THE JOURNAL OF ALTERNATIVE AND COMPLEMENTARY MEDICINE
Volume 9, Number 5, 2003, pp. 659–670

Effect of Acupuncture or Acupressure on Quality of Life of Patients with Chronic Obstructive Asthma: A Pilot Study

SUH-HWA MAA, D.S.N.,[1] MAO-FENG SUN, M.D.,[2] KUANG-HUNG HSU, Ph.D.,[3] TZONG-JEN HUNG, M.D.,[4] HAO-CHENG CHEN, M.D.,[4] CHIH-TENG YU, M.D.,[4] CHUN-HUA WANG, M.D.,[4] and HORNG-CHYUAN LIN, M.D.[4]

ABSTRACT

Objectives: Acupuncture and acupressure are known to relieve symptoms associated with asthma, but the benefits to patients with chronic obstructive asthma have not been fully evaluated. In this pilot clinical study, acupuncture or acupressure was incorporated into the standard care for adult patients with chronic obstructive asthma to determine their contribution to the improvement of their quality of life and relief of symptoms.

Design: A prospective, randomized study that involved 8 weeks of treatment at Chang Gung Memorial Hospital (Tao-Yuan, Taiwan) was conducted between March 1997 and September 1998. Forty-one ($n = 41$) patients with chronic obstructive asthma were enrolled. Patients were randomly assigned to receive acupuncture in addition to standard care ($n = 11$), acupressure and standard care ($n = 17$), or standard care alone ($n = 13$). Twenty (20) acupuncture treatments were administered, and self-administered acupressure was performed daily for 8 weeks. Six-minute walking, the Dyspnea Visual Analogue Scale, the modified Borg scale, St. George's Respiratory Questionnaire (SGRQ), and the Bronchitis Emphysema Symptom Checklist (BESC) were used at the beginning and end of the 8 weeks of treatment.

Results: The total SGRQ score of acupuncture subjects showed an average 18.5-fold improvement (95% confidence interval [CI] 1.54–211.48, $p = 0.02$); the improvement for the acupressure subjects was 6.57-fold (95% C.I. 0.98–44.00, $p = 0.05$). Additionally, for patients who received acupressure, the irritability domain score determined by the BESC exhibited an 11.8-fold improvement (95% C.I. 0.88–158.64, $p = 0.06$) after adjustment for covariables. The other variables did not differ from those of the controls.

Conclusions: Patients with clinically stable, chronic obstructive asthma experienced clinically significant improvements in quality of life when their standard care was supplemented with acupuncture or acupressure.

[1]School of Nursing, Chang Gung University, Tao-Yuan, Taiwan.
[2]Department of Acupuncture and Moxibustion, Chang Gung Memorial Hospital, Tao-Yuan, Taiwan.
[3]Department of Health Care Management, Chang Gung University, Tao-Yuan, Taiwan.
[4]Department of Thoracic Medicine II, Chang Gung Memorial Hospital, Tao-Yuan, Taiwan.

INTRODUCTION

The World Health Organization has recognized that acupuncture and acupressure may demonstrate efficacy in treating chronic pulmonary disorders (NIH Consensus Development Panel on Acupuncture, 1998). Unfortunately, these useful techniques have not been fully accepted or integrated into Western scientific and medical practice, thereby possibly denying patients a valuable treatment option. In the hope of facilitating the integration of these treatments into conventional medicine, this study quantitatively evaluated the effect of acupuncture and acupressure on patients with chronic obstructive asthma. Five measurements were performed: the distance walked in 6 minutes (6-MWD) (Butland et al., 1982); a measurement of difficulty of breathing on the Dyspnea Visual Analogue Scale (DVAS) (Bond et al., 1974); a measurement of difficulty of breathing on the modified Borg Scale (Burdon et al., 1982), administration of St. George's Respiratory Questionnaire (SGRQ) (Jones et al., 1991); and the administration of the Bronchitis Emphysema Symptom Checklist (BESC) (Kinsman et al., 1983).

ASTHMA

Asthma is a serious public health issue in nations throughout the world and strong evidence exists of increasing incidence (National Institute of Health, 1995). It is defined as the chronic inflammation of the airway associated with production of excess mucus (Barnes et al., 1992). Symptoms of chronic obstructive asthma include recurrent episodes of bronchospasm, manifested by dyspnea (shortness of breath/difficulty with breathing), wheezing, and tightness in the chest (Magnussen et al., 2000). These symptoms can seriously restrict the physical and social aspects of patients' lives (Quirk et al., 1990). Unfortunately, accurate prevention and treatment of asthma are lacking because the factors that induce airway inflammation are poorly understood (Woolcock, 1992). Since the 1980s, the backbone of traditional treatment has been the inhalation of corticosteroids (Connolly et al., 1998). Despite 3 to 6 months of such steroid therapy and an additional 4 to 6 weeks of physical therapy, some clinically stable patients continue to suffer from persistent ventilatory dysfunction and an inability to exercise. Moreover, patients with chronic obstructive asthma have shown increased anxiety, depression, and psychiatric morbidity (Jones, 1992). Several patients distrust long-term medication because they worry about dependence and side-effects (Harding et al., 1985); however, this is usually a general concern rather than a response to previous experience. To address such concerns, treatments beyond the realm of conventional medicine, such as acupuncture, are being explored. Previous evidence supports the claim that acupuncture can alleviate asthma and other diseases (Biernacki et al., 1998; Hare, 1988; Linde et al., 1996; Maa et al., 1997; Thatte, 1988).

