Contents lists available at www.innovativejournal.in

INTERNATIONAL JOURNAL OF NURSING DIDACTICS

Homepage: http://innovativejournal.in/index.php/ijnd

IJND ISSN: 2231-5454

Massage Therapy Program and Telephone Follow-UpEffects on Anxiety and Satisfaction among Bronchial Asthma Children

[1] Josephin A. Lawend,[2] Boshra Attia Mohammed, [3*] Shereen Ahmed Elwasefy

[1, 2] Assistant Professor of Pediatric Nursing, [3] Lecturer of Pediatric Nursing, Faculty of Nursing, Mansoura University, Egypt

DOI: https://doi.org/10.15520/ijnd.v10i07.3030

Abstract: Bronchial asthma is the most common chronic childhood illness. It is a serious public health problem all over the worldespecially among children, even with the current significant progress in the diagnosis, treatment and control of asthma in developed countries. Massage therapy is one of the most common complementary and alternative medicines used for the maintenance of safety and endurance in children and their families with asthma. Telephone follow-up is using for counseling, training, answering possible questions and follow-up children with asthma. This study ***aimed*** to evaluate massage therapy program and telephone follow-up effects on anxiety and satisfaction among bronchial asthma children.***Setting:*** This study was done at pediatricoutpatient clinic in Aga Central Hospital at Dakahlia Governorate, Egypt. ***Subjects:*** A convenience sample of 60 children who recruited in the previously mentioned settings. ***Tools:*** four toolswas used to collect the study,***toolI:*** a semi-structured interviewing questionnaire sheet to assess children's knowledge regarding asthma, ***tool II:***Spence children's anxiety scale is a clinically valuable tool in assessment of childhood anxiety, ***tool III:***Asthma Control Test toidentify those with poorly controlled asthma and ***tool IV:*** Short Assessment of Patient Satisfaction Scalethat is used to assess patient satisfaction with their treatment. ***Results:*** the mean score for generalized anxiety was 7.95± 2.00 compared to 3.23±1.91 and 3.38±1.92 with highly statistically significant difference andmore than half of them were very satisfied at post-massage therapy application compared to more than three-quarters of them at follow-up three months. Moreover, there was a positive correlation between satisfaction level and asthma control with highly statistically significant difference.***Conclusion:***The study wasconcluded that reducing in anxiety and improving in the satisfaction level of children with bronchial asthma after massage therapyapplication combined with telephone follow up calls. ***Recommendations:*** Public health strategies should increase children and parents' awareness of the importance of using asthma control toolsand massage therapy as one of complementary therapies.

Keywords:Massage Therapy,Telephone Follow-up, Anxiety,Bronchial Asthma, Children

INTRODUCTION

Breathing happens naturally without a second thought and it is life's most basic and essential function. But for children with asthma, breathing is not something they take for granted **(Mendez & Carver, 2019)**. It is the most common chronic childhood illness. It is a common public health problem among children all over the world, even with the current significant progress in the diagnosis, treatment and control of asthma in developed countries. There is an increase in hospitalization frequency and asthma-related death.It affects an estimated 300 million individuals around the world with an expected increase to 400 million worldwide by 2025. About 10% to 15% of children worldwide are diagnosed with asthma**(Fazlollahi et al., 2019; Serebrisky&Wiznia, 2019; Ferrante& La Grutta, 2018; WHO, 2017).**

In the last two decades the global prevalence of asthma has increased as well as morbidity, and asthma-related mortality among children and adolescents increased over the past 40 years. It also has a major impact on lifestyle and accounts for millions of missed school days every year and can deprive both academic achievements of children. Therefore, the governments will also commit to testing, intervention and surveillance to reduce the world's asthma burden, develop cost-effective innovative methods to prevent the disease, and more comprehensive treatment approaches. In this way, asthmatic children and their families improve their quality of life (**Amin, Elsamman&Hussin, 2014; World Health Organization, 2017**; **Mendez & Carver, 2019).**

Recent asthma prevalence is higher for children than for adults, and children can experience variable symptoms of asthma. Among children prevalence of asthma ranged from 2.1% in developing to 32.2% in non-developed countries. While this prevalence in Egypt ranged between 7.7% in the Nile Delta to 9.4% in Cairo among children. (**Fazlollahiet al., 2019).** In addition to **El-Mashad, Mahmoud and Hafez** conducted the study about the bronchial asthma prevalence among primary school children in Menoufiya Governorate, (El-Bagour Center) Egypt. They concluded that the overall point prevalence of childhood bronchial asthma among primary school children was 6.5%. This reveals a significant increase in the magnitude of the problem of bronchial asthma in our community and the need for effective prevention and management programs (**Fazlollahi et al., 2019; El-Mashad, Mahmoud & Hafez, 2016).**

Pediatric asthma is a difficultrespiratory system inflammatory disease which places a considerable burden on children. Some of the symptoms include tightness of the chest, shortness of

breath, coughing, increased bronchiole mucous secretion and wheezing. So the children with asthma understand how complex and challenging it can be to find successful treatment for this condition. Their asthma experience is significantly affected by their home environment, and their sense of well-being and health. When a child is dealing with a chronic condition, support is needed for the whole family and the parents' psychological health and the parent-child social interaction play an important role in the child's health. Therefore the pediatric massage represents a positive approach to children with asthma **(Dowell, Arcoleo, Ruiz, &Halula, 2020; Morris, 2019; Balthazar, 2018).**

The main objective of pharmacological treatment is to avoid complications, reduce morbidity of acute episodes, avoid functional and psychological morbidity, and provide the child with a near safe lifestyle based on age. This contains inhaled corticosteroids, long-acting bronchodilators, derivatives of theophylline, leukotriene, and bronchodilators and systemic corticosteroids(**Morris, 2019).** While the main treatment for children with asthma is through asthma medications, there is evidence that interventions in the lifestyle can help children with asthma live well. Lifestyle interventions are inexpensive therapies that can improve the quality of life and other asthma outcomes in adults and children alike.It should be considered a central component in controlling asthma. Therefore there are many health benefits to improving proper nutrition, increasing regular physical activity and using relaxation therapies as yoga and massage therapy for children with asthma. But there is still a need for more research to determine the best components of diet and exercise for improving asthma. Weight reduction in obese asthma patients has obvious benefits, while massage therapy may be more promising(**Stoodley, Williams, Thompson, Scott & Wood, 2019)**.

