

Discharge Plan for Mothers to Cope with their Children Suffering from Bronchial Asthma

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Abstract: Asthma is the most common chronic childhood disease that can have significantly negative effect on children and their families. **Aim** of this study was to evaluate the effect of a discharge plan on mothers to cope with their children suffering from bronchial asthma. **Design:** A quasi experimental design was used. **Setting:** The study was carried out at the Pediatric Emergency Department in Children's Hospital, affiliated to Ain Shams University Hospitals. **Subjects:** A purposive sample composed of 58 mothers accompanying their children suffering from bronchial asthma who were admitted in the previously mentioned setting over a 6 month period were recruited. **Tools:** It included; a pre-designed interviewing questionnaire, observation checklist, parenting stress index, and coping health inventory for parents. **Results:** More than three quarters of the studied mothers had unsatisfactory total knowledge about bronchial asthma pre implementation of the discharge plan compared to slightly less than three quarters of them had satisfactory total knowledge post implementation with a statistically significant difference. As well, mothers' practices and coping patterns were statistically improved post implementation of the discharge plan. Moreover, mothers' stress levels were significantly decrease post implementation. **Conclusion:** It can be concluded that, the discharge plan led to significant improvements in mothers' knowledge and practices as well as coping patterns and decrease in stress level regarding care of their children suffering from bronchial asthma. **Recommendations:** Discharge plan for all mothers having children suffering from bronchial asthma should be conducted in emergency department, inpatient and outpatient clinics. **Keywords:** Bronchial asthma, children, coping patterns, discharge plan, mothers, parent stress.

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I. Introduction

Bronchial asthma is the most common chronic disease of childhood, it constitutes a serious public health problem all over the world that can have significantly negative effect on children and their families, and it is considered a common cause of emergency room visits and hospital admissions. Bronchial asthma is a chronic inflammatory disorder of the respiratory tract characterized by an obstruction of airflow due to spasms of the bronchial smooth muscles, edema of the mucosa and increased mucus secretions in the bronchi and bronchioles brought on the various stimuli [1].

Bronchial asthma is a highly prevalent chronic respiratory disease affecting 300 million people worldwide. Epidemiological studies examining asthma prevalence trends among children in both developed and developing countries suggest that the prevalence of asthma and other allergic diseases is continuing to rise [2]. Worldwide, the prevalence of asthma is 8-10 times higher in developed countries as United States, Great Britain, Australia, and New Zealand than in the developing countries as in Southeast Asia. Estimates from developed countries suggest that it affects between 11 and 20% of all school age children, with between 6.7 and 9.6 million children affected in the U.S. alone. Although the onset of asthma may occur at any age, 80% to 90% of children have their first symptoms before 4 or 5 years of age, and boys are affected more frequently than girls until adolescence [3,4]. In Egypt, the bronchial asthma prevalence among children and teenagers is 8.4% [5,6].

Bronchial asthma in children usually has many causes, or triggers. These triggers may not be the same for each child and children often have more than one trigger. Asthma triggers may change as a child ages and child's reaction to a trigger may also change with treatment. There is no single known cause of asthma. However, certain things may increase the likelihood of child developing asthma. Trigger factors are classified as follows; genetic factors, environmental factors which may be indoor or outdoor allergens, respiratory infection, diet allergy, drugs allergy, psychological factors, gastroesophageal reflux disease, weather factors and endocrine factors [7].

The symptoms of asthma can range from mild to severe. Symptoms vary between children who may have one or more asthma symptoms. The most common symptoms are coughing, particularly at night and early morning and with exercise, breathlessness that includes shortness of breathing or difficult of breathing, a tight chest like a band tightening around it, and chest wheezing. When asthma symptoms get significantly worse it is

known as an asthma attack. Such attacks are usually accompanied by diffuse, variable limitation of airflow in the lungs, which usually subsides spontaneously or with treatment [8,9].

Any asthma symptom, whether mild or severe, is always serious; even mild symptoms can quickly become life-threatening. Poorly controlled and undiagnosed asthma in small children can result in trips to the emergency room, hospital stays, missed school days and workdays for parents, as well as suffering that small children are unable to express. It's very important that the children receive proper treatment. The treatment depends on the severity and frequency of the symptoms. Asthma medications are classified in two groups; long-term medications to control of inflammations and quick-relief medications to treat symptoms and exacerbations. The medication can be taken via inhaler or nebulizer [10].

In pediatric patients, mothers are typically the primary agents in promoting the children's health, giving direct care, providing access to health services, and modeling attitudes and behaviors that influence the children's well-being. Mothers of children with bronchial asthma face many different stresses throughout the course of their children's illness and experience more negative psychological distress than mothers with typically developing children. This psychological distress can range from confusion, feelings of helplessness, frustration, sadness, anger, and fear [11,12].

Coping is expending conscious effort to solve personal and interpersonal problems, and seeking to master, minimize or tolerate stress or conflict. Effectiveness of the coping efforts depends on the type of stress and/or conflict. Meanwhile, coping responses are partly controlled by personality (habitual traits), but also partly by the social environment, particularly the nature of the stressful environment. Coping function generally centers on five main tasks: reduce harmful environmental conditions and enhance prospects of recovery; tolerate or adjust negative event or realities; maintain apposite self-image; maintain emotional equilibrium and decrease emotional stress; and maintain a satisfying relationship with the environment [13,14].

Obviously, some of the coping patterns are more effective than others, but it is not possible to simply categorize patterns of coping as intrinsically good or bad, although denying the reality of a situation is often seen as a poor way to cope, in some situations it may be very effective. Coping can take two main forms: focus on the emotional effects of the stressors, and focus on solving the problems of stressors [15].

Discharge planning is a widespread process – nurses are frequently involved in planning and coordinating discharge. Discharge planning aims to decrease time spent in hospital, improve patient outcomes and reduce costs. Effective discharge planning can decrease the chances of readmitted to the hospital, help in recovery, ensure medications are prescribed and given correctly, and adequately prepare the mothers to take children's care [16].

