

Original Article

Effects of Acupressure and Massage Therapy in Relieving Respiratory Problems in Children with Respiratory Distress

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Abstract

Background: Acute respiratory tract infections are among the most common childhood diseases throughout the world. In the treatment of respiratory tract infections, in addition to the medical treatment, acupressure and massage methods are implemented to relieve and cure the symptoms of a child.

Objective: This randomized-controlled experimental research was done in order to determine the effectiveness of acupressure and massage in children with respiratory distress.

Methodology: The sample consisted of children aged 2-6 years who were admitted to the ward with the diagnosis of acute respiratory tract infection. Acupressure group, massage group and control group were comprised of 26, 25, and 27 children respectively. The data were collected by means of Parents Information Form, Child Information Form and Preschool Respiratory Assessment Measure.

Results: It was determined that the PRAM point averages of acupressure group and the massage group decreased significantly. It was also found that the discharge period of children who were applied acupressure shortened significantly compared to massage and control group.

Conclusion: It was suggested that acupressure and massage are included in nursing practices, and nurses get informed about supplementary and alternative treatment practices during their education and with in-service training.

Key words: acupressure, massage, children, respiration, relieving

Introduction

Acute respiratory tract infections (LRTIs) are the most common infectious conditions during infancy and childhood, leading to a significant mortality and morbidity worldwide. According to the data of the World Health Organization (WHO), about 12.2 million children aged less than five years die every year, and three million of them are caused by LRTIs (Örün, Yalçın & Yurdakök 2007; WHO 2014). There are several factors which predispose to LRTIs and increase mortality. These include malnutrition, age below one year, incomplete vaccination status, not being fed breast milk, low birth weight, ineffective therapies, population density, air pollution, and other social factors (Nicholson et al, 2006). Various complementary and alternative medicine (CAM) methods such as nutrition and

diet support, musical therapy, distraction and dreaming, homeopathy, hypnosis, behavioral therapy, acupressure, and massage and acupuncture are recommended in combination with medical treatment of respiratory tract infections to relieve symptoms and reduce time to discharge (Shen & Oraka 2012).

Acupressure is one of the CAM which rely on releasing blocked energy in certain areas of the body and thereby evoking the body's power to heal itself in the treatment of respiratory tract infections. Several studies have demonstrated that acupressure and acupuncture used in the treatment of respiratory tract infections regulate respiration, increase oxygen saturation, and significantly decrease asthma assessment scores (Wu et al, 2004; Lin, Ly & Golianu 2005; Lin et al, 2010; Scheewe et al, 2011).

Massage is one of the non-pharmacological methods used to stimulate arterial, venous, capillary and lymphatic circulation, activate circulatory system, and optimize respiratory system by reducing the workload of the heart with its biochemical advantages such as beta-endorphin release, vagal stimulation and increased serotonin production in LRTIs (Gürol 2010; Kulkarni et al, 2010; Salvo 2011). In the study by Nekooee (2008) had evaluated 44 children with asthma, massage therapy significantly improved the results of respiratory function tests in the massage therapy group, compared to the control group (Nekooee et al, 2008). Other studies on massage therapy also reported that massage therapy facilitated expectoration in respiratory tract infections, supported immune system, regulated respiratory functions, and increased oxygen saturation (Kulkarni et al, 2010; Field et al, 1998; Koç 2013).

Although there are many studies, worldwide which evaluated acupressure and massage therapy in adults with respiratory tract infections (Wu et al, 2004; Maa et al, 2007; Lee et al, 2007; Patria & Esposito 2013) there is a very limited number of studies on acupressure and massage therapy in pediatric population (Wu et al, 2004; Nekooee et al, 2008; Field et al, 1998; Chen et al, 2008; Fattah & Hamdy 2011). In addition, there is no study investigating the effectiveness of acupressure and massage therapy in LRTIs in Turkey. With further studies on this subject, we believe that acupressure and massage therapy can be used as CAM method in children with LRTIs. In this randomized, controlled study, we aimed to evaluate the effectiveness of acupressure and massage therapy in relieving respiratory symptoms in children with respiratory distress.