Acupuncture

Nearly 5000 years ago, acupuncture and acupressure developed in China as a therapeutic modality for treating disease and discomfort by unblocking interruptions in the body's energy network. According to Eastern medicine, the body has a network of energy channels or meridians tissue, similar to the vascular system for the circulation of blood. Twelve (12) main pathways called meridians, 2 unpaired channels, several other connecting or conjoint meridians, and 361 acupuncture points along the meridians constitute this network (Stux et al., 1987). The meridian tissue is highly conductive and preferentially directed compared to adjacent nonmeridian tissue (Chen, 1996). When the network is disrupted, health suffers; therefore, acupuncture and acupressure were developed to stimulate these clogged meridians. The exact physiological mechanism of the effectiveness of acupuncture remains unknown, but evidence exists that acupuncture acts on the central nervous system by increasing the production of endorphins and enkephalins (Pomeranz et al., 1976; Research Group of Acupuncture Anaesthesia, 1974) and acupuncture needle manipulation modulating the activity of the limbic system and subcortical structures demonstrated by functional magnetic resonance imaging (fMRI) (Hui et al.,

2000; Wu et al., 1999). Theoretically, acupuncture can clear harmful blockages in the network. Using acupuncture, an appropriate amount of stimulation is achieved when the patient feels the *De Qi* sensation at the acupuncture point. This sensation is characterized by soreness, numbness, heaviness, and as either hot or cold (Stux et al., 1987). Stimulation can be performed by many methods, each with its intrinsic advantages and disadvantages; they include the use of needles (acupuncture), herbs (moxibustion), pressure (acupressure), heat or lasers (NIH Consensus Development Panel on Acupuncture, 1998).

This study attempted to reduce airway inflammation by reducing the production of mucus using two Eastern strategies: warming the lung and strengthening the spleen. Both the acupuncture and acupressure groups used a uniform set of five acupuncture points: *Zhongfu, Dazhui, Dingchuan, Neiguan,* and *Zusanli* (Fig. 1). These acupuncture points were chosen from *Zhenjiu Dacheng* (*Compendium of Acupuncture and Moxibustion* 1601 A.D.) a work by Yangjizhou, an acupuncturist of the Ming Dynasty of China. Previous studies have established that the stimulation of these five specific points provides maximum relief to patients with dyspnea and can improve immune function (Hare, 1988; Stux et al., 1987). The first, *Zhongfu* (Lung 1) is the alarm point (*Mu* front point) of the lung and the meeting point (*Hui Shu* point) of the lung and the spleen. One *Mu* front point is attributed to each internal organ. Treating this particular point ventilates the lung, relieves asthma, strengthens the spleen, and relieves pain in the shoulders and back. The second, *Dazhui* (*Du Mai* 14) is the meeting point of several *Yang* meridian connections in the neck and upper chest region; it is an important governing and coordinating point. Treating this point improves immune function, and relieves fever and asthma. The third, *Dingchuan* (Extra 17) is an extra point for asthma relief. It is located 1 cm (0.5 cun) away from *Dazhui*. *Dingchuan* is not bilaterally used, despite being located on both sides on the body. The fourth, *Neiguan* (Pericardium 6) is the connecting point (*Luo* point) that isconfluent to *Yinwei* and is near *Yangchi* (*Sanjiao* 4), which is a *Yuan* point. Longitudinally separated from this point is a *Luo* vessel that connects a meridian to its corresponding internal organ. Treating this point warms the lung, reduces sputum, and strengthens the spleen. Finally, *Zusanli* (Stomach 36) is the uniting point (*He* point), which has a homeostatic effect on the stomach meridian. Treating this point strengthens the spleen and warms spleen *Yang* because the spleen and the stomach are closely related (Stux et al., 1987). *Zhongfu, Neiguan,* and *Zusanli* were used bilaterally.

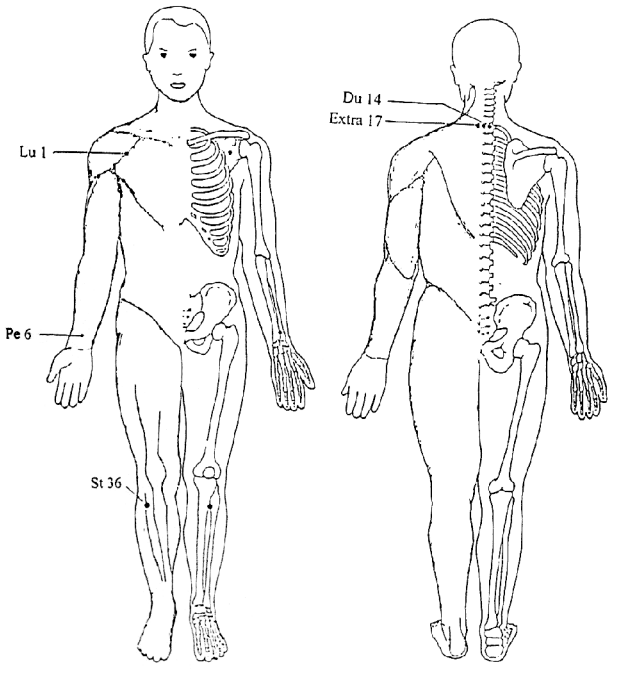

FIG. 1. Location of acupuncture points. Acupuncture points *Zhongfu* (Lu 1), *Dazhui* (Du 14), *Dingchuan* (Extra 17), and *Neiguan* (Pe 6) may relieve dyspnea. Acupuncture point *Zusanli* (St 36) may restore energy and acupuncture points *Dazhui* and *Zusanli* may also enhance immune function. Each acupuncture point is located bilaterally except acupuncture point *Dazhui*.