Discharge plan is often complex and involve multiple domains, including medications, follow-up appointments, concerning symptoms to act on (return precautions), and diet and activity restrictions. Given that discharge plans are complex and mothers are at risk for poor outcomes post discharge, it is important to examine whether mothers understand and can adequately manage the discharge plan. Mothers often misunderstand or are unable to recall elements of the discharge plan after inpatient or emergency department discharge [17,18].

Management of discharge plan in children presents unique challenges compared with those faced by adults managing their own care, including dosing medications and knowing when to return to school. The responsibility is often on mothers. Therefore, it is essential that mothers receive adequate information and explanation of disease treatment, plans, goals, side effects and care provided from health care professionals to cope with the child's physical and emotional needs [19,20].

Nurses play a vital role in supporting both mothers and children at the time of treatment and prevention of attack. On the basis of nursing assessment, nurses can formulate the nursing diagnosis and implement the intervention. Nurses can teach mothers and children about the conditions to avoid precipitate of asthmatic attack. Mothers and children should be well aware of correct use of bronchodilators and anti-inflammatory drugs. Nurses can encourage for sound health practices to support body's natural defenses [21].

1.1. Significance of the study

Annually, the World Health Organization (WHO) has estimated that 250,000 asthma deaths are reported worldwide and approximately 500,000 annual hospitalizations are due to asthma. The burden of the uncontrolled asthma is high, which needs frequent emergency room visits, and hospital admissions. Pediatric asthma prevalence within Egypt ranged between 7.7% in Nile Delta to 9.4% in Cairo [22,23]. The prevalence of asthma among Egyptian children aged 3-15 years was estimated to be 8.2% [6]. Continuity of care, discharge planning, and home health care are the primary subjects in quality of health care today. Ensuring discharge planning is to reduce hospital length of stay and unplanned readmission to hospital, and improve the coordination of services following discharge from hospital [20]. In order to ensure all mothers are knowledgeable and skilled to fulfill their roles, the current study was carried out.

1.2. Aim of the Study

This study aimed to evaluate the effect of discharge plan on mothers to cope with their children suffering from bronchial asthma. This aim was achieved by:

- Assessing mothers' knowledge and practices regarding care of their children suffering from bronchial asthma.
- Assessing mothers' stress levels and coping patterns regarding care of their children suffering from bronchial asthma.
- Designing and implementing a discharge plan for mothers of children suffering from bronchial asthma.
- Evaluating the effect of the discharge plan on mothers' knowledge, practices, stress levels and coping patterns regarding care of their children suffering from bronchial asthma.

1.3. Research hypothesis

A discharge plan has a positive effect on mothers' knowledge, practices, stress levels and coping patterns regarding care of their children suffering from bronchial asthma.

II. Subjects and Methodology

The subject and methods of the current study will be discussed under the following four (4) designs: Technical design, operational design, administrative design and statistical design

2.1. Technical Design:

It included research design, setting, subjects and tools for data collection.

Research design:

A quasi- experimental design was adopted to conduct the study.

Research setting:

This study was conducted at the Pediatric Emergency Department in Children's Hospital, affiliated to Ain Shams University.

Research subjects:

A purposive sample consisting of 58 mothers accompanying their children suffering from bronchial asthma who were admitted in the previously mentioned setting over a 6 month period, was recruited under the following inclusion criteria; mothers of children newly diagnosed with bronchial asthma, first admission to the Pediatric Emergency Department, and free from any other chronic or acute disease, regardless children's age, gender, educational level and residence.

Tools of data collection:

Data were collected through using the following tools twice (Pre/post the discharge plan):

1. A pre-designed interviewing questionnaire:

It was designed by the researchers after reviewing the recent related literature, and was written in Arabic language in the form of open and closed ended questions. This tool was divided into two parts:

Part A: This part was concerned with characteristics of:

Children: Age, gender, level of education, rank among sibling.

Mothers: Age, level of education, occupation, residence and housing condition.

Part B: This part dealt with knowledge of mothers related to bronchial asthma (meaning, causes, triggers, signs & symptoms, treatment, prevention & care of attack).

Scoring system: According to the answers obtained from the studied mothers, a scoring system was followed to assess the mothers' knowledge, each question scored two marks for a correct answer and zero for an incorrect or no answer, and accordingly the mothers' total knowledge was categorized into; satisfactory $\geq 50\%$ and unsatisfactory $< 50\%$.

2. Observation checklist:

It was developed by the researchers based on **Advanced Pediatric Life Support** [24] and **Hockenberry et al.** [1] to assess the actual practices of mothers related to nebulizer, inhaler, breathing and coughing exercises, and chest physiotherapy.

Scoring system: As regards the scoring system for mothers' practices, a score one was given to the mothers for each step done correctly and zero for each step done incorrectly or not done, and accordingly the mothers' total practices were categorized into; adequate $\geq 50\%$ and inadequate $< 50\%$.

3- Parenting Stress Index (PSI):

It was adopted from **Berry and Jones** [25] to measure mothers' stress levels toward care of their children suffering from bronchial asthma, the PSI consisting of 18 items (8 positive and 10 negative), it has

three parts; child characteristics, parent characteristics, and stress stemming from situational or demographic conditions.

Scoring system: The index items were scored using a 5-point rating scale ranging from 1= strongly agree, 2= agree, 3= not sure, 4= disagree and 5= strongly disagree. The 8 positive items are reverse scored so that possible scores on the scale can range from 18 to 90. Higher scores on the scale indicate greater stress. Total mothers' stress was divided into 3 levels; mild stress (1-<30), moderate stress (30-<60) and severe stress (60- 90).

4- Coping Health Inventory for Parents (CHIP):

It was adopted from **McCubbin et al.** [26] to measure mothers' coping patterns toward the disease. The CHIP consisting of 45 items, it has three subscales developed through factor analysis, those subscales include: 1) maintaining family integration, cooperation and an optimistic definition of the situation, 2) maintaining social support, self-esteem and psychological stability and 3) understanding the medical situation through communication with other parents and consultation with medical staff.

Scoring system: Mothers asked to rate their coping on a 4 point rating scale ranging from "0"= not helpful, 1= minimally helpful, 2= moderately helpful to 3= extremely helpful. Total coping health inventory score = 135. Total mothers' coping was divided into 3 levels; poor coping (1-<45), average coping (45-<90) and good coping (90-135).