Massage therapy is one of the most common complementary and alternative medicine treatments used for the maintenance of safety and endurance in children and their families with asthma. Several research reported positive effects of massage therapy on of pain relief, improved sleep and function as well as decreased depressive symptoms and improved quality of life. Besides handling anxiety, stress and promoting relaxation, it was effective in modulating physiological stress response, as expressed in heart rate and reduced blood pressure. In addition, massage therapy used to treat nausea and vomiting, anxiety, stress, chronic disease management, delayed muscle discomfort and pulmonary function (**Ng & Cohen, 2011).**

Childrenwith asthma suffer from dyspnea, cough, wheeze in their daily life and this may be by stress and anxiety. Therefore, massage therapy may promote relaxation and relieve symptom. Thus, it is appropriate to explore the effectiveness of massage on symptoms in children with asthma.In addition to**Goli and Shabestari, (2017)** found that massage therapy can reduce anxiety in children with asthma and may have beneficial effects on asthma symptoms such as dyspnea, cough and wheeze. Hence, the use of massage in children with asthma can be used as a nursing education for parents.Massage therapy is a common form of healing that includes kneading or manipulating muscle and soft tissue to enhance health. Parents can perform it for their children at home and can perform it easily. It is used to improve existing therapies for asthma. Some of the studies used therapies such Chinese medicine or acupuncture, so future work needs to focus solely on massage therapy and in particular on the results of quality of life**(Polastri, Clini, Nava &Ambrosino, 2019).**

The pediatric nurse plays a significant supporting role in communicating between health providers and families of children with chronic disease in the follow-up care. This role is monitoring to anticipate, identify, and prevent physical, psychological, emotional, and social problems related to the disease. The nurses also need to be informed and professional in the physical and psychosocial assessment of diseased children, as well as interpersonal communication skills with the children according to their developmental stage and their parents, in addition, to help the parents cope with their child's illness **(Huckleberry and Wilson, 2016; Borzou et al. 2020).** This follow-up care can be conduct by regular telephone calls made by experienced and specialized nurses to improve the quality of life for chronic disease children due to safe their time, space restrictions, travel costs and efforts, and easy access to information and training of care items. Follow-up care used for training, counseling, follow-up, and answering possible questions of chronic diseased children and their families. This approach of health care system is used to provide health care services in dealing with children with chronic illness, especially asthma **(Ghazanfari, Arab,Forouzi&Pouraboli 2010; Borzou et al. 2020).**

Also, **Chow and Wong, (2010)**concluded that providing telephone follow up care tohome counseling has a positive effect on children with chronic diseaseon their health and behaviors and significant improvement in children received this type of care than others who received routine treatment.In addition to **AbdElgaphar, Ali, Kanona, and Henedy, (2019)**concluded that the telenursing-related exercise intervention had a positive effect in increasing hemoglobin levels and decreasing fatigue and total anemia symptoms among anemic patients with iron deficiency. Thus, they recommended telephone-based nursing intervention as an effective method of delivering educational services to their households for patients with anemia, thereby enhancing the patient-nurse relationship, saving time and reducing management costs.

Other studies by**Abusaad and Sarhan, (2016)** demonstrated in their study results the increase level of depression and fatigue of children with thalassemia. The exercise training program coupled with a three-month follow-up call to telenursing has been successful in reducing depression and tiredness among thalassemic children.On the other hand, follow up telephone nursing intervention proved to be safe and efficient in many chronic diseases among children such as, inflammatory rheumatic diseases, bronchial asthma and

hemodialysis patient and thalassemic children **(Ghazanfari, Arab, ForouziandPouraboli, 2010, Ramelet, Fonjallaz, Rapin, Gueniat, & Hofer, 2014; Abusaad and Sarhan (2016).**The massage therapy training program for children with chronic disorders and their parents are scare area in research and still needed and recommended. In addition to continuous follow-up care at home through telephone calls to decrease anxiety level and increased satisfaction level for children and their parents that have never been explored in pediatric asthma-positive children. Therefore, the main aim of the current study is to evaluate the massage therapy program and telephone follow up effects on anxiety and satisfaction among bronchial asthma children.

SUBJECTS &METHODS

Aim of the study:

This study aimed toevaluate themassage therapy program and telephone follow-up effects on anxiety and satisfaction among bronchial asthma children.

Research hypotheses:

Children with bronchial asthma who receive massage therapy treatment in combination with telephone follow-up calls may demonstrate a decrease in anxiety and an increase in their level of satisfaction.

Study design:Quasi experimental **(**pretest/ posttest) was used to conduct this study.

Study setting:

This study carried out at pediatric outpatient clinic in Aga Central Hospital at Dakahlia Governorate, Egypt.

Study Sample:

A convenience sample of 60 children (based on a medium-effect power analysis in previous studies at a level of 0.05 and 80) whohas been recruited to the pediatric outpatient clinic in the previously stated setting and willing to participate in the study after meeting the following inclusion criteria:

- Suffering from bronchial asthma and had standard asthma therapy
- Both sex children with asthma in the 10-18 year age range.
- Children diagnosed as having asthma within two years.
- Free from any other chronic diseases.
- Had a mobile phone or a phone from home.

Data collectiontools:

Four tools were used to collect the research data:

Tool I. A Semi - Structured Interview Questionnaire:

The researchers established that after reviewing the relating literature. To suit the level of understanding among children, this resource was written in an Arabic language. The following parts were composed of:

A. Children Socio-demographic datawhich includes: age, gender, educational level and residence, family income and child birth order.

B. Family history for asthma; does any brothers/sisters suffer from asthma, smoking, family history of smoking.

C. Clinical data of children, which includes: duration and severity of disease, treatment methods were used, has anyone done regular massage for your body before.

Tool II.Spence Children's Anxiety Scale (SCAS): This was adopted from **(Spence, 1998 & Spence, Barrett, & Turner, 2003).**It was an acceptable psychometric properties and a clinically valuable tool in assessment of childhood anxiety. It provides an indication of symptoms related to specific forms of anxiety disorder among children. As such, it provides an advance on other child self-report measures that focus on the more general aspects of anxious behavior. The Arabic version of the SCAS was demonstrated to be a valid instrument to evaluate anxiety level. The SCAS consists of 45 self-rated items on a scale ranging from never (0), sometimes (1), often (2) and always (3) and has six subscales covering anxiety-related disorders:(1) Panic/agoraphobia,(2) Separation anxiety, (3) Social phobia, (4) Physical injury fears, (5) Obsessive-compulsive, (6) Generalized anxiety.

