Effects of acupressure therapy for patients having prolonged mechanical ventilation support

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Aims. This paper reports an investigation of the effects of acupressure therapy on dyspnoea, anxiety and physiological indicators of heart rate and respiratory rate in patients with chronic obstructive pulmonary disease having mechanical ventilation support.

Background. Patients with chronic obstructive pulmonary disease who are using mechanical ventilation often experience dyspnoea and anxiety, which affects successful ventilator use.

Methods. The study had an experimental blocking design, using sex, age and length of ventilator use as a blocking factor. Qualified patients in two intermediate respiratory intensive care units were randomly assigned to an acupressure group and a comparison group. A total of 52 patients with chronic obstructive pulmonary disease in northern Taiwan participated. Those in the experimental group received daily acupressure therapy and massage treatment for 10 days. Patients in the comparison group received massage treatment and handholding. The primary outcome measures were the visual analogue scales for dyspnoea and anxiety, and physiological indicators of heart rate and respiratory rate. Data were collected every day from baseline (day 1), during the treatment (days 2–10) and follow-up (days 11–17). Data were analysed using generalized estimation equations. The study was carried out in 2003.

Results. Patients with chronic obstructive pulmonary disease who were using prolonged mechanical ventilatory support experienced high levels of dyspnoea and anxiety. Dyspnoea ($P = 0{\cdot}009$), anxiety ($P = 0{\cdot}011$) and physiological indicators ($P < 0{\cdot}0001$) in the acupressure group improved statistically significantly over time when compared with those of the comparison group.

Conclusions. This results support the suggestion that acupressure therapy could decrease sympathetic stimulation and improve perceived symptoms of dyspnoea and

anxiety in patients with chronic obstructive pulmonary disease who are using prolonged mechanical ventilation.

Keywords: acupressure, anxiety, chronic obstructive pulmonary disease, dyspnoea, nursing, ventilator

Background

Chronic obstructive pulmonary disease (COPD) is characterized by alterations in the airways and lung parenchyma, resulting in increased respiratory workload (Palm & Decker 2003). Patients with COPD typically have an acute exacerbation of their disease one to three times a year, and 3–16% of these incidents require hospital admission (Soto & Varkey 2003). Many of these patients require mechanical ventilation support. Nonetheless, patients with COPD who are using prolonged mechanical ventilation are at increased risk of intubation-associated complications and mortality (Schonhofer *et al.* 2002, Kobashi & Matsushima 2003). The goal of treatment is to wean these patients off the ventilator rapidly. Although numerous technological advances and protocols have been made over recent years to support respiratory failure, many patients must still depend on ventilators for survival.

Using mechanical ventilation support is an incredibly stressful experience for these patients and this should not be overlooked. They describe mechanical ventilation as 'the most inhumane treatment ever experienced' (p. 57), and have reported being miserable most of the time they were intubated (Gries & Fernsler 1988). Anxiety and dyspnoea are reported as major problems for most patients requiring a ventilator (Bergbom-Engberg & Haljamae 1989, Johnson & Sexton 1990, Mazzeo 1995, Rotondi *et al.* 2002). Furthermore, high levels of perceived dyspnoea with anxiety are often reported as major factors interfering with weaning trials, and lead patients to long-term respirator dependency (Knebel *et al.* 1994, Rotondi *et al.* 2002). Anxiety and dyspnoea cause increased sympathetic nervous system activation, lead to arterial and venous constriction, myocardial stimulation, bronchoconstriction, increased airway resistance, increased laboured breathing, and increased oxygen demand, thus increasing the difficulty of weaning patients from mechanical systems (Johnson & Sexton 1990).

Few documented interventional studies have addressed the symptoms of anxiety and dyspnoea in patients using mechanical ventilation. Thus, there is a need to develop effective methods to manage problems such as dyspnoea or anxiety in these patients using a ventilator.