Validity and reliability:

The tools were tested for their content validity by a jury of five experts in the pediatrics and community health nursing. The required modifications were carried out accordingly. Testing reliability of the study tools was done by Cronbach alpha, the result was 0.78 for questionnaire, 0.69 for observation checklist, 0.74 for PSI and 0.80 for CHIP.

2.2. Operational Design:

Preparatory Phase

During this phase, a review of the literature was done through reviewing the available national and international related literature to be oriented with various aspects of the research problem and to develop the study tools.

Pilot study:

A pilot study was carried out on 10 mothers and their children to test the applicability and feasibility of the study tools, mothers included in the pilot study were excluded from the main study sample since some modifications were done in the form of rephrasing for some statements. The final form of the tools was then obtained and the time needed for completing each tool was also determined.

Ethical considerations

Informed consent was obtained from mothers prior to data collection. The studied mothers were informed about the purpose and the expected outcomes of the study and they were assured that, the study was harmless to their children and their participation was voluntary and they have the right to withdraw from the study at any time without giving any reason. They were also assured that, anonymity and confidentiality will be guaranteed, as well the collected data will be used for the research purpose only. Ethics, values, culture and beliefs were respected.

Field work

The actual field work was carried out over a period of 6 months from beginning of April up to the end of September 2016. The researchers were available in the study setting 3 days/week from 8.00 a.m. to 1.00 p.m. and the actual field work was divided into four phases:

1. Assessment phase:

In this phase, the researchers were using the constructed tools in collecting the data about mothers' knowledge and practices, as well as their stress and coping patterns related to care of their children suffering from bronchial asthma (pre-test). The purpose of the study and its expectations were explained by the researchers to the studied mothers before starting interviewing and data collection. The questionnaire was filled in by the researchers, the time needed to fill in the questionnaire depended on mothers' own knowledge, the average time ranged between 10-15 minutes. The observation checklist was filled in by the researchers during observation of mothers' practices (re-demonstration) and the time needed to filling in the checklist depended on mothers' own practices of the procedures, each procedure time ranged between 3 to 5 minutes. The PSI and CHIP were filled in by the researchers by asking the mothers to rate their statements on the rating scales, the average time needed to fill in the two scales was 15-20 minutes.

2. Planning phase:

The discharge plan was designed on the light of the literature review and modified according to mothers' educational needs regarding care of their children suffering from bronchial asthma. The aim of discharge plan was to enhance mothers' knowledge and practices regarding care of their children suffering from bronchial asthma, as well as minimize mothers' stress level and improve coping patterns among them. The content of discharge plan included knowledge about definition, causes, triggers, signs and symptoms, treatment, complications and prevention of bronchial asthma. As well, the discharge plan included practices related to nebulizer, inhaler, breathing and coughing exercise, and chest physiotherapy. Constructing the discharge plan content was then followed by selecting the suitable teaching methods and appropriate media for teaching this content. In addition to the discharge plan intervention, a discharge illustrated booklet was designed by the researchers in Arabic language to serve as a referral guideline for mothers having children suffering from bronchial asthma. The discharge illustrated booklet was evaluated for its content validity and clarity by a panel of experts, professors in the field of Pediatrics and Community health nursing. In the light of their comments, the necessary modifications were carried out and the final form of the discharge booklet was administered.

3. Implementing phase:

The total number of sessions was 4: One session for theory and 3 sessions for practices, each session took about one hour. The total time was 4 hours for each group. The studied mothers were divided into groups, each group included 5 to 7 mothers according to their attendance to the study setting. At the beginning of the first session, an introduction about the discharge plan was done and each session started with a summary feedback about the previous session, and at the end of each session the researchers inform mothers about the date and time of next session according to their time in the Emergency Department. Different teaching methods were used such as; modified small group discussion, role play, demonstration and re-demonstration. Suitable media was used such as; real equipment, posters and booklet. Some equipment as nebulizer, used for the practical skills, were not available in enough amounts to facilitate the training in the Emergency Department, therefore the researchers bought three by their own money.

4. Evaluation phase:

The same tools were used immediately post implementations of discharge plan to evaluate the outcome.

2.3. Administrative design:

An official permission to carry out the study was obtained through an issued letter from the Dean of the Faculty of Nursing, Ain Shams University to the medical and nursing directors of the previously mentioned setting. The letter included the title, aim and the expected outcomes of the study to obtain their approval to conduct the study.

2.4. Statistical Design

The collected data were organized, revised, scored, tabulated and analyzed using the number and percentage distribution. Statistical analysis was done by computer using statistical package for social sciences (SPSS). Qualitative variables were compared using Chi-square test and quantitative variables were compared using Pearson correlation coefficient (r) for continuous parametric variables, and Spearman rank correlation for ordinal nonparametric variables. The significance of the results was considered as follows: When $P > 0.05$: it is a statistically insignificant difference, while $P < 0.05$ and $P < 0.001$: it is a statistically significant difference.

III. Results

Considering profile of the studied sample, the results of the present study clarified that, 69% of the children aged less than five years and almost three quarters of them are male. As regards to socio-demographic characteristics of the mothers, less than half (46.3%, 48% & 48%) of them aged less than 30 years, were highly educated and working respectively. While, an equal percentage of 80% of mothers were living in urban areas, in separate houses, and 95% of these houses have a source of ventilation.

Table (1) shows that, there are statistically significant differences ($p < 0.001$), in all items of mothers' knowledge regarding bronchial asthma between pre/post implementation of the discharge plan. Most (82.8%, 94.8% & 84.5%) of studied mothers had unsatisfactory knowledge regarding warning signs, treatment and complications of bronchial asthma respectively pre-implementation of the discharge plan, compared to 74.1%, 72.4% and 70.7% of them had satisfactory knowledge respectively post implementation.

According to the research hypothesis, **figure (1)** illustrates that there is a statistically significant difference ($X^2 = 31.2$ at $p < 0.001$) between pre/post implementation of the discharge plan regarding mothers' total knowledge about care of children suffering from bronchial asthma, where 79.3% of studied mothers had unsatisfactory total

knowledge pre-implementation of the discharge plan compared to 72.4% of them had satisfactory total knowledge post implementation.

