Nursing interventions for School Age Children with Bronchial Asthma in a Rural Area

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Abstract

Background: Bronchial asthma is one of the most common chronic diseases among children and adolescents. In recent decades, the prevalence of asthma and morbidity are increasing. It is a common cause of school absenteeism and limitation of activity in children. **Aim**: the study aimed to evaluate nursing interventions for school age children with bronchial asthma in a rural area. **Subject and Methods**: The study was conducted at primary school in rural area in Saft El- Laban El Giza governorate. **Sample**: Multi stage random sample technique (**76**) asthmatic children were selected. **Tools**: (1) child health record (2) self administer questionnaire (3) observation checklists. **Results**: as predisposing factors**,** majority (more than four third) of them had of previous problem related to respiratory system**,** more than half of study sample exposed to father smoking**,** 96.1% of asthmatic children had oil painted on their walls more than half of them had animals inside their home and majority (more than four third) had suffered from mosquitoes inside the house more than three third of school class had Poor ventilation and four third of class had blackboard and Study sample had improved total knowledge of asthma near one third, more than three third, about four third pre, post, and follow up respectively. **Conclusion**: there were improved the knowledge and practices of asthmatic children after nursing intervention program. **Recommendations:** the study recommended establish plan for periodical health educational program for asthmatic school children and their mothers to be conducted in inpatient, emergency department and outpatient clinics.

Keywords: Bronchial asthma, school children, Nursing intervention.

Introduction

Bronchial asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation **(GINA, 2016).**

Asthma is a highly prevalent disease involving a complex interplay of environmental factors, airflow obstruction, bronchial hyper-responsiveness, and inflammation. The dominant feature that leads to clinical symptoms is smooth muscle contraction and inflammation, which results in narrowing of the airway and obstruction. Numerous triggers can induce broncho-constriction, such as allergic responses, respiratory infections, exercise, irritants, and non-steroidal anti-inflammatory drugs **(Tayel et al., 2017).**

Children spend many hours each week in school buildings. Their short- and long term health outcomes and ability to learn are affected by numerous environmental factors related to the school buildings, school grounds. The school transportation system and used of various

products and materials in and around the school. Many school buildings are old, and they even newer buildings can contain multiple environmental health hazards **(Paulsson& Barmett, 2010)**.

According to *Guide to Community Preventive Services, (2011),* Asthma management strategies include adequate patient education, smoking cessation, consistent use of preventive medication, and control of environmental factors that affect asthma (home-based, multi-trigger multi-component interventions). These strategies have been shown to be effective in improving the health of individuals affected by asthma and are integral to reducing the impact of asthma.

Community health nursing focuses on promoting and maintaining the health of individuals, families, and groups in a community setting. Community health nursing is a synthesis of nursing and public health. It is population focused and involves collaboration with other disciplines to assess, plan, and implement care that emphasizes personal responsibility for health and self-care by community members *(Hockenberry & Wilson, 2013).*

Significance of the study

Asthma constitutes 13% from Egypt population, and affects 8% of Egyptian children. Environmental asthma triggers commonly found in school bulging are cockroackes and other pests, molds result from excess moisture in building and dander from animals in the classroom. Second hand smoke and dust mites are other known environmental asthma triggers found in the school **(Taylor & Liavaneras, 2008, Hemeda, 2013).**

Aim of the study

The aim of this study is to evaluate nursing interventions for school age children with bronchial asthma in a rural area through:-

1) Assessing children knowledge and practice about bronchial asthma as a disease to detect their needs

2)Assessing the school environment factors prevailing the asthma.

3) Designing and implementing nursing interventions to meet asthmatic school children needs.

4) Evaluating the effect of nursing interventions on asthmatic school children knowledge and practice.

Research Hypothesis

Nursing interventions affect the school age children with bronchial asthma knowledge and practice.

Subjects and methods:

Research Design and setting: A quasi experimental research design was used in this study; this study was conducted at primary school in rural area in Saft El-Laban El Giza governorate (government and Azhar) Primary school in rural area Saft El- Laban 4 government school composed of 187 classes with average 17592 children, and 2 Azhar school which contain 27 classes with average 1598 children. Multi stage random sample technique of (76) asthmatic children was selected based on the inclusion criteria of age 11-12 (6th grade) regardless their gender and confirmed diagnosis of bronchial asthma for at least 6 month. The

study started in October 2015 to December 2015.