- **Scoring system***:*the total score classified to mild Anxiety: 1-45,moderate Anxiety: 46-90 and severe Anxiety: 91-135.

Tool III. Asthma Control Test (ACT):

This scale is achildren self-administered tool for recognizingchildren with poorly controlled asthma. It was adopted from **(Nathan et al., 2004**) andcontains 5 items, with 4weeks recall (on symptoms and daily functioning).ACT assesses the frequency of shortness of breath and general asthma symptoms, use of rescue medications, effect of asthma on daily functioning, and overall self-assessment of asthma control. 5-point scale (for symptoms and activities: 1=all the time to 5= not at all; for asthma control rating: 1=not controlled at all to 5=completely controlled).

Scoring system:

It ranges from 5 (poor control of asthma) to 25 (complete control of asthma), with higher scores reflecting greater asthma control. An ACT score >19 indicates well-controlled asthma.

Tool IV: Short Assessment of Patient Satisfaction (SAPS) Scale:

This is a short, reliable and valid seven items scale that can be used to assess patient'ssatisfaction with their treatment. The scale was adopted from **(Hawthorne et al., 2006; Sansoni et al., 2011)**. The SAPS was used to assess the core domains of patient satisfaction, which includes; 1: treatment satisfaction; 2: explanation of treatment results; 3: clinician care; 4: participation in medical decision-making; 5: respect by the clinician; 6: time withthe clinician; 7: satisfaction with hospital/clinic care. Responses scales are 5-point scales from (0) very dissatisfied to (4) very satisfied.

Scoring system:

1. Reverse the scores for items #1, #3, #5, #7

2. Sum all scores. The score range is from 0 (extremely dissatisfied) to 28 (extremely satisfied). 0 to 10 = Very dissatisfied; 11 to 18 = Dissatisfied; 19 to 26 = Satisfied; 27 to 28 = Very satisfied.

Validity and Reliability of Tools:

Five pediatric nursing experts tested the tools for their content validity, reviewing the questions for clarity, relevance, applicability; minor changes were made accordingly. Regarding to the internal consistency reliability which was α=0.8 for Spence Children's Anxiety Scale (SCAS) & α=0.89 for asthma control test & α=0.85 for Short Assessment of Patient Satisfaction (SAPS) scale, the alpha correlation coefficient was calculated.

Pilot Study

A pilot study was performed for six bronchial asthmachildren to test the applicability and feasibility of the tools and the accuracy of the questionnaire format, and to estimate the time taken to respond to them; these children were removed from the study sample.

Field work:

- The data was collected using the above-mentioned tools from the first of November 2019 to the end of March 2020.
- The child age, family history and clinical data were collected; baseline data about their anxiety level (pretest) were assessed during the interviewing individually for each child with his mother.
- Use telephone follow-up carethat is based on Cox's Interaction Model of Client Health Behavior (**Cox,2003**). This model provides support in determining the ideal method for a nurse to interrelate with a patient to achieve positive outcomes on health. This initiative seeks to ensure continuity of care for children and their families through a telephone service that offers nursing advice to meet children's needs for: A health information; providing information on the condition of the child and explaining treatments, medications, tests and the overall situation; clarity of the information provided is an important factor in satisfaction (**Moscato et al., 2007**). B- Effective support: by giving time to talk to children and their parents and listening carefully to their problems, a predictor of satisfaction. Help in decision-making: The telephone call nurse can encourage the participation of parents in decision-making by informing them about the progress of their child care and providing them with the various choices that are likely to match their needs and answer their concerns (**Wahlberg, Cedersund and Wredling, 2002) & Beaulieu and Humphreys, 2008).**
- Massage therapy program: consisted of stroking and kneading motions in face, head, neck, shoulders, arms, hands, legs, feet and back. These massages were administered and performed by the mothers for their children every bedtime for one month at a home.This program aimed to promote good health and alleviate levels of anxiety. The program was designed by consulting experts in the area of health science and the physical education faculty. The protection of the massage therapy for children with bronchial asthma was confirmed by the aforementioned specialists.
- The researchers interviewed the child and his mother individually and gave them an adequate explanation about the disease and the massage therapy in four sessions during inhalation therapy of nebulizer. Each session has taken (45-60 minutes).
- A twenty minute massage therapy sessionconducted a by their mothers to the child just before bedtime every night for one month. The researchers were trained the mothers about the massage therapy programin the pediatric outpatient clinic using videos and PowerPoint presentation, demonstration and re demonstration.
- Massage therapy involved stroking and kneading motions in face, head, neck, shoulders (5 minutes), arms, hands (5 minutes), legs, feet (5 minutes) and back (5 minutes).
- Then the researcher asked the mothers to demonstrate the massage techniques to correct by researchersand each mother get CD include video about massagetherapy (performed by a physiotherapist)was given to children's mother.
- Researchers communicated with all mothers of the studied children by telephone three times per week in the first month to check their compliance with the massage therapy program. Each child was instructed to perform massage therapy 20-minutes by his mother and instructed to stop if he felt paroxysmal cough or dyspnea.
- The children were followed-up by telephone call as they left their phone number on the sheet. Twelve calls were in the first month and then eight calls for the second and third months. During telephone calls by the researchers; the children and their mothers asked about compliance with steps of the massage and any complaint through the performance and gave them adequate explanation and solution for any problem and ask them about it in the next call to reassess it. The researchers recorded the series of phone calls in the record form with the name, phone number, and date of each call, any complaint, and management of it.
- The level of anxiety was measured before, and after one month and three months of the study using Spence children's anxiety scale (SCAS) and asthma control test was assessed before, after one month and after three months.
- Satisfaction of the children with massage therapy was reassessed after one month and after three months using Short Assessment of Patient Satisfaction (SAPS).

Ethical considerations:

Permission had been obtained from the study setting director. After presenting comprehensive details on the purpose of the study, the procedure benefits and risks. Then the informed consent was obtained from parents and assent from their children. Mothers and children were assured that it was voluntary to participate in the study and refusal to allow their children to participate in the study did not affect the services they received.They were also assured that they can withdraw from the study at any stage. Mothers notified that all information will be kept confidential.

