Effect of Reflexology on Quality of Life of Preschool Children Suffering from Bronchial Asthma

Shimaa Ramadan AhmedAbd El-Sattar: M.SC. N, Pediatric Nursing

Faculty of Nursing, Tanta University

RahmaSolimanBahgat: Prof. of Pediatric Nursing

Faculty of Nursing, Tanta University

SamiaAbd El-Hameed El-Dardiry: Prof. of Biochemistry

Faculty of Medicine, Tanta University

Ebtisam Mohammed El-Saied: Prof. of Pediatric Nursing

Faculty of Nursing, Tanta University

Ali Eed El-Deep: Prof. of Physical Medicine, Rheumatology and Rehabilitation

Faculty of Medicine, Tanta University

Abstract:

Bronchial asthma is one of the most common chronic respiratory diseases that affect children. Children with bronchial asthma symptoms have significantly lower health related quality of life scores. The nurse can play an important role in management of asthma by applying a safe and an effective assistant method beside the standard medical care as reflexology that can promote well-being, relaxation and improve asthma severity symptoms. **The present study aimed** to evaluate the effect of reflexology on quality of life of preschool children suffering from bronchial asthma. **Materials and Method**: The study was conducted at Inpatient Pediatric Chest Unit at Tanta University Hospital. Sixty preschool children suffering from asthma and their mothers were included in the study. They were divided into two equal groups. The study group received the routine hospital medical care plus reflexology. Data were collected by using a structure interview sheet, the basic reflexology technique and outcome measurement scales **Results:** The present study revealed **t**hat applying reflexology beside medical care for study group children improved their overall quality oflife 3days and one month post-program in a degree more than that of applying medical care only for control group children. **The study recommended** in-service training programs and workshops should be conducted periodically and regularly for nurses working in Pediatric Chest Unit about skills of applying reflexology for asthmatic children.

Key words: reflexology, quality of life, bronchial asthma

Introduction:

The preschool stage is the period in a child's life from the age of three to the age of five or six that ordinarily precedes attendance at school.(1) During this stage of life the child may be exposed to certain medical conditions or diseases that may slow the child's development as infections, head injuries and chronic diseases such as bronchial asthma.(2)

Bronchial asthma is a chronic lung condition in which the airways are inflamed and narrowed, making it harder to breathe normally. It is the most common, long-term condition among people in the UK. It affects about five million people and more than a million children in the UK. Bronchial asthma often starts in childhood, but it can happen for the first time at any age.[3]

About twenty million Americans have bronchial asthma, including nine million children. In fact, bronchial asthma is the most common chronic childhood illness. About half of all cases develop before the age of 10, and many children with bronchial asthma also have allergies.[4, 5] The prevalence of bronchial asthma among Egyptian children aged 3 - 15 years was estimated to be 8.2%. Of major concern is the annual increase in mortality.[6] It is estimated that bronchial asthma accounts for about one in every 250 deaths worldwide, many of the deaths are preventable, being due to suboptimal long-term medical care and delay in obtaining help during acute exacerbation.[7]

Bronchial asthma probably results from a combination of inherited (genetic) and environmental factors. However, no one knows for sure why some children get bronchial asthma while others do not.[3] More and more evidence suggests that allergies can play an important role in whether children develop bronchial asthma. Bronchial asthma can either be allergic or non-allergic. In allergic bronchial asthma, an allergic reaction occurs due to an inhaled irritant as pet dander, pollen and dust mites, some drugs as penicillin and aspirin, and some foods as milk, egg and fish, so the immune system springs into action, but instead of helping, it causes inflammation that triggers an attack. It is the most common cause of bronchial asthma in children older than five years of age. Non-allergic bronchial asthma does not involve the immune system. Attacks can be triggered by stress, anxiety, strenuous exercise, cold air, fumes, dust, strong odors, smoke, or viral infection. It is the most common cause of bronchial asthma in the first five years of life.[8,9]

Bronchial asthma symptoms vary from one child to another. The most common symptom of childhood bronchial asthma is coughing which is typically non-productive and can frequently be the only symptom. When it is the only symptom, this is termed cough-variant bronchial asthma. [10] Other common symptoms include wheezing, difficult breathing, chest tightness and poor exercise endurance. Children with bronchial asthma often have a history of recurrent bronchitis or even a recurrent croup-like cough.[10]

Quality of life measures convey an overall sense of well-being. Having uncontrolled bronchial asthma can negatively affect quality of life. Bronchial asthma not only affects the person who has bronchial asthma, but other family members as well, with unscheduled trips to the doctor or emergency department, modifications to the home environment to reduce triggers, and increased caregiver responsibilities. [11, 12] High prevalence of bronchial asthma puts a considerable burden on health care resources, and effective bronchial asthma management is important to reduce morbidity and to optimize utilization of health care facilities. This has led to the development of guidelines for bronchial asthma diagnosis and management.[13, 14]

It is assumed, based on earlier research that bronchial asthma nurse is able to provide good bronchial asthma care by reinforcing knowledge, ensuring adherence to management plan, checking inhalation technique, and adjusting medication according to guidelines. [14, 15] Management goals for

childhood bronchial asthma are fairly consistent between the different guidelines. The aims are for a "normal life" free of any symptoms (e.g., cough, wheeze and breathlessness), the ability to have a restful sleep, to grow and develop normally, to participate in all activities including sports, to minimize the number of attacks of acute bronchial asthma, to avoid hospitalization and to avoid medication related side effects. [16]

While there is no cure for bronchial asthma, it can be controlled. Children with moderate to severe bronchial asthma should use conventional medications to help control symptoms. Complementary and alternative therapies, used under doctor's supervision, may help, but shouldn't replace conventional treatment. [4, 8] It is important to be aware that some complementary and alternative modalities may have adverse effects that trigger an allergic response or exacerbate bronchial asthma. These include case reports of serious allergic reactions to Echinacea, bee pollen/ propels/ royal jelly, garlic. Other types of complementary therapies of bronchial asthma as buteyko breathing exercise, yoga, massage, Vitamin E and D supplementation and reflexology may affect positively on some of these clinically relevant outcomes of bronchial asthma as symptoms, lung function, need for medication and quality of life of the child. [17]

Reflexology is a form of Chinese medicine that applies therapeutic pressure involving stimulating reflex points that are located on the foot or hand. These reflex points correspond to specific areas of the body and when used singly or in combination, produce therapeutic benefits; increase energy and bring about a state of well-being. [18] The goal for bronchial asthmatics is to improve circulation, help relaxation, increase the intake of oxygen and improve the overall health. In general, reflexology cannot take the place of conventional medicine that treat and prevent bronchial asthma, but it can supplement bronchial asthma management plan. Since it reduces anxiety and enhances circulation, reflexology promotes overall health for the troubled bronchial asthmatics. [19]

Aim of the study: To evaluate the preschool children suffering from bronchial asthma the beneficial complementary effect of reflexology, its influence on relevant outcomes of asthmatic symptoms, lung functions, need for medications and quality of life would be surveyed.

Research Hypothesis: The use of reflexology may improve the quality of life of preschool children suffering from bronchial asthma.

Materials and Method: Experimental research design was used in the present study. **Setting:** The present study was conducted at Inpatient Pediatric Chest Unit at Tanta University Hospital.

Subjects: Sixty preschool children suffering from asthma and their mothers. They were divided into two groups; study and control group which were selected randomly. The **study group** consisted of 30 preschool children suffering from asthma and their mothers where they received the routine medical care of the hospital plus reflexology. However, the **control group** consisted of other 30 preschool children suffering from asthma and their mothers where they received the routine medical care of the hospital only.

The children had **the following criteria:** both sexes**,** aged from 3 to 6 years**,** had asthma with attack, free from foot or hand injury, abscess, tingling, numbness or pain, and free from any disease other than asthma that could affect quality of life.

