

Nursing Intervention for Mothers Having Children Suffering from Acute Bronchitis

Zeinab F. El-Sayed¹, Radia Abd El-Sattar²

¹Pediatric Nursing Department, Faculty of Nursing, Ain Shams University, Egypt.

e-mail: dr.zeinab.fathy@nursing.asu.edu.eg

²Pediatric Nursing Department, Faculty of Nursing, Ain Shams University, Egypt.

e-mail: dr.radia.abdelsattar@nursing.asu.edu.eg

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ABSTRACT

Context: Acute bronchitis is one of the most common causes of chronic respiratory diseases in childhood with a significant impact on children.

Aim: The study aimed to evaluate the effect of nursing intervention on mothers' knowledge and practices regarding caring for their children suffering from acute bronchitis.

Methods: A quasi-experimental design (one group pre/post-test). The study was conducted at the Pediatric Emergency Department and Outpatient clinic in children's hospital affiliated to Ain Shams University Hospitals. A convenient sample of 52 children newly diagnosed with acute bronchitis accompanied their mothers who were recruited for this study. Two tools were used to collect data: a structured interview questionnaire, and mothers' observation checklist.

Results: The study shows that there was a highly statistically significant improvement found in the post-test compared to their pre-test, regarding the mothers' knowledge and practices related to the care of their children suffering from acute bronchitis.

Conclusion: The implementation of a nursing intervention program improves the mothers' knowledge and practices related to their children with acute bronchitis. These study findings were supporting the study hypotheses. Continuous mothers' evaluation and monitoring for their knowledge and practices toward children with acute bronchitis are recommended in the pediatric emergency and outpatient clinics. Periodic health education for children and their mothers lead to improve their knowledge and practice regarding acute bronchitis.

Keywords: Acute bronchitis, mothers, children, nursing intervention

1. Introduction

Acute bronchitis is the most common respiratory tract infection in infants and early childhood, affecting almost one-third of children under five years. Bronchitis is a seasonal illness with a peak that occurs in winter months. Respiratory syncytial virus (RSV) is the most common cause in approximately 70% of affected children (Pahwa *et al.*, 2015; Kim & Criner, 2013). Environmental tobacco smoke, malnutrition, overcrowding, reduced ventilation, lack of fresh running water, wood smoke, and obesity are known as risk factors for bronchitis. These factors increase the prevalence of acute bronchitis (Du Prel *et al.*, 2006).

The prevalence of acute bronchitis was 17.9%. While 86.6% had at least one parent who smoked, smoking inside the home was 43.9%. The prevalence of houses with any damage caused by dampness was 42.2%. Significant predictors of increased risk of bronchitis were obese, having respiratory allergies; exposed to parental cigarette smoking; and signs of mold and mildew in the home (Karunanayake *et al.*, 2017).

Although bronchitis remains the leading cause of hospitalization of children worldwide, the vast majority of those affected can be safely managed at home and in primary care, which carries the most significant burden of

the disease (Pahwa *et al.*, 2015; Kim & Criner, 2013). The incidence of acute bronchitis in children was decreased by 30%, and the mortality rate decreased by 51% in recent years. These reductions are consistent with the decrease in the prevalence of risk factors for respiratory problems, increasing socioeconomic development, preventive interventions, improved access to care, and quality of care in hospitals. However, the action is required to improve mothers' knowledge and increase coverage of interventions targeting risk factors for the children with bronchitis to accelerate the decline of pneumonia mortality and achieve the Sustainable Development Goals for health by 2030 (World Health Organization, 2018).

Bronchitis is an inflammation of the trachea and bronchi (larger airways), causing dry, hacking persistent cough, which later on becomes productive, tachypnea, respiratory distress, and shortness of breathing. Subsequently, sinusitis, otitis media, and pneumonia may occur. Bronchitis can be either acute or chronic and results from the same infection that causes influenza, common cold (Kim & Criner, 2013; Patrick, 2019).

Mothers are considered an essential part of the health care team; the mothers' participation is essential in caring for their children with acute bronchitis to attain good health. There is a great deal that the mother must learn before the care of the child. Nurses' role is crucial to provide better education and support to mothers; therefore,

¹Corresponding author: Zeinab Fathy El-Sayed

the mothers need support, encouragement, and practical suggestions for care. Most care involves comfort measures and administration of medication, a primary goal of education is related to these activities (Glasper & Alan, 2015; World Health Organization, 2017).

Both the child and mother need a great deal of nursing support because early diagnosis and treatment are essential to prevent complications. Since children are not able to perform self-care for themselves and dependent on their caregiver, it is the responsibility of the nurse to prepare the mother for such a role. Mothers represent the most crucial person in the management of their children with acute bronchitis. When children's needs are considered within the context of the family and community, better outcomes will result. These outcomes lead to improved care, facilitated recovery, decrease complications, and resumption of activities of daily life (Blais et al., 2016; Pillitteri, 2017).

The nursing intervention focuses on strengths instead of weakness, rights instead of needs, abilities instead of deficiencies. Caring by using an intervention program is assumed as an integral part of nursing practices through providing the children and their mothers with information about the illness and the treatment through using instructions (Wurzbach, 2014; Scaparrotta et al., 2018).

Pediatric nurses can act as catalysts to alert the mothers to the needs of children and the strategies that can improve their ability to obtain the services. Also, it can influence the planning and implementation of necessary change in the health care system so that children's health is improved, and the national health goals are achieved (Kluska et al., 2004).

2. Significance of the study

Acute bronchitis is one of the most severe lower respiratory tract infections in the pediatric age group. In Egypt, approximately 30% of the population lives in a rural village that carries out more traditional behaviors detrimental to health than do their urban counterparts. Several environmental factors influence the spread of infection as inadequate sanitation facilities as well as poverty, which leads to malnutrition and makes children more susceptible to diseases. Mothers' lack of knowledge and faulty practices may lead to deterioration in the child's health condition (WHO, 2017; Karunanayake et al., 2017).

A close relation between the mothers and nurses, and the mother's expert knowledge and ability to identify subtle changes in the infant's clinical condition overtime was essential to the assessment process. The assessment sharing with mothers provides nurses with the most comprehensive and holistic view of the children's clinical condition, and vital assessment information could be lost if this relationship does not occur. In the recent era, it becomes imperative to teach the mothers how to prevent and manage the child with acute bronchitis. Therefore, the researchers conducted this study to enhance mothers' understanding of the disease process and their adherence to the acute bronchitis regimen.