Statistical analysis:

Collected data was sorted, coded, organized, categorized, and then transferred into specially designed formats. Analysis

performed using SPSS (Stands for Statistical Product and Service Solutions) version 21. Categorical variables were described using the number and percent. Continuous variables were presented as mean ± SD (standard deviation). Repeated measured analysis of variance (RM-ANOVA) was used to compare means between three points durations (pre-training, immediate-post, and after 6 months of follow up). More ever, a paired t-test was used for comparison between satisfaction score of two-time points (post- the intervention and after 6 months of follow up). Statistically significant was considered a statistical study with a p-value of 0.05.

RESULTS

Table (1): Distribution of Socio-demographic characteristics of the studied asthmatic children:

Socio-demographic characteristics	N=(60)	%
Agein Years (10-18)		
10-<14ys	23	38.3
14-18ys	37	61.7
M± SD	**14.3 ±2.6**	
Gender		
Male	26	43.3
Female	34	56.7
Educational level		
Primary	19	31.7
Preparatory	21	35
Secondary	20	33.3
Residence		
Urban	20	33.3
Rural	40	66.7
Income		
Enough	20	33.3
Moderate	33	55
Low	7	11.7
Birth order		
Oldest	28	46.7
Middle between brothers	6	10
Youngest	26	43.3
Family history for asthma?		
Yes	48	80
No	12	20
Does any brothers/sisters suffer from the asthma?		
Yes	13	21.7
No	47	78.3
Do you smoke?		
Yes	11	18.3
No	49	81.7
Family history of smoking?		
Yes	21	35
No	39	65

Table (1) showed distribution of socio-demographic characteristics of the studied asthmatic children. Near two-thirds of children (61.7%) were from 14-18years with mean age of children 14.3 ±2.6 and more than half of them (56.7%) were females. Moreover,about one-third of them had primary and secondary education (31.7% & 33.3%) respectively. Furthermore, one-third of them (33.3%) was from urban area and had enough income. Also, only one fifth of the children (20%) had no family history of asthma with more them one third of them (35%) had family history of smoking.

Table (2): Distribution of the studied asthmatic children clinical data:

Clinical data	N=(60)	%
Disease duration		
6-<12months	24	40
12-<24months	24	40
24-<36months	3	5
≥36months	9	15
Disease severity		
Moderate	12	20
Sever	48	80
The used treatment*		
Nebulizer	48	80
Antibiotics	21	35
Cough suppressants	35	58.3
Symptomatic inhaler	20	33.3
Regular inhaler	34	56.7
Has anyone done regular massage for your body before?		
No	60	100

*More than one answer

Table (2) revealed distribution of the studied asthmatic children clinical data. About 40% of the children had disease from 6-<12 and 12-<24 months with 80% of them in sever state and take nebulizer as a treatment while 58.3% of them take cough suppressants compared to only one-third of them (33.3%) take Symptomatic inhaler. Moreover, all of them (100%) have no regular massage for their body before.

Table (3): Comparison of the mean asthma control scores of the studied children before, after one month and three months after massage therapy with telephone follow-up call

Asthma control sentences	No=60					
	Before massage therapy		After one month of massage therapy		Follow up after 3 –months of massage therapy	
	M	SD	M	SD	M	SD
During the past 4 weeks, how often did your asthma prevent you from getting as much done at work, school or home?	**1.80**	**1.03**	**3.80**	**1.23**	**3.93**	**1.17**
How much have you had shortness of breath over the last 4 weeks?	**2.23**	**1.15**	**4.16**	**0.99**	**4.30**	**0.94**
During the past 4 weeks, how often did your asthma symptoms (wheezing, coughing, and shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?	**1.55**	**0.76**	**4.20**	**1.37**	**4.38**	**1.24**
During the past 4 weeks, how often have you used your rescue inhaler Bronchodilator?	**2.08**	**0.92**	**3.76**	**0.99**	**3.88**	**0.97**
How would you rate your control of asthma during the last 4 weeks?	**2.76**	**0.81**	**4.43**	**0.69**	**4.53**	**0.62**
Full scale score	**10.43**	**3.94**	**20.36**	**4.90**	**21.03**	**4.61**

Table (3) showed comparison of the mean asthma control scores of the studied childrenbefore, after one, and three months after massage therapy with telephone follow-up call. The mean score of children before massage therapy when they asked about how often their asthma prevented them from getting as much done at work, school or home during the past 4 weeks was 1.80 $\pm$ 1.03 compared to 3.80$\pm$1.23 after one month and 3.93$\pm$1.17 at follow up after three months. In addition, children's mean score when asked how often your asthma symptoms (wheezing, coughing, and shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning was 1.55 + 0.76 before massage therapy compared to 4.20 + 1.37 & 4.38 + 1.24 after one and three months of follow-up after massage therapywith telephone follow-up call, respectively.

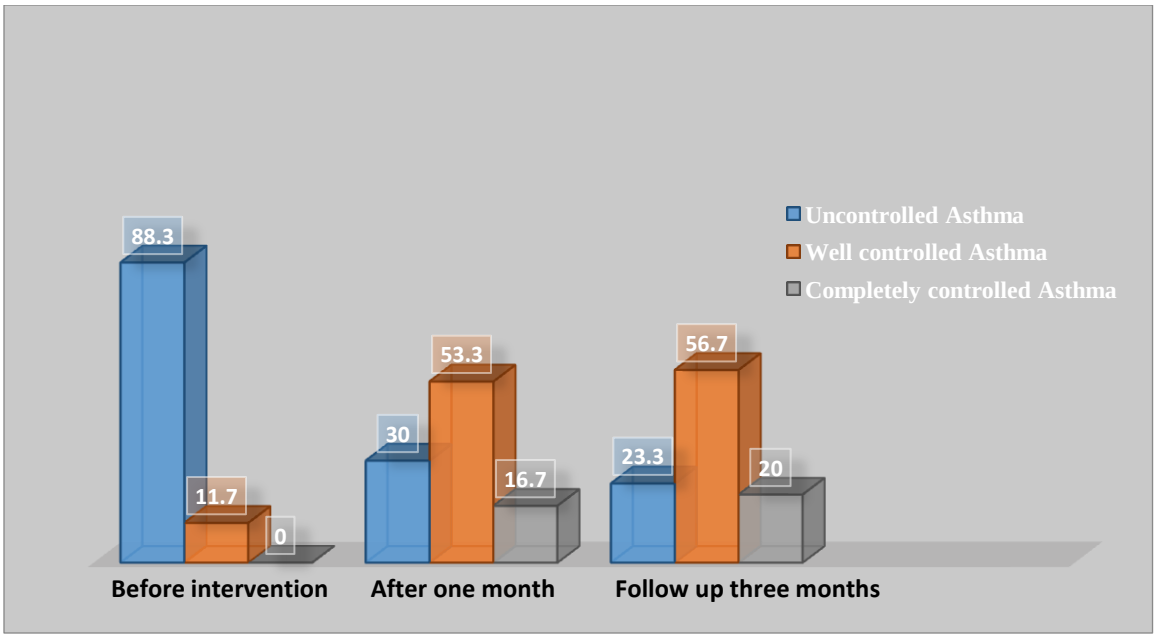


Figure (1): The asthma control level of the studied asthmatic children's before, after one month, and three months after massage therapy with telephone follow-up call