Tools of data collection: Three tools were used in this study for data collection. They were developed based on recent literature.

Tool I:''A Structured Interview sheet": It was developed by the researcher after review of literature. It included the **socio-demographic characteristics** to obtain the following data:

- **Related to the child:** such as age, sex, child's order among his siblings, and date of admission, weight, and length.

Present medical history includes:

- Onset of asthma, present manifestations, name and frequency of inhaler used by the child daily.
- History of allergy and relating testing, type of allergy (food, drugs, insects or others).
- History of asthma triggering factors as exposure to allergens or non- allergens stimuli

Past medical history includes:

- History of the first attack of asthma, duration of illness, repeated admission, frequency of attack, when and how asthma evoked.
- History about using any type of complimentary therapies in reducing severity of asthma symptoms.

- **Related to:** - **Child's Mother as** age, level of education, religion, occupation and opinion about using any type of complimentary therapies for management of asthma.
  - **Child's Father as** age, level of education, religion, occupation and cigarette smoking habit.
- **Socioeconomic condition** as: family size and number of rooms and residence and family income
- **Family medical history** of bronchial asthma or other chronic physical or mental disorders.

Tool II: ''Outcome measurement scales'' which included the primary and secondary measures which were evaluated by the researcher before, 3 days and one month after applying reflexology course for the preschool asthmatic children to assess its effects on quality of life of the preschool asthmatic children.

Primary Measures: Using **PedsQL™ 3.0 Asthma Module** which was integrated with the **PedsQl™ 4.0 generic core scale**

- **Pediatric Quality of Life Inventory™ 3.0 Asthma Module (PedsQL™ 3.0 Asthma Module):** It was developed to measure asthma-specific aspects of HRQOL in children aged 2-18 which comprised of child self-report and parent proxy-report formats. Both formats contained the same items/ questions about how much problems the child faced in the past one month in relation to different aspects of life. One format (child self-report) is answered by the child himself in about 10-15 minutes. However, the other format (parent proxy-report) is answered by the mother in about 5-10 minutes. This scale included 28 items consisted of 4 subscales for each format: Asthma Symptoms (11 items), Treatment Problems (11 items), Worry (3 items), and Communication (3 items). Responses were rated on a 5-point Likert scale across child self-report for children and parent proxy-report (0 = never a problem, 1 = almost never a problem, 2 = sometimes a problem, 3 = often a problem, 4 = almost always a problem). Items were reversed scored and linearly transformed to a 0-100 scale (0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0), so that higher scores indicated better HRQOL. HRQOL regarding asthma was graded and categorized into three categories: **-Good** when the total score was (76-100%)
  -Fair when the total score was (51-75%) **-Poor** when the total score was (0-50%)

Both formats (child self-report and parent proxy-report) were translated into Arabic and revised by 3 experts for content validity.

- **Pediatric Quality of Life Inventory™ 4.0 generic core scale (PedsQl™ 4.0 generic core scale):**

It is an instrument with 23 items grouped into four subscales: Physical functioning (8 items), Emotional functioning (5 items), Social functioning (5 items) and School Functioning (5 items). This scale was modified by removing the fourth subscale (School Functioning) to be consistent of 18 items which were suitable for assessment of asthmatic preschool children. The formats, instructions, Likert scales, and scoring methods, required time were the same as those of the PedsQL™ 3.0 Asthma Module.

Both formats (child self-report and parent proxy-report) were translated into Arabic and revised by 3 experts for content validity.

Secondary Measure: It included **Pediatric asthma severity score (PAS)** which was used by the researcher to assess asthma severity regarding the following variables: respiratory rate, oxygen requirements (the skin color), chest auscultation, retractions, dyspnea. The scale was translated into Arabic, and revised by 3 experts. A 3-point Likert scale was used. The scoring system was done and each item in the Pediatric asthma severity score/scale was scored either (1 point) for mild asthma, (2 points) for moderate asthma, or (3points) for severe asthma. The overall asthma score was calculated by adding the scores for each of the five previous variables. The total score involved 15 points with a range of (5-15 points). Asthma severity was categorized as follows:

5-7 points = mild asthma
8-11 points = moderate asthma
12-15 points = severe asthma

- ***Pediatric asthma severity score (PAS):***

Table 1. The Pediatric Asthma Score (PAS)*

Clinical features (Variables)	1	2	3
Respiratory rate			
2–3 years	≤34	35–39	≥40
4–5 years	≤30	31–35	≥36
Skin color	Good skin color (pink)	Normal or pale skin color	Blue skin color
Oxygen requirements	>95% on room air	90% to 95% on room air	<90% on room air or on any oxygen
Auscultation	Normal breath sounds to end-expiratory wheeze only	Expiratory wheezing	Inspiratory and expiratory wheezing to diminished breath sounds
Retractions	None or intercostal	Intercostal & substernal	Intercostal, substernal and supraclavicular
Dyspnea	Speaks in sentences, coos and babbles	Speaks in partial sentences, short cry	Speaks in single words/short phrases/grunting
		Scoring Reference	
Percent of predicted peak flow		>70%	50%–70%	<50%
Pediatric asthma score		5–7	8–11	12–15

* Values from each category were added to compute total PAS and designation of asthma severity.

Me

1- A
Pediatric Chest Unit at Tanta University Hospital).

2- Meeting with children and their mothers before starting data collection procedure was done to establish a good relationship, check the availability of conducting the research and to explain the purpose and importance of the study in a simple way.

3- Oral consent was taken from children and their mothers to participate in the study. The researcher emphasized that the participation in the study is voluntary and anonymous.

4-**Ethical considerations**: children and their mothers were informed of the confidentiality of their names, all data obtained from them, nature of the study and their right to withdraw from the study at any time.

5- Study tools were structured and developed based on review of the related literature.

6-**''A Structured Interview sheet''** was developed to collect the basic data including socio-demographic data of the studied children and their families. **(Tool I)**

7-**"The Basic Reflexology Technique"** was applied on the studied children individually for one session/day for 3 subsequent days and then for two sessions/ week for one month using therapeutic pressure and massage of the reflex points found on the feet or the hands. Massage was applied to each point for about 2-3 minutes. The total procedure had taken about 20-30 minutes for both feet. **(Tool II)**

The following basic steps were applied:

-The child was asked to relax and take in deep breaths (by imitating the researcher) before starting the massage (**relaxation breathing technique**).

-The child was laid down on the back in a comfortable position with adequate support to (head, back, knees, feet), legs were straight and arms were uncrossed.

-The researcher also was in a comfortable position facing the child's feet and correctly seated (feet flat, set apart, back straight, head up, shoulders down/back).
-The child's feet were held simply, **warm-up technique** and **a general or relaxation reflexology session** were used before working on different reflex sections. This will last about **10 minutes** for both feet. In a general reflexology session, one did not focus on any particular area of the foot; the researcher rubbed firmly both feet and moved along the entire foot. Warm-up technique included stretching the Achilles' tendon, rotating the ankle, loosening the foot, loosening the ankle, twisting the foot, popping and rotating the toes, wringing the foot and pressing the arch.

-The researcher applied a suitable diluted amount of **therapeutic-quality essential oils** to the relevant reflex areas to enhance the child's reflexology session as (eucalyptus oil "Eucalyptus radiate can be used on the lung, bronchial, sinus reflexes) and (lavender oil "Lavendulaangustifolia" on the spinal reflexes). An extra-virgin olive oil can be used on the child's feet in a ratio of one drop essential oil to one teaspoon olive oil. Also a blend of these essential oils can also be used on the feet. The essential oils can be diluted with hazelnut or sweet almond oil.