Tool used for data collection:

1) Child health record**:** This child's follow up record was used to determine child's diagnosis as bronchial asthma severity of attacks. This tool was applied to all school age children who attended the health insurance clinic who fulfilled criteria of selection. This tool comprised child's name, sex, diagnosis, symptoms duration of current episode of asthma of asthma**.**

2)Self administer questionnaire: it was diagnosed review and experts to assess children knowledge about bronchial asthma and how to care for themselves to decrease the recurrence of asthma attacks through

A- Questionnaire related to sociodemographic data of school age children and their parents. It is composed of closed-ended questions (e.g. name, age, sex, rank order, study grade, mother and father education… etc.). Family size of children was classified according to **Wigalet et al (2011**), into large (five children), mild (three to four) and small families (one to two children).

B- Questionnaire to assess medical history of asthmatic school age children and family history, smoking in the family house, history of previous problems relater to respiratory system, …etc.

C- Questionnaire to assess the effect of bronchial asthma on scholastic achievement of asthmatic school age children through child attendance,

activities in the class, school children achievement and previous grade failure.

D- Questionnaire prepared to assess the safety house of the child with bronchial asthma. The child filled it through asking questions. It comprises the following parts: Characteristic of the house: these comprised 8 closed-end questions covering room number, source of water, electricity, ventilation, sewerage, sunlight at the home, cooking facilities, place of cooking.

E- Questionnaire related to assess school age children knowledge and practice about bronchial asthma, it composed the following parts: Questionnaire related to child knowledge assessment, Questionnaire related to child practice assessment and source of their information related to management of asthma attack of school age children.

3 Observation checklists were developed and tested by the researcher for school environment, child actual practices related to using inhaler and breathing exercise techniques.

Field work:

Before starting the work an official permission for data collection and implementation of the educational nursing intervention in Saft Elban schools was obtained from the schools directors, by submission of formal letter from the director of the Faculty of Nursing, Ain Shams University**,** Describing the aim of the research. Two days in the week, the total number of session was 6 sessions at school clinic (40 minutes for sessions) of the educational program.

Results

Table (1): Distribution of school age children with bronchial asthma according to personal characteristics (n=76).

Items	N	%
Age:		
11	22	28.9
12	54	71.1
Sex:		
Boy.	51	**67.1**
Girl**.**	25	32.9
Study grade:		
6th grade.	76	100
Rank order:		
First.	6	7.9
Second.	9	11. 8
Third.	13	17.1
Fourth.	31	**40.8**
Fifth.	17	22.4
Family size:		
Small family (1-2 children).	15	19.7
Moderate family (3-4 children).	44	**57.9**
Large family (5 or more children).	17	22.4

Table (1) indicated that 67.1% of the studied children were boys. 40.8% of the study sample was ranked fourth order in their families. Regarding family size, 57.9% had moderate families.

Table (2): Distribution of school age children with bronchial asthma according to their medical history (n=76).

Items	N	%
Family history related to BA.	29	**38.2**
Consanguinity among parents.	22	**32. 9**
*History of previous problems related to respiratory system:		
Flu.	70	**92.1**
Sinusitis.	61	**80.3**
Pharyngitis.	11	14.5
Pneumonia.	12	15.8
*Respiratory symptoms:		
Blocked nose and coughing.	47	**61.8**
Wheezing.	34	**44.7**
Dyspnea.	30	39.4
Running nose.	16	21.1
Hyperventilation.	9	11.8
Duration of illness:		
>1 year	76	100
Severity of attack:		
Mild.	29	38.2
Moderate.	44	**57.9**
Severe.	3	3.9
*Smokers in the family house:		
Father.	41	**53.9**
Brother.	12	15.8
Other relative.	16	21.1
No one.	11	14.5
*Seasonal variation and BA attacks:		
Winter.	70	**92.1**
Spring.	41	**53.9**
Autumn.	16	21.1
Summer.	11	14.5
Symptoms worsening:		
Outdoor.	51	**67.1**
Indoor.	25	32.9
*Precipitating factors:		
Respiratory infections.	67	**88.2**
Foods.	45	**59.2**
Emotions.	39	51.3
Exercise.	25	32. 9
Odors.	5	6.6
Dusts.	2	2.6
*Patient's medications:		
Anti-allergic.	40	52.7
Bronchodilators.	32	42.1
Oxygen.	28	36.8
Expectants.	22	28.9
Inhalers.	76	**100**
Corticosteroid.	11	14.5

* Not mutually exclusive.