MATERIALS AND METHODS

This study was a three-group prospective, randomized, pilot study that lasted for 8 weeks. Patients were assigned to one of three groups: supplemental acupuncture and standard care, supplemental acupressure and standard care, and standard care only (control). Adjunctive to biomedical standard care comparisons assesses the efficacy of acupuncture plus standard care

Table 1. Subject's Criteria for Participation

1. Age 40 years or older
2. A clinical history of asthma for at least 3 years with current symptoms
3. Methacholine $PC_{20} < 5.0$ mg/mL
4. $FEV_1/FVC < 75\%$ or increased RV/TLC
5. Under regular inhaled steroid (> 1000 μg/d), theophylline, or β-agonist treatment for more than 6 months
6. Using rescue bronchodilators more than twice weekly
7. Without evidence or history suggesting bronchiectasis, old pulmonary tuberculosis or pleurisy, cardiac dysfunction, other systemic diseases, occupational asthma, disability or confounding environmental factors

PC_{20}, provocation concentration of methacholine causing a 20% fall in FEV_1; FEV_1, forced expiratory volume in 1 second; FVC, forced vital capacity; RV, residual volume; TLC, total lung capacity.

relative to standard care alone (Hammerschlag, 1998). The Institutional Ethical Committee approved the following protocol.

Selecting and assigning patients

A nonprobability purposive sample was drawn from patients who visited the Department of Thoracic Medicine as outpatients. Patients were selected according to seven criteria (Table 1). Patient lung function was tested in the sitting position by spirometry, recorded with an Autobox Vmax22 (Sensor Medics, Yorba Linda, CA). After written informed consent and full medical histories were obtained from each patient, the patient was randomly assigned to one of the three treatment groups: supplemental acupuncture and standard care (acupuncture group), supplemental acupressure and standard care (acupressure group), and standard care alone (control group). Initially, the investigators approached 132 outpatients with chronic obstructive asthma. Seventy patients ($n = 70$) agreed to participate in this study; of these, 24 withdrew during week 4, and 5 withdrew during week 8. Withdrawals included, but were not limited to, patients in the acupuncture and acupressure groups who failed to attend their first appointment or failed to complete a full course of treatment. Forty-one patients ($n = 41$) completed the full course of treatment; the attrition rate was 41%. The final group sizes were: acupuncture, $n = 11$; acupressure, $n = 17$; and control, $n = 13$. Figure 2 shows the allocation of patients.

Standard care

All patients were asked to maintain their current level of oral medication and chest physiotherapy throughout the experiment. For the control group, these were the only prescribed treatments. None of the subjects received any antibiotics except for erythromycin, but they all took oral theophylline (400 mg/day-1) and inhaled β-agonists and steroids. All subjects received instruction in the proper use of all medication, relaxation training, pursed-lip breathing retraining, deliberate coughing, and joint and muscle stretching exercises. Clinical visits were scheduled for weeks 4 and 8 to monitor treatment progress and address new patient concerns.

Acupuncture

Patients in the acupuncture group completed a total of 20 sessions (Joshi, 1992; Parson, 1993), 3 times weekly for 10 sessions, followed by 1 week without treatment, and then 3 times weekly for another 10 sessions. During treatment, each subject assumed the supine position, to promote relaxation and prevent fainting. After the skin was sterilized with alcohol, Dr. Sun, M.D., coinvestigator of this study, per-

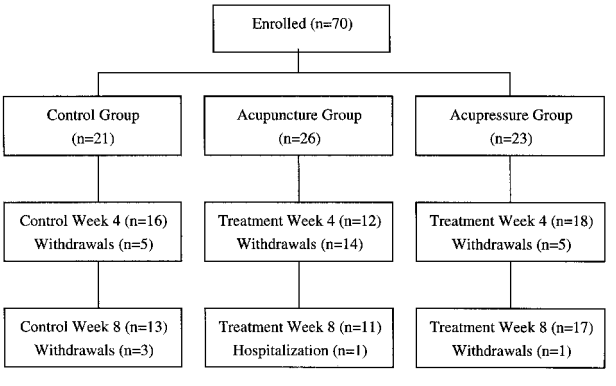

FIG. 2. Summary data for study recruitment and completion at each time-point; baseline, week 4 and week 8.

formed acupuncture. Dr. Sun is an attending physician of the Department of Acupuncture and Moxibustion. He has received relevant training for 5 years and independently practiced acupuncture for more than 20 years. His expertise is in treating pediatric cerebral palsy, soft tissue pain, and allergy disease. The treatment was with disposable sterile 34-gauge stainless-steel needles (0.22 mm diameter, 2.5 cm length) (Yu Kwang, Taipei, Taiwan, R.O.C), which were inserted to depths of 0.5–2 cm into the acupuncture points. Once subjects verified the *De Qi* sensation, the physician manually stimulated the point for 10 seconds using the *nian* technique (rotation of the needle between thumb and forefinger). During stimulation, subjects were asked to remain still because excessive motion could have caused pain. The 8 needles were remained inserted in place for 30 minutes while the subjects rested. After each session, patients were asked to record the treatment and any possible side-effects in a diary.

Acupressure

Patients in the acupressure group were taught the necessary techniques and asked to self-administer treatment whenever needed but at least once daily (Matsumura, 1993). Investigators provided verbal instructions and instructional booklets to teach patients. An investigator marked the patient's skin on the acupuncture points with a marker and performed acupressure on the patient to demonstrate the acupressure techniques. Once the investigator was confident that the patient could self-administer acupressure, he or she gave the patient an instructional booklet, which described how to locate and stimulate the acupuncture points, to reinforce the demonstration. The technique taught by the investigator involved using the fingers to apply pressure. The fingers must remain at the same point on the skin and be moved in small circles, or back and forth for 30 seconds to 2 minutes. Patients applied gentle but firm pressure; the amount of pressure depended on the location of the acupuncture point and the thickness of the skin and fatty tissue at the point. Pressure produced a feeling of soreness, tingling, and distention at the point. The points were stimulated in any order preferred by the patient first on one side of the body, and then on the other. Patients maintained a diary of the frequency of stimulation, the number of points stimulated, and the duration of stimulation at each point.