Table (2) reveals that there are statistically significant differences ($p < 0.001$) in all items of mothers' practices between pre/post implementation of the discharge plan. More than three quarters (79.3%, 82.8% & 79.3%) of studied mothers had inadequate practices of nebulizer, breathing and cough exercises and chest physiotherapy respectively pre-implementation of the discharge plan compared to 74.1%, 72.4% and 81% of them had adequate practices respectively post implementation.

According to research hypothesis, **figure (2)** illustrates that, there is a statistically significant difference ($X^2 = 27.2$ at $p < 0.001$) between pre/post implementation of the discharge plan regarding mothers' total practices related to care of children suffering from bronchial asthma, where 70.7% of studied mothers had inadequate total practices regarding care of children suffering from bronchial asthma pre-implementation of the discharge plan compared to 77.6% of them had adequate total practices post implementation.

According to research hypothesis, **figure (3)** illustrates that, there is a statistically significant difference ($X^2 = 26.8$ at $p < 0.001$) between pre/post implementation of the discharge plan regarding mothers' total stress levels related to care of children suffering from bronchial asthma, where 55.2% of studied mothers had severe stress pre implementation of the discharge plan compared to 12.1% of them post implementation.

According to research hypothesis, **figure (4)** shows that, there is a statistically significant difference ($X^2 = 23.8$ at $p < 0.001$) between pre/post implementation of the discharge plan regarding mothers' total coping patterns related to care of children suffering from bronchial asthma, where 72.4% of studied mothers had poor coping patterns pre-implementation of the discharge plan compared to 27.6% of them post implementation.

Table (3) indicates that, there is strong positive correlation ($r = 0.617$ at $p < 0.001$) between total knowledge and total practices of studied mothers regarding care of children suffering from bronchial asthma post implementation of the discharge plan. However, there is no correlation ($r = 0.175$ at $p > 0.05$) between them pre implementation of the discharge plan.

Table (4) clarifies that, there are negative correlations ($r = - 0.831$, & $r = - 0.701$ at $p < 0.05$) between total mothers' stress and their total knowledge as well as total practices respectively regarding care of children suffering from bronchial asthma post implementation of the discharge plan. However, there is no correlation ($p > 0.05$) between them pre implementation. The same table also reveals that, there are negative correlations ($r = - 0.781$, & $r = - 0.846$ at $p < 0.05$) between total mothers' stress and their total coping patterns pre/post implementation of the discharge plan respectively.

Table (5) displays that, there are positive correlations ($r = 0.391$, & $r = 0.638$ at $p < 0.05$) between total mothers' coping patterns and their total knowledge as well as total practices respectively regarding care of children suffering from bronchial asthma post implementation of the discharge plan. However, there is no correlation ($p > 0.05$) between them pre implementation.

Table (6) shows that, there are positive correlations ($r = 0.595$, & $r = 0.582$ at $p < 0.05$) between mothers' education and their total knowledge as well as total practices respectively regarding care of children suffering from bronchial asthma post implementation of the discharge plan. Moreover, there is a positive correlation ($r = 0.561$ at $p < 0.05$) between mothers' education and their total coping patterns post implementation of the discharge plan. Meanwhile, there are no correlations between mothers' age, working and residence and their total knowledge, practices and coping patterns post implementation of the discharge plan. Moreover, there are no correlations between mothers' stress and their characteristics post implementation of the discharge plan.

Table (1): Distribution of the Studied Mothers According to their Satisfactory Knowledge about Bronchial Asthma Pre /Post Implementation of the Discharge Plan (n=58).

Mothers' knowledge regarding bronchial asthma	Pre discharge plan		Post discharge plan		X ²	p value
	No.	%	No.	%		
Meaning	19	32.8	46	79.3	25.5	<0.001*
Causes	13	22.4	42	72.4	29.1	<0.001*
Trigger factors	12	20.7	44	75.9	35.4	<0.001*
Clinical manifestations	24	41.4	46	79.3	17.4	<0.001*
Warning signs	10	17.2	43	74.1	37.8	<0.001*
Treatment	3	5.2	42	72.4	55.2	<0.001*

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Complications	9	15.5	41	70.7	35.9	<0.001*
Prevention	14	24.1	45	77.6	33.1	<0.001*
Daily living activity	20	34.5	48	82.8	27.9	<0.001*
Management of attack	12	20.7	49	84.5	47.3	<0.001*

*Statistically significant difference

Figure (1): Distribution of the Studied Mothers According to their Total Knowledge about Bronchial Asthma Pre/Post Implementation of the Discharge Plan.

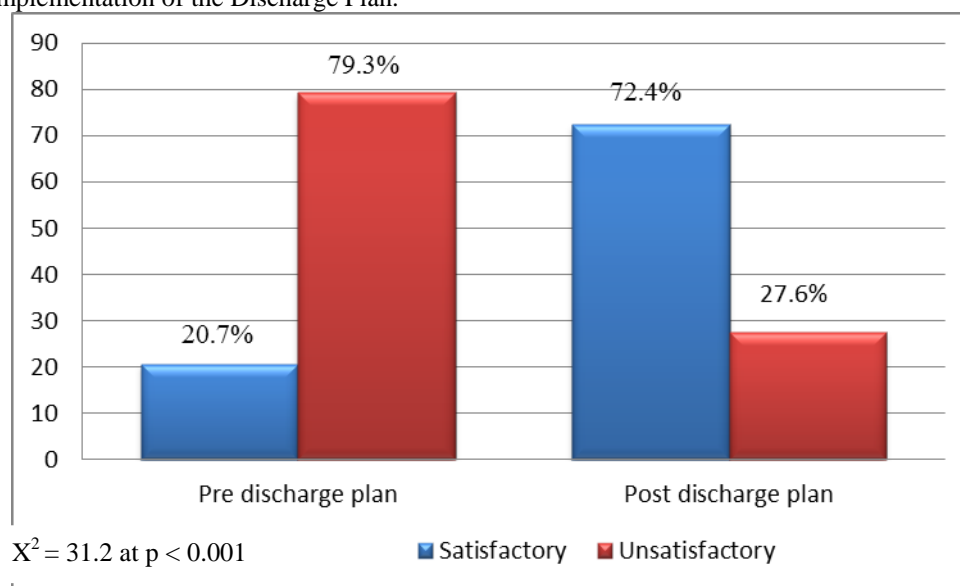


Table (2): Distribution of the Studied Mothers According to their Adequate Practices of all Items Related to Caring of their Children Suffering from Bronchial Asthma Pre/Post Implementation of the Discharge Plan (n=58).