3. Aim of the study

This study aimed to evaluate the effect of nursing intervention on mothers' knowledge and practices regarding caring for their children suffering from acute bronchitis.

3.1. Research Hypotheses

- Mothers who exposed to the nursing intervention program will exhibit significant improvement in their knowledge compared to their pre-intervention level.
- Mothers who exposed to the nursing intervention program will exhibit significant improvement in their practices compared to their pre-intervention level.

4. Subjects & Methods

4.1. Research design

Quasi-experimental research (one group pre/post-test) used to achieve the aim of the current study. Quasi-experimental research designs, like experimental designs, test causal hypotheses. A quasi-experimental design, by definition, lacks random assignment. Quasi-experimental designs identify a comparison group that is as similar as possible to the treatment group in terms of baseline (pre-intervention) characteristics (White & Sabarwal, (2014).

4.2. Research setting

The study was conducted at the Pediatric Emergency Department and Outpatient Clinic of Ain Shams University and Children's Hospital affiliated to Ain Shams University Hospitals.

4.3. Subjects

A convenience sample was involved in the study from newly diagnosed children suffering from acute bronchitis. Their total number was 52 children. They were selected nonrandomized, out of two hundred children from the previously mentioned setting for three months, according to the inclusion criteria. The first time admitted for being newly diagnosed with acute bronchitis accompanied by their mothers, their age ranged between 3 years to 5 years old, both gender and excluding criteria: children who had cystic fibrosis and other chest diseases.

4.4. Tools of the study

Two tools were used for data collection pre and post the intervention program. The researchers designed the tools after reviewing the relevant and include the following:

4.4.1. A Structured Interview Questionnaire

This questionnaire is designed to assess the demographic characteristics of mothers and their children and to assess the mothers' knowledge regarding acute bronchitis (pre/post-test format) of the intervention. It was written in the Arabic language in the form of close and open-ended questions. It encompassed three main parts:

Part I consisted of 6 questions concerned with the demographic characteristics of the mothers, such as age

education, occupation, marital status, family size, and income, and three questions related to children as regards gender, ranking, and social setting.

Part II is concerned with child medical data. It used by the researcher to assess child's history regarding child postnatal health problems and current medical history as loss of weight, dry and productive cough, nasal blockage, wheezing, rhinorrhea, fever, sore throat, fast breath, difficult breathing, chest indrawing, cyanosis, pale, difficulty swallowing, red swallowing tonsil, otitis media, diarrhea, vomiting, tachycardia, cervical lymph node, anorexia and voice change.

Part III concerned with the assessment of the studied mothers' knowledge. It included 60 multiple choices and open-ended questions used pre/post- intervention about the following (WHO, 2018).

- Acute bronchitis: it covered the following: meaning, causes, risk factors as (obesity, any respiratory allergy, parental cigarette smoking), signs and symptoms, methods of transmission, complications, proper diet, preventive methods, management, and follow up (15 questions).
- Infection control: it covered the following: source of infection, organism transmitted, the importance of handwashing (before and after any procedure) with soap and water, hygienic measure, droplet, contact, and standard precautions, using gloves and masks when dealing with the infected child, clean food utensils and proper way of food preparation (10 questions).
- Nasal and ear hygiene for child included question regards the importance of using disposable tissue to clean nose during sneezing, dispose of tissues after using, secretion removal, instill nasal saline drops (5 questions).
- Measure child temperature and respiration: knowledge about, measuring the temperature and respiratory rate such as reading the thermometer, identify normal and abnormal temperature, measure under axillary or rectal, the importance of tap compress during elevated temperature. Methods of count the respiratory rate also identify the normal and abnormal range of respiration, humidification, and information regarding the child's status (15 questions).
- Methods of drug administration included knowledge regarding therapy and child's condition, identifying the proper time and proper dose of antipyretics, bronchodilators, anti-inflammatory and antimicrobial as prescribed, humidity, cough suppressant especially at night, expected actions, double-checked by another person before giving them to the child, possible side effects of drugs (15 questions).

Scoring for knowledge:

Each question had a score of zero for an incomplete or incorrect answer and score one grade for the complete and correct answer. A subtotal score calculated for each subsection. The total score for knowledge was 60 Marks categorized into two levels: satisfactory when the score above 50% and unsatisfactory below 50%.

4.4.2. Mothers Observation Checklists

It designed to assess mothers' practices in caring for their children suffering from acute bronchitis. It was used pre/post of the intervention program. It includes the six main practices encompassing the administration of medication as correct dosages and preparation. Hygiene care such as hand washing and infection control precautions (by avoid touching the nasal mucosa or conjunctiva, covering mouth when coughing). Measuring the temperature as a method of cleaning the thermometer and read the thermometer degree. Measuring respiration, such as count the respiratory rate. Nasal and ear hygiene by aspirate the mucus using sterile equipment and technique also disposing of secretions to avoid cross-contamination and training on a treatment regimen (Wong et al., 2015).

Scoring system:

Each step in the checklist scored one if done correctly and scored zero if not done or done incorrectly. Then total scoring for mothers' practices classified into an adequate level > 60% and an inadequate level < 60%.

4.5. Procedures

The validity of the study tools was done through five experienced professionals' pediatric nursing experts' opinions, as well as in pediatric medicine, reviewed the materials for comprehensiveness and relatedness. After rigorous revision by their recommendations concerning reliability, two separate assessments were carried out using the tools at different times are performed that compared the results with each other's to ensure stability over time. Tool reliability was assessed; it was 0.89 for a structured interview questionnaire and 0.90 for mothers' observation checklists.

Ethical considerations: The research approval obtained before the intervention, the researcher cleared the aim of the study to all the study subjects; then, oral consent from mothers before starting the data collection was obtained, strict confidentiality throughout the study process was achieved. Mothers announced that all data would be used only for research purposes. Also, the mothers informed that they could refuse or withdraw at any time, with no consequences after the program intervention.

A pilot study was applied, including 10% (5 mothers) of the studied sample who accompanying children to test the applicability, clarity of the study tools, and the feasibility of the research process. The pilot study helped to estimate the time needed for fulfilling the study tools. The final form was achieved through re-arrangement and modification of the tools' item based on the findings of the pilot study. The pilot sample is later excluded from the primary sample.

