12.24 ± 1.20 post program. This result might be due to the program effect on the improvement of the nurses' practices. However, this study goes in line with Ranaut et al⁽¹⁸⁾ in a study about "Effect of Intervention on the use of Metered Dose Inhaler with spacer (PMDIs) amongst the Children Suffering with Asthma and their Caregivers" who found that medical treatment and care provided to asthmatic patients may not help them much until the right techniques of using inhaler were followed. Many studies showed that providing written materials might help patients to recall information.

This finding was supported by Roopavathy et al⁽¹⁹⁾ who conducted a study about "Impact of an Educational Intervention on Asthma Knowledge and Metered-Dose Inhaler Technique among Nursing Students of Government college of Nursing, Bengaluru". Also, it was found that. PMDIs demonstration was very poor (pre intervention), which improved drastically post intervention. The knowledge of asthma and metered-dose inhaler technique improved significantly after the educational intervention. So, regular training program and workshops must be conducted to improve the nurses, competencies in PMDIs usage.

Sadry et al⁽²⁰⁾ In a study about "Is Nurse's knowledge of DISKUS Inhaler (Dry powder inhaler) Use Sufficient to Provide Accurate Patient Education?", found that nearly most of nurses failed in completing a questionnaire, which was related to general information about dry powder inhaler. After the training, the majority of nurses passed the questionnaire about DPI (Diskus). This result showed that although, the training time was short, but it was effective. This study was consistent with the result of the present study which revealed that there was a statistical significant difference between interventions and had poor

practice regarding using dry powder inhaler (Diskus) with total average score before program 0.54 ± 1.67 and improved to 7.38 ± 0.94 after training program. The result of the present study might be due to the effect of the program on nurses' practice regarding utilization of dry powder inhaler technique.

Similarly, Fink and Rubin⁽²¹⁾ who conducted a study about "Problems with inhaler use: A call for Improved Clinician and Patient Education", it had been estimated that more than two thirds of patients do not use their PMDIs or DPI well enough to benefit from the prescribed medication. This correlates with reports that two thirds of nurses, doctors, and respiratory therapists were unable to adequately describe or perform critical steps of inhaler use. This poor practice might be attributed to lack of facilities, guidance, and reinforcement from the head nurse and inadequate training educational programs about dry powder inhaler procedure.

Concerning oxygen therapy the present study clarified that improvement in nurses' practices after implementation of nursing interventions. This might be due to success of program, which might be attributed to the fact that procedures were practiced under the supervision and guidance of the researcher.

This result was in agreement with a study carried out at Benha University by Taha⁽²²⁾ about "Emergency Nursing Care for Critically ill Patients: Impact of A designed teaching protocol on Nurses performance and Practice in Intensive care units(ICU)". It was found that nurses' performance of administering oxygen improved significantly post program than pre-program.

Also Ahmed et al⁽²³⁾ found that more than two thirds of nurses know how to give oxygen to asthmatic children, and this result was not in the same line with the present study in which the majority of nurses had poor score regarding providing oxygen therapy before program.

Moreover, Eastwood⁽²⁴⁾ reported in a study about "Oxygen Therapy Management for Patients at Risk of Respiratory Dysfunction" that oxygen therapy was one of the major interventions

that were used to manage respiratory dysfunction.

Cook and Montgomery ⁽²⁵⁾, who stated that the monitoring and measuring of vital signs and clinical assessment were core essential skills for all health care practitioners working with infants, children and young people. This was not in a harmony with the present study which showed that there were poor practices on pretest which improved post intervention. This result might be due to the effect of intervention.

Regarding respiratory rate in children, Hatfield ⁽²⁶⁾ mentioned that the pediatric nurse had a crucial role in

CONCLUSION

In the light of the current study findings, it might be concluded that the educational training program to nurses' had a profound effect on improving their practice about bronchial asthma and its care as there was a statistical significant difference throughout the three phases of the study.

Based upon the finding of the present study, the following recommendations can be deduced:

- 1- Nurses should attend formal training program about bronchial asthma by a qualified and competent practitioner

maintaining normal respiratory function which must be continuously be monitored. Moreover, listening to lung sounds should be done to monitor the respiratory function. This result was in disagreement with the present study in which the majority of nurses had poor practice level regarding measuring respiratory rate before program.