Figure (1) showed that asthma control level of the studied asthmatic children before, after one month, and three months after massage therapy with telephone follow-up call. About 88.3% of children were uncontrolled asthma before massage therapy compared to less than one-third of them (30%)in one month after massage therapy and less than one-quarter of them (23.3%) in follow up after 3 months of massage therapy . While 11.7% of them before massage therapywere well controlled asthma compared to more than half of them (53.3%) & (56.7%) one month after massage therapyand follows up after 3 months of massage therapy with telephone follow-up call.

Table (4): Comparison of the mean anxiety scores of the studied asthmatic children before, one month, and three months after massage therapy with telephone follow-up call.

Anxiety subscales	No=60							
	Before massage therapy		After one month of massage therapy		Follow up after 3 –months of massage therapy		Test of significance (Repeated measure ANOVA)	
	M	SD	M	SD	M	SD	F	P
Panic/agoraphobia	11.75	9.77	4.65	2.54	4.88	2.69	27.95	0.000
Separation anxiety	5.78	3.37	2.33	1.89	2.49	1.80	43.39	0.000
Social phobia	7.55	2.32	3.56	2.83	3.61	1.97	69.94	0.000
Physical injury fears	6.15	3.43	2.48	2.02	2.37	1.60	51.65	0.000
Obsessive-compulsive	5.70	1.26	3.23	1.91	3.33	1.93	65.27	0.000
Generalized anxiety	7.95	2.00	3.23	1.91	3.38	1.92	77.58	0.000

□:MeanSD: Standard deviationF: for repeated measure ANOVA

P: Significance. * Significant (p≤ 0.05).

Table (4) revealed comparison of the mean anxiety scores of the studied asthmatic children before, after one month, and three months after massage therapy with telephone follow-up call. The mean panic/ agoraphobia anxiety score before massage therapy was11.75+9.77 compared to 4.65±2.54 &4.88±2.69after one month and follow up after 3–months of massage therapy respectively. While the mean score for social phobia for asthmatic children before massage therapywas7.55±2.32 compared to 3.56±2.83 after one month and 3.61±1.97 follow up after 3 –months massage therapy. Lastly, the mean score for generalized anxiety was7.95± 2.00 compared to 3.23±1.91 &3.38±1.92 with highly statistically significant difference.

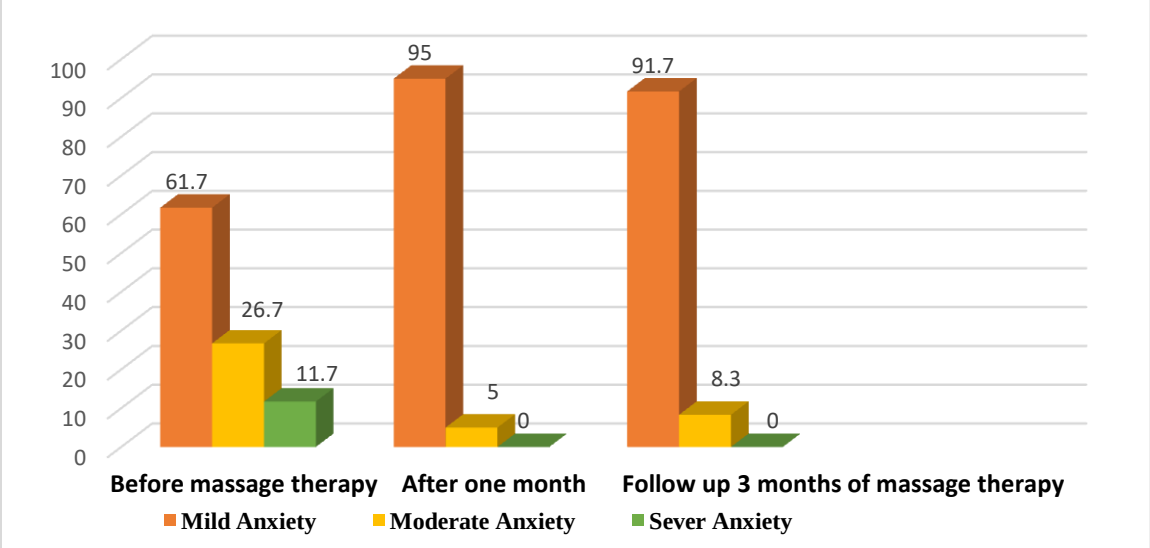
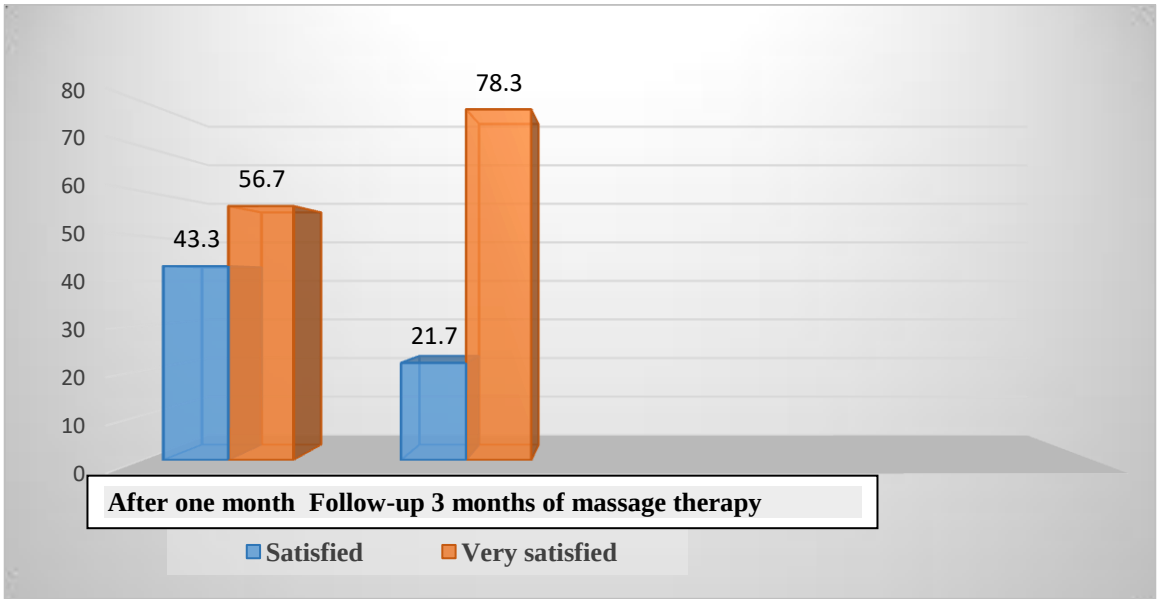