Methodology

Design and sample: The study population comprised children with LRTI who were admitted to pediatric emergency department of a state hospital located in a Middle Anatolian province of Turkey in 2014. Children aged between 2 and 6 years were enrolled due to the

ease of communication and ease of determining application points.

A preliminary study was performed with 25 children at the beginning of the study. However, these children were not included in the main analysis. Of children who met the inclusion criteria and for whom the parents provided a written informed consent, 26 were randomized to the acupressure group (AG), 25 to the massage group (MG), and 27 to the control group (CG) (Figure 1). Children meeting the inclusion criteria were assigned into groups by lot and based on the order of admission. Power analysis at the end of the study showed 100% power for the study.

Inclusion criteria

- Age between 2 and 6 years at the time of study,
- Admission to the hospital with the diagnosis of acute respiratory tract infection,
- Absence of chronic disease,
- Absence of any infection, eczema, skin rash or burns on the skin,
- Not having used antibiotics or bronchodilator drugs in the past one week prior to admission,
- Children for whom one of the parents provided a written informed consent for the child's participation in the study.

Children included in the study were similar in terms of age, sex, diagnosis, duration of hospital stay, treatment protocol, and number of children randomized to the study and control groups ($p>0.05$).

Intervention

Acupressure and Massage Therapy: The investigator who performed acupressure and massage therapy in the study received 44 hours of theoretical and 106 hours of practical training for acupressure and 60 hours of theoretical and 90 hours of practical training for massage therapy from the Association of Massage and Natural Therapies.