Outcome measures

Five measurements of the effect of the different treatments were made 6-MWD, DVAS, Modified Borg Scale, SGRQ, and BESC. Subjects completed the surveys twice, once before treatment (baseline), and once on the day treatment ended (post-test). For 6-MWD, subjects were asked to walk for 6 minutes at their own maximal pace along a 50-m long hospital corridor, stopping as necessary. The distance walked was measured in meters. DVAS refers to a 100-mm vertical line, with the anchors "no difficulty breathing" at the low end and "unable to breathe" at the high end. The Modified Borg Scale is a 10-point analogue scale on which only selected points have descriptors.

SGRQ

The overall health-related quality of life of a patient with chronic obstructive asthma can be estimated using SGRQ. The validity of both the English and Chinese versions of the SGRQ has been established (Jones et al., 1991; Wang et al., 2001). The questionnaire seeks 50 weighted responses, grouped into three domains—symptoms, activity, and impact—from which a total score is calculated. Symptoms refer to distress specifically caused by respiratory symptoms, and the duration and frequency of attacks of breathlessness or wheezing. The activity portion covers the extent to which symptoms limited daily activities. The impact portion seeks to derive an overall measure of disruption of patients' social and emotional lives. A total score is determined, and provides a global estimate of the patients' respiratory health-related quality of life. The scores range from 0 to 100, where 100 indicates poor health.

BESC

The response of a patient with chronic obstructive asthma to breathing troubles can be measured using the BESC. Written permission

to use the BESC was obtained from its developers. The validity and reliability of the English BESC has been established (Kinsman et al., 1983). The Chinese version, derived from a back-translation procedure (Chapman et al., 1979; Jones and Kay, 1992), was confirmed herein. The internal consistency reliability of the BESC was determined by calculating Chronbach α for the baseline scores. The α scores of BESC's 11 categories range from 0.43 (alienation) to 0.92 (fatigue, anxiety). The criterion-related validity of BESC in relation to SGRQ was verified by calculating Pearson product-moment correlation matrices using baseline scores. A significant positive correlation was obtained between BESC's 11 domains and the SGRQ total score (r ranged from 0.33 to 0.64; all $p < 0.05$).

To evaluate the checklist's 89 items, a Likert scale (1 = never, 5 = always) is used to measure the frequency of various symptoms during periods of breathing difficulty. The items are grouped into 11 domains; namely dyspnea, fatigue, congestion, peripheral sensory complaints, irritability, anxiety, decathexis, helplessness, sleeping difficulties, poor memory, and alienation. A raw scale score is obtained from the results and then converted to a T-score (mean 50; standard deviation [SD] = 10) based on normative values, where a high score indicates poor pulmonary conditions.

Statistical analysis

Assessed data were analyzed using SPSS for Windows, version 9.0 (SPSS, Chicago, IL), a statistical package. The analysis included an analysis of variance (ANOVA) for continuous variables, the Kruskal-Wallis Test, and the Mantel-Haenszel χ^2 test for categorical data and the odds ratio. The odds ratio in this experiment is,

$$\text{Odds ratio} = \frac{\text{Odds in favor of clinical improvement of treatment group}}{\text{Odds in favor of clinical improvement of control group}}$$

Multiple logistic regression analysis was used to investigate the multivariant adjusted odds ratios for clinical improvement, which were significant in univariant analysis. In this experiment, significance was indicated by a p value of less than 0.05, in two-sided tests.

Eighteen (18) variables, addressed by the surveys, were identified: 6-MWD, DVAS, Modified Borg Scale, 4 variables from SGRQ, and 11 from the BESC (Table 2). The dependent variable was the difference between the post-test and baseline scores. Scores were given as improved (1) or not improved (0). Because the norm of the indicators of this population was not available, the 6-MWD, DVAS, Modified Borg Scale, and BESC scores were considered to be of relative clinical importance when the change exceeded the median of the difference between the post-test and the baseline scores. A post-test SGRQ score 4 points lower than the baseline score represented a clinically meaningful improvement (Jones et al., 1991).

A sensitivity analysis was performed because of the smallness of the sample. The aim of the sensitivity analysis was to determine the effect that an idiosyncratic individual would have on the statistical analysis, and to identify subjects with greatly aberrant responses.

RESULTS

Population

Table 3 summarizes the population's baseline demographic and clinical characteristics, including pulmonary function. More men (29) than women (12) participated; all subjects who had a history of smoking were male; the mean

Table 2. Eighteen Variables

6-Minute Walking Distance (6-MWD)
Dyspnea Visual Analogue Scale (DVAS)
Modified Borg Scale
Four variables from SGRQ: symptoms, activity, impacts and total score
Eleven variables from BESC: dyspnea, fatigue, congestion, peripheral sensory complaints, irritability, anxiety, decathexis, helplessness, sleeping difficulties, poor memory and alienation

SGRQ, St. George's Respiratory Questionnaire; BESC, Bronchitis Emphysema Symptom Checklist.

Table 3. Clinical Characteristics of Patient with Chronic Obstructive Asthma Enrolled in the Study by Three Groups