Mothers' Practices Regarding	Pre discharge plan		Post discharge plan		X ²	p value
	No.	%	No.	%		
Nebulizer	12	20.7	43	74.1	33.2	<0.001*
Inhaler	18	31	44	75.9	23.4	<0.001*
Breathing and cough exercises	10	17.2	42	72.4	39.7	<0.001*
Chest physiotherapy	12	20.7	47	81	42.3	<0.001*

*Statistically significant difference

Figure (2): Distribution of the Studied Mothers According to Their Total Practices Regarding Care of Children Suffering from Bronchial Asthma Pre/Post Implementation of the Discharge Plan.

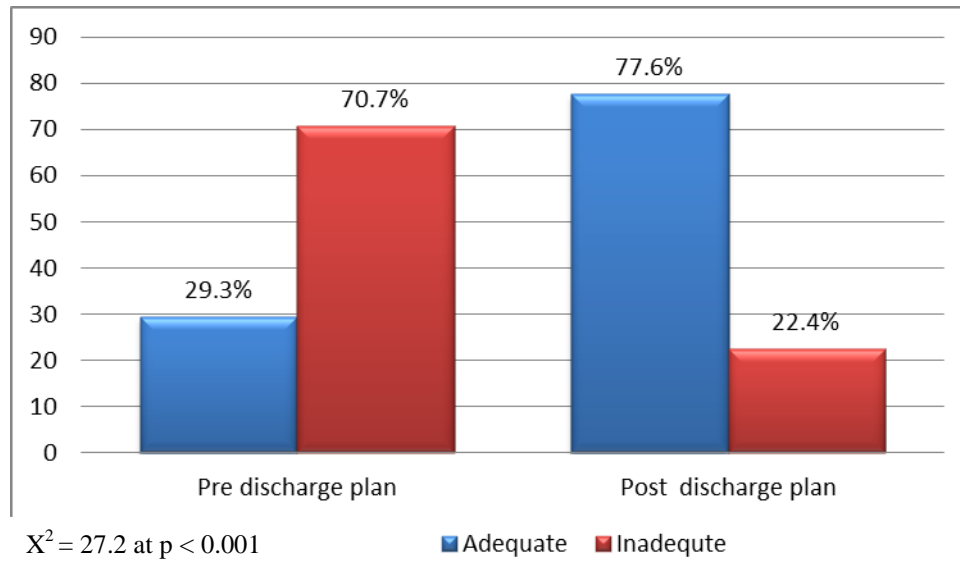


Figure (3): Distribution of the Studied Mothers According to Their Total Stress Regarding Care of Children Suffering from Bronchial Asthma Pre/Post Implementation of the Discharge Plan.

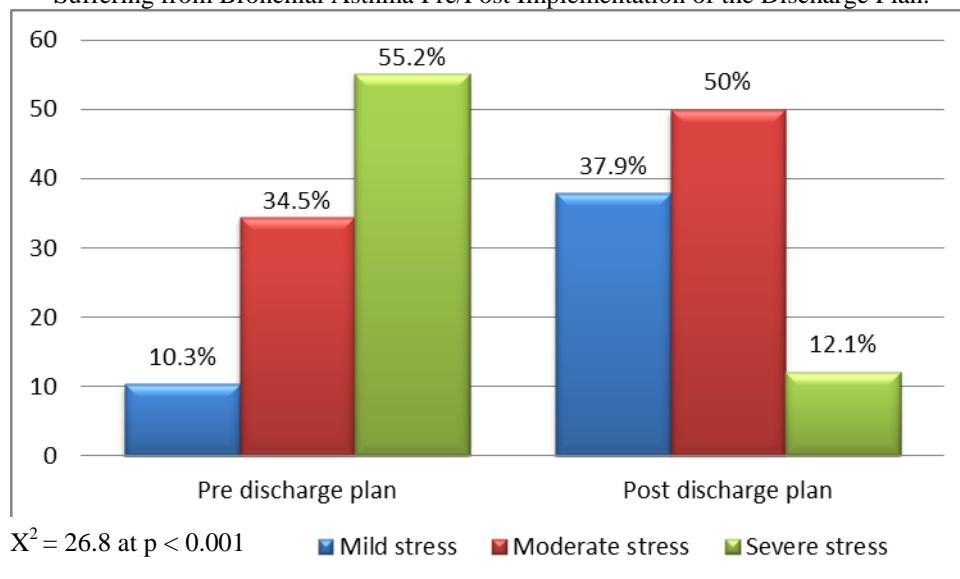


Figure (4): Distribution of the Studied Mothers According to Their Total Coping Patterns Regarding Care of Children Suffering from Bronchial Asthma Pre/Post Implementation of the Discharge Plan.