Figure 1. Sampling Diagram

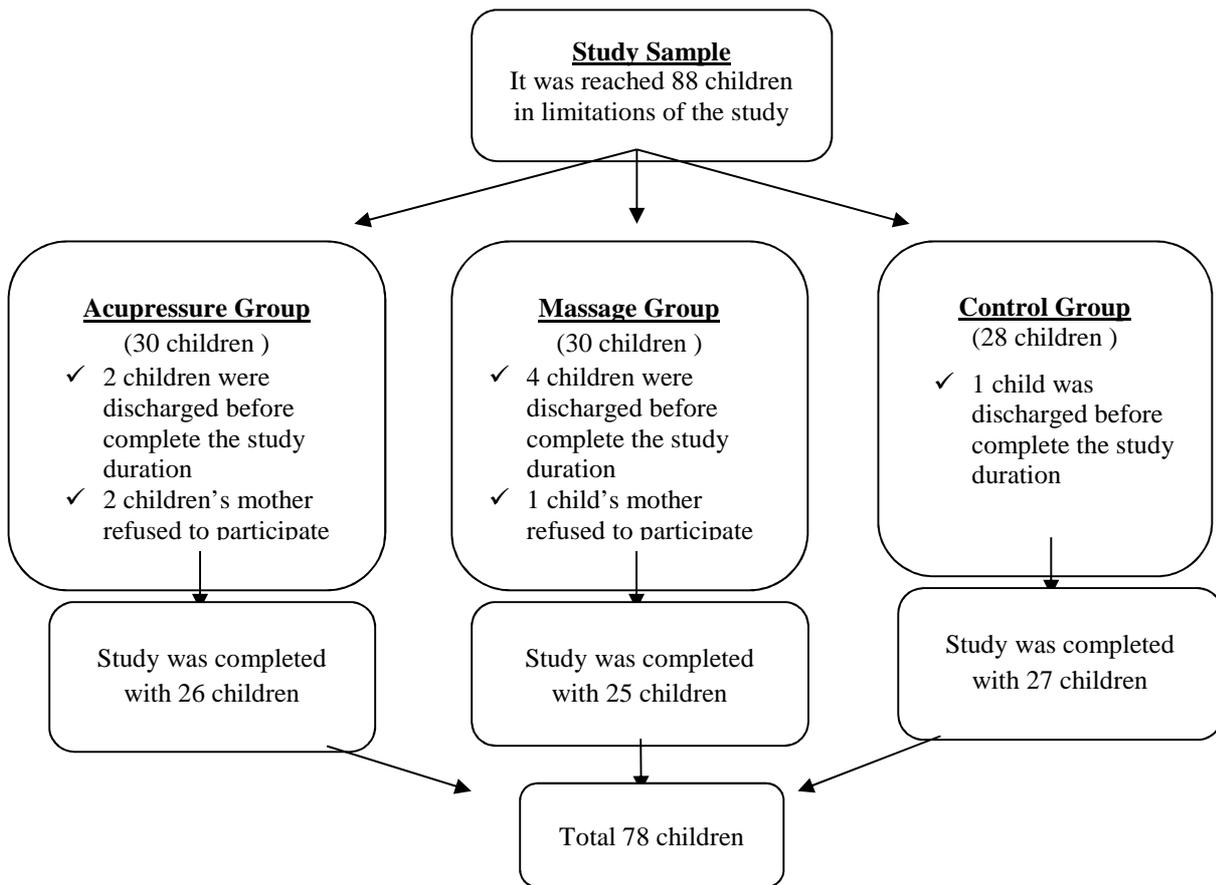


Table 1 Acupressure Application Steps (Kılıç Akça, Taşçı, & Karataş, 2013; Reed Gach, 2014)

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1. Determining the acupressure points,
 2. Marking the points with a pen,
 3. Giving accurate information to the child about the steps of the procedure,
 4. Appropriate positioning of the child while protecting privacy,
 5. Application of circular movements for 15 seconds with both thumbs on LU 5, LU 11 points, application of simultaneous movements with both index fingers or middle fingers on KD 27 point, application with a single index or middle finger on,
 6. Application three times daily for the duration of three days until discharge,
 7. Maintaining communication with the child during the procedure,
 8. Termination of the procedure,
 9. Recording completed procedure,
 10. Determining interrupted procedures for any reason and exclusion of the child from the study.
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Table 2 Massage Therapy Steps (Salvo, 2011)

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1. Giving accurate information to the child about the steps of the procedure,
 2. Placing the child in lying position while protecting privacy (supine and prone),
 3. Warming up hands,
 4. Application of Effleurage, petrissage, friction, tapotement, and vibration techniques in respective order,
 5. Completion of chest and back massage in 15 minutes,
 6. Covering body areas beyond the scope of massage therapy,
 7. Keeping the massage area warm after massage therapy by covering with a towel.
 8. Application three times daily for the duration of three days until discharge,
 9. Maintaining communication with the child during the procedure,
 10. Termination of the procedure,
 11. Recording completed procedure,
 12. Determining interrupted procedures for any reason and exclusion of the child from the study.
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Table 3 Descriptive Characteristics of Children in Acupressure, Massage And Control Group

Descriptive characteristics	Study Groups			Test <i>p</i>
	Acupressure Group (n=26)	Massage Group (n=25)	Control Group (n=27)	
Age of child	M±SD	M±SD	M±SD	
Mean (SD)	3.38 ± 1.06	3.16 ± 0.89	3.29 ± 1.13	p>0.05 ^a
Sex of child	n (%)	n (%)	n (%)	
Girl	12(46.2)	13 (52.0)	12(44.4)	.668
Boy	14(53.8)	12 (48.0)	15(55.6)	
Age at birth of child				
Preterm	3(11.5)	3(12.0)	3(11.1)	.312
At term	23(88.5)	22(88.0)	24(88.9)	
Diagnosis of child				
Bronchitis	21(80.8)	21(84.0)	20(74.1)	.455
Pneumonia	5(19.2)	4(16.0)	7(25.9)	
Breastfeeding duration				
0-6 months	2(7.7)	4(16.0)	4(14.8)	.256
7-12 months	5(19.2)	9(36.0)	6(22.2)	
13-18 months	6(23.1)	3(12.0)	4(14.8)	
19 months and over	13(50.0)	9(36.0)	13(48.2)	

^a *t test*

Table 4 Comparison of Mean PRAM Scores of Children in Acupressure, Massage And Control Group

