

A Complementary Therapy to Improve the Lung Function and Reduce Anxiety in Asthmatic Children

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Received: January 16, 2017; Published: January 27, 2017

Introduction

Asthma is the most common chronic illness in childhood and the greatest cause of disability in children. Asthma prevalence in children in India is expected to be twice in 2020. In India Asthma ranks within the top 10 prevalent condition causing limitation of activity and about one of every 12 children has asthma. There is a great deal of evidence that anxiety can worsen asthma symptoms and the mechanism between asthma and anxiety is many-folded. It's a known fact that there are different treatment modalities for asthma but still complementary therapies play a vital role along with the regular treatment. One such, complementary therapy for maintaining lung function and improving overall health status among asthmatic children would be massage therapy.

Massage therapy is one very viable source of reducing stress, anxiety and promoting relaxation. It increases circulation, flexibility, strengthens the immune system, reduces stress and anxiety, improves the health of the skin, speeds healing and reduces blood pressure. Massage therapy relieves spasm (most common in the muscles between the ribs and those of the back, shoulders and diaphragm) by dilating the bronchioles and promotes better respiration. Massage slows down the rate of respiration via reduced stimulation of the parasympathetic nervous system by freeing tight respiratory muscles and fascia; massage can be used to increase vital capacity and pulmonary function.

Based on various statistical reports and literature, the researcher felt that there is a need to provide comprehensive care to the asthmatic children to improve their quality of life and to find out evidence based complementary therapy for maintaining lung function and improving overall health status among asthmatic children. Therefore, the present study is aimed to assess the effectiveness of massage therapy on lung function and anxiety among asthmatic children. The objective of the study was to compare and correlate the lung function and anxiety level among asthmatic children before and after the therapy between study group and control group.

In this study massage therapy is the practice of applying pressure or vibration to the soft tissues of the body. It includes deep breathing exercises, kneading, stroking, effleurage, friction, raking, hot pack application which is performed for 20 - 30 minutes daily during bed time for one month. The lung function is measured in terms of Peak Expiratory Flow Rate (PEFR), Forced Expiratory Volume in one second (FEV1), Forced Vital Capacity (FVC), Forced Expiratory Ratio (FER) assessed by Micro -plus Spiro Meter along with Heart Rate (HR) and Respiratory Rate (RR). The study is delimited to asthmatic children undergoing treatment in two different tertiary care hospitals fall under the age group of 8 - 12 years who had follow up twice during the data collection period with the selected lung function test.

Research Methodology

It is a quantitative research approach with a pre test post test control group design conducted in the Out Patient department of two selected tertiary care hospitals. One of the hospitals is 550 bedded Super Speciality Hospital with all major departments. The Paediatric

department consists of OPD, the Paediatric ward, and the NICU. Among other cases nearly 300 children are getting treated for bronchial asthma per year. The other hospital is 100 bedded children hospital. Nearly 70 children attend the paediatric chest disease clinic OPD every week. The Asthmatic children who have fulfilled the inclusion criteria and attending the Out Patient Department of the selected tertiary care hospitals were considered as the samples. Sample selection criteria involved both male and female children diagnosed with asthma for two years in the age group of 8 - 12 years and undergoing treatment in two different tertiary care hospitals with follow up for twice during the data collection period and with the selected lung function test. Any children with complications and who were already practicing any type of complementary therapy were not involved in the study. Purposive Sampling technique was adopted to select 238 children with asthma. The sample size was calculated based on the pilot study findings by using power analysis. The tool comprised of three sections. Section A consists of three parts viz., Variables pertaining to the child, variables related to the mother and family and Clinical variables related to the children. Section- B comprised of tools related to Lung function test and Section- C with Modified Spence Children Scale to assess the anxiety level of the children.

Lung function test scores were interpreted according to Global Lung Initiative (GLI) predicted values which is based on age, sex and height of the child. The scores of Peak Expiratory Flow Rate (PEFR) is calculated based on the formula. The average Peak Expiratory Flow Rate (Lit/min) = (Height - 100) x 5 + 100. Modified Spence Children Scale comprised of 15 statements which was scored as Always (3), Often (2), Sometimes (1), Never (0) with the score of 1 - 15 as mild anxiety, 16 - 30 as moderate anxiety and 31 - 45 as severe anxiety with the overall maximum score as 45. The tool was developed in English and translated into local language. Congruencies were maintained after the translation. Reliability of the tool was assessed by using interrelated reliability and split-half technique and its correlation coefficient was $r = 0.88$. The reliability of intervention was assessed by intervention fidelity checklist which was validated by experts (88%).