-The researcher started the **spot therapy** which was applied to the reflex areas and using the foot reflexology chart as a guide. It was taken about 10 to 20 minutes for both feet. In which the researcher rubbed or applied firm, gentle, not too hard massage to reflex points on the affected areas related to asthma (which included **the lung, thoracic spine and heart**) using thumb or forefinger that moved like an inchworm and in a straight lines so the reflexes received greater stimulation. The right foot was worked first and then the left.

''Outcome measurement scales'' which represent the children's responses to reflexology were assessed before, 3 days and one month after applying reflexology course for the child. **(Tool III)**

A pilot study: pre-test of the used tools was carried out at the above mentioned setting before starting the data collection. It was done on (10%) of preschool asthmatic children and their mothers to assess clarity, applicability, reliability of the study tools, the time needed for each and to identify obstacles that might be faced during data collection. This sample was excluded from the total study sample.

- After implementation of the pilot study and according to its results, the necessary modifications were done in the form of questions rearrangement, restatement of some items as "replacement of the item of "oxygen requirement" which is one item of clinical features of pediatric asthma severity score (PAS) with " skin color on room air" as there were not monitors at Inpatient Pediatric Chest Unit. Also, deletion of some question for its inapplicability as the question about "using inhaler by the child during

hospitalization" and the question about "allergy tests which were done for the asthmatic child during hospitalization"

- Data of this study were collected over a period of one year, from January 2014 to January 2015.

Statistical analysis: For ordinal data, to compare between the different periods Friedman test was applied. Significance of the obtained results was judged at the 5% level.

Results:

Table (1) presents the percent distribution of the studied preschool asthmatic children regarding socio-demographic characteristics. In relation to age in study group, it was revealed that the mean age of children was (4.5±0.75). However in control group, the mean age of children was (4.37±0.51). Regarding sex, more than two thirds of the study group children (70%) were males. Also, the majority of control group children (80%) were males as illustrated in figure (26). Concerning the child's birth order, less than half of study group children (46.7 %) their birth order was the second. However, more than half of the control group children (53.3%) their birth order was the second.

As regards to period of stay in hospital of the study group, it was found that more than two thirds of children (70%) spent less than 7 days in hospital. However, less than three quarters (73.3%) of control group children spent 7-14 days in hospital. Regarding the child's weight on admission, it was clear that less than two thirds of study group children (63.3%) their weight was less than normal. However more than two thirds of control group children (70%) their weight was less than normal. As regards to the child's height on admission, less than two thirds of study group children (63.3%) their length was less than normal. However, less than three quarters of control group children (73.3%) their length was less than normal.

Table (2-a) presents the percent distribution of the preschool asthmatic children regarding their present medical history. In relation to onset of asthma attack, it was revealed that half of study group children (50%) their asthma attack began 4-6 days ago. However, less than half of control group children (43.3%) their asthma attack began 4-6 days ago. Regarding the presence of cough, it was clear that all children of both groups (100%) had cough. All study group children (100%) had wheezing. However, the majority of control group (93.3%) had wheezing. All children of both groups (100%) had dyspnea.

Table (2-b) illustrates the percent distribution of preschool asthmatic children regarding their present medical history. In relation to using of nebulizers before program, it was revealed that more than one third of study group (36.7%) used nebulizers every 4 hrs/day, more than one quarter (26.7%) used nebulizers every 6 hrs/day while 3 days after program, one quarter of study group (26.7%) used nebulizers every 8 hrs/day. Also, more than one quarter (26.7%) used nebulizers every 12 hrs/day and 20% of them used nebulizers every 24 hrs/day. In control group, before program it was found that 40% of asthmatic children used nebulizers every 4 hrs/day, less than one quarter of them (23.3%) used nebulizers every 3 hrs/day, 3 days after program it was revealed that more than one quarter (26.7%) used nebulizers every 6 hrs/day and 20% of them used nebulizers every 4 hrs/day.

Regarding the present history of asthma triggering factors, it was clear that the majority of study group (83.3%) was sensitive to common cold and influenza, but only 3.3% were sensitive to emotional stress. However, the majority of control group (80%) was sensitive to common cold and influenza, but only 3.3% were sensitive to medications as penicillin or aspirin.

Table (3) illustrates the percent distribution of the studied preschool asthmatic children regarding their past medical history. In relation to age of onset of asthma, it was revealed that more than three quarters of study group (76.7%) their asthma attack began at age of less than 2 years and the rest of them (23.3 %) began at age of 2-4 years. However, the majority of control group (83.3%) began at age of less than 2 years; however the minority of them (16.7 %) began at age of 2-4 years.

Regarding duration of illness, more than two thirds of study group (70%) had asthma attack for 2-4 years but only 10% for 4-6 years. However, the majority of control group (80%) began for 2-4 years however the minority of them (3.3%) for 4-6 years. In relation to readmission to hospital during the past year, two thirds of both groups (66.7%) admitted to hospital 1-3 times during the past year. Regarding the frequency of asthma attack, 46.7% of study group and 43.3% of control group their asthma attack was repeated every two months. Regarding the season in which asthma episodes evoked mostly, both groups (100%) during winter. In relation to past history of asthma triggering factors, it was clear that both groups (100%) had common cold, influenza and cold air.

Table (٤) shows levels of total scores of generic quality of life scale of asthmatic children (young child report). There were statistical significant differences in relation to levels of total scores of generic quality of life scale among children of study and control groups one month after program (p= 0.008)

Table (٥) shows levels of total scores of generic quality of life scale of asthmatic children (parent report for young child). There were statistical significant differences in relation to levels of total scores of generic quality of life scale between study and control groups 3 days and one month after program (p= 0.004, p= 0.001 respectively).

Table (٦) shows levels of total scores of asthma quality of life scale of asthmatic children (young child report). There were statistical significant differences in relation to levels of total scores of asthma quality of life scale between study and control groups 3 days and one month after program (p= 0.001 for each).

Table (٧) shows levels of total scores of asthma quality of life scale of asthmatic children (parent report for young child). There were statistical significant differences in relation to levels of total scores of asthma quality of life scale between study and control groups 3 days and one month after program (p= 0.023, p = 0.002 respectively).

Table (٨) presents levels of total scores of overall quality of life scales of asthmatic children (young child report). In study group 3 days after program less than two thirds of children (60%) their level of overall quality of life scales was fair, less than one quarter of them (20%) their level of overall quality of life scales was good and poor (for each level). One month after program, less than three quarters of children (73.3%) their level of overall quality of life scales was good, but only 6.7% of children their level of overall quality of life scales was poor. However, in control group 3 days after program more than half of children (56.7%) their level of overall quality of life scales was poor but only 3.3% of them their level of overall quality of life scales was good. One month after program, half of children (50%) their level of overall quality of life scales was fair, but only 20% of them their level of overall quality of life scales was poor. There were statistical significant differences among children of study and control groups in relation to levels of total scores of overall quality of life scales 3 days and one month after program (p= 0.005, p= 0.004 respectively).

Table (٩) presents levels of total scores of overall quality of life scales of asthmatic children (young child report). In study group 3 days after program less than two thirds of children (60%) their level of overall quality of life scales was fair, less than one quarter of them (20%) their level of overall quality of life

scales was good and poor (for each level). One month after program, less than three quarters of children (73.3%) their level of overall quality of life scales was good, but only 6.7% of children their level of overall quality of life scales was poor. However, in control group 3 days after program more than half of children (56.7%) their level of overall quality of life scales was poor but only 3.3% of them their level of overall quality of life scales was good. One month after program, half of children (50%) their level of overall quality of life scales was fair, but only 20% of them their level of overall quality of life scales was poor. There were statistical significant differences among children of study and control groups in relation to levels of total scores of overall quality of life scales 3 days and one month after program (p= 0.005, p= 0.004 respectively).