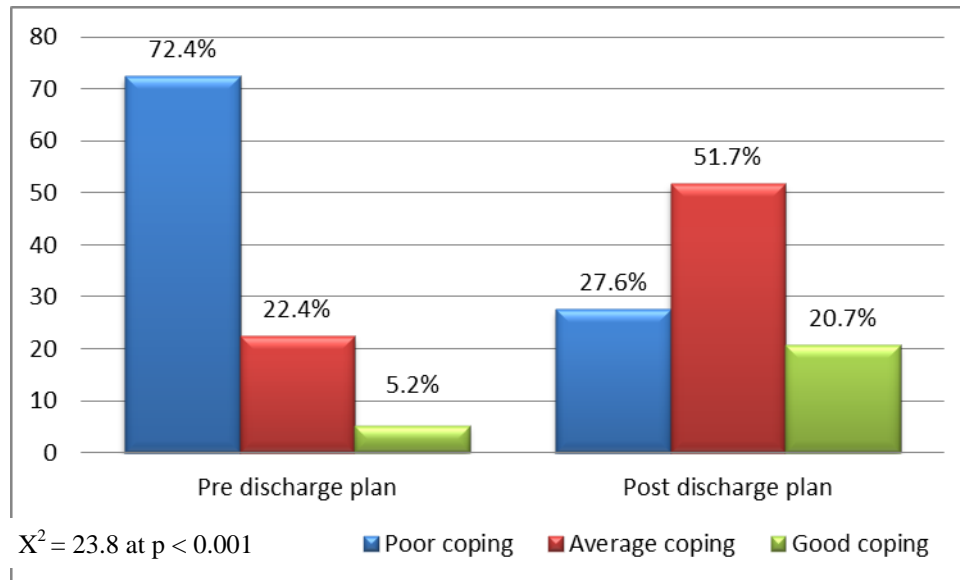


Table (3): Correlations Between Total Mothers’ Knowledge and Their Total Practices Regarding Care of Their Children Suffering from Bronchial Asthma Pre/Post Implementation of the Discharge Plan.

Total mothers' practices	Total mothers' knowledge			
	Pre discharge plan		Post discharge plan	
	r	p	r	p
Pre discharge plan	0.175	0.483	-	-
Post discharge plan	-	-	0.617	0.000*

*Correlation is significant at $p < 0.05$

Table (4): Correlations Between Total Mothers’ Stress and their Total Knowledge, Practices and Coping Patterns Regarding Care of Their Children Suffering from Bronchial Asthma Pre/Post Implementation of the Discharge Plan.

Items	Total mothers' stress			
	Pre discharge plan		Post discharge plan	
	r	p	r	p
Total mothers' knowledge				
Pre discharge plan	0.234	0.406	-	-
Post discharge plan	-	-	- 0.831	0.004*
Total mothers' practices				
Pre discharge plan	0.102	0.391	-	-
Post discharge plan	-	-	- 0.701	0.003*
Total mothers' coping patterns				
Pre discharge plan	- 0.781	0.031*	-	-
Post discharge plan	-	-	- 0.846	0.021*

*Correlation is significant at $p < 0.05$

Table (5): Correlations Between Total Mothers’ Coping Patterns and their Total Knowledge and Practices Regarding Care of Their Children Suffering from Bronchial Asthma Pre/Post Implementation of the Discharge Plan.

Items	Total mothers' coping patterns			
	Pre discharge plan		Post discharge plan	
	r	p	r	p
Total mothers' knowledge				
Pre discharge plan	0.059	0.563	-	-
Post discharge plan	-	-	0.391	0.005*
Total mothers' practices				
Pre discharge plan	0.157	0.118	-	-
Post discharge plan	-	-	0.638	0.020*

*Correlation is significant at $p < 0.05$

Table (6): Correlations Between Mothers' Characteristics and their Total Knowledge, Practices, Stress and Coping Patterns Regarding Care of Their Children Suffering from Bronchial Asthma Post Implementation of the Discharge Plan.

Mothers' characteristics	Mothers' knowledge		Mothers' practices		Mothers' stress		Mothers' coping	
	r	p	r	p	r	p	r	P
Age	0.043	0.767	-0.003	0.986	0.021	0.618	0.208	0.148
Education	0.595	0.012*	0.582	0.014*	0.305	0.591	0.561	0.032*
Working ©	0.224	0.116	0.171	0.235	0.201	0.701	0.021	0.887
Residence ©	0.129	0.373	0.093	0.519	0.075	0.574	0.149	0.301

*Correlation is significant at $p < 0.05$ © Spearman rank correlation

IV. Discussion

Bronchial asthma is the most prevalent chronic diseases of childhood; it constitutes a serious public health problem all over the world. However, it is considered a common cause of emergency room visits and hospital admissions, it accounts for more hospitalizations in children than any other chronic illness. Moreover, asthma causes children and adolescents to miss school and causes parents to miss days at work [27].

The number of children suffering from bronchial asthma in any population is far greater than what can be managed by trained persons. Therefore, a vast majority of these children and their parents all over the world are in great need for asthma education [28]. Care giving in childhood asthma is generally the responsibility of the children's mothers, as the children spend most of their time with their mothers rather than any other families' members. So that, the current study was conducted to evaluate the effect of discharge plan on mothers having children suffering from bronchial asthma through; assessing mothers' knowledge, practices, stress levels and coping patterns regarding care of their children; designing and implementing a discharge plan for mothers about care of their children suffering from bronchial asthma; and evaluating the effect of the discharge plan on mothers' knowledge, practices, stress level and coping patterns regarding care of their children suffering from bronchial asthma.

The findings of the current study revealed that, more than two thirds of the studied children aged less than five years, and almost three quarters of them were males. These findings are in agreement with those of **Ahmed** [29], who found, in a study entitled "Stressors and coping patterns of mothers having children with bronchial asthma" that, more than half of the children were in the age group 3-6 years and were males. Meanwhile, these findings are incongruent with those of **El-Morshedy** [30], who carried out a study entitled "Quality of life for children suffering from bronchial asthma" and found that, more than one third of the studied children aged less than five years and more than half of them were females. These results might be due to the differences in the samples' size.

As regards characteristics of the mothers under study, results revealed that slightly less than half of them aged less than 30 years, were highly educated and working. These findings are consistent with those of **Tantawi et al.** [31], who carried out a study entitled "Effect of educational guidelines program on asthmatic children and their mothers" and reported that, less than half of the mothers aged less than 35 years, were highly educated and working. Meanwhile, these findings are incongruent with those of **Ebrahim** [32], who recently conducted a study entitled "Nursing intervention for school age children with bronchial asthma in a rural area" and mentioned that, more than half of the mothers were in the age group 35<40 years, were secondary school and housewives. These results might be due to the differences in the study settings.