Literature review

Acupressure is a non-invasive therapy that is based on Traditional Chinese Medicine (TMC), and might offer a valuable therapy modality to manage symptoms in these patients. Acupuncture plays an important role in today's multidisciplinary approach to the treatment and management of various symptoms. The National Institute of Health (NIH) (1997) has recommended acupuncture as an effective tool in the treatment of various health problems. The traditional technique(s) appears to be effective in the treatment of pain, nausea, fatigue, sleep disturbances, drug detoxification and in aiding stroke victims (NIH 1997, Tsay & Chen 2003, Tsay 2004). Acupuncture stimulates neurotransmitters and adrenocorticotropic hormones, and studies have supported its use as an endorphin-mediated mechanism in treat analgesia (Hsu 1996). Acupuncture appears to be a safe and effective alternative therapy for certain health problems (Ceniceros & Brown 1998, Tsay & Chen 2003, Tsay 2004). Similar to acupuncture (a very mild but invasive procedure), acupressure therapy applies mild, non-invasive pressure to certain meridian points on the body to relieve various symptoms.

Dyspnoea is a frequent complaint in patients with COPD, especially in those using mechanical ventilation, and is a strong subjective experience of physiological distress. No intervention studies have documented the management of symptoms of dyspnoea in patients COPD who are using a ventilator. Nevertheless, three related studies were identified within a community of patients with COPD. In the first study, 12 matched pairs of such patients received acupuncture or placebo acupuncture. Following 3 weeks of treatment, the acupuncture group showed a statistically significant improvement in perceived breathlessness; however, objective measures of lung function remained unchanged in both groups (Jobst *et al.* 1986). The second study assessed the effects of self-administered acupressure as an adjunct to a pulmonary rehabilitation programme (PRP) for the relief of symptoms of dyspnoea in patients with COPD (Maa *et al.* 1997). Real acupressure was found to be more effective than sham acupressure in reducing dyspnoea, as measured by a visual analogue scale (VAS) (Maa *et al.* 1997). However, these reports did not give the locations of the

acupoints used. A recent study investigated the effectiveness of acupressure in improving dyspnoea in 44 patients with COPD. The results demonstrated that the true acupoints acupressure group improved statistically significantly in dyspnoea scores compared with the sham group (Wu *et al.* 2004). However, the protocol for acupressure treatment was very complicated and might not be realistic for use by busy clinicians in practice.

Anxiety often accompanies symptoms of perceived dyspnoea. Acupuncture has been reported to reduce anxiety symptoms statistically significantly better than amitriptyline in patients with depression (Yang *et al.* 1994). Similarly, a randomized controlled trial of 43 patients with anxiety disorders showed statistically significant improvements after 10 acupuncture treatments (Eich *et al.* 2000). Additionally, a study evaluated the effect of acupuncture on presurgical anxiety, with statistically significant beneficial differences found only in the group receiving acupuncture at the 'relaxation points' of the body (Wang & Kain 2001).

In conclusion, many patients with COPD require mechanical ventilator support, and confront the difficulty of a weaning process as a result. Mechanical ventilation treatment is a very stressful experience, and this should not be ignored by nurses taking care of these patients. Patients using ventilators exhibit high levels of perceived dyspnoea, and the accompanying anxiety interferes with weaning protocols and leads to unwanted dependency on ventilator systems for survival. Few empirical studies have been conducted to assist these patients to decrease their perceived dyspnoea and anxiety. Moreover, preliminary findings from published studies suggest that acupuncture or acupressure might be effective in helping patients with COPD with symptoms of dyspnoea and/or anxiety on an outpatient basis. A number of these studies are limited by the reliance on small sample sizes and lack of appropriate control groups. Given that acupressure therapy is low cost, easily mastered and performed and non-invasive, this treatment technique should be investigated using methodologically sound, well-controlled studies.

The study

Aim

The aim of this study was to apply a prospective, experimental design to examine the effectiveness of acupressure therapy to perceived dyspnoea, anxiety, heart rates (HRs) and respiratory rates (RRs) in patients with COPD with prolonged mechanical ventilation system usage.