Regarding correlation between total practice score during pre/post and follow up, there was a strong positive significant correlation between total practice score post intervention and total practice score during follow up phases

- 2- Adequate Head nurse for supervision, guidance, and regular feedback to nurses about their performance should be provided.
- 3- Evidence based guidelines on bronchial asthma should be available in hospitals for all nurses to follow.
- 4- Learning resources about bronchial asthma among children as library books, periodical journal and internet should be available for nurses at chest unit.

Table (1) personal characteristics of the studied nurses (N=50)

Characters	Items	No	%
Age /Years	20-	29	58.0
	30-	16	32.0
	40-45	5	10.0
Range	21.0 – 45.0 years	Mean ± SD	30.04 ± 5.60 years
Years of experience	< 5 years	18	36.0
	5– 10 years	16	32.0
	>10 years	16	32.0
Social status	Married & had children	39	78.0
	Married & hadn't children	3	6.0
	Single	8	16.0
Education	A bachelor of nursing	5	10.0
	Nursing institute	21	42.0
	Diploma	24	48.0
Training course	Yes	5	10.0
	No	45	90.0
When training	Before joining work	2	40.0
	During	3	60.0
Is it useful?	Yes	5	100.0
	No	0	00.0

Table (2): Total Average Score of Nursing Role in Admission of asthmatic children

Practice	Pre	Post	Follow up	Significance test
Nursing role in child admission	4.60 ± 2.21	9.18 ± 1.27	8.24 ± 1.10	t3=7.282 , P0.000*
	Paired t test	t1=14.448, P0.000*	t2=11.361, P0.000*	
P<0.05 (significant)				

Table (3): Total Average Score of Nursing Role in Provided Medication

Practice	Pre	Post	Follow up	Significance test
Nebulizer therapy	5.52±2.45	10.64±1.52	9.48±1.20	
PMDI with Spacer	1.52±3.32	12.24±1.20	10.76±2.15	
Dry Powder Inhaler (Diskus)	0.54±1.67	7.38±0.94	6.54±1.30	
Oxygen Therapy	4.24±1.53	8.00±1.28	6.94±1.61	
Total score in medication given	11.82 ± 6.20	38.26 ± 2.92	33.72 ± 4.91	
Paired t test		t1=25.955, P0.000*	t2=19.101, P0.000*	t3=10.757, P0.000*

* P<0.05 (significant)

Table, (4): Total Average Score of Nursing Role in Measuring Vital Signs

Practice	Pre	Post	Follow up	Significance test
Measuring Body Temperature (axillary)	4.88±1.69	8.04±1.96	7.22±1.80	
Measuring Pulse (radial pulse)	0.76 ±1.22	3.86 ±0.71	3.58 ±0.90	
Measuring Respiratory Rate	1.78±2.08	6.70±1.30	5.84±1.25	
Total score in measuring vital signs	7.42 ± 3.56	18.42 ± 3.70	16.64 ± 2.88	
Paired t test		t1=18.049, P0.000*	t2=15.503, P0.000*	t3=6.349, P0.000*

* P<0.05 (significant)

Table, (5): Total Nurses' Practice Score about Bronchial Asthma

Practice level	Groups					
	Pre		Post		Follow up	
	No	%	No	%	No	%
Poor Practice (<50.0%)	46	92.0	0	0.0	0	0.0
Fair practice (50.0-<75.0%)	3	6.0	4	8.0	10	20.0
Good practice (\geq 75.0%)	1	2.0	46	92.0	40	80.0
Significance test			$X^2 = 86.010, P 0.000^*$			

* **P<0.05 (significant)****Table, (6):** Correlation between Total Practical Scores throughout Study Phases.

Items	Total practical score post program	Total practical score during follow up
Total practical score before program	$r = + 0.223, P 0.113$	$r = 0.140, P 0.332$
Total practical score post program		$r = 0.914, P 0.000^*$

* **P<0.05 (significant)**

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