Figure (2): Total anxiety level of the studied asthmatic children before, after one month and three months after massage therapy with telephone follow-up call

Figure (2) represented total anxiety level of the studied asthmatic children before, after one month, and three months after massage therapy with telephone follow-up call. About 61.7% of asthmatic children before massage therapy had mild anxiety compared to 95% of them after one month and 91.7% in follow up after 3–monthsof massage therapy. Moreover, more than one-quarter of them (26.7%) had moderate anxiety before massage therapy compared to only 5% and 8.3% of them after one monthand follow up after 3–months of massage therapy. Furthermore, only 11.7% of the asthmatic children had sever anxiety before massage therapy with no one after one month and follow up after 3–months of massage therapy.



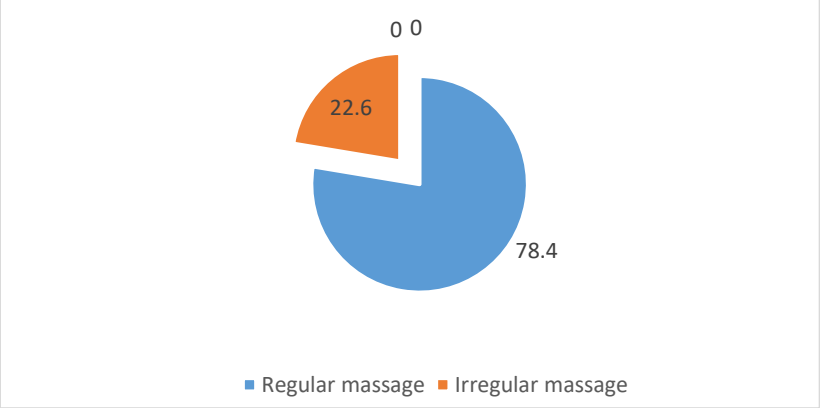
Figure(3): Total satisfaction level of the studied asthmatic children after one month, and three months after massage therapy with follow-up telephone call

Figure (3) represented the total satisfaction level of the studied asthmatic children after one month, and three months after massage therapy. About 43.3% of asthmatic children were satisfied after one month of massage therapy compared to 21.7% of them at follow-up three months. Also, more than half of them (56.7%) were very satisfied after one month compared to more than three-quarters of them (78.3%) at follow-up three months after massage therapy.

Table (5): Comparison of the mean satisfaction scores of the studied asthmatic children's after one month and three monthsafter massage therapy with follow-up telephone call

Satisfaction sentences	No =60			
	After one month of massage therapy		Follow up after 3 –months of massage therapy	
	M	SD	M	SD
1. How satisfied are you with the effect of massage therapy?	**4.00**	**0.00**	**4.00**	**0.00**
2. Are you satisfied with the care at (hospital / clinic) you received?	**4.00**	**0.00**	**4.00**	**0.00**
3. How satisfied you are with the nurse's comments about the massage therapy outcomes?	**3.83**	**0.37**	**3.80**	**0.40**
4. How satisfied were you with the choices of participating in educational program about message therapy and its positive effects on your health?	**3.86**	**0.34**	**3.83**	**0.37**
5. The nurse was very careful when checking you, to examine everything.	**3.60**	**0.49**	**3.58**	**0.49**
6. The time you had with the nurse was too short.	**3.18**	**0.53**	**3.23**	**0.46**
7. How much of the time did you feel respected by the nurse?	**3.75**	**0.43**	**4.00**	**0.00**
Total satisfaction score	**26.28**	**1.00**	**26.45**	**1.12**

Table (5) showed comparison of the mean satisfaction scores of the studied asthmatic children after one month and three months after massage therapy with follow-up telephone call. The mean score of asthmatic children about their satisfaction with the effect of massage and with the care they received in (hospital/ clinic) was 4.00±0.00 after one month of massage therapy and follow up after three months of massage therapy. Moreover, the mean score of asthmatic children about satisfaction with the choices of participating in educational program about massage and its positive effects on their health was 3.86±0.34after one month of massage therapy and 3.83±0.37 at follow up after 3 months of massage therapy. Lastly, the mean score of asthmatic children about the time they feel respected by the nurse was 3.75±0.43 after one month of massage therapy compared to 4.00± 0.00 at follow up after 3 months of massage therapy.



Regularity of massage therapy

Figure (4): showed regularity of massage therapy where 78.4% of children performed regular massage therapy while 22.6% of them were irregular.

Table (6): Correlation between total anxiety and satisfaction level of the studied asthmatic children and their asthma control level before massage therapy, one month and follow up three months after massage therapy with follow-up telephone call

Variables	Total asthma control No=60					
	Before massage therapy		After one month of massage therapy		Follow up after 3 –months of massage therapy	
	R- value	P-value	R value	P-value	R value	P-value
Total Anxiety level	-0.280	0.03	-0.350	0.006	-.547	0.000
Total satisfaction level	-	-	0.750	0.000	0.720	0.000

P: Significance. * Significant (p≤ 0.05).

Table (6) showed correlation of the anxiety level of the studied asthmatic children and their asthma control level before massage therapy, one month and follow up three months after massage therapy with follow-up telephone call. There is a negative correlation between anxiety level and asthma control with statistically significant difference where (R= -0.280 & P=0.03) before massage therapy compared to (R=-0.350 & P=0.006) and (R=-.547 & P=0.000)after one

month and follow-up after 3–months of massage therapy respectively. Furthermore, There is a positive correlation between satisfaction level and asthma control with highly statistically significant difference where (R= 0.750 & P=0.000) after one month compared to (R=0.720 & P=0.000) follow-up after 3–months of massage therapy.