Table (2) showed that 38.2% of school age children with bronchial asthma had family history of bronchial asthma, and 32.9% of school age children had consanguinity among parents.

Regarding history of respiratory problems, 92.1% of children had flu, followed by 80.3% of them who had sinusitis. Regarding current respiratory symptoms, 61.8% of asthmatic children had blocked nose and coughing followed by 44.7% who had wheezing.

Moreover, 53.9% of school age children with bronchial asthma were exposed to fathers' smoking. Also, 92.1% had asthmatic attacks in winter followed by 53.9% of them in spring. In 67.1% of asthmatic children, the symptoms increased outdoors.

Table (3): Distribution of school age children with bronchial asthma according to predisposing factors of asthma at home (n=76).

Items	N	%
*Type of floor:		
Dusty.	4	5.7
Floor tiles.	47	**61.1**
Mat.	36	47.4
Carpet.	38	**50**
Type of paint:		
Oil.	73	**96.1**
Lime.	3	3.9
*Fumes:		
Smoking.	42	**55.3**
Burning wood or trash.	15	19.7
Gas stove.	23	30.3
Other.	28	36.8
*Presence of animals:		
Dog/cat.	42	**55.3**
Birds.	34	**44.7**
Animals.	11	14.4
Other.	26	34.2
*Presence of insects:		
Flies.	43	**56.6**
Mosquitoes.	69	**90.8**
Ants.	13	17.1
Other.	1	1.3
*Strong odors:		
Cooking food.	76	**100**
Animal odors.	21	27.6
Perfume.	3	3.9
Cleaners.	10	13.2
Pesticides.	64	**84.2**

 * Not mutually exclusive.

Table (3) showed that 61.1% of school age children with bronchial asthma had floor tiles and 50.0% had carpets in their homes. 96.1% had oil paints on their walls. Also, 55.3% were exposed to smoking fumes. Regarding presence of animals, 55.3% of the study sample had cats/dogs inside their homes, followed by 44.7% who had birds. 90.8% exposed to mosquitoes inside their homes, and 56.6% exposed to flies. 100% had odors due to food cooking inside their home, followed by 84.2% due to pesticides.

Table (4): Distribution of school age children according to their satisfactory levels of knowledge related to bronchial asthma throughout nursing intervention phases (n=76).

Items	Pre (%)	Post (%)	Follow up (%)	Chi-square	
				X^2	P-value
Asthma meaning.	14.4	86.8	59.2	34.12	0.00
Sign and symptom of asthma.	26.3	96.1	86.1%	74.28	0.00
Predisposing factors of asthma.	28.4	86.8	72.4	25.47	0.00
Warning signs.	32.9	96.1	88.2	11.57	0.00
Recurrence (day/season).	11.8	88.2	84.2	43.73	0.00
Complications of asthma.	15.8	85.5	59.2	42.23	0.00
Medication of asthma.	14.4	86.8	53.9	12.65	0.00
Precautions.	15.8	97.4	86.8	73.64	0.00
Total knowledge.	19.2	89.9	80.5	42.24	0.000*

Statistically significant (P<0.05*).

Table (4) showed that there were improvements regarding the knowledge of school age children with bronchial asthma after nursing intervention. 86.8% and 59.2% post-intervention and during follow up respectively of the study sample had good knowledge about meaning of asthma compared to 14.4% pre-intervention. Moreover, 86.8% and 72.4% post-intervention and during follow up respectively of the study sample showed better knowledge about predisposing factors of asthma compared to 28.4% pre-intervention. Also, 96.1% and 88.2% post-intervention and during follow up respectively of them had good knowledge regarding warning signs of asthma compared to 32.9% pre-intervention. 89.9% and 80.5% post-intervention and during follow up respectively of the study sample had improved total knowledge of asthma compared to 19.2% pre-intervention.

Table (5): Distribution of school age children according to using metered dose inhaler throughout nursing intervention phases (n=76).

Items	Pre (%)	Post (%)	Follow up (%)	Chi-square	
				X^2	P-value
Remove cap and shake the inhaler.	32.9	97.4	93.4	44.5	0.00
Breathe out gently.	22.3	93.4	82. 4	61.19	0.10
Put mouth piece in the mouth at the start of inspiration which should be slow and deep.	15.7	92.1	90.8	58.50	0.00
Press the canister down and continue to inhale deeply.	15.7	93.4	84.2	53.50	0.00
Hold breath for about 10 seconds.	19.7	94.7	82.4	61.44	0.00
Wait about 30 seconds before taking another inhalation.	18.4	92.1	89.4	56.22	0.00

Statistically significant (P<0.05*).