Massage therapy is the intervention adopted in this study. Before administering the massage therapy to the children informant consent was obtained from the mothers. The mothers were asked to observe the procedure performed by the researcher. Massage therapy consists of 11 steps which were performed within 20 - 30 minutes. The techniques involved in massage therapy were deep breathing exercises, effleurage on the back, kneading upper trapezius (shoulder), thumb stroking between the scapula (shoulder blades), thumb stroking of the lower back, shoulder and neck effleurage, chest and abdomen effleurage, chest friction, rake between the ribs, chest and abdomen effleurage and hot water application. Formal approval and Ethical clearance was obtained from the Institutional ethical committee and Review Board of the concerned hospitals for conducting the study.

Data collection procedure was carried out in two phases. In the first phase data was collected from the control group. Eligible children and mothers underwent detailed history and the findings were recorded. Researcher assessed Heart rate and Respiratory Rate manually and Children were assessed for lung function by using Microplus Spiro-Meter. The child was advised to blow out as hard and as fast as possible and the readings (PEFR, FEV1, FVC and FER) were recorded. The level of anxiety was assessed by using Modified Spence Children Anxiety Scale (SCAS). This scale consists of 15 statements, each statement was explained to the children and get answers from them. These answers were recorded after getting confirmation from mothers. On 15th day Heart rate, Respiratory Rate and lung functions were assessed. On 30th day along with the Heart rate, Respiratory Rate and lung functions assessment, anxiety was also assessed by using same technique and same tool.

During the second phase data was collected from the study group and the initial steps were similar to control group. The children received intervention (Massage) for 20 minutes. The mothers of asthmatic children were asked to observe the technique of massage therapy. Education film of massage therapy (CD) and massage technique manual and check list were given to the mothers. Mothers were instructed to do massage to their children for 20 minutes just before the bedtime for one month and record in the check list. Mothers have been reinforced to attend the hospital during alternate week to share their views and perform massage in front of the investigator. The children were assessed on 15th and 30th day for their Heart rate, Respiratory Rate, lung function and Anxiety by using same technique and same tool.

Results and Discussion

Table no:1 highlight son the highly significant the difference between the pre-test and post-test mean lung function score among the asthmatic children between study group and control group on the 15th day as well as on the 30th day after the intervention.

| Lung Function Score | | Group n = 238 | | | | Student independent t- test |
|--------------------------------|-----------------|-----------------|-------|-------------------|-------|-----------------------------|
| | | Study (n = 118) | | Control (n = 120) | | |
| | | Mean | SD | Mean | SD | |
| Pre-test | PEFR (l/m) | 175.86 | 25.43 | 173.25 | 22.90 | t = 0.83 p = 0.40 |
| | FEV1 (l/m) | .93 | .34 | .90 | .29 | t = 0.82 p = 0.40 |
| | FVC (l/m) | .96 | .35 | .95 | .29 | t = 0.19 p = 0.85 |
| | FER (%) | 83.03 | 4.56 | 83.59 | 4.16 | t = 1.00 p = 0.32 |
| | HR (beats /m) | 97.76 | 6.90 | 97.82 | 6.10 | t = 0.06 p = 0.94 |
| | RR (breaths /m) | 36.42 | 2.70 | 36.17 | 3.18 | t = 0.67 p = 0.50 |
| Post-test 15 th day | PEFR (l/m) | 202.88 | 32.25 | 184.07 | 30.41 | t = 4.63 p = 0.001*** |
| | FEV1 (l/m) | 1.18 | .40 | 0.93 | .30 | t = 5.39 p = 0.001*** |
| | FVC (l/m) | 1.19 | .42 | 0.96 | .30 | t = 4.83 p = 0.001*** |
| | FER (%) | 87.37 | 3.22 | 83.63 | 4.42 | t = 7.44 p = 0.001*** |
| | HR (beats /m) | 93.64 | 3.92 | 96.73 | 5.20 | t = 5.17 p = 0.001*** |
| | RR (breaths /m) | 28.59 | 1.87 | 34.13 | 3.31 | t = 15.8 p = 0.001*** |
| Post-test 30 th day | PEFR (l/m) | 235.46 | 38.18 | 188.00 | 30.26 | t = 10.63 p = 0.001*** |
| | FEV1 (l/m) | 1.29 | .44 | .99 | .29 | t = 6.19 p = 0.001*** |
| | FVC (l/m) | 1.29 | .56 | 1.04 | .32 | t = 4.31 p=0.001*** |
| | FER (%) | 89.71 | 2.37 | 84.10 | 5.38 | t = 10.38 p = 0.001*** |
| | HR (beats /m) | 90.73 | 2.53 | 95.63 | 4.54 | t = 10.67 p = 0.001*** |
| | RR (breaths /m) | 22.46 | 1.47 | 33.29 | 2.84 | t = 36.90 p = 0.001*** |

Table 1: Comparison of pre-test and post-test mean lung function score among the asthmatic children between study group and control group.