Official permission was obtained by submission of a formal letter issued from the Dean of Faculty of Nursing, Ain Shams University, to the director of the previously mentioned setting to collect the necessary data for the current study after a brief explanation of the purpose of the study and its expected outcomes.

The study performed through four phases: assessment, planning, intervention, and evaluation. These phases were carried out from the first week of August 2019 till the end of October 2019, covering a long period of three months. The researchers were available at the study settings, two days/week, Sunday and Tuesday from 10.00 a.m. to 2.00 p.m.

Assessment phase: During this phase, the data was collected from the study subject using the tools designed to assess mothers' knowledge deficit as well as practice deficit (pre-intervention information) (Pre-test).

Development phase: The intervention was aiming at improving the knowledge and practices of mothers toward their children with acute bronchitis. It designed to emphasize the areas of significant deficiency in mother's knowledge and practices about acute bronchitis based on the pre-intervention assessment, such as the meaning of acute bronchitis, causes, risk factors, signs and symptoms, methods of transmission, complications, proper diet, preventive measures, management and importance of follow up.

Also, it included knowledge about infection control, nasal and ear hygiene, temperature, respiration, and drugs prescribed. Also, the program developed to improve the mothers' practices regarding drug administration, hygiene care, measuring temperature and respiration, nasal and ear care, and training for treatment regimen. Children medical file was used for obtaining information regarding diagnosis, clinical manifestation, complication, and treatment pre/post-intervention.

Implementation of the program for the mothers takes place during this phase. The studied mothers divided into small groups ranging between three to five at the waiting area. The intervention was implemented in four sessions, covered the theoretical and practical parts. The time of each session ranged from 30-60 minutes, including the time of discussion. The intervention implemented for each small group at one week (2days/week).

The theoretical sessions covered the following items: background about bronchitis (definition, causes, risk factors, signs and symptoms, mode of transmission, complications, diet, prevention, treatment and follow up), information about (infection control, nasal & ear hygiene, temperature, respiration, and drugs prescribed). The practical sessions covered the following practices: measurement of axillary temperature, respiration, performing nasal and ear care, administration of drugs, and performing hygienic care.

Each mother was assessed and observed for her practices using the study tools, which were filled by the researcher pre/post-intervention. Each session started with a summary and feedback regarding the previous session—simple words of the Arabic language used to suit the mothers' level of understanding. Different methods of teaching were used (lectures, demonstration, and re-demonstration). Suitable teaching aids were prepared and used during program intervention (proper equipment, posters, and pictures).

Evaluation phase: the program evaluation was done by comparing the mothers' knowledge and practices pre- and post-intervention. The researchers motivate the studied mothers by encouraging words to gain their participation.

4.6. Data analysis

Computerized data entry and statistical analysis by using the Statistical Package for Social Sciences (SPSS) version 20. The obtained data in pre-test and post-test organized, analyzed, represented in tables using numbers, percentage, mean, and standard deviation, paired t-test was used to study the comparison between pre and post results of the intervention. The chi-square test used to test the associations among the understudied qualitative variables. Statistical significance was considered at p-value < 0.05.

5. Results

Table 1 shows that more than two-thirds of studied mothers' age ranged between 25 to less than 35 years, with a mean of 32.14 ± 4.51 years. As regards education, 61.5% of them cannot read and write and were housewives, respectively. Also, 38.4% were working, and 94.2% of them have been married. Concerning their family size, 65.5% live with more than four family members. Besides, 90.4% of studied mothers had <1000 pounds monthly income. As regards children's characteristics, the majority 82.7% of them were females, around two thirds 61.5% of was third ranking or more, and living at home, respectively.

Table 2 represents the child's medical history. It reveals that 23.1% premature, 44.2% of children had cyanosis, and 30.7% of them was a low birth weight during postnatal. 80.0% of studied children had a dry cough and sore throat 80.8%, 71.2% of studied children had a nasal blockage, fever, pale and tachycardia, respectively. 90.4% of studied children had wheezes, more than half (55.8% and 51.9%) of them had rhinorrhea and difficult swallow. In addition, 38.5% and 32.7% had vomiting and a muffled voice. 28.8% and 21.2% of them had diarrhea, obese, productive cough, and anorexia, respectively.

Table 3 shows that the vast majority of mothers, 94.2% had adequate knowledge regarding the causes of acute bronchitis post-program intervention compared to 34.6% of them pre-intervention. Concerning signs and symptoms, preventive measures, and management & follow up, the majority(84.6%) of studied mothers had improved their knowledge post-intervention respectively, regarding the preventive measures, management and follow up compared to 25.0, 19.2%, and 15.4% before intervention with a highly statistically significant difference between pre and post-implementation of the program regarding all knowledge elements (p<0.01).

Table 4 demonstrates the studied mothers' knowledge about the care given for their children with acute bronchitis. It shows that there was an improvement in mothers' knowledge post-program intervention with highly statistically significant differences at p-value = <0.001 regarding all knowledge elements. Concerning infection control, 73.1% of studied mothers post-program had a

satisfactory level compared to 26.9% pre-program. Concerning nasal and ear hygiene, it was observed 84.6%, 80.7% of mothers improved their knowledge post-intervention, respectively, compared to 17.3% and 19.3% pre-program intervention. Also, knowledge about temperature and respiration, 75% and 78.8% had satisfactory knowledge, respectively, post-program intervention compared to 25% and 21.2% pre-intervention. Besides, drugs, as prescribed, were known by 78.8% post-program intervention compared to 21.2% pre-intervention.

Figure 1 illustrates the total level of mothers' knowledge regarding acute bronchitis; it is evident from this figure that, 80.8% of mothers had satisfactory knowledge post-program intervention compared to 26.9% of them before the program intervention.

Figure 2 illustrates the studied mothers' adequate practices regarding care given to their children, the vast majority (90.4%) of the studied mothers had adequate practices related to measuring temperature post-intervention of the program compared to 9.6% of studied mothers pre-intervention, and 88.5%, 84.6%, 84.6%, and 80.7% of the studied mothers had adequate practices related to nasal and ear hygiene, hygiene care, treatment regimen and administration of drugs post-intervention compared to 11.5%, 15.4%, 15.4%, and 19.3%. Also, 78.8% of studied mothers had an adequate level of practice regarding measuring the respiration for their children post-intervention compared to 21.2% of them had inadequate practices pre-intervention.