Table (5) showed that there were improvements regarding using metered dose inhaler for school age children with bronchial asthma after nursing intervention, where 97.4% and 93.4% post-intervention and during follow up respectively of the study sample had good

practices regarding removing cap and shaking the inhaler compared to 32.9% pre-intervention. 93.4% and 82.4% post-intervention and during follow up respectively of them had good practice regarding breathing out gently compared to 22.3% pre-intervention. Moreover, 93.4% and 84.2% post-intervention and during follow up respectively of the study sample had improved in pressing the canister down and continuing to inhale deeply compared to 15.7% pre-intervention. 92.1% and 89.4% post-intervention and during follow up respectively of the study sample had good practice regarding waiting about 30 seconds before taking another inhalation compared to 18.4% pre-intervention.

Table (6): Changes in bronchial asthma severity among school age children with bronchial asthma throughout nursing intervention study phases (n=76).

Items	Nursing intervention phases			Chi-square	
	Pre (%)	Post (%)	Follow up (%)	X^2	P-value
Frequency of attacks:					
Once/week or no.	38.2	76.3	80.3	55.545	0.000*
2- 6 times/week.	57.9	23.68	19.7		
Daily.	2.9	0.0	0.0		
Oral cortisone use:					
None.	19.0	42.9	42.9	54.57	0.02*
Sometimes with attacks.	71.0	57.1	57.1		
Severity index:					
Mild**.**	11.9	61.9	64.3	22.55	0.001*
Moderate.	64.4	38.1	35.7		
Severe**.**	23.8	0.0	0.0		

Statistically significant ($P<0.05*$).

Table (6) clarified that there was an observed decline in the frequency of attacks and use of oral cortisone among the asthmatic school age children after 3 months (post-intervention: 76.3%), while this decline rate decreased after 6 months (follow up: 80.3%), compared to 38.2% of who had no or single recurrent asthma attacks/week pre-intervention. Also, 23.68% and 19.7% post-intervention and during follow up respectively of the study sample had 2-6 asthma attacks per week compared to 57.9% pre-intervention. Furthermore, 2.9% of asthmatic children suffered from daily recurrence of asthma attacks, which improved after nursing intervention to 0%. Overall, 88.1% of the children had moderate to severe asthma at the pre-intervention phase, this decreased to 38.1% at the post-intervention phase, and down to 35.7% during the follow-up phase ($P<0.001$).

Table (7): Statistical relation among sociodemographic data of asthmatic children and their knowledge throughout nursing intervention phases (n=76).

Demographic data	N	Knowledge			Test value	T-test	
		Mean	±	SD		F or T	P-value
Age:							
11	22	3.591	±	1.333	T	-2.038	0.095
12	54	4.296	±	1.382			
Sex:							
Male.	51	3.902	±	1.526	T	-1.717	<0.042*
Female.	25	4.480	±	1.005			
Family size:							
Small.	15	5.200	±	0.447	F	-1.427	0.712
Moderate.	44	4.364	±	1.567			
Large.	17	4.000	±	1.265			
Mother's education:							
Illiterate.	40	4.050	±	1.431			
Basic.	25	4.120	±	1.333	F	0.912	<0.002*
Secondary.	6	4.500	±	1.378			
University.	5	2.500	±	2.121			
Mother's job:							
Work.	15	4.030	±	1.380	T	-0.336	0.738
Housewife.	61	4.140	±	1.424			
Father's education:							
Illiterate.	23	4.524	±	0.814			
Basic.	21	4.609	±	1.406	F	3.158	0.910
Secondary.	26	3.333	±	1.366			
University.	6	3.000	±	2.000			

Statistically significant (P<0.05*).

Table (7) revealed a statistically significant relation between children's sex, mother's education and children's knowledge (P<0.05).