Table (7): Association between the socio-demographic characteristics of the studied asthmatic children andtheir asthma control level before massage therapy, one month and follow up after three months of massage therapy with follow-up telephone call

Demographic characteristics		Before massage therapy N= 60				After one month after massage therapy N=60				Follow up After 3 –months of massage therapy N=60				Test of significance Chi square or fisher test		
		Uncontrolled N=53		Controlled N=7		Uncontrolled N=18		Controlled N=42		Uncontrolled N=14		Controlled N=46		before	After one month	Follow up
														χ^2 & p	χ^2 & p	χ^2 & p
Children' age	10-<14ys	20	33.3	3	5	2	3.3	21	35	2	3.3	21	35	FE &1.00	8.06 & 0.005	4.467 &0.035
	14-18ys	33	55	4	6.7	16	26.7	21	35	12	20	25	41.7			
Income	Enough	17	28.3	3	5	9	15	11	18.3	8	13.3	12	20	MC &0.883	8.143 &0.017	8.33 &0.015
	Moderate	30	50	3	5	5	8.3	28	46.7	3	5	30	50			
	Low	6	10	1	1.7	4	6.7	3	5	3	5	4	6.7			
Children smoking status	Yes	9	15	2	3.3	7	11.7	4	6.7	7	11.7	4	6.7	0.501 &0.479	7.25 &0.007	12.23 &0.00
	No	44	73.3	5	8.3	11	18.3	38	63.3	7	11.4	42	70			
Family history of smoking	Yes	18	30	3	5	12	20	9	15	10	16.7	11	18.3	FE &0.687	11.33 &0.001	10.65 &0.001
	No	35	58.3	4	6.7	6	10	33	55	4	6.7	35	58.3			
Disease duration	6-<12 months	21	35	3	5	1	1.7	23	38.3	1	1.7	23	38.3	MC &1.000	14.36 &0.001	9.61 &0.022
	12-<24months	21	35	3	5	13	21.7	11	18.3	10	16.7	14	23.3			
	24-<36months	3	5	0	0	1	1.7	2	3.3	1	1.7	2	3.3			
	≥36months	8	13.3	1	1.7	3	5	6	10	2	3.3	7	11.7			

(*) Statistically significant at p ≤0.05, $\chi^{2:}$ Chi square, **MC:** Monte Carlo test, FE: Fisher exact test

Table (7) showed association between the socio-demographic characteristics of the studied asthmatic children and their asthma control level before, one month and follow up after three months of massage therapy. Only 5% of children aged from 10-<14yrs were controlled asthma before-massage therapy compared to more than one-third of them (35%) after one month and follow up after 3 –months of massage therapy with statistically significant difference. Moreover, less than three-quarters of non-smoking children (73.3%) were uncontrolled asthma before massage therapy compared to only (18.3% & 11.4%) of them after one month and follow up after 3–months of massage therapy respectively. Furthermore, more than one third of children (35%) with disease duration 12-<24months were uncontrolled asthma before massage therapy compared to 21.7% of them after one month and only 16.7% follow up after 3–months of massage therapy with telephone follow-up call with highly statistically significant difference.

DISCUSSION

Asthma is the leading chronic disease for children and adolescents, with a point prevalence rate of around 9.5 percent. Medically, a diagnosis of asthma carries with it a risk of further morbidity and increased mortality, although rare. Psycho-socially, children asthma has been associated with increased educational troubles, behavioral and social difficulties and psychological impairment **(Australian Bureau of Statistics, 2013; Dudeney et al. 2017).** Children and adolescent with asthma have been reported to be at increased risk for developing anxiety disorders. Importantly, suffering from anxiety may also have an impact on their disease-related outcomes (**Cobham et al. 2020).**

Research study conducted by **(Easter, Sharpe & Hunt 2015)** showed evidence of the prevalence of internalizing conditions like anxiety at higher levels among children with asthma than seen in those without asthma. However, with prevalence rates ranging from 14% to 49%, there is a disparity in children with asthma on the exact incidence of anxiety disorders. Research literature regarding pediatric massage therapy was very prolific for many years, but it seems to have been diminishing over the last several years. Massage therapy has shown positive effectsfor psychological problems including aggression, anxietyand for chronic illnesses including diabetes, asthma **(Ketelaars et al. 2018).**

Nurses play supporting role to coordinate between healthcare professionals' team and families of children with chronic disease in the follow-up care. This care providedthrough regular communication sessions by telephone were made by specialized and experienced nurses**(Borzou, et al., 2020)**. Another study conducted by Chow **and Wong, 2010,** whoconcluded that hospital-to-home counselingwas provided by telephone has a positive effect on children with chronic diseases in their health and behavior. In addition to those who followed up by phone made significant progress compared to those who had regular care. So, this study aimed to evaluate the massage therapy program and telephone follow-up effects on anxiety and satisfaction among bronchial asthma children.

As regarding the socio-demographic characteristics of children with asthma, the study findings reveals that less than two-thirds of childrenwere between 14 and 18 years of age, more than half of them were females, majority of them had family history of asthma (Table 1). These results may be due to this age of asthma diagnosis is easily confirmed in children over 6 years of age as revealed by **Bousema et al, (2019).** This was in disagreement with **Dudeney et al, (2017)** who found that the mean age of asthma participants ranged from 8.7 to 17.2 years, and the male's percentranged from half to three-quarters of them.Also, in contrary to the current study, **Hallit et al, (2017)**reported thatthe mean age of the sample was 8.83 ± 3.60 year and the majority of them had no family history of asthma.

In this study, it is cleared from our findings that more than three quarters of children had severe asthma and taken nebulizer as a treatment while more than half of them take cough suppressants and regular inhaler respectively (Table2). These results were contradictory with **Soomro et al, (2020);Jamalvi et al, 2006** who found that moderate asthma was the most frequent and severe asthma was least frequent. Furthermore, contradicted study conducted by **Ahmed et al, (2020)** in Lahore showed intermittent asthma, the most frequent severity and no child with severe persistent asthma, this difference may be due to child-related controller therapy. Additionally, **Ahmed et al, (2017)** stated that more than of studies children were found to be prescribed with inhalers while more than one third with oral medication.