Figure 3 illustrates the total mothers' adequate practices regarding care given to their children suffering from acute bronchitis; it is evident from this figure that the majority (86.5%) of studied mothers had adequate level the practices post-program intervention compared to 25% of them before the program. There were highly statistically significant differences between pre and post-program intervention at p -value = <0.001 .

Table 4 reveals that the mean scores post-intervention was higher than pre-intervention for both knowledge and practice with a highly statistically significant difference between total mothers' knowledge score and total adequate practices score pre/ post the program intervention at p -value= <0.001 .

Table (1): Frequency and percentage distribution of studied mothers and children according to their demographic characteristics (n=52).

Variables	No.	%
Characteristics of mothers		
Age (years)		
25- < 35	33	63.5
35- < 45	19	36.5
Mean± SD		
32.14 ± 4.51		
Educational level		
Cannot read and write	32	61.5
Read and write	12	23.2
Secondary	8	15.3
High education	0.0	0.0
Occupation		
Working	20	38.4
Housewives	32	61.5
Marital status		
Married	49	94.2
Divorced	3	5.7
Family size (members)		
<4	18	34.6
≥4	34	65.4
Family Monthly Income		
Insufficient (<1000 pounds)	47	90.4
Sufficient (>1000 pounds)	5	9.6
Socio-demographic characteristics of children		
Age		
Range	in	years
3-5		
Gender		
Male	9	17.3
Female	43	82.7
Ranking		
1-	8	15.4
2-	12	23.1
3+	32	61.5
Social setting		
Home	32	61.5
Kinder garden	20	38.5

Table (2): Frequency and percentage distribution of studied children's medical history (n=52).

Children's medical history	No.	%
History of postnatal health problem		
Premature	12	23.1
Cyanosis	23	44.2
Low birth weight	16	30.7
Present health problem		
Dry cough	42	80.0
Productive cough	11	21.2
Nasal blockage	37	71.2
Wheeze	47	90.4
Rhinorrhea	29	55.8
Fever	37	71.2
Sore throat	42	80.8
Dyspnea	10	19.2
Cyanosis	5	9.6
Pale	37	71.2
Difficult swallow	27	51.9
Red tonsil	26	50.0
Otitis media.	14	26.9
Diarrhea	15	28.8
Vomiting	20	38.5
Tachycardia	37	71.2
Enlarged lymph node	5	9.6
Anorexia	11	21.2
Voice is muffled	17	32.7
Obesity	15	28.8

* Numbers not mutually exclusive

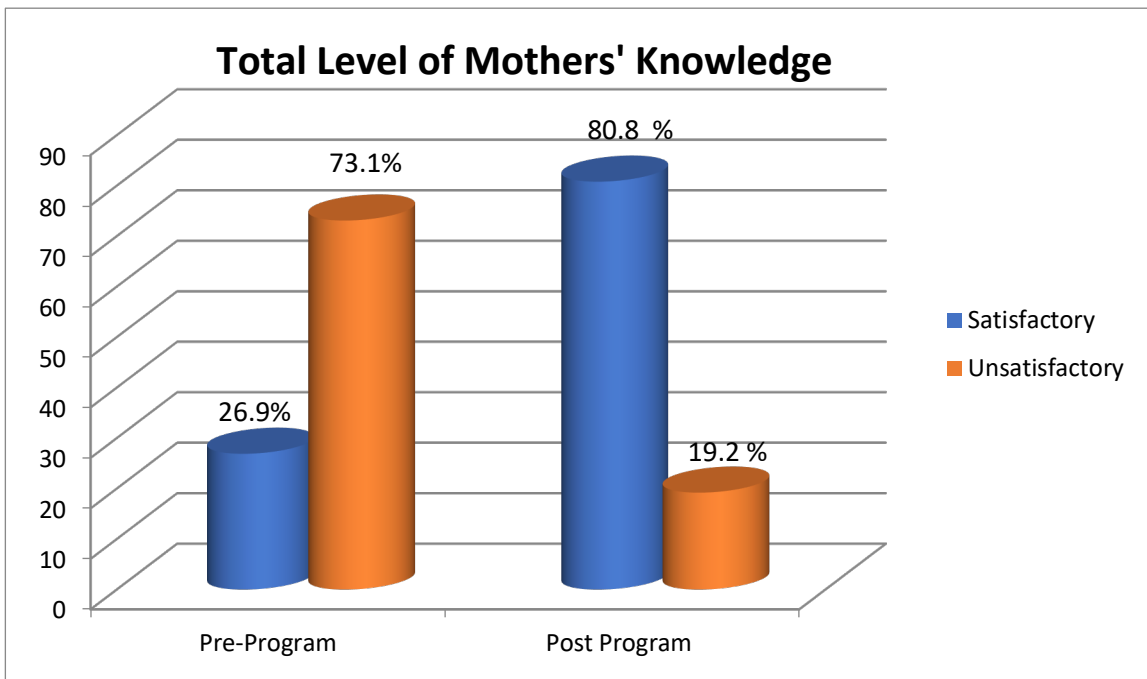
Table (3): Comparison of the studied mothers' satisfactory knowledge regarding acute bronchitis pre/post the intervention (n=52).

Items	Pre-Program		Post-program		X ²	P-value
	No.	%	No.	%		
Meaning of acute bronchitis	18	34.6	36	69.2	12.480	<0.001
Causes	15	28.8	49	94.2	46.963	<0.001
Risk Factors	7	13.5	24	46.2	10.340	<0.001
Sign and Symptoms	13	25.0	44	84.6	37.306	<0.001
Method of Transmission	9	17.3	23	44.2	6.500	0.01
Complication	22	42.3	42	80.7	16.250	<0.001
Proper diet	11	21.1	36	69.2	24.263	<0.001
Preventive measures	10	19.2	44	84.6	44.527	<0.001
Management and follow up	8	15.4	44	84.6	49.846	<0.001

High Significant ($P < 0.001$), significant ($P < 0.01$)

Table (4): Comparison of the studied mothers' satisfactory knowledge according to care given to studied children with acute bronchitis pre /post the intervention program (n=52).