Discussion

Asthma, disorder of the respiratory system in which the passages that enable air to pass into and out of the lungs periodically narrow, causing coughing, wheezing, and shortness of breath. This narrowing is typically temporary and reversible, but in severe attacks, asthma may result in death. Asthma most commonly refers to bronchial asthma, an inflammation of the airways, but the term is also used to refer to cardiac asthma, which develops when fluid builds up in the lungs as a complication of heart failure (**Binuyo, 2013).**

The current study displayed sociodemographic characteristics among school age children with bronchial asthma. The results of the current study revealed that, all of the asthmatic children aged 11-12 years old, this result similar by **Al-Qerem et al., 2016**, the age range in their study was 7–12 years, which could lead to a different male-female prevalence ratio because the prevalence of asthma in girls increases after puberty.

The present study showed that more than two third of the school age children were males. The higher contribution of boys than girls in present study may be explained by the fact in Egypt, especially in rural areas greater attention for education and medical care are given by families and parent to boys than girls. In addition boys go out of the house more often and consequently encounter more allergens and infections and also their practice exercises. This was supported by **Bozek et al (2016**), who reported that asthmatic males (22.8%) are slightly more than females (21.5%).

The present study revealed that more than half of the mothers in the study group are illiterate. This is agreement with **Jing et al., 2013,** Education level will affect the parents' ability to acquire knowledge. Higher-educated parents have more asthma knowledge and can better provide the appropriate care**.**

The current study showed that, more than one third of children had past history related to bronchial asthma. This supported by **Worstell, (2012),** who mentioned that when one parent has asthma there is approximately a 30% - 60% chance of a child having asthma and a 60% or greater chance when both parents are affected.

The association of parental smoking and wheezing symptoms in children suggests a potential relation between passive cigarettes smoking and non specific bronchial hyper responsiveness. Finding of the present study indicated that more than half of the studies have exposed to father smoking. This finding is confirmed by **Al-Qerem et al., 2016,** showed that the presence of a smoking/former smoking member in the household was associated with having allergies most asthmatic are exposed to passive smoking.

Regarding the risk factors at home of asthmatic children it was found that there is more than half of the study sample having domestic cats and doges inside their homes and more than third have birds. This is confirmed by **Kanchongkittiphon et al., 2014,** who reported in his study that inner-city children with asthma are exposed to various indoor allergens and irritants in their homes and schools. Pets, pests, mouse, dust mite, tobacco smoke, endotoxin and NO_2 are common indoor exposures in the inner-city. These potential exposures can influence the development of asthma and asthma morbidity in children known to have asthma.

Finding of the present indicated that before the implementation of the education nursing intervention, knowledge of the school age children regarding asthma was inadequate. This finding is supported by **Bhagavatheeswaran et al (2016**), only 12% of the participants were aware that "wheezing >3 times, coughing more than 4 weeks, >6 respiratory infection in previous year and amelioration of symptoms by using bronchodilators" were features of asthma. In contrast, **Zhao et al., 2013** a previous study in China had shown that two-third of the participants were aware about the nature of asthma.

Results of the presents study showed significant differences in some steps after implementation of supportive educational nursing intervention in the use of meter dose inhaler. This finding agree with **Ganguly et al., (2014**), stated that using of MDI with spacer most convenient method. Doctors often did not have sufficient time to train patients regarding proper technique of inhaler use. With ever increasing and widespread use of inhalers patients' education is becoming more important. Proper training will surely make these drugs more

effective and cost benefit ratio more favorable.

The current study revealed that, there were improvement of asthma severity index after nursing intervention, more than half of asthmatic children had mild grade of asthma severity, while more than one third of them had moderate grade of asthma. In similar study, **Sirounx et al (2012**) reported that, the first step towards better asthma control is finding out what score of is that very necessary to assess the severity and diagnose the Couse of the symptoms. This depends very much on taking a detailed history, on detecting any abnormal physical signs to maintain asthma control that means participating in activities and less symptoms severity**.**

In our study the results revealed that there was a statistical significant difference between the children' knowledge and their mothers level of education after the intervention, this finding can be due to the fact that the educated mothers are more powerful and more oriented to take the right decision related to her child's health.

Conclusion

The results of the present study, it can be concluded that the research hypothesis was accepted while; the implementation of nursing intervention program improved the knowledge and practices of asthmatic children. Also there was an observed decline in the recurrence of attacks and there was an observed decline in anxiety level**.**

Recommendations

The study recommended establish plan for Periodical health educational program for asthmatic school children and

their mothers' to be conducted in inpatient, emergency department and outpatient clinics and Periodical follows up for the level of knowledge and practices of asthmatic school children and their mothers.

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Conflict of interest

No

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