Table (١٠) presents the levels of total scores of overall asthma severity score of asthmatic children. There were statistical significant differences among children of study and control groups in relation to levels of total scores of overall asthma severity scores 3 days and one month after program (p=0.011, p= 0.002 respectively)

Table (١١) presents the correlation between demographic data related to the child and severity of asthma with generic quality of life (parent report for young child). In study group it was found that there were statistical significant differences with negative correlation before program, 3 days and one month after program among generic quality of life (parent report for young child) and period of stay ($p<0.001$ for each), using nebulizers (p=0.006, p= 0.001, $p<0.001$ respectively), frequency of attack (p=0.022, p=0.012, $p<0.001$ respectively) and severity of asthma (p=0.161, $p<0.001$, $p<0.001$ respectively). There was a statistical significant difference with negative correlation 3 days and one month after program between generic quality of life (parent report for young child) and onset of asthma (p=0.027, p=0.041 respectively)

In control group, it was found that there were statistical significant differences with negative correlation before program, 3 days and one month after program among generic quality of life (parent report for young child) and period of stay ($p<0.001$ for each), and severity of asthma ($p<0.001$ for each).

Table (١٢) shows the correlation between demographic data related to the child and severity of asthma with asthma quality of life (parent report for young child). In study group it was found that there were statistical significant differences with negative correlation before program, 3 days and one month after program among ast hma quality of life (parent report for young child) and period of stay (p= 0.001, $p<0.001$, $p<0.001$, respectively), using nebulizers (p=0.001, p= <0.001, $p<0.001$, respectively) , frequency of attack (p=0.030, p=0.005, $p<0.001$ respectively) and severity of asthma (p=0.001, $p<0.001$, $p<0.001$ respectively). There was a statistical significant difference with negative correlation one month after program between asthma quality of life (parent report for young child) and onset of asthma (p=0.009). In control group, it was found that there were statistical significant differences with negative correlation before program, 3 days and one month after program among asthma quality of life (parent report for young child) and period of stay ($p<0.001$for each), and severity of asthma ($p<0.001$ for each).

Table (1): Percent distribution of the studied preschool asthmatic children regarding their socio-demographic characteristics

Socio-demographic characteristics of preschool asthmatic children	Study group (n = 30)		Control group (n = 30)	
	No	%	No	%
Age in years:				
3<4	9	30	7	23.3
4<5	17	56.7	21	70
5<6	4	13.3	2	6.7
	Range	3-6	**Range**	3-5.5
	Mean± SD	4.5± 0.75	**Mean± SD**	4.37±0.51
Sex :				
Males	21	70	24	80
Females	9	30	6	20
Child's birth order:				
first	13	43.3	12	40
second	14	46.7	16	53.3
third	2	6.7	2	6.7
fourth	1	3.3	0	0
Period of stay in hospital:				
Less than 7	21	70	1	3.3
7-14	5	16.7	22	73.3
15-22	2	6.6	6	20
23-30 days	2	6.6	1	3.3
Weight on admission:				
Under normal	19	63.3	21	70
Normal	10	33.3	7	23.3
Over normal	1	3.3	2	6.7
Height on admission:				
Below normal	22	73.3	19	63.3
Normal	8	26.7	9	30
Above normal	0	0	2	6.7

Table (2-a): Percent distribution of the preschool asthmatic children regarding their present medical history

Present medical history	Study group (n = 30)		Control group (n = 30)	
	No	%	No	%
Onset of asthma attack: Since				
1-3 days	12	40	11	36.6
4-6 days	15	50	13	43.3
↑ 6 days	3	10	6	20
Present manifestations of respiratory system				
Cough:				
Continuous	5	16.7	1	3.3
Intermittent	10	33.3	15	50
At night only	15	50	14	46.7
Wheezing:				
Yes	30	100	28	93.3
No	0	0	2	6.7
Dyspnea:				
Yes	30	100	30	100
No	0	0	0	0
Nasal secretions:				
Yes	26	86.7	28	93.3
No	4	13.3	2	6.7
Sore throat:				
Yes	26	86.7	21	70
No	4	13.3	9	30
Present manifestations of digestive system				
Cough + vomiting:				
Yes	11	36.7	4	13.3
No	19	63.3	26	86.7
Eating + vomiting:				
Yes	7	23.3	4	13.3
No	23	76.7	26	86.7
Abdominal pain more than once/week:				
Yes	23	76.7	20	66.7
No	7	23.3	10	33.3
Mouth odor:				
Yes	24	80	21	70
No	6	20	9	30

Table (2- b): Percent distribution of preschool asthmatic children regarding their present medical history

Present medical history	Study group (n = 30)		Control group (n = 30)	
	No	%	No	%
Using of nebulizers before program is every:				
1	0	0.0	1	3.3
2	1	3.3	2	6.7
3	6	20.0	7	23.3
4	11	36.7	12	40.0
6	8	26.7	6	20.0
8 hrs/ day	4	13.3	2	6.7
Using of nebulizers 3 days after program is every:				
1	0	0.0	1	3.3
2	1	3.3	2	6.7
3	1	3.3	4	13.3
4	0	0.0	6	20.0
6	6	20.0	8	26.7
8	8	26.7	5	16.7
12	8	26.7	4	13.3
24 hrs/ day	6	20.0	0	0.0
History of asthma triggering factors				
House dust:				
Yes	21	70	18	60
No	9	30	12	40
Insecticide odor:				
Yes	3	10	5	16.7
No	27	90	25	83.3
Medications as Penicillin or Aspirin:				
Yes	2	6.7	1	3.3
No	28	93.3	29	96.7
Foods as eggs or milk or fish:				
Yes	3	10	2	6.7
No	27	90	28	93.3
Pollens:				
Yes	5	16.7	3	10
No	25	83.3	27	90
Cold air:				
Yes	22	73.3	21	70
No	8	26.7	9	30
Smoking or fumes:				
Yes	13	43.3	13	43.3
No	17	56.7	17	56.7
Common cold or influenza:				
Yes	25	83.3	24	80
No	5	16.7	6	20
Exercise:				
Yes	15	50	8	26.7
No	15	50	22	73.3
Emotional stress:				
Yes	10	33.3	6	20
No	20	66.7	24	80

 # More than one answer was allowed

Table (3): Percent distribution of preschool asthmatic children regarding their past medical history

Past medical history	Study group (n = 30)		Control group (n = 30)	
	No	%	No	%
Age of onset of asthma:				
Less than 2 years old	23	76.7	25	83.3
2- 4 years old	7	23.3	5	16.7
4-6 years old	0	0	0	0
Duration of illness:				
Less than 2 years old	6	20	5	16.7
2- 4 years old	21	70	24	80
4-6 years old	3	10	1	3.3
Readmission to hospital during past year:				
1-3 times	20	66.7	20	66.7
4-6 times	6	20	7	23.3
7-9 times	4	13.3	3	10
Frequency of attack is every:				
One week	1	3.3	2	6.7
Two weeks	4	13.3	3	10
One month	11	36.7	12	40
Two months	14	46.7	13	43.3
Season in which asthma episodes evoked mostly: #				
Summer :				
Yes	3	10	22	73.3
No	27	90	8	26.7
Winter:				
Yes	30	100	30	100
No	0	0	0	0
Spring:				
Yes	17	56.7	15	50
No	13	43.3	15	50
Autumn:				
Yes	13	43.3	12	40
No	17	56.7	18	60
Asthma evoked mostly by: #				
House dust	12	40	10	33.3
Insecticide odor	5	16.7	3	10
Medications	2	6.7	2	6.7
Foods	3	10	1	3.3
Pollens	6	20	8	26.7
Cold air	30	100	30	100
Smoking	10	33.3	10	33.3