Items	Pre-Program		Post-program		X ²	P-value
	No.	%	No.	%		
Infection control	14	26.9	38	73.1	10.560	<0.001
Nasal hygiene	15.4	17.3	44	84.6	38.851	<0.001
Measure temperature	13	25.0	39	75.0	29.422	<0.001
Measure respiration	11	21.2	41	78.8	31.014	<0.001
Drugs as prescribed	11	21.2	41	78.8	31.014	<0.001
Ear hygiene	10	19.3	42	80.7	35.211	<0.001



χ^2 13.82 (**) highly statistically significant at $p < 0.001$ **

Figure (1): Percentage distribution of the studied mothers' according to their practices regarding acute bronchitis pre/post the intervention (n=52).

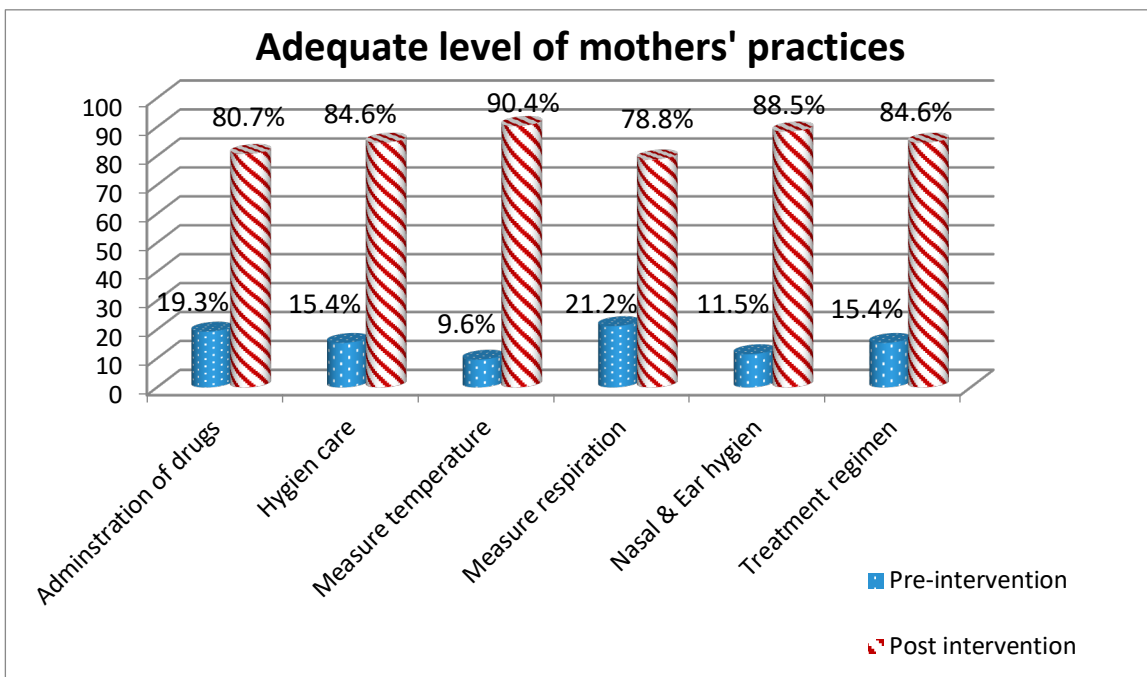
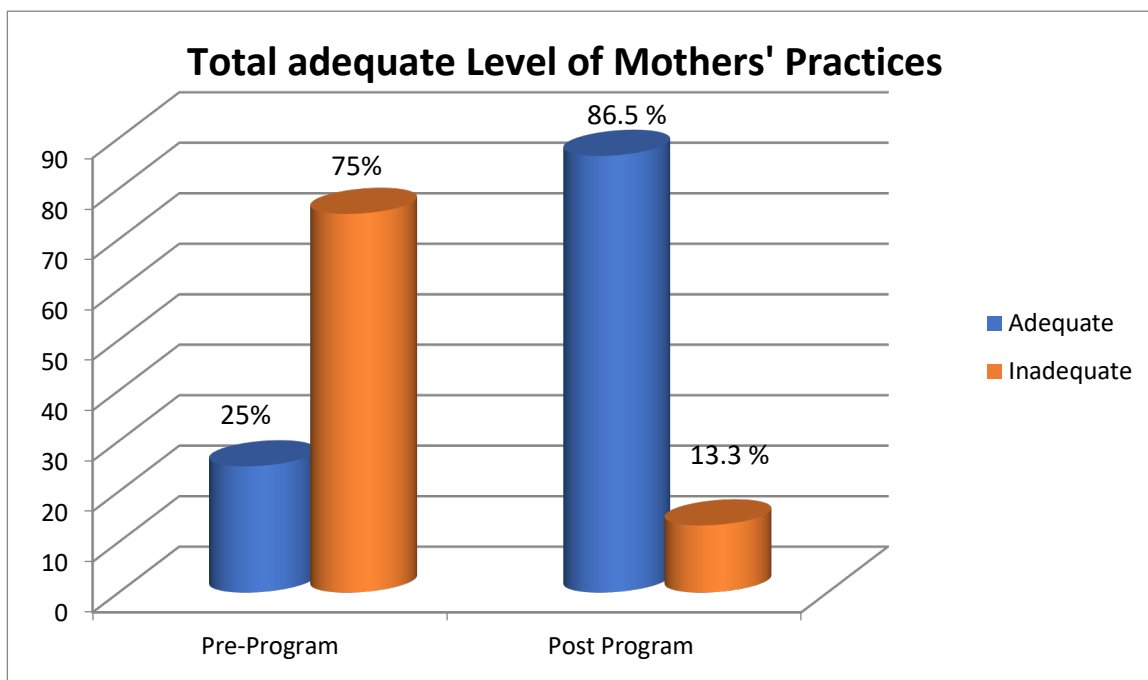


Figure (2): Percentage distribution of the studied mothers' according to their adequate practice level to their children suffering from acute bronchitis at pre /post the nursing intervention program (n=52).



χ^2 16.79 (**) highly statistically significant at $p < 0.001$ **

Figure (3): Percentage distribution of the studied mothers' according to their total adequate level of reported practices to their children suffering from acute bronchitis at pre /post the intervention program(n=52).