	All subjects (n = *41*)	*Control group* (n = *13*)	*Acupuncture group* (n = *11*)	*Acupressure group* (n = *17*)	p[a]	p[b]
Gender M/F	29/12	9/4	7/4	13/4		
Cigarette pack-years						
0	22	6	6	10		
1–19	8	3	1	4		
20 or over	11	4	4	3		
Age						
64 or younger	17	3	5	9		
65 or older	24	10	6	8		
Asthma history (yrs)	14.1 ± 13.7	12.1 ± 13.4	12.6 ± 14.0	16.6 ± 14.2	0.63	0.78
IgE[c]	339.1 ± 443.1	173.0 ± 195.0	534.8 ± 689.0	353.6 ± 380.6	0.18	0.28
ECP[d]	8.8 ± 8.1	8.8 ± 10.1	7.4 ± 4.9	9.5 ± 8.4	0.81	0.85
Pulmonary function test						
FEV_1 % of predicted[e]	69.3 ± 26.0	75.0 ± 26.6	63.4 ± 15.6	68.9 ± 28.8	0.49	0.54
FVC % of predicted[e]	94.2 ± 21.4	103.2 ± 17.0	82.1 ± 17.6	93.0 ± 23.9	0.08	0.10
FEV_1/FVC[e] %	56.6 ± 12.9	55.5 ± 15.8	57.5 ± 8.6	57.1 ± 12.8	0.93	0.93
RV % of predicted[c]	184.9 ± 65.5	210.2 ± 77.6	173.8 ± 63.1	169.4 ± 50.8	0.23	0.42
RV/TLC[c] %	56.8 ± 12.3	59.9 ± 10.1	58.9 ± 15.8	53.2 ± 11.9	0.31	0.21
FRC % of predicted[c]	149.8 ± 43.0	168.6 ± 45.2	138.5 ± 34.2	138.8 ± 41.4	0.15	0.17
$D_{L_{CO}}$ % of predicted[e]	98.0 ± 38.5	96.9 ± 38.6	85.0 ± 30.9	104.9 ± 41.9	0.49	0.44
PC_{20}[c] $\mu g \bullet mL^{-1}$	2.7 ± 3.8	4.0 ± 5.8	2.6 ± 3.3	1.7 ± 1.5	0.30	0.76

Values are mean ± standard deviation (SD)
[a]*p* value for ANOVA.
[b]*p* value for Kruskal-Wallis test.
[c]$n = 37$.
[d]$n = 39$.
[e]$n = 38$.
ECP, eosinophil cationic proteins; FEV_1, forced expiratory volume in 1 second; FVC, forced vital capacity; RV, residual volume; TLC, total lung capacity; FRC, functional residual capacity; $D_{L_{CO}}$, carbon monoxide diffusing capacity; PC_{20}, provocation concentration of methacholine causing a 20% fall in FEV_1; ANOVA, analysis of variance.

age of the population was 64 years and the mean period of asthma history was 14 years.

Outcome measures

Table 4 presents the actual outcome measures in all patients at the baseline and at 8 weeks. The SGRQ and BESC scores show that acupuncture and acupressure treatment are beneficial. The multivariant adjusted odds ratios and 95% CI, presented in Table 5, reveal improvements made by the patients in the acupuncture and acupressure groups. In the acupuncture group, SGRQ total scores improved 18.5-fold (95% CI 1.54–211.48, $p = 0.02$); the acupressure group showed a 6.57-fold improvement (95% 0.98–44.00, $p = 0.05$). For acupressure patients, the irritability domain score of the BESC improved 11.8-fold (95% CI 0.88–158.64, $p = 0.06$). Scores in other domains did not exhibit statistically significant improvement.

DISCUSSION

The data show that acupuncture and acupressure were effective supplements of standard care routines, assuming adequate patient compliance. The clinical implications of these findings are consistent with the goals of asthma management, and support the incorporation of acupuncture treatment in the comprehensive management of asthma (Jobst, 1995; NIH Consensus Development Panel on Acupuncture, 1998).

Recruitment and attrition

The attrition rate in this experiment was high, perhaps because of the characteristics of acupuncture and acupressure. Of the 132 patients approached to participate in this experiment, 70 agreed to participate and 41 completed treatment, yielding an attrition rate of 41%. Of the 14 subjects in the acupuncture

Table 4. Outcome Measures During the Study

Outcome measure	*Control group (n = 13)*	*Acupuncture group (n = 11)*	*Acupressure group (n = 17)*
		6-MWD, DVAS and Modified Borg Scale	
6-MWD meters			
Baseline	462.02 ± 130.30	315.45 ± 66.21	428.51 ± 147.47
8 week	480.53 ± 137.17	324.35 ± 106.75	489.31 ± 142.71
DVAS			
Baseline	48.96 ± 32.59	36.91 ± 25.48	53.82 ± 23.59
8 week	21.38 ± 19.78	18.82 ± 17.09	24.47 ± 24.00
Modified Borg Scale			
Baseline	4.92 ± 2.81	4.55 ± 2.54	5.00 ± 2.15
8 week	1.85 ± 1.46	2.45 ± 2.07	2.44 ± 2.31
		BESC	
Dyspnea			
Baseline	36.05 ± 11.34	36.94 ± 9.71	38.41 ± 10.52
8 week	30.34 ± 6.44	30.01 ± 6.54	28.83 ± 5.20
Fatigue			
Baseline	32.31 ± 10.59	34.30 ± 12.24	31.76 ± 14.05
8 week	29.03 ± 9.21	38.42 ± 16.28	28.78 ± 12.71
Sleep difficulties			
Baseline	43.65 ± 10.89	42.37 ± 8.72	38.89 ± 8.95
8 week	36.55 ± 8.83	39.03 ± 9.53	35.44 ± 8.65
Congestion			
Baseline	36.19 ± 14.37	45.11 ± 10.23	45.72 ± 12.84
8 week	32.55 ± 9.94	37.53 ± 13.33	34.19 ± 11.81
Irritability			
Baseline	39.10 ± 8.75	38.29 ± 12.62	39.37 ± 11.73
8 week	37.68 ± 9.00	37.09 ± 14.33	34.42 ± 9.90
Anxiety			
Baseline	37.90 ± 8.47	40.22 ± 14.53	39.45 ± 11.30
8 week	33.06 ± 3.27	35.97 ± 9.95	35.98 ± 9.43
Decathexis			
Baseline	43.32 ± 9.97	41.98 ± 8.91	44.20 ± 12.14
8 week	36.61 ± 5.55	41.71 ± 10.11	38.90 ± 10.30
Helplessness			
Baseline	40.47 ± 6.28	40.10 ± 7.86	38.57 ± 5.46
8 week	37.63 ± 3.45	39.46 ± 9.09	37.85 ± 5.30
Poor memory			
Baseline	50.02 ± 11.33	49.72 ± 13.06	46.94 ± 13.48
8 week	49.69 ± 8.23	51.91 ± 14.36	47.97 ± 11.70
PSC			
Baseline	43.32 ± 5.27	46.99 ± 8.81	42.98 ± 7.07
8 week	42.36 ± 5.78	42.25 ± 6.03	40.04 ± 4.29
Alienation			
Baseline	39.52 ± 3.34	40.57 ± 5.20	42.39 ± 6.59
8 week	37.60 ± 1.87	37.16 ± 0.94	38.35 ± 4.00
		SGRQ	
Symptoms			
Baseline	29.33 ± 20.94	51.93 ± 24.95	41.88 ± 24.22
8 week	25.25 ± 22.34	35.70 ± 28.65	24.50 ± 24.84
Activity			
Baseline	41.20 ± 35.79	54.76 ± 21.58	40.47 ± 24.97
8 week	31.42 ± 21.03	44.49 ± 29.35	32.96 ± 30.29
Impacts			
Baseline	21.49 ± 20.06	30.30 ± 16.55	22.92 ± 17.93
8 week	11.47 ± 13.06	20.33 ± 24.89	10.60 ± 19.99
Total score			
Baseline	28.76 ± 20.64	41.30 ± 16.68	31.39 ± 17.19
8 week	19.80 ± 13.86	30.20 ± 24.26	19.69 ± 21.64