Design

The study was a two-group experimental design with repeated measures using sex, age and length of ventilator use as a blocking factor. The data were collected in 2003.

Power analysis

Sample size was estimated using a power table for repeated measures and within the two groups, a significance level at 0·05, effect size of 0·57, correlations of 0·80, power of 80%, showed that only 14 patients were needed in each group. In this study, 26 patients per group were included.

Participants

The study was conducted in two respiratory intermediate intensive respiratory care units affiliated with medical centres in Taiwan. Participants were required to be alert, mentally competent and able to communicate, medically stable, diagnosed with COPD and receiving mechanical ventilation assistance over 21 days, aged 60 years and above, and to have reported symptoms of dyspnoea, require $FiO_2 < 50\%$ of the time, and have a resting arterial $PaO_2 > 60$ mmHg, serum albumin $> 2{\cdot}5$ mg/dL, and haemoglobin > 10 mg/dL. Those with active heart or neuromuscular diseases, hearing problems, psychiatric diagnoses, using steroids, neuromuscular blocking agents or tranquillizers were excluded. All patients received regular treatment with inhaled bronchodilators.

Acupressure protocol

We developed an acupressure protocol based on the literature (Huang 1991) and in consultation with five licensed TMC physicians, who had practised acupuncture for more than 10 years. To control the validity and reliability of the acupressure intervention, the protocol was set up as follows.

Three acupoints of Neiguan (PC6) and Hegu (LI4) in both hands, Shenmen (HT7) on both ears were selected to decrease symptoms of dyspnoea and anxiety (Figure 1). Neiguan (PC6) is a pericardium meridian, indicated for symptoms of palpitation, stuffy chest and irritability. Hegu (LI4) is a large intestine meridian, with medical implications for treating pain and swelling of neck, face, nose, mouth, throat and respiratory tract

Figure 1 Acupoints used in the study for dyspnoea and anxiety relief.

congestion. Shenmen (HT7) is a heart meridian with medical implications for managing patients with symptoms of irritability, palpitation, hysteria or insomnia (Huang 1991).

The precision of acupressure was confirmed if patients felt sore, numb, heavy, or distended as a result of acupressure massage. Each acupressure therapy was limited to 15 minutes, consisting of 3 minutes of massage on the shoulders and both arms to relax the person and 12 minutes of acupoints massage (4 minutes per acupoint). Patients in the experimental group received acupressure therapy every day for 10 days at mid-afternoon.

A trained TMC nurse therapist (2 years at a Chinese medicine) followed the protocol with the experimental group patients. The reliability and validity of acupressure treatment was assessed by confirmation of application of consistent pressure on the correct acupoints. Two TMC experts, who confirmed with 100% accuracy and agreement, evaluated the accuracy of acupoints selection.

Outcome measures

Respiratory rate and HR are important indicators of anxiety and were therefore selected as physiological indicators of anxiety or relaxation. Mean RRs were measured and recorded for 30 minutes while patients were resting during ventilator use in the afternoon. Mean HRs were obtained at same time via a bedside cardiac monitor. Both mean RR and HR values were recorded every day during the study period.

Patients requiring mechanical ventilation face numerous challenges in responding to and completing Likert-type paper and pencil measures. Because they can become fatigued easily as a result of their critical illness, a simple VAS was used to measure perceived dyspnoea and anxiety daily. Patients rated these in response to the following questions in the same order at each measurement time: 'How short of breath are you today?' and 'How anxious are you today?' They responded to each question by marking with pencil separate 100 mm vertical VASs anchored by 'not at all' and 'worst possible' at both extremes. These data were collected daily at baseline (day 1), before each intervention session (days 2–10) and follow-up (days 11–17). The vertical VAS has been shown to be valid in patients with COPD (Gift 1989).

Data collection

Qualified patients who consented to participate were randomly assigned to either the acupressure or comparison group. Only the researcher and acupressure therapist were aware of which treatment the patients were receiving. Their usual caregivers were uninformed as to their treatment group. The data were collected at baseline (day 1) prior to intervention protocol, everyday during the intervention (days 2–10) and daily for 7 days following the intervention (days 11–17). The data collector was a trained research assistant who was purposely left unaware of patients' group status.