Table (4) Relation between total mothers' knowledge and their total adequate practices pre/post-intervention program (n=52)

Items	Pre-program Mean±SD	Post-program Mean±SD	Paired t-test	P-value
Mothers' knowledge	24.300±5.121	45.900±6.444	15.870	<0.001
Mothers' practices	14.400±3.545	30.600±5.778	22.578	<0.001

6. Discussion

Intervention programs for mothers have been an integral part of disease management. Knowledge is considered necessary but not sufficient for adequate self-regulation of the diseases. Instead, the focus of intervention is on assessing the children and their families to overcome attitudinal and motivational barriers, improve their self-management skills, and feeling of self-efficacy (Hockenberry et al., 2017).

The study aimed to evaluate the effect of nursing intervention on mothers' knowledge and practices regarding caring for their children suffering from acute bronchitis

According to the age of studied mothers, the present study revealed that more than two-thirds of them aged ranged between 25 to less than 35 years with a mean 32.14 ± 4.51 years. These results were in disagreement with those of Chellini et al. (2005), who studied "Changes in social characteristics and risk factors for bronchitis among children and adolescents in Italy," and stated that the mean age of studied mothers was 25 ± 4.8 . Also, Jackson et al. (2016), found in a similar study about "Risk factors for severe acute lower respiratory infections in children," that less than half of studied mothers were from 20 to less than 25 years.

Regarding the studied mothers' education, the finding revealed that slightly two-thirds of them could not read and write. This result agreed with Habib, (2007), who studied "Mothers' responsiveness to the needs of preschool children correlates with their development at Urban Area in Egypt," and mentioned that when the mothers were educated, the health risk will be decreased. Habib also mentioned that uneducated mothers' ignorance was one of the predisposing factors which lead to many health problems for children. Moreover, Chapman and Durham (2014) stated that education for mothers is associated with better achievement in their child's health status.

Regarding the occupation and marital status of the studied mothers, the current study cleared that around two-thirds of mothers were housewives, working mothers represented more than one third, and the majority of them were married. From the researchers' point of view, the mother's work might affect the child's health status positively or negatively according to the types of work.

Regarding family size, near to two-thirds of the studied sample had an average of four members or more per family; most of the children's families had insufficient income, and their children stay at home. This result was in agreement with Muhamed (2018), who studied health problems guidelines for the management of children with bronchitis

in Egypt; found that increased family size, overcrowding in homes, polluted environment, and insufficient income are associated with an increase the morbidity of acute bronchitis. Also, this finding agreed with *Bont et al. (2017)*, who studied epidemiology and burden of severe respiratory syncytial virus infection among infants and children in western countries and reported that smaller family size had consequent improvement in the quality of child's life. However, economic growth, employment, equity, and appropriate health services could lead to a reduced burden of infections.

Regarding the studied children's characteristics, the finding of the current study showed that the majority of them were females, and approximately two-thirds of children were ranked third child in family or more. This finding was supported by *El-Morshidy et al. (2015)*, who studied the impact of the intervention on family and children suffering from bronchitis; found that the majority of participant children were females. This finding in agreement with *Holloway et al. (2009)*, who studied community intervention to promote rational treatment of acute respiratory infection in Nepal and found that the female gender was a significant risk factor for acute bronchitis.

As regards children's medical history, the current study reported that the majority of studied children had a dry cough, wheeze, and sore throat. Near to three quarters had a nasal blockage, fever, pale, and tachycardia, respectively. More than half had rhinorrhea and difficult swallow. Around one third had vomiting and a muffled voice. Also, less than one-third of them had diarrhea and obesity, respectively. This finding may be attributed to illiteracy and insufficient income of the mothers.

These results are also consistent with *Chen et al. (2016)*, who found that there was a higher risk of bronchitis in children who had a dry cough, wheezing, and fever. Some studies have shown that obesity in children was positively associated with bronchitis. *Lee et al. (2013)* studied "Obesity and occurrence of bronchitis in children" and reported an increased risk of occurrence of bronchitis among overweight and obese children. Also, *Sutherland, (2014)* stated that obesity in children might take shallow respiration due to compression of the thoracic cage from high soft tissue weight and fatty infiltration of the chest wall, resulting in the form of dyspnea and chronic cough.

As regards mothers' knowledge level about acute bronchitis pre and post-program implementation indicated, significant improvement in all items of knowledge regarding the disease. High statistically significant differences between pre and post-implementation of the program regard definition, causes, and signs and symptoms, complications, proper diet, prevention, and treatment, respectively, $p < 0.001$. This lack of knowledge pre-intervention emphasized the importance of raising mothers' awareness through an educational program to develop their knowledge regarding acute bronchitis in children. This study was following *Denno, et al. (2014)*, who studied "Maternal knowledge, attitude, and practices regarding childhood acute respiratory infections in Ghana," and

pointed out that knowledge broadly improved by curriculum given to mothers in primary prevention of bronchitis, there were information improvements after the intervention. A similar study by *Al-Naser et al. (2016)*, entitled "Factors influencing and clinical manifestation of upper and lower respiratory diseases and anti-histaminic drugs consumption in Egypt," and mentioned that a national program to prevent acute bronchitis must deal with multiple socioeconomic problems and must reflect general national policy and be suited to country's present level of development and many problems of supply, demand, distribution of wealth, social status and education.

Concerning mothers' knowledge regarding care given for their children with acute bronchitis, there was a highly statistically significant improvement observed regarding mothers' knowledge at $p < 0.001$ about infection control, and nasal hygiene, measuring temperature, and respiration, drugs prescribed, and ear hygiene post-program intervention compared to pre-intervention. This finding could have related to the lack of education and lack of training for mothers in hospitals.

These findings were supported by those of *Carrière et al. (2017)*, who studied "hygienic measures and respiratory hospitalizations among children" and reported a statistical significance difference between pre and post-program intervention. Also, the study of *Hamzah et al. (2018)*, who studied "Impact of an educational program based on fever management," indicated that mothers had unsatisfactory knowledge at the pre-program phase regarding measuring temperature and administration of drugs as prescribed. They emphasized that mothers should know the nasal hygiene, body temperature, and respiration, drugs used as prescribed for the caring of their children to minimize complications and improve the children's condition.

Regarding the total level of knowledge of studied mothers about acute bronchitis where the majority of them had a satisfactory level of knowledge post-program intervention compared to approximately one-quarter pre-program intervention, there was a highly statistically significant difference at $p < 0.001$ which indicated that the study intervention had a positive effect on knowledge of mothers. This finding consistent with the finding of the *American Academy of Pediatrics (2018)* in a study entitled "Pediatric respiratory diseases in childhood and adolescent," as it reported that the majority of respondents had unsatisfactory knowledge and suggested innovative education programs.