PRAM Scores	Study Groups						Test
	Acupressure Group (n=26)		Massage Group (n=25)		Control Group (n=27)		^Ω K-W
	M±SD	Median (Min-max)	M±SD	Median (Min-Max)	M±SD	Median (Min-Max)	<i>p</i>
Pre Implementation	7.46 ± 1.79	7.50 (4-10)	7.28±1.36	7.0 (5-9)	7.55 ± 1.47	7.0 (5-10)	.437 .804
Post Implementation	0.50 ± 0.64 ^a	0.0 (0-2)	0.92±0.65 ^m	1.0 (0-2)	1.85 ± 0.53 ^k	2.0 (1-3)	34.458 .000 * a< m,k
[#] Z	-4.482		-4.397		- 4.563		
p	.000		.000		.000		

[#] Wilcoxon test ^Ω Kruskal Wallis test ^{*} Dunnett's test

The sessions were started immediately after the admission of the child to the hospital. Descriptive features related to the child and parents were collected with the Parent and Child Identification Form using face-to-face interview technique, and data related to the clinical condition of the child was collected with PRAM. Data regarding the child's illness was obtained from the observation form of the nurses and medical chart of the child. Girls were given with dolls and boys were given a toy car to distract attention and comply with the procedure and remain calm during the session. For better comprehensibility of the application, mothers watched an eight-minute video film prepared by the investigator explaining the steps of acupressure and massage therapy. All mothers provided a verbal and written informed consent.

Data collection

Acupressure group: The Parent and Child Identification Forms were completed at the first visit. Respiratory function was assessed using the PRAM. Acupressure therapy was initiated in the same day before starting the patient's medical therapy. Acupressure was performed by the investigator in participating children three times a day (morning, afternoon, night). A particular attention was paid to perform acupressure, when the child was full and relaxed. Acupressure points were determined before the session and marked with a pen. Circular massage was given

to these points for 15 seconds using the thumb, index finger, and middle finger. Lung meridian (LU-5, LU-11), front-middle meridian (Conception Vessel, CV-17, CV-22) and kidney meridian (KD-27) were selected for massaging. At the end of the third day, the respiratory function was re-assessed using the PRAM. The literature relevant to the study was reviewed and application steps for acupressure were composed (Table 1) (Reed Gach 2014; Kilic Akca, Taşçı & Karataş 2013).

Massage group: The Parent and Child Identification form was completed at the first visit. Respiratory function of the child was assessed using the PRAM. Massage therapy was initiated in the same day before starting medical therapy of the child.

Chest and back massage was performed to the study patients by the investigator for 15 minutes in the morning, afternoon, and night for three days by selecting a time frame, when the children felt relaxed. Baby oil with a pH of 5.5 was used while massaging. Effleurage, petrissage, friction, tapotement, and vibration techniques were used during massage therapy. Respiratory functions of the children were re-assessed at the end of the third day using PRAM. The literature relevant to the study was reviewed and application steps for massage were established (Table 2) (Madenci 2007).

Control group: The Parent and Child Identification form was completed at the first visit. Respiratory function of the child was assessed using the PRAM. Children in the control group received no therapies other than their usual treatments. Respiratory functions of the children were re-assessed at the end of the third day using the PRAM.

Measurements: The study data were collected using the Parent Identification Form, Child Identification Form, and Preschool Respiratory Assessment Measure (PRAM).

Parent Identification Form: The Parent Identification Form contains 11 questions on age, educational status, occupation, and income of the parents.

Child Identification Form: The Child Identification Form contains 8 questions on demographic and clinical characteristics and treatment.

Preschool Respiratory Assessment Measure (PRAM): The Preschool Respiratory Assessment Measure (PRAM) developed by Ducharme (2008) is used to grade respiratory difficulty (Ducharme et al, 2008). The internal consistency coefficient of this scale was Cronbach's $\alpha=0.71$. It was obtained formal permission from the author for the use of PRAM. The Turkish version of the PRAM was delivered to the investigator by Francine Ducharme. The PRAM contains the following variables: oxygen saturation, retraction, inspiratory muscle contraction, inspiration and wheezing. The items are score as mild, moderate or severe. In the PRAM, 0-3 points indicate mild, 4-7 points indicate moderate, and 8-12 points indicate severe respiratory distress.

Pulse Oximetry: Oxygen saturation, one of the variables of the PRAM was measured using a pediatric pulse oximetry finger probe (plumed 50 DL model) before each application and after the completion of session.