Values are mean ± standard deviation (SD).

A lower score indicates better condition for DVAS, Modified Borg Scale, BESC, and SGRQ; values are mean ± SD. A higher score indicates better condition for FEV_1/FVC, PEF, 6-MWD.

6-MWD, 6-minute walking distance; DVAS, Dyspnea Visual Analogue Scale; BESC, Bronchitis Emphysema Checklist; SGRQ, St. George's Respiratory Questionnaire; PSC, peripheral sensory complaints.

Table 5. Multivariate Adjusted Odds Ratios of Three Groups on Outcome Measurements

	Control group		*Acupuncture group*			*Acupressure group*		
Outcome measure	n *(improved/ not improved)*	*Adjusted OR*[a]	n *(improved/ not improved)*	*Adjusted OR*[a]	*95% CI for OR*[a]	n *(improved/ not improved)*	*Adjusted OR*[a]	*95% CI for OR*[a]
6MWD		1.00	4/7	0.53		8/7	1.23	
DVAS	6/7	1.00	4/7	0.12	(0.10, 2.91)	10/7	0.37	(0.24, 6.24)
	8/5	1.00	7/4	0.57	(0.02, 1.08)	8/9	0.24	(0.05, 2.57)
Modified Borg	8/5				(0.08, 4.11)			(0.03, 1.73)
Scale		1.00	6/5	1.82		10/7	1.91	
BESC	5/8				(0.35, 9.60)			(0.38, 9.57)
Dyspnea								
Fatigue	7/6	1.00	5/6	0.78	(0.15, 4.11)	13/4	2.39	(0.43, 13.32)
Sleep difficulties	8/5	1.00	7/4	1.16	(0.21, 6.28)	8/9	0.47	(0.09, 2.40)
Congestion	6/7	1.00	7/4	1.84	(0.34, 9.99)	9/8	0.95	(0.19, 4.79)
Irritability	9/4	1.00	7/4	1.07	(0.17, 6.94)	16/1	11.80[b]	(0.88, 158.64)
Anxiety	11/2	1.00	9/2	0.92	(0.10, 8.81)	15/2	0.99	(0.09, 10.59)
Decathexis	8/5	1.00	5/6	0.59	(0.11, 3.24)	10/7	1.15	(0.22, 6.04)
Helplessness	11/2	1.00	10/1	1.33	(0.09, 19.62)	15/2	0.61	(0.05, 7.63)
Poor memory	10/3	1.00	6/5	0.28	(0.04, 1.86)	9/8	0.27	(0.04, 1.73)
PSC	8/5	1.00	9/2	3.22	(0.45, 22.83)	9/8	0.75	(0.15, 3.84)
Alienation	11/2	1.00	10/1	1.60	(0.12, 21.90)	15/2	0.82	(0.08, 8.58)
SGRQ								
Symptoms	5/8	1.00	7/4	2.56	(0.46, 14.09)	12/5	2.53	(0.49, 13.19)
Activity	6/7	1.00	7/4	3.11	(0.37, 25.96)	10/7	1.84	(0.29, 11.87)
Impacts	8/5	1.00	9/2	3.08	(0.41, 23.36)	13/4	2.96	(0.46, 19.06)
Total score	5/8	1.00	10/1	18.05[b]	(1.54, 211.48)	13/4	6.57[b]	(0.98, 44.00)

[a]Adjusted for gender, age, cigarette consumption, gender-cigarette consumption. For age, taking the category 64 or younger as the reference, 65 or older as indicator variable. For cigarette consumption, taking the category 0 pack-year as the reference, 1–19 pack-year and 20 or over pack-year were used as indicator variables for each of the two groups. Because males tended to smoke more than females in this study, two indicator variables were subsequently introduced for gender-related cigarette consumption. Taking the category female and 0 pack-year as the reference, males who smoked 1–19 pack-year and males who smoked 20 or over pack-year were used as the indicator variables for each of the two groups. In addition to group, gender, age, cigarette consumption and gender-cigarette consumption were forced into the model performed multiple logistic-regression analyses.

OR, odds ratio; 6-MWD, 6-minute walking distance; DVAS, Dyspnea Visual Analogue Scale; BESC, Bronchitis Emphysema Symptom Checklist; PSC: peripheral sensory complaints, SGRQ: St. George's Respiratory Questionnaire.