Concerning the residence of studied mothers and their children, the findings of the present study clarified that, the majority of them were living in urban areas, in separate houses and the great majority of these houses have a source of ventilation. These findings are corresponding with those of **Ahmed** [29], who reported that more than half of asthmatic children were living in urban areas, in good ventilated houses. Meanwhile, these findings are contrasting with those of **Zedan et al.** [22], who studied the prevalence of bronchial asthma among Egyptian school children, and found that, there was no great difference between prevalence of childhood asthma in urban and rural areas that may be explained by similarity in environmental conditions in both areas due to close proximity to each other in the crowded Nile Delta region. On the other hand, **Hossny et al.** [33], who carried out a study entitled "Analysis of the filed data of a sample of Egyptian children with bronchial asthma" observed that allergic diseases were more prevalent in urban residents, followed by suburban residents, with few cases coming from rural areas. These differences can be partially explained by differences in environment exposures, such as air pollution, and exposure to allergens, such as pollens, cockroaches, and house dust mites.

Considering the mothers' knowledge, the results of the current study indicated that there are statistically significant differences in all items of mothers' knowledge post implementation of the discharge plan compared to pre implementation regarding meaning of bronchial asthma, its causes, trigger factors, clinical manifestations, warning signs, treatment, complications, prevention, daily living activities, and management of attack. These differences showed also a statistically significant improvement about total mothers' knowledge after implementation of discharge plan. This improvement in mothers' knowledge justified the research hypothesis, and attributed it to the fact that the discharge plan was planned after assessment of mothers' identified

knowledge gaps and needs and the mothers were willing to get more information to help their children. From the researchers' point of view this emphasizes the importance for conducting discharge plan especially for newly diagnosed children with asthma and their mothers.

The previous results are parallel to that of **Thomas et al.** [34], whose very recent study entitled "Parental knowledge and recall of concussion discharge instructions" reported that there was statistically significant improvement in parents' knowledge after discharge instructions that helped increase understanding of family to care their children. Previously, **Salama et al.** [35], who carried out a study entitled "Quality of care of Egyptian asthmatic children: Clinicians adherence to asthma guidelines", mentioned that all patients may benefit from formal asthma education programs. However, the same study showed that most of their participants agree with the concept of patient education which included how to recognize allergen triggers, and how to recognize, and report asthma symptoms. In the same context, **Camp et al.** [36], whose study entitled "Emergency department visits for children with acute asthma: Discharge instructions, parental plans, and follow-through of care - a prospective study" identified that educating families about asthma triggers, proper medication administration, and identification of early warning signs and symptoms is essential to asthma control.

Regarding the studied mothers' practices, the results of the current study showed that, more than three quarters of studied mothers had inadequate practices of nebulizer pre-implementation of the discharge plan compared to slightly less than three quarters of them had adequate practices post implementation. This may be reflecting the importance of providing discharge plan for improving mothers' practices in addition to active involvement of mothers and active communication with the researchers. This finding is similar to those of **Bayoumi** [37], who carried out a study entitled "Discharge guide program for mothers of children with bronchial asthma" and found that there was statistically significant improvement in mothers' practices toward nebulizer after program implementation. Additionally, this finding is corresponding with that of **Williams et al.** [28], who studied "Parental education on asthma severity in the emergency department and primary care follow-up rates" and reported that parents' practices toward inhaled corticosteroids is statistically improved after education. In a similar study, **Camp et al.** [36] mentioned that, improvements are urgently needed in developing strategies to manage pediatric asthma, communication with parents at discharge in acute care, and using alternate acute care services for parents who continue to rely on emergency departments for the initial care of asthma.

The results of present study revealed statistically significant difference pre/post implementation of discharge plan regarding the mothers' practices of inhaler administration, where more than two thirds of studied mothers had inadequate practices pre implementation of discharge plan compared to about three quarters of them had adequate practices post implementation. This result is consistent to that of **Glick et al.** [20], who recently studied Parental management of discharge instructions: A systematic review, and found that parents' knowledge and practices related to medication were statistically improved after discharge instruction. Previously, **Salama** [35] reported that most of participants agree with the concept of patient education which included how to use medication.

The present study findings showed that there are improvements in mothers' practices post implementation of discharge plan regarding breathing and cough exercises and chest physiotherapy. These findings may highlight the importance of the discharge plan in increasing the mothers' awareness regarding importance of breathing exercise in reducing attack occurrence. These findings are supported by that of **Tantawi et al.** [31], who reported that, mothers' practice related to breathing exercise was statistically improved after educational guidelines program.

Concerning total practices of the studied mothers, the finding of the present study revealed that there was a statistically significant improvement post implementation of the discharge plan. This improvement justified the research hypothesis and reflected the importance of discharge plan for newly diagnosed children with bronchial asthma and their mothers, which helped the mothers to acquire the needed practices to care their children. This result is matched with that of **Ahmed et al.** [38], who performed a study entitled "The use of self-management skills in improving pediatric asthma outcomes" and reported that there was highly statistically significant improvement in mothers' practices related to their children with asthma after application of self-management program.

Considering mothers' stress, the result of the present study clarified that, there is a statistically significant difference between pre/post implementation of the discharge plan regarding mothers' stress levels related to care of children suffering from bronchial asthma. More than half of the studied mothers had severe stress pre implementation of the discharge plan compared to slightly more than one tenth of them post implementation, the improvement in mothers' stress justified the research hypothesis and reflected the positive effect of the discharge plan on stress levels of mothers. This result is supported by that of **El Sayed** [39], who conducted a study entitled "Impact of supportive care for mothers of children with brain tumor on their coping" and reported that, mothers who received supportive care experienced less level of stress than those who did not. From the researchers' point of view, numerous new sources of stress faced mothers and their children, including

change in routines (e.g., missing school and frequent hospital visits), physical effects of treatment, and uncertainty about their disease, and inability of mothers to meet their infants' basic care needs. In addition, change in the mothers' role was the most stressful.

The result of the present study clarified that, there is a statistically significant difference between pre/post implementation of the discharge plan regarding mothers' coping patterns related to care of their children suffering from bronchial asthma. Less than three quarters of studied mothers had poor coping patterns pre implementation of the discharge plan compared to more than one quarter post implementation. This improvement in mothers' coping patterns justified the research hypothesis and reflected the positive effect of the discharge plan on coping patterns of mothers. This result is supported by that of **Stephanie et al.** [40], who recently carried out a study entitled "Parent coping support interventions during acute pediatric hospitalizations: A meta-analysis" and found that, experimental interventions, designed for caregivers, affect significantly in alleviating psychological distress and helping parents to cope with the disease.