In a study performed by *Bastable, (2014)*, entitled "Nurse as educator: principles of teaching and learning for nursing practices." It was found that the discussion during the implementation of the content of the program erased the mothers' doubts and questions as they become knowledgeable, so education plays an essential role in correct misinformation and provides the mothers with correct information. In another study done by *Allison (2015)*, who found a lack of knowledge about bronchitis, therefore intervention program could be performed to reinforce information, as well as means to evaluate the participant's knowledge. It is vital to give participant time

to process information. Moreover, *Allender, and Spradley, (2015)*, recommended acute bronchitis intervention programs applied to children and their mothers could succeed in improving concepts, increase mothers' knowledge and building a self-management behavior to a higher rate. These findings are supporting the first research hypothesis.

Concerning the studied mothers' practice regarding care given for their children pre and post-intervention, most practices were adequate at the post-program intervention that affects the child's condition. The areas of improvement were administration of drugs, hygiene care measuring temperature, respiration, nasal and ear hygiene, and treatment regimen. *Ali (2016)* supported this finding, demonstrating that the steps of care are essential to participant mothers to strengthen their practices of care toward their children immediately and over a long time.

Also, as regards drug administration, this result was supported by *Tantawi et al. (2015)*, who studied "Effect of educational guidelines program on asthmatic children and their mothers in Egypt," and found that keep the medication in a safe specific place for preparation affect the proper doses as prescribed. Moreover, *Qassem et al. (2016)*, who studied "knowledge, attitude and practice of mothers on acute respiratory infection in children under five years in Karachi," and found that a significant relation between mothers' practices and knowledge after program intervention.

Regarding the studied mothers' total adequate level of practices where the majority of them had an adequate level of total practices post-program intervention compared to one-quarter pre-program intervention, there were highly statistically significant differences at $p < 0.001$. This result was supported by *Monir (2015)*, who studied the "Discharge plan for children having bronchial asthma in Egypt," and found that the majority of the participants achieved good practice score. These findings are supporting the second research hypothesis.

In the relation between total mothers' knowledge and their adequate practices, the current study showed that the mean scores post-intervention was higher than pre-intervention for both knowledge and practice with a highly statistically significant difference at $p < 0.001$. This finding was supported by *Allister et al. (2019)*, who studied "Respiratory morbidity and mortality in children younger than five years in the United Kingdom" and mentioned that there was an improvement in the studied participant after program intervention.

The results evidenced the significant effects of the intervention program, which demonstrated by the researcher and re-demonstrated by the mothers for their children, had modified the practices and strengthen the mother's ability to provide the care for their children independently.

7. Conclusion

In light of the study findings, the implementation of nursing intervention improved the mothers' knowledge and

practices related to their children with acute bronchitis. There was a significant improvement post-intervention in knowledge and practices regarding the care of acute bronchitis. These study findings support the study hypotheses.

8. Recommendations

Based on the findings of the present study, it recommended that:

- Continuous mothers' evaluation and monitoring of their knowledge and practices for children with acute bronchitis.
- Periodic education programs in hospitals for mothers and children to improve their knowledge and practice about acute bronchitis.
- Developing a simplified illustrated and comprehensive Arabic booklet including information supported with photos (for non-educated mothers) about acute bronchitis
- Replication of the research on a more substantial probability sample to achieve more generalization.

9. References

- Al-Naser, H., Saharara, A., Hasnaoui, A., Taxier, N., Al-Ali, M., Al-Zoubi, K., & Batareseh, M. (2016)*. Factors influencing and clinical manifestation of upper and lower respiratory diseases and anti-histaminic drugs consumption. *Life Science J.*, 2(12), 3659.
- Allender, J., & Spradley, B. (2015)*. *Pediatrics nursing: promoting and protecting the pediatrics' respiratory health*. 12th ed., J. B Co. Philadelphia. Pp. 257-255.
- Allister, D., Liu, L., Shi, T., Chu, Y., Reed, C., Burrows, J., Adelo, D., Black, R., Campbell, H. & Nair, H. (2019)*. Global, regional, and national estimates of respiratory morbidity and mortality in children younger than five years at the University of Edinburgh. The United Kingdom Published by Elsevier Ltd. Bill & Melinda. 46: 1021-1026.
- Allison, A. (2015)*. Improving pediatric respiratory infection outcomes using self-management skills. *The American Journal of primary health care*, 25(11), 16. <https://doi.org/10.1097/00006205-200025110-00002>.
- Ali, K., Grigoratos, D., & Cornelius, V. (2016)*. Outcome of infants following fetoscopic tracheal occlusion—the influence of premature delivery. *J. Pediatric Surgery*, 48(9), 1831–1836. <https://doi.org/10.1016/j.jpedsurg.2013.01.049>.
- American Academy of Pediatrics (2018)*. Pediatric Respiratory diseases, childhood, and adolescent —the United States, *Pediatrics J*, 133(2), 357–363.
- Bastable, S. (2014)*. *Nurse as educator principles of teaching and learning for nursing practices*. 10th ed., Jones and Bartlett Publishers Sudbury, Massachusetts, London. Pp. 357- 366.
- Blais, K., Hayeos, J., & Gordon, E. (2016)*. *Professional nursing practice, concepts, and perspectives*, 9th ed., Pearson Prentice Hall, U.S.A. Pp. 145-156.
- Bont, L., Checchi, P., & Fauroux, B. (2017)*. Defining the epidemiology and burden of severe respiratory syncytial virus infection among infants and children in western