[b]$p < 0.05$ compared to controls.

group who dropped out in week 4, 5 did not accept acupuncture treatment, 6 dropped out because of the study was too time-consuming, and 3 voluntarily withdrew. Of the 10 subjects in the acupressure and control groups who dropped out in week 4, 2 dropped out because the study was too time-consuming and 8 voluntarily withdrew. Of the 5 subjects who dropped out in week 8, 1 did so because of an asthma attack, 1 because of a long-term holiday abroad, and 3 voluntarily withdrew. That most of the withdrawals were not for medical reasons reflects the fact that some patients may not have appreciated the value of alternative treatments. As in earlier studies, some patients may have withdrawn because of the pain associated with needle insertion during acupuncture. Notably, however, the pain was not a long-term side-effect, and indeed, patients experienced few side effects. Conversely, the completion of acupuncture treatment by 11 patients and of acupressure treatment by 17 patients shows that some patients do accept acupuncture, and others are willing to learn about and perform self-administered acupressure over a defined period. For those who do not accept acupuncture or acupressure, we suggest using an educational program to help patients integrate their knowledge, skills, and attitudes into appropriate behaviors to cope optimally with asthma.

Demographic data and characteristics

Three issues regarding the sample population must be addressed. First, pre-test physical

conditions were similar among the three groups; therefore, the subjects represented a homogeneous population. This assumption increases statistical power and improves the estimates of relative improvement. The population was stable because patients' inflammatory conditions were controlled. Second, significant differences in cigarette consumption were found in a preliminary analysis, implying responses to acupuncture and acupressure vary between smokers and nonsmokers. Moreover, Ulrik (1999), in a review of the present knowledge of longitudinal changes in lung function, concluded that three variables—female gender, long history of asthma, and cigarette consumption—negatively impact such changes. These facts empirically support the considering of the three variables associated with a longitudinal change in lung function as covariables for hypothesis testing. Adjusting the multivariant odds ratios for gender, age, cigarette consumption, and gender-cigarette consumption interactions allowed the assumption to be made that results should not statistically differ between men and women. Third, sensitivity analyses revealed overall consistency of each dependent variable. Therefore, the experimental design was sufficiently tolerant of atypical individuals.

Acupuncture

The improvement in patient health-related quality of life after acupuncture treatment is explained by acupuncture's activating and strengthening of the body's natural defenses and repair systems, with minimal side-effects. The results show that acupressure was less effective than acupuncture, which are consistent with the fact that acupressure is shorter acting and less effective (Dundee et al., 1990), possibly because the effects of acupuncture are related to specific symptoms whereas those of acupressure are more general, although this fact has not yet been clearly established. Although some pain may be experienced when a needle is inserted, such pain is not long term. Patients did not experience bruising or other adverse skin reactions as a result of the methods used to treat their asthma, and intervention did not induce any serious adverse effects during or after treatment.

Acupressure

Acupressure affects the nervous system and may affect the body in three ways. First, acupressure promotes relaxation (Bauer, 1987). The relaxation response reduces stress and tension. Second, acupressure may stimulate more than a local meridian system. The fingertip is much larger than a specific acupuncture point and so, when used to apply pressure, it may simultaneously stimulate multiple meridian systems. However, the fact that acupressure stimulates multiple meridian systems has not yet been clearly established. Third, self-administered acupressure reduces a patient's fear of dyspnea and side-effects.

Practically, acupressure has many distinct advantages because it is accessible. Once learned, treatment can be self-administered at home as required, reducing the need for several clinical and office visits. Moreover, acupressure does not depend on specialized tools or products, but only knowledge, and as demonstrated by this experiment, patients can be readily taught the skills required for self-care. Most patients respond positively to the challenge of participating actively in their treatment.

The differences between the groups revealed by the 6-MWD, DVAS, and modified Borg scale were relatively small and not statistically significant, perhaps partially because the chosen acupuncture points were those associated with relief of dyspnea, rather than with the other particular outcomes.

The overall results of this study may have been affected by the effect of disappointment in the control group patients who did not receive any adjunctive care, they would have deduced the fact from reading the informed consent. Some limitations of this study include not obtaining information about other variables that might have affected outcomes. Future studies should interview patients and their families on various occasions to obtain information about other treatment modalities used, such as meditations, exercise, nutrition, and coexisting medical conditions.

CONCLUSIONS

The data show that clinically stable patients with chronic obstructive asthma experienced

clinically significant improvements in their quality of life when their standard care is supplemented with acupuncture or acupressure. The authors posit that both acupuncture and acupressure would be readily accepted by other patients with asthma as a treatment supplement, as they were in this study, despite issues of patient compliance and attrition. Similar studies must be undertaken with a larger patient population. A larger population would allow the effect, if any, of compliance on outcome, to be determined. It could also reveal whether patients who chose not to take part and those who withdrew did so because of discomfort during the treatment; it would differentiate between specific and nonspecific effects of acupuncture therapy, elucidate long-term outcomes, and allow practitioner preferences and dosing frequencies to be specified. Such extended studies might allow the teaching of acupuncture and acupressure at medical schools to be recommended for treating various health problems.

ACKNOWLEDGMENTS

The authors greatly appreciate Deborah B. McGuire, Ph.D., R.N., F.A.A.N., an assistant professor, and the director of the Oncology Advanced Practice Nurse Program, School of Nursing, Philadelphia, PA, and Helen Hong, a doctoral student at Rensselaer Polytechnic Institute, Troy, NY, for the time and effort they have spent in reviewing and editing the manuscript. This study was supported by grant NSC 86-2314-B-182-120 and NSC 87-2314-B-182-032 from the National Science Council of the Republic of China (Taiwan).

REFERENCES

Barnes PJ, Rodger IW, Thomson NC. Pathogenesis of asthma. In: Barnes PJ, Rodger IW, Thomson NC, eds. Asthma, Basic Mechanisms and Clinical Management, 2nd ed. London: Academic Press, 1992:391–411.

Bauer C. Acupressure for Women. Berkeley, CA: The Crossing Press, Freedom, 1987.