Common cold	30	100	30	100
Exercise	4	13.3	9	30
\Emotional stress	5	16.7	4	13.3

 # More than one answer was allowed

Result

Table (٤): Levels of total scores of generic quality of life scale of asthmatic children (young child report)

Levels of total scores of generic quality of life (young child report)	Study group (n=30)						Control group (n=30)					
	Before Program		3 days after program		1 month after program		Before program		3 days after program		1 month after program	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor (0-50%)	20	66.7	6	20.0	2	6.7	22	73.3	13	43.3	4	13.3
Fair (more than50%-75%)	10	33.3	17	56.7	6	20.0	8	26.7	13	43.3	16	53.3
Good (more than75%-100%)	0	0.0	7	23.3	22	73.3	0	0.0	4	13.3	10	33.3
□□ **(p)**							0.317(0.573)		3.930(0.140)		9.645^{*} ($^{MC}p= 0.008^{*}$)	

*: Statistically significant at $p \leq 0.05$

T able (٥) : Total scores of levels of generic quality of life scale of asthmatic children

(Parent report for young child)

Levels of total scores of generic quality of life scale (parent report for young child)	Study group (n=30)						Control group (n=30)					
	Before program		3 days after program		1 month after program		Before Program		3 days after program		1 month after program	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor (0-50%)	20	66.7	4	13.0	1	3.3	21	70.0	16	53.3	8	26.7
Fair (more than50%-75%)	10	33.3	20	66.7	6	20.0	9	30.0	10	33.3	13	43.3
Good (more than75%-100%)	0	0.0	6	20.0	23	76.7	0	0.0	4	13.0	9	30.0
□□ **(p)**							0.077(0.781)		10.933*(0.004*)		14.097 (MCp= 0.001*)	

*: Statistically significant at $p \leq 0.05$

Table (٦): Levels of total scores of asthma quality of life scale of asthmatic children (Young child report)

Levels of asthma quality of life scale (Young child report)	Study group (n=30)						Control group (n=30)					
	Before Program		3 days after program		1 month after program		Before program		3 days after program		1 month after program	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor (0-50%)	20	66.7	5	16.7	1	3.3	22	73.3	19	63.3	5	16.7
Fair (more than50%-75%)	10	33.3	19	63.3	6	20.0	8	26.7	10	33.3	16	53.3
Good (more than75%-100%)	0	0.0	6	20.0	23	76.7	0	0.0	1	3.3	9	30.0
□□ **(p)**							0.317(0.573)		14.491*(0.001*)		13.143* (MCp= 0.001*)	

*: Statistically significant at $p \leq 0.05$

Table (٧): Levels of total scores of asthma quality of life scale of asthmatic children

(Parent report for young child)

Levels of asthma quality of life scale (Parent report for young child)	Study group (n=30)						Control group (n=30)					
	Before Program		3 days after program		1 month after program		Before program		3 days after program		1 month after program	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor (0-50%)	19	63.3	5	16.7	2	6.7	22	73.3	15	50.0	6	20.0
Fair (more than50%-75%)	11	36.7	19	63.3	5	16.7	8	26.7	11	36.7	15	50.0
Good (more than75%-100%)	0	0.0	6	20.0	23	76.7	0	0.0	4	13.3	9	30.0
□□ **(p)**							0.693(0.405)		7.533* (0.023*)		13.013* (^{MC}p= 0.002*)	

*: Statistically significant at $p \leq 0.05$

Table (^): Levels of total scores of overall quality of life scales of asthmatic children (young child report)

Levels of overall quality of life scales (young child report)	Study group (n=30)						Control group (n=30)					
	Before program		3 days after program		1 month after program		Before program		3 days after program		1 month after program	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor (0-50%)	20	66.7	6	20.0	2	6.7	22	73.3	17	56.7	6	20.0
Fair (more than50%-75%)	10	33.3	18	60.0	6	20.0	8	26.7	12	40.0	15	50.0
Good (more than75%-100%)	0	0.0	6	20.0	22	73.3	0	0.0	1	3.3	9	30.0
□□ **(p)**							0.317 (0.573)		9.844* (MCp= 0.005*)		11.151* (MCp=0.004*)	

*: Statistically significant at $p \leq 0.05$

Table (٩): Levels of total scores of overall quality of life scales of asthmatic children (Parent report for young child)

Levels of overall quality of life scales (parent report for young child)	Study group (n=30)						Control group (n=30)					
	Before program		3 days after program		1 month after program		Before program		3 days after program		1 month after program	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor (0-50%)	20	66.7	6	20.0	2	6.7	22	73.3	16	53.3	8	26.7
Fair (more than50%-75%)	10	33.3	18	60.0	5	16.7	8	26.7	10	33.3	13	43.3
Good (more than75%-100%)	0	0.0	6	20.0	23	76.7	0	0.0	4	13.3	9	30.0
□ □ **(p)**							0.317(0.573)		7.231* (0.027*)		13.281* (0.001*)	

*: Statistically significant at $p \leq 0.05$

Table (١٠): Levels of total scores of overall asthma severity score of asthmatic children

Levels of overall asthma severity score	Study group (n=30)						Control group (n=30)					
	Before program		3 days after program		1 month after program		Before program		3 days after program		1 month after program	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mild attack (5-7 points)	2	6.7	9	30.0	22	73.3	1	3.3	4	13.3	9	30.0
Moderate attack (8-11 points)	15	50.0	18	60.0	8	26.7	14	46.7	13	43.3	18	60.0
Severe attack (12-15 points)	13	43.3	3	10.0	0	0.0	15	50.0	13	43.3	3	10.0
□□ **(p)**							0.610 (^{MC}p = 0.839)		8.980*(0.011*)		11.862* (^{MC}p = 0.002*)	

*: Statistically significant at $p \leq 0.05$

Table (١١): Correlation between demographic data related to the child and severity of asthma with generic quality of life

(Parent report for young child)

Variable		Study group (n=30)			Control group (n=30)		
		Before program	3 days after program	1 month after program	Before program	3 days after program	1 month after program
Age of child	r	0.011	0.075	0.134	0.096	0.109	0.106
	p	0.953	0.694	0.481	0.613	0.567	0.576
Child's order	r	-0.232	-0.207	-0.208	0.045	0.014	0.034
	p	0.217	0.273	0.271	0.815	0.942	0.858
Period of stay	r	-0.629*	-0.752*	-0.844*	-0.726*	-0.759*	-0.802*
	p	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Weight	r_s	-0.109	0.036	-0.020	0.139	0.089	0.073
	p	0.568	0.850	0.918	0.464	0.641	0.700
Height	r_s	0.166	0.214	0.201	0.292	0.268	0.263
	p	0.381	0.257	0.288	0.118	0.153	0.160
Onset of asthma	r_s	-0.301	-0.403*	-0.375*	0.039	0.073	0.057
	p	0.106	0.027*	0.041*	0.840	0.700	0.764
Using of nebulizers	r	-0.487*	-0.595*	-0.731*	0.168	0.168	0.154
	p	0.006*	0.001*	<0.001*	0.374	0.374	0.418
Age of onset of asthma	r_s	-0.219	-0.096	-0.078	-0.098	-0.093	-0.057
	p	0.244	0.615	0.684	0.605	0.624	0.765
Duration of illness	r_s	0.278	0.253	0.176	-0.126	-0.103	-0.122
	p	0.137	0.178	0.353	0.509	0.587	0.519
Readmission to hospital during past year	r_s	-0.426*	-0.367*	-0.434*	0.034	-0.040	-0.001
	p	0.019*	0.046*	0.017*	0.859	0.832	0.996
Frequency of attack	r_s	-0.418*	-0.454*	-0.620*	-0.068	-0.057	0.104
	p	0.022*	0.012*	<0.001*	0.720	0.764	0.585
Severity of asthma	r_s	-0.263	-0.668*	-0.768*	-0.831*	-0.815*	-0.850*

	p	0.161	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

*: Statistically significant at $p \leq 0.05$

Table (١٢): Correlation between demographic data related to the child and severity of asthma with asthma quality of life