This study findings illustrated that the mean score of the childhood asthma control symptoms (chest tightness or pain,coughing, and shortness of breath, wheezing,) and asthma control rate were 1.5± 50.76 & 2.76± 0.81 before intervention compared to 4.20±1.37 & 4.43±0.69 after one- month and 4.38±1.24 & 4.53±0.62 three months follow up respectively, also one-tenth of them was controlled asthma well pre-intervention compared to more than half of them one-month post-intervention and follows up after 3 months subsequently (Table3& Figure1). The findings are based on the results of a survey carried out by **Hallit et al, (2017)** who found that there was a significant difference in the asthma control test (ACT) mean score in the absence or presence of all 4 symptoms ($p < 0.001$ for all variables), with a lower ACT score (better control) in the absence of any of these symptoms.

Concerning to the mean anxiety scores and the total anxiety level of the studied asthmatic children (Table 4&Figure 2), this study concluded that the mean score for generalized anxiety was 7.95± 2.00 compared to 3.23±1.91 &3.38±1.92 with highly statistically significant difference; more than one quarter of them had moderate anxiety pre-intervention compared to only less than one-tenth of them after one month and follow up after 3–months respectively. This study was in accordance with **Deraz et al, (2018)** who reviewed their results, showed that two-thirds of studied children had anxiety with mean Spence Children's Anxiety Scale (SACS) score of 38 ± 25.2 and that co-morbidity with anxiety was an independent risk factor for poorly controlled asthma. Moreover, severe asthma, uncontrolled asthma, and depression co-morbidity were independent risk factors for anxiety among asthmatic children.This may be due to that the children were little aware of their case management with massage therapy of their child and available teaching sessions regarding performance of this massage was effective in alleviating anxiety among them.

In relation to the mean satisfaction scores and total satisfaction level of the studied asthmatic children, it is evident that the mean score of children's satisfaction about the effect of massage therapy and with the care received in (hospital/ clinic) was 4.00±0.00 post-intervention and follow up after 3 months. In addition to, more than half of them were very satisfied at one month post-intervention compared to more than three- quarters of them at follow-up three months.This finding in a similar view of **Roncada et al, (2018)** who reported in their study for self-perception of satisfaction with health, the asthma group had correlations shown for total score only ($r=0.57$, $p<0.001$). Moreover, **Shanmugam, (2016)** concluded that massage therapy combined with standard treatment is more effective and satisfied in children with asthma.

The results of the current study revealed regularity of massage therapy (Figure 4), in which more than three-quarters of children performed regular massage therapy while less than one-quarter were irregular.This was in agreement with **Nekooee et al., (2008) and Alsac&Polat (2019)** who found that most of the sample studied conducted regular daily massage that improves airway tonicity, reduces airway sensitivity, and improves asthma control.

As regards of correlation between total anxiety and satisfaction level of the studied asthmatic children and their asthma control level (Table 6), it noticed that there is a negative correlation between anxiety level and asthma control with statistically significant difference where (R= -0.280 & P=0.03) before-intervention compared to (R=-0.350 & P=0.006) and (R=-.547 & P=0.000) after one-month and follow-up after 3months respectively. The current findings were in contrast to **Ghazavi et al, (2010)** which showed that caregivers' anxiety level can be reduced through successful use of regular child massage therapy and active role in caring for and treating the child. Regular massage has helped caregivers have a greater sense of involvement in treatment and can be supported by pharmacological interventions as a non-pharmacological tool. The researcher point of view was that related to effect of massage therapy among asthmatic children improved manifestations that displayed in the asthma control test with reduced anxiety and enhanced satisfaction level

Concerning to the association between the socio-demographic characteristics of the studied asthmatic children and their asthma control level before, one month and follow up the intervention (table7), Only fifth percent of children aged from 10-<14yrs were controlled asthma before-intervention compared to more than one-third of them post-intervention

and follow up after 3 months with a statistically significant difference. This result may be due to the effective role of massage therapy program and telephone follow-up to guide children for better ways to control asthma preprogram intervention compared to post and follow up. The current study was inconsistent with a previous study which stated that more than half of children were uncontrolled asthma with age ranged from 4-11 years **BinSaeed et al., (2014).**

The present study revealed that half of the moderate-income children were pre-intervention uncontrolled asthma compared to less than a tenth of them post and follow-up. This result was consistent with **BinSaeed et al., (2014)** research, which showed that moderate household incomes raised the risk of uncontrolled asthma by 2.30 (95 percent CI = 1.02–5.21). Contrary to the current research, **Thakur et al., (2014)** confirmed that low income was the greatest indicator of poor asthma control, and low-income children had poorer control of asthma than those with higher incomes (OR 1.39; 95% CI 0.92–2.12). **De Blic et al., (2009)** added that Multivariate analysis established the existence of low socio-economic status ($p = 0.042$) as a predictor correlated with inacceptable control of asthma.

Moreover, more than one-third of children with disease duration 12-<24 months were pre-intervention uncontrolled asthma compared to about one-quarter of them post-intervention and only seventeen percent follow-up with highly statistically significant difference after 3 months. This result may be related to the shorter duration of children with bronchial asthma, which may lead to a lack of proper control experiences before the implementation of the program compared to post and follow-up after 3 months. **De Blic et al., (2009)** accepted the current findings, reporting that unacceptable control of asthma was significantly correlated with higher body mass index ($p = 0.002$), more recent diagnosis of asthma ($p = 0.008$) and low socioeconomic status ($p < 0.001$).

CONCLUSIONS

Based on the study hypotheses, the study concluded that there were reducing in anxiety and improving in satisfaction level of children with bronchial asthma after massage therapy application combined with telephone follow up care. Furthermore, there was a positive correlation between satisfaction level and asthma control with highly statistically significant difference.

RECOMMENDATIONS

The following recommendations are suggested, based on previous findings:

- Public health strategies should increase children and parents' awareness of the importance of using asthma control tools and massage therapy program as complementary therapies
- Develop personal asthma management strategies.
- Developing a child and health care provider relationship may be a successful way to enhance asthma care.

ACKNOWLEDGMENT

The author thanks Dr. Zainb Ahmed Ali, lecturer of physical therapy for surgery, Faculty of Physical Therapyfor his efforts and support with the preparation of the correct massage therapy program for the children studied. Authors greatly value the support of the children and their parents and their acceptance of participating in the study.

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