Biernacki W, Peake MD. Acupuncture in treatment of stable asthma. Respir Med 1998;92:1143–1145.

Bond A, Lader M. The use of analogue scales in rating subjective feelings. Br J Med Psychol 1974;47:211–218.

Burdon J, Juniper E, Killian K, Hargreave F, Campbell E. The perception of breathlessness in asthma. Am Rev Respir Dis 1982;126:825–828.

Butland RJA, Pang J, Grossk ER, Woodcock AA, Geddes DM. Two-, six-, and 12-minute walking test in respiratory disease. BMJ 1982;284:1607–1608.

Chapman D, Carter JF. Translation procedures for the cross-culture use of measurement. Educ Eval Policy An 1979;1:71–76.

Chen K-G. The science of acupuncture-theory and practice. II. Electrical properties of meridians. IEEE Eng Med Biol 1996;15:58–63.

Connolly CK, Alcock SM, Prescott RJ. Management and control of asthma as assessed by actual/best function and corticosteroid use 1980–1993/4. Eur Respir J 1998; 12:859–864.

Dundee JW, McMillan CM. Clinical uses of P6 acupuncture antiemesis. Acupunct Electrother Res Int J 1990;15: 211–215.

Hammerschlag R. Methodological and ethical issues in clinical trials of acupuncture. J Altern Complement Med 1998;4:159–171.

Harding JM, Modell M. How patients manage asthma. Br J Gen Pract 1985;35:226–228.

Hare ML. Shiatsu acupressure in nursing practice. Holistic Nurs Pract 1988;2:68–74.

Hui KKS, Liu J, Makris N, Gollub RL, Chen AJW, Moore CI, Kennedy DN, Rosen BR, Kwong KK. Acupuncture modulates the limb system and subcortical gray structure of the human brain: Evidence from fMRI studies in normal subjects. Hum Brain Mapp 2000;9:13–25.

Jobst KA. A critical analysis of acupuncture in pulmonary disease: Efficacy and safety of the acupuncture needle. J Altern Complement Med 1995;1:57–85.

Jones PW. Measurement of health in asthma and chronic obstructive airways disease. Pharmaceutical Med 1992; 6:13–22.

Jones EG, Kay M. Instrumentation in cross-cultural research. Nurs Res 1992;41:186–188.

Jones PW, Quirk FH, Baveystock CM. The St George's respiratory questionnaire. Resp Med 1991;85(Suppl B):25–31.

Joshi YM. Acupuncture in bronchial asthma. J Assoc Phys India 1992;40:327–331.

Kinsman RA, Yaroush RA, Fernandez E, Dirks JF, Schocket M, Fukuhara J. Symptoms and experiences in chronic bronchitis and emphysema. Chest 1983;83:755–761.

Linde K, Worku F, Stör W, Wiesner-Zechmeister M, Pothmann R, Weinschütz T, Melchart D. Randomized clinical trials of acupuncture for asthma—A systematic review. Forsch Komplementärmed 1996;3:148–155.

Maa S, Gauthier D, Turner M. Acupressure as an adjunct to a pulmonary rehabilitation program. J Cardiopulm Rehab 1997;17:268–276.

Magnussen H, Kanniess F, Richter K. Difficult or therapy-resistant asthma: Clinical phenotypes of near-fatal, fatal, premenstrual and chronic fixed asthma. Eur Respir Rev 2000;10:5–10.

Matsumura WM. Use of acupressure techniques and concepts for nonsurgical management of TMJ disorders. J Gen Orthodont 1993;4:5–16.

National Institutes of Health. Global Initiative for Asthma, Global Strategy for Asthma Management and Prevention, NHLBI/WHO Workshop Reports. National Institute of Health, United States. Bethesda: National Heart, Lung and Blood Institute, 1995. NIH Publication No. 95-3659.

NIH Consensus Development Panel on Acupuncture. Acupuncture. JAMA 1998;280:1518–1524.

Parson A. Acupuncture, getting the point. Harvard Health Letter 1993;18:6–8.

Pomeranz B, Chiu D. Naloxone blockade of acupuncture analgesia: Endorphin implicated. Life Sci 1976;19:1757–1762.

Quirk FH, Jones PW. Patients' perception of distress due to symptoms and effects of asthma on daily living and an investigation of possible influential factors. Clin Sci 1990;79:17–21.

Research Group of Acupuncture Anaesthesia, Peking Medical College. The role of some neurotransmitters of brain in finger-acupuncture analgesia. Scientia Sinica 1974;17:112–130.

Stux G, Pomeranz B. Acupuncture: Textbook and Atlas. New York: Springer-Verlag, 1987.

Thatte DG. Acupuncture Marma and Other Asian Therapeutic Techniques. Varanasi: Chaukhambha Orientalia, 1988.

Ulrik CS. Outcome of asthma: longitudinal changes in lung function. Eur Respir J 1999;13:904–918.

Wang KY, Chiang CH, Maa SH, Shau WY, Tarn YH. Psychometric assessment of the Chinese language version of the St. George's respiratory questionnaire in Taiwanese patients with bronchial asthma. J Formos Med Assoc 2001;100:455–460.

Woolcock AJ. Management of asthma in adults. In: Barnes PJ, Rodger IW, Thomson NC, eds. Asthma, Basic Mechanisms and Clinical Management, 2nd ed. London: Academic Press, 1992:679–699.

Wu MT, Hsieh J-C, Xiong J, Yang C-F, Pan H-B, Chen Y-CI, Tsai G, Rosen BR, Kwong KK. Central nervous pathway for acupuncture stimulation: localization of processing with functional MR imaging of the brain-preliminary experience. Radiology 1999;212:133–141.

Address reprint requests to:
Suh-Hwa Maa, D.S.N.
School of Nursing
Chang Gung University
259 Wen-Hwa 1st Road Kwei-San
Tao-Yuan 33351
Taiwan

E-mail: shmaa@mail.cgu.edu.tw