The use of pulse oximetry during monitorization of the respiratory functions of the child is particularly critical to detect and intervene in hypoxic state in the early period, to assess response to therapy, and to improve the patient's safety (Uysal 2010).

Ethical considerations: This clinical study received formal approval from the hospital, Ethics Committee of Erciyes University and

Ministry of Health. The study was conducted in accordance with the principles of the Declaration of Helsinki (2000). Before the forms were applied, the purpose of the study was explained to the parents of children comprising the study group and the verbal and written consents were obtained using Volunteer Form.

Data analysis: The data obtained from the study were analyzed using computer software. The Shapiro-Wilk normality test was used to determine whether quantitative data were normally distributed ($p>0.05$). Descriptive statistics were given as unit number (n), percentage (%), and mean \pm standard deviation.

Since the data did not show normal distribution, Kruskal-Wallis test was used to compare the groups. Dunnett's test was used in multiple comparisons. Wilcoxon test was used to analyze mean PRAM and oxygen saturation scores in pretest and posttest measurements. The value of $p<0.05$ was considered as statistically significant in comparisons.

Limitations of the study: Seasonal variations in respiratory tract infections and discharge of children after the therapy were the main limitations of this study. In addition, acupressure application was more difficult and prolonged in children than in adults.

Results

The mean age was 3.38 ± 1.06 years in the acupressure group, 53.8% of the subjects were males, 88.5% of the subjects were delivered at term, 80.8% of the subjects were diagnosed with bronchitis, and half of these children were breastfed for 19 months or longer. In the massage group, the mean age was 3.16 ± 0.89 years, 52.0% of the subjects were females, 88.0% were delivered at term, 84.0% were diagnosed with bronchitis, and 36.0% of children were breastfed for 7-12 month and 19 months or longer. In the control group, the mean age was 3.29 ± 1.13 years, 55.6% of the subjects were males, 88.9% were delivered at term, 74.1% were diagnosed with bronchitis, and almost half of these children were breastfed for 19 months or longer. Children in acupressure, massage and control groups were similar in terms of descriptive characteristics ($p>0.05$, Table 3). Of children in the acupressure group, 50.0% were previously admitted to the hospital due to respiratory tract infection, 53.8% had a hospitalization frequency of 1-5 times a year, and 34.6% received oxygen therapy in the

first day of hospitalization. All children in the acupressure group received antibiotics and bronchodilator therapy. Of children in the massage group, 44.0% were previously admitted to the hospital due to respiratory tract infection, 72.0% had a hospitalization frequency of 1-5 times a year, and 40.0% received oxygen therapy in the first day of hospitalization. All children in the massage therapy received antibiotics and bronchodilator therapy. Of children in the control group, 55.6% were previously admitted to the hospital due to respiratory tract infection, 66.7% had a hospitalization frequency of 1-5 times a year, and 44.4% received oxygen therapy in the first day of hospitalization, and all children received antibiotics and bronchodilator therapy. Children allocated into acupressure, massage and control groups were similar in terms of disease characteristics ($p>0.05$).

The mean PRAM score in the acupressure group (0.50 ± 0.64) and the massage group (0.92 ± 0.65) was significantly lower than children in the control group (1.85 ± 0.53), and there was a strongly significant difference between the groups ($KW=34.458$; $p<0.001$, Table 4).

The mean oxygen saturation in the acupressure (98.38 ± 0.89) and the massage group (98.00 ± 0.81) was significantly higher than children in the control group (97.18 ± 0.92), and there was a strongly significant difference between the groups ($KW=20.767$; $p<0.001$).

After the sessions, the mean time to discharge in the acupressure (3.53 ± 0.76) and the massage group (3.84 ± 0.68) was significantly shorter than children in the control group (4.07 ± 0.78), and there was a significant difference between the groups ($KW=7.757$; $p<0.05$).

Discussion

The present study found significantly lower mean PRAM scores in the acupressure and massage groups compared to the control group. The current results suggest that acupressure and massage therapy are effective in relieving respiratory distress in these children. In the study by Ng et al. (2004), 72 children with allergic rhinitis received acupuncture for eight weeks and the authors reported a significant reduction in symptoms scores of these children. Another study conducted in school age children with asthma reported that acupuncture therapy was effective in reducing the frequency of acute respiratory tract infection in winter and prevented acute

exacerbations in children with mild asthma (Ng et al, 2004; Stockert et al, 2007).