As regards the correlation between the total knowledge of the studied mothers and their total practices regarding care of their children suffering from bronchial asthma, the result of the current study indicated that, there is a strong positive correlation between them post implementation of discharge plan. This result indicated that the improvement in mothers' knowledge about asthma led to improve mothers' practices. As well, this observed improvement in knowledge and practices regarding asthma may be attributed to the fact that barriers can be prevented to reduce the burden such as poor disease education, and delay in obtaining help during the acute attack. This result is similar to that of **Mohamed** [41], who carried out a study entitled "Effect of discharge plan for children undergoing chemotherapy and their caregivers on improving practice and coping pattern" and reported that, there is statistically positive correlation between total knowledge and total practices of parents post discharge plan. Moreover, **Everhart and Koinis-Mitchell** [42], who studied supporting caregivers in the management of childhood asthma, found that, there was highly statistically significant positive correlation between mother's knowledge and reported health care related practice. In the same context, **Dawood et al.** [43], who studied parent's knowledge and management of their children's ailments in Malaysia, clarified that, parents with better and higher medical knowledge had better means of managing their children's ailments.

The results of the current study revealed that, there are negative correlations between mothers' stress and their total knowledge as well as total practices regarding care of children suffering from bronchial asthma post implementation of the discharge plan. However, there are negative correlations between mothers' stress and their coping patterns pre/post implementation of the discharge plan. These results are similar to that of **Mohamed** [41], who found that, there are negative correlations between caregivers' stress and their knowledge, practices and coping patterns post discharge plan. Previously, **Falk et al.** [44], who carried out a study entitled "Informational needs in families after their child's mild head injury", and mentioned that, providing adequate information was one of the most valuable ways to help the family deal with their stress.

As regards correlations between mothers coping patterns and their total knowledge and practices, the results of the present study revealed positive correlations between these items post implementation of discharge plan. These results are supported by **Kerr et al.** [45], who mentioned that, mothers being well informed by staff about disease and its care helped them to cope.

Considering correlations between the characteristics of the studied mothers and their total knowledge regarding care of their children suffering from bronchial asthma, the results of the present study revealed that, there is a positive correlation between mothers' level of education and their total knowledge post implementation of the discharge plan. Meanwhile, there are no correlations between mothers' age, working and residence and their total knowledge pre/post implementation. These findings can be due to the fact that, the educated mothers are more powerful and more oriented to take the right decision related to their children's health. As well, the housewife mothers have a good opportunity and plenty of time to care for their children's health by themselves and also, they are usually in need and have been desire to know any valuable instructions related to their children's health. These results are corresponding with those of **El Sayed** [39], who found that, there was a statistically significant difference between the mothers' knowledge and their level of education post supportive care. Additionally, **Golfenshtein et al.** [46] mentioned that higher level of education is usually associated with good behavior towards child's health.

Concerning correlations between the characteristics of the studied mothers and their total practices regarding care of children suffering from bronchial asthma, the results of the present study indicated that, there is a positive correlation between mothers' level of education and their total practices post implementation of the discharge plan. These results are corresponding with those of **Ahmed** [29], who found that there was a significant correlation between the mothers' practices and their level of education. Previously, **Bell and Wright** [47] mentioned in a study entitled "The illness beliefs model: Advancing practice knowledge about illness beliefs, family healing, and family interventions" that, more misconceptions in asthma practices between studied caregivers was much stronger in less educated ones. The results of the current study also revealed that, there were no correlations between mothers' age, working and residence and their total practices pre/post

implementation of the discharge plan. From the researchers' point of view these characteristics have no effect on the role of the mother as a care provider, in addition, the practices can be mastered by training.

As regards correlations between the characteristics of the studied mothers and their total coping patterns regarding care of their children suffering from bronchial asthma, the results of the present study indicated that, there is a positive correlations between mothers' education and their total coping patterns post implementation of the discharge plan. Meanwhile, there are no correlations between mothers' age, working and residence, and their total coping patterns pre/post implementation of the discharge plan. This can be referred to that educated mothers were able to understand their children's disease symptoms, can deal with problems, and communicate with medical and nursing staff to understand the process of their children's disease, so, mothers' stress level decreased and they became able to cope with the disease. These findings are corresponding with that of **Kunswa** [48], who carried out a study entitled "Effect of nursing intervention on stressors and coping pattern of mothers having preterm infants" and revealed that, there was no statistically significant difference between mothers' age and their coping post intervention and at follow up, whereas all mothers in all ages needed actual support to reduce their stress, and promote their confidence and coping skills. Meanwhile, these results are incongruent with those of **Stephanie et al.** [40], who found that, parents' characteristics namely; age, gender and education are positively correlated with their coping to children's diseases after support interventions.

V. Conclusion

Based on the results of the current study, it can be concluded that, the research hypothesis is accepted and the implementation of the discharge plan led to significant improvements in mothers' knowledge and practices as well as coping patterns and decrease in stress levels regarding care of their children suffering from bronchial asthma. Moreover, there are positive correlations between mothers' coping patterns and their knowledge as well as their practices, meanwhile, there is negative correlation between mothers' coping patterns and their stress levels post implementation of the discharge plan.

VI. Recommendations

Based on the results and conclusion of the present study, the following recommendations were suggested:

- Discharge plan for all mothers having children suffering from bronchial asthma should be conducted in emergency department, inpatient and outpatient clinics.
- Discharge instructional pamphlet or illustrated booklet should be available at all emergency departments, inpatient departments, outpatient hospital clinics and health centers for children suffering from bronchial asthma and for their mothers about asthma.
- Periodical follow-up for the level of knowledge and practices of mothers having children suffering from bronchial asthma.
- Appropriate intervention to decrease stress levels and enhance coping patterns among mothers of children suffering from bronchial asthma according to their actual needs and problems.
- Further researches are required involving larger study sample of children suffering from bronchial asthma and their mothers about the effect of discharge plan at different study settings, all over Egypt, in order to generalize the results.

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