- countries. *Infectious Diseases and Therapy*, 5(3), 271–272. <https://doi.org/10.1007/s40121-016-0123-0>
- Carrière, G., Garner, R., & Sanmartin, C. (2017).** Hygienic measures and respiratory hospitalizations among children. *J of Child Health Care*, 28, 15-16.
- Chapman, L., & Durham, R. (2014).** *Newborn nursing: The critical components of nursing care*. 1st ed., Davis Company, New York: McGraw-Hill. Pp. 282, 290.
- Chen, C., Wu, K., Hsu, M., & Tang, R. (2016).** Prevalence and relationship between respiratory diseases and infectious diseases. *J. Microbiol. Immunol. Infect*, 34, 57–62.
- Chellini, E., Talassi, F., Bisanti, L., & Ciccone, G. (2005).** Changes in social characteristics and risk factors for bronchitis among children and adolescents in Italy. *Epidemiologia and prevention*, 29(2), 80-82.
- Denno, D., Bentsi, A., Mock, C., & Adelson, J. (2014).** Maternal knowledge, attitude, and practices regarding childhood acute respiratory infections in Kumasi, Ghana. *Paediatr.*, 14(4), 293-301. <https://doi.org/10.1080/02724936.1994.11747732>
- Du Prel, X., Krämer, U., Behrendt, H., Ring, J., Oppermann, H., Schikowski, T., & Ranft, U. (2006).** Preschool children's health and its association with parental education and individual living conditions in East and West Germany. *BMC Public Health*, 6, 312. <https://doi.org/10.1186/1471-2458-6-312>
- El-Morshidy, S., Wafy, M., & Adel, M. (2015).** Impact of intervention on family and children with bronchitis. *American J of Respiratory Critical Care Med*, 68, 622-623.
- Glasper, E., & Alan, S. (2015).** *Children's nursing*. 10th ed., Mosby, mirror International publisher. London, England. Pp. 762.
- Habib, N. (2007).** Mothers' responsiveness to the needs of preschool children correlates with their development in the Urban Area. *The New Egyptian Journal of Medicine*, 36 (4), 66- 69.
- Hamzah, A., Sarkadi, A., & Ronqueist, U. (2018).** Educational Impact and Pediatric Patient Outcomes: Exploring the Gap. *Journal of Advanced Nursing*, 9(8), 461.
- Holloway, K., Shiba, A., Tamang, A., Kafle, K., & Barnaby, C. (2009).** Community intervention to promote rational treatment of acute respiratory infection in rural Nepal, *tropical medicine, and international health*, 14(1), 101–110. <https://doi.org/10.1111/j.1365-3156.2008.02191.x>.
- Hockenberry, M., Wilson, D., & Rodgers, S. (2017).** *Wong's Essentials of Pediatric Nursing*, 10th ed., St. Louis, Mosby El-Sevier Co, London. Pp. 1414- 1430.
- Jackson, S., Mathews, K. H., Pulanic, D. (2016).** Risk factors for severe acute lower respiratory infections in children: A systematic review and meta-analysis. *Croat Med J*, 54, 110–21. <https://doi.org/10.3325/cmj.2013.54.110>
- Karunanayake, P., Rennie, D., Ramsden, V., Fenton, M., Kirychuk, S., Lawson, J., Henderson, R., Jimmy, L., Abonyi, S., & James A. (2017).** Bronchitis and its associated risk factors in children. Canadian Centre for Health and Safety, University of Saskatchewan, *MDPI*, 4(13), 36-37. <https://doi.org/10.3390/children4120103>
- Kim, V., & Criner, G. (2013).** Chronic bronchitis and chronic obstructive pulmonary disease. *Antiviral therapy*, 16 (8), 228. <https://doi.org/10.1164/rccm.201210-1843CI>.
- Kluska, K., Laschinger, H., & Ken, M. (2004).** Staff nurse encouragement. *Can. Y Nurse. Leadership*, 17(1), 112. <https://doi.org/10.12927/cjnl.2004.16247>
- Lee, Y., Chen, Y., & Chen, Y. (2013).** Obesity and the occurrence of bronchitis in children. *Obesity*, 21(1), 149-153. <https://doi.org/10.1002/oby.20262>
- Monir, E. (2015).** Discharge plan for school-aged children having bronchial asthma. *Egyptian J of Health Care*, 9(4), 245-256.
- Muhamed, K. (2018).** Health problems guidelines for the management of childhood with bronchitis. World Health Organization, *Lancet Glob Health*, 6(1), e8–9.
- Pahwa, P., Abonyi, S., Karunanayake, C., Rennie, D., Janzen, B., Kirychuk, S., & Lawson, J. (2015).** A community-based participatory research methodology to address redress and reassess disparities in respiratory health problems. *BMC Res.*, 8, 199. <https://doi.org/10.1186/s13104-015-1137-5>
- Pillitteri, A. (2017).** *Child Health Nursing care of the Childbearing & Childrearing in family*, 9th ed., Wolters Kluwer Saunders, London. P 1227.
- Patrick, C. (2019).** Acute bronchitis in children, *Nursing Research. Tokyo, Japan*, 45(3), 237-239.
- Qassem, B., Saeed, F., & Shah, A. (2016).** Knowledge, attitude, and practice of mothers on acute respiratory infection in children under five years. *Pak J Med Sci.*, 32 (6), 1557-1561. <https://doi.org/10.12669/pjms.326.10788>
- Scaparrotta, A., Attanasi, M., & Pillo, S. (2018).** *Pediatric Lower Respiratory Infections*. 8th ed., Elsevier Saunders United Kingdom. P. 245.
- Sutherl, E. (2014).** Obesity and Respiration. *Immunol. Allergy Clin. N. Amercan.J.*, 28(5), 89.
- Tantawi, H., Adly, R., & Fathy, Z. (2015).** Effect of educational guidelines program on asthmatic children and their mothers, Ain Shams University. *American science*; 8(2). Available at <http://www.mericanscience.org>
- White, H. & Sabarwal, S. (2014).** Quasi-experimental design and methods. *Methodological Briefs Impact Evaluation No.8*. Unicef Office Research. P. 1. https://www.unicef-irc.org/KM/IE/img/downloads/Quasi-Experimental_Design_and_Methods_ENG.pdf
- World Health Organization (2017).** Prevention and control of acute respiratory tract infection in health service. Retrieved from <http://www.who.int/csr/resources/publications/AMpandemicbahasa>
- World Health Organization (2018).** Global health sector strategy on acute respiratory infection in young children 2016-2021. Available at: <http://www.who.int/news-room/publications/fact>
- Wong D., Hockenberry M., Wilson D., Winkelstein M. & Kline N., (2015).** *Wong Nursing Care of Infants and Children*. (10th ed.,) Mosby, Philadelphia. Pp. 333- 410.

Wurzbach, M. (2014). *Community health education and promotion, a guide to program design and evaluation* 2nd ed, Jones and Bartlett Publishers Sudbury, Massachusetts, London. P. 487.