The present study found significantly higher oxygen saturation in the acupressure and the massage groups compared to the control group. Intragroup analysis showed a significantly higher mean oxygen saturation after the sessions compared to before the sessions among the three groups.

Touch and massage increase blood and lymphatic circulation and vasodilation in the arterioles, and increase the supply of nutrients and oxygen in the tissues (Bayrakçı et al, 2010). Exerting these effects, massage therapy improves respiratory functions and, thereby, resulting in increased oxygen saturation. In a study, Koc (2013) evaluated pain, pulse rate, oxygen saturation and crying times in babies before and after vaccine shots during foot reflexology (Koç 2013). The authors reported that babies felt less pain with lower pulse rates, higher oxygen saturation, and shorter crying. In the study by Gurol and Polat (2012), massage therapy was found to be effective in increasing oxygen saturation in babies. In the light of these findings, acupressure and massage therapy can be suggested to show efficacy in reducing respiratory distress in babies and children, increasing oxygen saturation (Koç 2013; Gürol & Polat 2012).

The mean time to discharge was significantly lower in acupressure and massage groups compared to the control group ($p<0.05$). Based on this result, acupressure applied to children admitted due to LRTIs can be effective in reducing the mean time to discharge. Acupressure and massage therapy were also reported to reduce time to discharge in the study by Chen et al. (2008) that evaluated 40 premature babies. Our findings are in consistent with the study of Chen et al (Chen et al, 2008).

Conclusion

In conclusion, considering the effectiveness in relieving respiratory symptoms, increasing oxygen saturation, and reducing time to discharge, it is recommended that acupressure and massage therapy should be integrated into the practice of nursing care and nurses should be trained with sustainable in-service education programs.