(Parent report for young child)

Variable		**Study group (n=30)**			**Control group (n=30)**		
		Before program	**3 days after program**	**1 month after program**	**Before program**	**3 days after program**	**1 month after program**
Age of child	**r**	0.118	0.075	0.217	0.119	0.118	0.207
	p	0.536	0.694	0.249	0.535	0.536	0.273
Child's order	**r**	-0.051	-0.170	-0.132	0.038	0.069	0.136
	p	0.791	0.369	0.488	0.841	0.717	0.472
Period of stay	**r**	-0.560*	-0.738*	-0.878*	-0.759*	-0.760*	-0.732*
	p	0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Weight	**r_s**	0.005	-0.073	-0.097	0.009	0.028	0.113
	p	0.977	0.702	0.611	0.963	0.882	0.551
Height	**r_s**	0.205	0.166	0.170	0.201	0.212	0.177
	p	0.277	0.382	0.368	0.287	0.261	0.350
Onset of asthma	**r_s**	-0.352	-0.346	-0.469*	-0.048	0.041	0.098
	p	0.057	0.061	0.009*	0.800	0.829	0.608
Using of nebulizers	**r**	-0.563*	-0.604*	-0.719*	0.145	0.122	0.062
	p	0.001*	<0.001*	<0.001*	0.444	0.520	0.744
Age of onset of asthma	**r_s**	0.009	-0.091	-0.123	-0.021	-0.021	-0.191
	p	0.962	0.632	0.516	0.914	0.914	0.311
Duration of illness	**r_s**	0.186	0.244	0.077	-0.186	-0.153	-0.040
	p	0.324	0.194	0.685	0.325	0.421	0.832
Readmission to	**r_s**	-0.326	-0.456*	-0.381*	0.145	0.108	-0.059

hospital during past year	**p**	0.078	0.011*	0.038*	0.444	0.570	0.756
Frequency of attack	**r_s**	-0.396*	-0.503*	-0.692*	-0.019	-0.005	0.071
	p	0.030*	0.005*	<0.001*	0.919	0.981	0.707
Severity of asthma	**r_s**	-0.554*	-0.707*	-0.769*	-0.783*	-0.815*	-0.801*
	p	0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

*: Statistically significant at $p \leq 0.05$

Discussion:

Asthma is a highly prevalent chronic respiratory disease affecting 300 million people world-wide. Asthma is the most frequent chronic disorder in childhood. It is an inflammatory disorder of the airways characterized by recurring symptoms, airway obstruction, and bronchial hyper-responsiveness. [(20)] Asthma puts a serious burden on children's health related quality of life, despite the availability of effective and safe treatment. Preschool children with asthma symptoms have significantly lower health related quality of life scores for lung problems, sleeping, appetite, communication and positive mood health related quality of life scales. [(21)]

Many asthma children seek alternative therapies such as reflexology.[(22)] Reflexology is a natural and very relaxing, holistic therapy that works by stimulating reflex points on the feet or hands, which are believed to correspond with organs, systems and structures within the entire body. Reflexologists believe that by stimulating the circulation and autonomic nervous system, Reflexology may help with the elimination of toxins, improve circulation and help to boost the immune system, restoring energy and balance. [(23)]

The present study revealed that, in relation to age of asthmatic children in study group, it was revealed the mean age of asthmatic children was 4.5± 0.75, however in control group, it was clear that the mean age of asthmatic children was 4.37±0.51. This is in consistent with **Fasseh et al. (2003)** who found that the prevalence of asthma is increasing especially in the younger age group (less than 10 years).This may be explained as increasing airway caliber is proportional with age and less exposure to environmental factors with increasing age.[(24)]

Regarding sex in the study group, it was clear that more than two third of children were males. Also, in control group, it was found that the majority of children were males. The risk of developing bronchial asthma was higher for boys than for girls, as shown from the result of the present study. This observation may reflect a sex-linked influence, boys have smaller airway caliber when they were young or may be due to different environmental exposure patterns. This result is in agreement with **fasseh et al. (2003)** who found that asthma was approximately double in boys than in girls before puberty.[(24)] This finding is supported by the findings of **Al-**

Gewely et al. (2013) and **Hossney et al. (2009)** who revealed that bronchial asthma was more common in males than in females in a ratio of 2.1:1. [25, 26]

As regard to period of stay of asthmatic children in hospital in study group, it was found that more than two third of children spent less than 7 days in hospital. While in control group, it was revealed that less than three quarters of children spent 7-14 days in hospital. The difference between study and control groups in relation to this finding may be attributed to the positive and rapid effect of reflexology which was combined with conventional therapy thus it improved circulation and blood flow resulting in better oxygen and nutrient supply to all the cells of the body especially lungs as well as strengthening the immune system therefore decreasing asthma symptoms and period of stay in hospital. This finding was in agreement with **Fengchun (1998)** who treated 81 children aged 3 to 6 years with foot reflexology massage. It is asserted that foot reflex-therapy, in combination with appropriate medical therapy, can not only shorten the clinical course and prevent complication, but also improve the immune activity, promote the child's recovery and reduce the recurrence of the disease. It is concluded that foot reflex-therapy is an excellent way to treat both the symptoms and the disease. [27]

Asthma should be treated as soon as it is diagnosed as in children asthma can have a negative impact. [28] In the present study, regarding the asthmatic children weight on admission in study group, it was clear that less than two third of children their weight was less than normal, However in control group, it was found that more than two third of children their weight was less than normal. Also, as regard to the asthmatic children length on admission in study group, it was clear that less than two third of children their length was less than normal. However in control group, it was found that less than three quarters of children their length was less than normal.These findings were shown that the physical growth of the asthmatic children was affected by their disease. The reason for this may be owing to the growth hormones that helps in growth of the body is into full swing in sleep and while doing vigorous exercises. In asthmatic condition the child will not be able to get proper sleep and may not be able to do vigorous exercise leads to minimal growth which leads to the child being underweight. This finding is differed from the finding of the study that was done by **Gandhi (2013)** who mentioned that more than half of the studied asthmatic children were obese.[29]

Regarding the presence of cough in study and control groups, it was clear that all children coughed. This may be due to the hyper-responsiveness of the airways as a response to allergens or foreign bodies that irritate the respiratory system. This result is in contrast with **Hossney et al. (2009)** who analyzed the data of 422 consecutively numbered files of asthmatic children from the Pediatric Allergy and Immunology Unit of Ain Shams University Children's Hospital. It concluded that only about half of children (49.1%) had cough.[26]

In relation to the presence of wheezing in study group, it was clear that all children had wheezing. However, in control group, the majority of children had wheezing, while the minority of them had no wheezing.This result is in accordance with **El- Khedr (2005)** who estimated that wheezing is manifested in 82.5% of the studied asthmatic children. [30]

As regard to the presence of dyspnea, in study and control groups, it was revealed that all children had dyspnea.This result is in agreement with **El- Khedr (2005)** who estimated that dyspnea is manifested in the majority of the studied asthmatic children. [30]This may be due to underestimation of asthma controllability and severity, and under diagnosis that will end in under treatment. Lack of mothers' knowledge about the management of aggravating factors, and ways to control asthma are other factors that cause persistent asthma.On contrast, **Hossneyet al. (2009)** who concluded that only about half of asthmatic children had dyspnea.[26]