Ethical considerations

Approval from the college and respective hospitals' Research and Ethics Committees was obtained before initiation of the study. Potential patients were approached and fully informed of the purpose of the research, its methods, benefits and risks. Patients and their families gave written consent once they had agreed to participate. Anonymity and confidentiality were assured and participants could withdraw from the study at any point without affecting their subsequent treatment.

Data analysis

All statistical analyses were carried out using the SAS statistical package (SAS Inc., Cary, NC, USA). Characteristics of the participants were summarized by means and standard deviations. The Students' *t*-test and chi-square test were used, as appropriate, to analyse group differences. Value changes of study outcomes (HR, RR, dyspnoea and anxiety) from baseline (day 1) to follow-up periods (days 2–17) were expressed in both experimental and comparison groups. A general linear model was used to model the outcome (HR, RR, dyspnoea and anxiety) as a function of main effect (group difference) and the covariates, including age, gender and duration of ventilation assistance. Both the stability analysis and the analysis of repeated relationships were performed by generalized estimation equations (GEE). An interaction term (group difference $\times$ time) was added into each model to investigate the synergistic effect of acupressure therapy with time. GEE was chosen because clinical longitudinal data frequently have a non-normal distribution and the variances often cannot be assumed to be equal, as required of ANOVA model (Armitage *et al.* 2002, p. 436).

Results

Demographics

As shown in Table 1, the sample consisted of 52 patients – 25 men and 27 women – with a mean age of 73·88 $\pm$ 7·19 years (range 60–83). Of the 52 people who participated in this study, 51 were married and one was

Table 1 Baseline characteristics of participants ($n = 52$)

	Acupressure group ($n = 26$)	Comparison group ($n = 26$)	t/χ^2	P value
Age (years)	73·77 ± 8·40	74 ± 5·91	0·12	0·90
Male:female	14:12	13:13	0·08	0·78
Days on ventilator	51·62 ± 8·40	50·46 ± 9·88	0·41	0·68
Albumin	2·87 ± 0·24	2·97 ± 0·26	1·36	0·18
Haemoglobin	10·73 ± 0·39	10·67 ± 0·37	0·61	0·54
Tidal volume (mL)	438·96 ± 55·46	429·45 ± 63·43	0·57	0·57
RR (bpm)	17·31 ± 2·84	18·69 ± 3·06	1·69	0·10
VE (L/min)	7·55 ± 1·35	7·92 ± 1·33	0·99	0·32
RSI (b/min/L)	40·27 ± 9·36	45·02 ± 11·73	1·61	0·11
Pimax (cmH_2O)	15·96 ± 3·08	17·27 ± 4·17	1·28	0·20

RR, respiratory rate; VE, minute ventilation; RSI, rapid shallow index; Pimax, maximum inspiratory pressure; bpm, breaths per minute.

Table 2 Generalized linear model* on the effect of heart rate and respiratory rate for acupressure therapy ($n = 52$)

	Heart rate			Respiratory rate		
Variable	β	SE	P value	β	SE	P value
Group (experimental vs. comparison)	−5·54	2·87	0·05	3·25	0·72	< 0·0001
Age (years)	0·13	0·15	0·42	−0·03	0·05	0·517
Gender (female vs. male)	2·76	2·87	0·33	0·04	0·73	0·954
Time (day)	−0·04	0·04	0·24	−0·00	0·02	0·971

*Using generalized estimation equations for repeated measurements and the correlation structure exchangeable. β, Coefficient of modelling.

single. Most were primary school graduates ($n = 22$), 15 were secondary school graduates, 13 were illiterate with no formal school education, and two were college graduates.