*** = Very highly significant at p = 0.001

The findings was supported by Yang E., et al. who had conducted a study on relationship related to pulmonary function, bronchial hyper responsiveness, and atopy in children with clinically stable asthma. In this study the clinically stable asthmatic children lung function (FEV1, FEV1/FVC, FEF25-75 and PEF) was assessed. All measures of pulmonary function were significantly decreased in the children with asthma. However, the results revealed a significant association between the pulmonary parameters and the degree of Bronchial Hyper Responsiveness (BHR).

The same above outcome was observed by Vullermin., et al. who had conducted a cross-sectional study on the concept “Anxiety is more common in children with asthma”. The study was conducted among 205 children aged 5 - 13 years. By using Spence Children Anxiety Scale (SCAS) the level of anxiety was assessed. The SCAS scores were higher in case of asthmatics than controls (p < 0.001) and they were more likely to be in the clinical range (OR = 2.5, 95 % CI1.1 to 5.8, p = 0.036). The study concluded that the children with asthma are substantially more likely to have anxiety than the children without asthma.

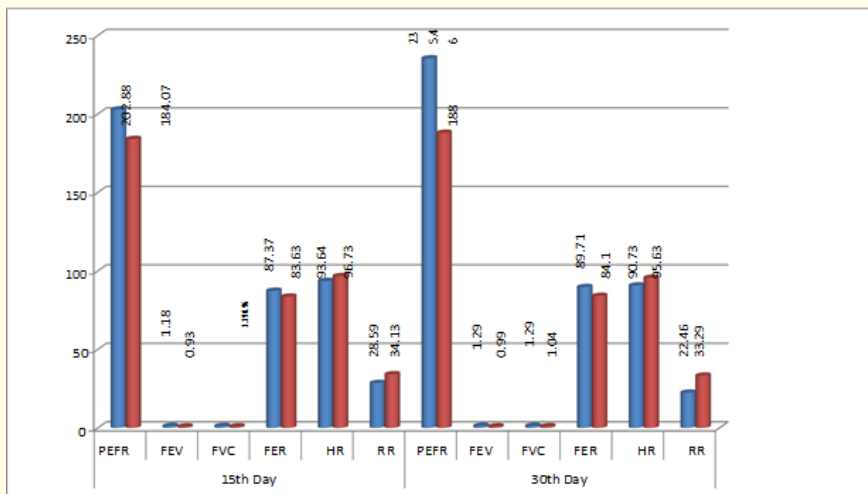


Figure 1: Comparison of post-test level of anxiety and lung function score among asthmatic children in study group and control group.

In post-test there was a strong negative correlation between anxiety and PEFR ($r = -0.52$ $p = 0.001$), FEV1 ($r = -0.46$ $p = 0.001$), FVC ($r = -0.48$ $p = 0.001$), FER ($r = -0.48$ $p = 0.001$) values in the study group. It means when anxiety decreases PEFR, FEV1, FVC and FER values improve. There was a strong positive correlation between anxiety and Heart Rate and Respiratory Rate. It means that when the level of anxiety decreases Heart Rate and Respiratory Rate also decreases. In considering control group, in pre-test and post-test there were weak negative correlation between anxiety and PEFR, FEV1, FVC and FER and a weak positive correlation between anxiety and Heart Rate & Respiratory Rate values. A similar outcome was observed by Jonathan M Feldman, *et al.* who had conducted a study on Perception of pulmonary function and asthma and the differential role of child versus caregiver anxiety and depression. A total of 97 children with asthma in the age group of 7 to 11 years were selected for the study. The children were assessed by psychiatric interview and spirometry. The results show that the children’s anxiety symptoms were associated with over-perception of respiratory compromise and taken quick relief medication. The study concluded that the children anxiety was associated with lung function.

Even though the study had thrown light on the importance of practicing complementary therapy for asthmatic children there are few limitations such as the massage therapy is a good old practice but still used in this era of evidence based practice. There was difficulty in evaluating the long lasting effect of massage on lung function and anxiety among asthmatic children due to time constraint. The positive effect shown by children in the control group might have occurred due to routine management strategies according to the hospital protocol. So the researchers were unable to impose control on it. The study includes the use of a clinic based samples, as opposed to a larger population based samples. After conducting the pre-test, two children withdrew their participation from the study due to personal reasons. A perfect matching of all demographic variables between the groups could not be achieved.

The above discussion clearly represents that there has been a statistically significant impact of the massage therapy on lung function and anxiety among the asthmatic children. These study findings will help the nursing staff, nursing students and other health personnel to understand the effectiveness of massage therapy on lung function among the asthmatic children. So they can provide appropriate and comprehensive care to the children who are diagnosed as asthma [1-18].

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Volume 3 Issue 4 January 2017

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