In relation to using of nebulizers, In study group, it was revealed that the need of study group children for using nebulizer treatments is decreases markedly than that of control group children.This could be related to the positive effect of reflexology which can improve circulation and blood flow resulting in better oxygen and nutrient supply to all the cells of the body as well as strengthening the immune system thus the asthmatic child's need for nebulizers or spray treatments is decreased. These findings go with **FDZ Research committee (1988)** which runs a study on sixteen patients received ten reflexology sessions each. At the end of treatment three patients reported a complete cure, they no longer required spray or nebulizer treatments; nigh patients felt considerable improvement and could reduce their spray and nebulizer treatments from 8 - 10 per day to 1 - 2 per day; two patients felt better; one patient felt a little better, and, one patient felt no improvement.[31]

Regarding present history of asthma triggering factors in both groups, it was clear that the majority of children were sensitive to common cold and influenza, and then they were sensitive to cold air. This may be due to lack of immunity of asthmatic children and bad ventilated environment that may make them susceptible to recurrent bacterial or viral respiratory tract infection which is one of the common asthma triggering factors. These results were in agreement with **Hossny et al. (2009)** who reported that viral infections were the commonest precipitating factor of bronchial asthma exacerbation in 38.6% of asthmatic children which was followed by exposure to cold in 36.7% of asthmatic children in this study. [29]

Concerning age of onset of asthma in study group, it was revealed that more than three quarters of children their asthma attack began at age of less than 2 years. While in control group, it was clear that the majority of children their asthma attack began at age of less than 2 years. This finding could be attributed to lack of immunity of children during this period of life or due to the large percentage of low educated mothers who are not able to care adequately with their young children who may expose to may triggers and infections during their infancy period. This result is in accordance with **Hopkins (2008)** who reported that the peak incidence of asthma occurs during the first year of life, and 8 to10 children who develop asthma experience their first episode of wheezing was before their third birthday. The onset of more than 80% of cases of persistent asthma is estimated to occur before the age of 3 years. [32]

Regarding season in which asthma episodes evoked mostly, in both groups, it was found that all children their asthma episodes evoked mostly during winter followed by spring and autumn. This could be attributed to exposure to cold air during this time of the year hence increase the incidence of viral respiratory tract infections beside overcrowded and badly ventilated environment. This finding is in accordance with **Fasseh et al. (2003),**

El-Khedr (2005) who mentioned that the frequency of asthma exacerbation increased significantly during winter and autumn. [24, 30]

Asthma might have physical, emotional and psychosocial impact on children's lives. Compared to preschool children without asthma symptoms, preschool children with asthma symptoms have significantly lower health related quality of life scores for lung problems, sleeping; appetite, communication and positive mood health related quality of life scales. [291]The present study revealed that more than two third of asthmatic children of both groups had poor generic (young child and parent reports) quality of life and asthma (young child and parent reports) quality of life before program. This may be related to lack of asthma control and lack of parents' knowledge about proper asthma strategies of management and control. This result go with the result of **Al-Gewely (2013)** who reported that the level of asthma control significantly affected overall and domains of QOL scores where uncontrolled asthma was associated with the lowest Quality of Life scores. [25]**Guilbert et al. (2011)** who mentioned that poorly controlled asthma symptoms impair health related quality of life in children. [33]

The use of complementary and alternative medicines (CAM) for asthma treatment is of great interest in patient care. The reasons why patients in general seek complementary or alternative medicines have been investigated in previous studies, and include a positive valuation of complementary treatment, the ineffectiveness of some treatments for their complaint, concern about the adverse effects of medicine, and dissatisfaction with care, particularly communication with doctors. Asthma patients may particularly seek complementary therapies because the chronicity of their illness necessitates long-term and continuing self-care, thus leading to disaffection with the outcomes of care by providers, and their perceived toxicities of modern prescription medicines, such as from inhaled corticosteroids.[34]There are a number of safe complementary medicines and therapies that may be of help to asthma as reflexology. While the science may not be strong for some of these, overall they are generally safe and can improve quality of life for the asthmatic patient. With consumer interest in CAM, nurses have increasingly incorporated these modalities into their practice. [35]

It was notified that there is an improvement in generic, asthma and overall quality of life of both groups 3days and one month post-program but the improvement in study children group who received reflexology beside the hospital medical care was higher than that of control children group who received hospital medical care only. This may be because reflexology helps balance organs and tissues throughout the body and, acting through the nervous system, it can actually help strengthen and normalize the circulatory and respiratory system. In this way, it can help activate the body's own healing force to strengthen lung and bronchial tissue. This result was in agreement with the study conducted by **Brygge et al. (2001)** who observed marked improvement in asthma symptoms and quality of life of a group of 40 outpatients with asthma who received ten weeks of active or simulated reflexology. [36] In contrast to this finding of current study, **Petersen et al. (1992)** did not find that investigations demonstrated that foot zone therapy was of effect on the disease bronchial asthma. It is concluded, however, that the favorable effects in both of the groups are due to increased care and control that occurred in both patient groups. [37]

In relation to asthma severity score, it was clear that there were statistical significant differences in relation to mean of total asthma severity scores between study and control groups pre-program, 3 days post-program and one month post- program. This may attributed to the positive effect of reflexology, because reflexology helps to relax the body, it could be beneficial to an asthmatic child. Once stress and anxiety is removed from the parts of the body that is ill, it can function properly. Also, it can improve circulation and blood flow resulting in better oxygen and nutrient supply to all the cells of the body particularly lungs as well as strengthening the immune system and thus decreases the severity of asthma attacks.

Most studies have focused on severity of symptoms to examine the impact of asthma symptoms on children's health related quality life; the results are conflicting. [71]**Vila et al (2003)** mentioned that disease severity is not consistently associated with children's health related quality of life. Other study conducted by **Merikallio et al (2005)** report that children with moderate or severe asthma have a worse level of functioning in several domains of their health related quality of life compared to children with mild asthma suggesting there may be a 'dose-response' relationship between the frequency and intensity of children's asthma symptoms and their health related quality of life. [38, 39]

There were statistical significant differences with negative correlation pre-program, 3 days post-program and one month post program between asthma quality of life (young child report and parent report) of study group and period of stay, using of nebulizers, frequency of attack and severity of asthma. Resolving or decreasing of all asthma, treatment, worry and communication problems that affect asthmatic children will enhance asthma quality of life of asthmatic children thus it will decrease using of nebulizers frequency of attack and severity of asthma, hence period of stay will reduce and this will be achieved better when reflexology is used together with medical care. This finding was in agreement with **Waters et al. (2000)** who showed that there was a statistically significant relationship between asthma severity and the child's Emotional quality of life subscale. [40] On the other hand, this result is not supported by **Dalheim-Englund et al (2004)** who reported that No significant relationship was seen between asthma severity and the child's Asthma Quality Of Life subscale. [41] **Magid et al, 2004** have concluded that poor health related quality of life is predictive of subsequent asthma-related emergency department visits, which implicates poor asthma control. [42]**Pont et al. (2004)** show that proper asthma management improves health related quality of life. [43]

Recommendations:

Based on the findings of the present study, the following can be recommended:

- In-service training programs and workshops should be conducted periodically and regularly for nurses working in Inpatient Pediatric Chest Unit about skills of applying reflexology for asthmatic children.
- Protocol of care for asthmatic children should include applying reflexology beside the medical care to achieve better improvement of health status and quality of life of asthmatic children.
- Health education program of asthmatic children and their caregivers about using complementary therapies beside medical care especially reflexology and how to apply.

- Teaching public about using of complementary therapies in care of asthma especially reflexology through mass media.
- Provision of handouts of up- to- date guidelines about using of reflexology in care of asthmatic children.