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References

- Abdel Fattah M. & Hamdy B. (2011) Pulmonary functions of children with asthma improve following massage therapy. *The Journal of Alternative and Complementary Medicine* 17(11): 1065-1068.
- Bayrakci Tunay V., Akbayrak T., Bakar Y., Kayihan H., & Ergun N. (2010) Effects of mechanical massage, manual lymphatic drainage and connective tissue manipulation techniques on fat mass in women with cellulite. *Journal of the European Academy of Dermatology and Venereology* 24(2):138-142.
- Chen L.L., Su Y.C., Su C.H., Lin H.C., & Kuo, H.W. (2008) Acupressure and meridian massage: combined effects on increasing body weight in premature infants. *Journal of Clinical Nursing* 17(9):1174-1181.
- Ducharme F.M., Chalut D., Plotnick L., Savdie C., Kudirka D., Zhang X., & McGillivray D. (2008) The pediatric respiratory assessment measure: a valid clinical score for assessing acute asthma severity from toddlers to teenagers. *The Journal of Pediatrics* 152(4):476-480.
- Fattah M.A. & Hamdy B. (2011) Pulmonary functions of children with asthma improve following massage therapy. *J. Altern. Complement Med* 17:1065-1068.
- Field T., Henteleff T., Hernandez-Reif, M., Martinez E., Mavunda K., Kuhn C., & Schanberg S. (1998) Children with asthma have improved pulmonary functions after massage therapy. *The journal of pediatrics* 132(5):854-858.
- Gürol A.P. (2010) Yenidoğan sağığında masajın yeri. *TAF Preventive Medicine Bulletin* 9(5):547-550.
- Gürol A., & Polat S. (2012) The effects of baby massage on attachment between mother and their infants. *Asian Nursing Research* 6(1):35-41.
- Kılıç Akça N., Taşçı S., & Karataş N. (2013) Effect of acupressure on patients in Turkey receiving hemodialysis treatment for uremic pruritus. *Alternative Therapies in Health & Medicine* 19(5):12-18.
- Koç T. (2013) Süt Çocuğunda Refleksoloji Tekniğı İle Uygulanan Ayak Masajının Akut Ağrıya Etkisi. İstanbul Üniversitesi Sağığ Bilimleri Enstitüsü. Doktora Tezi. İstanbul.
- Kulkarni A., Kaushik J.S., Gupta P., Sharma H., & Agrawal R.K. (2010) Massage and touch therapy in neonates: the current evidence. *Indian Pediatrics* 47(9):771-776.
- Lee A.L., Button B.M., Holdsworth M., & Holland A.E. (2007) The effects of musculoskeletal physiotherapy and massage on pain and ease of breathing in adults with cystic fibrosis. *Journal of Cystic Fibrosis* 6:68.
- Lin Y. C., Ly H., & Golianu B. (2005) Acupuncture pain management for patients with cystic fibrosis: a pilot study. *The American journal of Chinese Medicine* 33(01): 151-156.
- Lin C.H., Wang M.H., Chung H.Y., & Liu C.F. (2010) Effects of acupuncture-like transcutaneous electrical nerve stimulation on children with asthma. *Journal of Asthma* 47(10):1116-1122.
- Maa S.H., Tsou T.S., Wang K.Y., Wang C.H., Lin H.C., & Huang Y.H. (2007) Self-administered acupressure reduces the symptoms that limit daily activities in bronchiectasis patients: pilot study findings. *Journal of Clinical Nursing* 16(4):794-804.
- Madenci E. (2007) Klasik masaj. *Türk Fiz. Tıp. Rehab. Derg* 53:58-61.
- Nekooee A., Faghihinia J., Ghasemy R., Ghaibzadeh M., & Ghazavi Z. (2008) Effect of massage therapy on children with asthma. *Iranian Journal of Pediatrics* 18(2):123-129.
- Ng D.K., Chow P.Y., Ming S.P., Hong S.H., Lau, S., Tse, D., & Kwok, K.L. (2004) A double-blind, randomized, placebo-controlled trial of acupuncture for the treatment of childhood persistent allergic rhinitis. *Pediatrics* 114(5):1242-1247.
- Nicholson K.G., McNally T., Silverman M., Simons P., Stockton J.D., & Zambon M. C. (2006) Rates of hospitalisation for influenza, respiratory syncytial virus and human metapneumovirus among infants and young children. *Vaccine* 24:102-108.
- Örün E., Yalçın S., & Yurdakök K. (2007) Akut solunum yolu enfeksiyonu ile getirilen çocuklara Dünya Sağığ Örgütü kriterlerine göre hekim yaklaşımı. *Çocuk Sağığı ve Hastalıkları Dergisi* 50:16-24.
- Patria M.F., & Esposito S. (2013) Recurrent lower respiratory tract infections in children: a practical approach to diagnosis. *Paediatric respiratory reviews* 14(1):53-60.
- Reed Gach M, (2014) How to apply pressure to Acupressure Points. Available: http://www.acupressure.com/articles/Applying_pressure_to_acupressure_points.htm.
- Salvo S.G. (2011) *Massage therapy principles & practices*. (4th ed.). Saunders, Philadelphia.
- Scheewe S., Vogt L., Minakawa S., Eichmann D., Welle S., Stachow R., & Banzer W. (2011) Acupuncture in children and adolescents with bronchial asthma: a randomised controlled study. *Complementary Therapies In Medicine* 19(5):239-246.
- Shen J., & Oraka E. (2012) Complementary and alternative medicine (CAM) use among children with current asthma. *Preventive Medicine* 54:27-31.
- Stockert K., Schneider B., Porenta G., Rath R., Nissel H., & Eichler I. (2007) Laser acupuncture and probiotics in school age children with asthma: a randomized, placebo-controlled pilot study of therapy guided by principles of Traditional Chinese Medicine. *Pediatric Allergy And Immunology* 18(2):160-166.

Uysal H. (2010) Oksijen tedavisi ve hemşirelik bakımı. Türk Kardiyol Dern Kardiyovasküler Hemşirelik Derg 25(1):40-44.
World Health Organization. (2007). Geneva (Switzerland) Available: <http://www.who.int/en/>

Wu H.S., Wu S.C., Lin J.G., & Lin L.C. (2004) Effectiveness of acupressure in improving dyspnoea in chronic obstructive pulmonary disease. *Journal of Advanced Nursing* 45(3):252-259.