References

1) Core Knowledge Foundation. The Core Knowledge Sequence: Content and Skill Guidelines for Preschool, Canada, 2013; C1, 4

2) Anderson L, Stewart J, Thornton P, Wilson K. Normal growth and development of preschoolers, 2013.Available at http://www.drugs.com/cg/normal-growth-and-development-of-preschoolers.html, accessed on 1/1/2015

3) British Lung Foundation. Childhood asthma, 2011.Available at http://www.blf.org.uk/Conditions/ Childhood asthma, accessed on 1/1/2015

4) University of Maryland Medical Center. Asthma, 2014.Available at http://umm.edu/health/medical/altmed, accessed on 1/1/2015

5) Anandan C, Nurmatov U, Sheikh A. Omega 3 and 6 oils for primary prevention of allergic disease: systematic review and meta-analysis, J Allergy 2009; 64 (6): 840-8

6) Elham M, Zeinab E, Mohamed F, Ezzat S. Analysis of the filed data of a sample of Egyptian children with bronchial asthma, J Egyptian Pediatric Allergy Immunology 2009; 7 (2): 59-64

7) Masoli M, Fabian D, Holt S, Beasley R. Global initiative for asthma program, the global burden of asthma: executive summary of the GINA dissemination committee report, Allergy 2004; 59: 469-78

8) Barros R, Moreira A, Fonseca J. Adherence to the Mediterranean diet and fresh fruit intake are associated with improved asthma control, J Allergy 2008; 63 (7): 917-23

9) Staff Members of Pediatric Department. Pediatrics, Respiratory System Diseases: Bronchial Asthma, 10th ed., Egypt: Tanta, 2012-2013; C12, 295-305

10) Wiley J, Inc S. Asthma in Children 2014.Available at http://www.medicinenet.com/asthma_in_children/article.htm, accessed on 1/1/2015

11) Traore E, Dearborn L. New Hampshire Asthma Control Program: Asthma Control Management and Quality of Life, 2012; available at http://www.dhhs.nh.gov/dphs/cdpc/asthma/index.htm, accessed on 1/1/2015

12) Dean B, Calimlim B, Sacco P, Aguilar D, Maykut R, Tinkelman D. Uncontrolled asthma: assessing quality of life and productivity of children and their caregivers using a cross-sectional internet-based survey, J Health and Quality of Life Outcomes 2010; 8(3): 96

13) Levy M, Thomas M, Small I, Pearce L, Pinnock H, Stephenson P. Summary of the BTS/SIGN British guideline on the management of asthma, Primary Care Respiratory J2009; 18(2) :1905-08.

14) Kuethea M, Mulderb P, Bindelsc P, Aalderen W. Pediatric asthma outpatient care by asthma nurse, pediatrician or general practitioner: randomized controlled trial with two-year follow-up, Primary Care Respiratory J 2011; 20 (10): 122-154

15) Kamps A, Brand P, Kimpen J. Outpatient management of childhood asthma by pediatrician or asthma nurse: randomized controlled study with one year follow up, Thorax J 2003; 58 (11): 968-73

16) Potter P. Current guidelines for the management of asthma in young children, Asthma Immunology Respiratory J2010; 2 (1): 1–13.

17) National Asthma Council Australia. Asthma &complementary therapies, 2012.Available at www.nationalasthma.org.au, accessed on 1/1/2015

18) Site Sell Company. Safe treatments for asthma 2015.Available at http://www.safetreatments for asthma.com, accessed on 1/1/2015

19) Goss J. What is foot reflexology and how does it work? 2012; Available at www.ageless-acupuncture.com, accessed on 1/1/2015

20) Wilson D, Morylyne J. Wong's Essentials of pediatric Nursing: The child with respiratory dysfunction, 9th ed., New York: Mosby Co., 2013; 23, 736

21) Mohangoo, A, Essink-Bot M, Juniper E, Moll H, De Koning H, Raat H. Health-related quality of life in preschool children with wheezing and dyspnea: Preliminary results from a random general population sample. Quality of Life Research 2005; 14 (8), 1931-1936

22) Brygge T, Heinig H, Collins P, Ronborg S, Gehrchen M, Hilden J, Poulsen K. Reflexology and bronchial asthma, Respiratory Medicine J 2001; 95, 173–179

23) Valerie L. Reflexology, 2013. Available at http//www.naturalhealthhouse.co.uk/index.htm

24) Fasseh N, Essa M, Hammed H. Prevalence rate of bronchial asthma in school aged 6-14 years in Alexandria, Alex Pediatric J 2003; 17(2):375-83

25) Al-Gewely M., El-Hosseiny M., Abou-Elezz N, El-Ghoneimy D, Hassan A. Health-related quality of life in childhood bronchial asthma, J Egypt Pediatric Allergy and Immunology 2013;11(2):83-93

26) Hossny E, Hasan Z, Allam M, Mahmoud E. Analysis of the filed data of a sample of Egyptian childrenwith bronchial asthma. J Egypt Pediatric Allergy and Immunology 2009; 7(2):59-64

27) Fengchun L. Treatment of respiratory tract diseases in children with foot reflexology- massage, Clinic of the 3520 Factory of PLA, 1998

28) Asthma information guide. Asthma and children 2006. Available at http://www.asthmainformationguide.com/asthma-and-children

29) Gandhi P, Kenzik K, Thompson L, DeWalt D, Revicki D, Shenkman E, Huang I. Exploring factors influencing asthma control and asthma-specific health-related quality of life among children, Respiratory Research J 2013, 14:26

30) El-Khedr S. Improving Asthma Outcomes Using Self Management Skills, unpublished Doctoral Thesis, Faculty of Nursing, Tanta University 2005; 90-111

31) FDZ Research Committee. Reflexology, Asthma and Bronchitis Unpublished thesis 1988

32) Hopkins J. The impact of asthma on the patient, the family and society J 2008; 8(3):61

33) Guilbert T; Garris C, Jhingran, P, Bonafede M, Tomas K, Bonus T, Hahn R, Schatz M. Asthma that is not well-controlled is associated with increased healthcare utilization and decreased quality of life. Asthma J 2011; 48(2), 126-132

34) Wong C, Hong K, Koh L. The use of complementary and alternative medicine by asthma patients, QJM: An International J of Medicine 2003; 96(10): 747 – 754

35) Wang Y., Tsaip S., Leep. H., Changw Y., Yangc. M. The efficacy of reflexology: systematic review. J Advanced Nursing 2008; 62(5): 512–520

36) Brygge T. et al. Reflexology and bronchial asthma, Respiratory Medicine J 2001; 95: 173-179

37) Petersen L, Faurschou P, Olsen O, Svendsen U. Foot zone therapy and bronchial asthma--a controlled clinical trial, UgeskrLaeger J 1992; 154 (30): 2065-8

38) Vila G, Hayder R, Bertrand C, Falissard B, De Blic J, Mouren-Simeoni M. Psychopathology and quality of life for adolescents with asthma and their parents. Psychosomatics J 2003; 44(4): 319-328

39) Merikallio V, Mustalahti K., Remes S, Valovirta E, Kaila M. Comparison of quality of life between asthmatic and healthy school children, Pediatric Allergy and Immunology J 2005, 16(4): 332-340

40) Waters E, Salmon L & Wake M. The parent-form Child Health Questionnaire in Australia: comparison of reliability, validity, structure and norms. Pediatric Psychology J 2000; 25(6):381–91

41) Dalheim A, Rydstrem I, Rasmussen B, Moller C, Sandman P. Having a child with asthma-quality of life for Swedish parents, Clinical Nursing J 2004; 13(3): 386-395

42) Magid D, Houry D, Ellis J, Lyons E, Rumsfeld J. Health-related quality of life predicts emergency department utilization for patients with asthma, An Emergency Medicine J 2004; 43(5): 551-557

43) Pont L, Molen T, Denig P. Relationship between guideline treatment and health-related quality of life in asthma, European Respiratory J 2004; 23 (5): 718-722

Result