Table 2 shows the clinical variables. Patients had been using mechanical ventilation for a mean of 51·04 ± 10·06 (range 22–63) days. The majority had tracheotomies ($n = 50$). All received pressure support (PS) adjuncts (5–20 cm of water) and positive end-expiratory pressure (3–12 cm of water). Their RRs ranged from 10 to 22 breaths per minute while on PS or SIMV mode at baseline. The oxygen concentrations given to them ranged from 30% to 50%. There were no statistically significant differences between those randomly assigned to the acupressure and comparison groups in baseline demographics and clinical variables ($P > 0·05$).

Changes in HRs and RRs

All 52 patients completed 17 data points, which included baseline (day 1), during intervention (days 2–10), and follow-up (days 11–17) periods. Mean HR at baseline was 79·54 (SD = 9·39) for the experimental group and 83·38 (SD = 12·76) for the comparison group; there were no statistically significant differences between the groups ($t = 1·23$, $P = 0·22$). The profile of changes in mean HR for the experimental group, HR declined gradually from baseline (day 1) to a low point at day 13, and then increased slowly. However, for the comparison group, HR remained basically unchanged throughout the study (Figure 1).

Using GEEs, after controlling for potential confounding variables, we found a statistically significant difference between the groups and their HRs at baseline, intervention and follow-up. HRs in the experimental group changed from a non-significant difference at baseline ($P = 0·68$) to a statistically significantly lower range during intervention and follow-up, compared with the comparison group. The variations within the experimental group were statistically significantly higher ($-5·54$, $P = 0·05$) compared with the comparison group. Women generally had higher HRs (2·76) when compared with men, but this did not reach statistical significance. However, no differences were discovered with regard to age between the groups overtime ($P > 0·05$).

The mean RR at baseline was 17·31 (SD = 2·84) for the experimental group and 18·69 (SD = 3·06) for the comparison group; there were no statistically significant differences between them for RR ($t = 1·69$, $P = 0·10$). The profiles of changes in the mean RRs differed between the two groups. For those in the experimental group, RR gradually declined overtime, reaching the lowest value at 11 days (the last day of acupressure therapy), and slowly rising during the follow-up period. In contrast, for those in the control group, perceived dyspnoea increased over time throughout the follow-up period. Patients in the experimental group had lower RR ($-3·25$, $P < 0·0001$) than those in the comparison group; no differences with regard to gender and age were found over time ($P > 0·05$) (Figure 2).

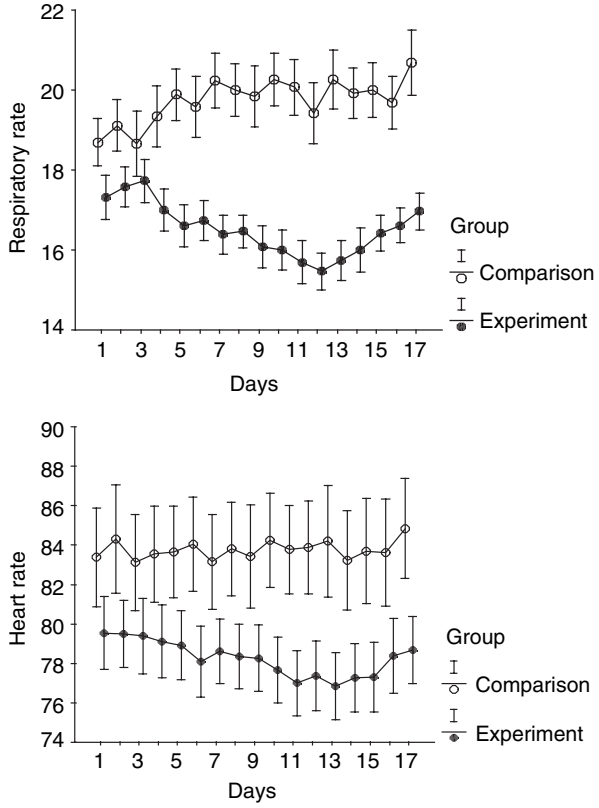

Figure 2 Changes in respiratory and HR over time at baseline (day 1), and during acupressure therapy (days 2–10) and follow-up (days 11–17). The data are shown as mean ± SEM (error bars).

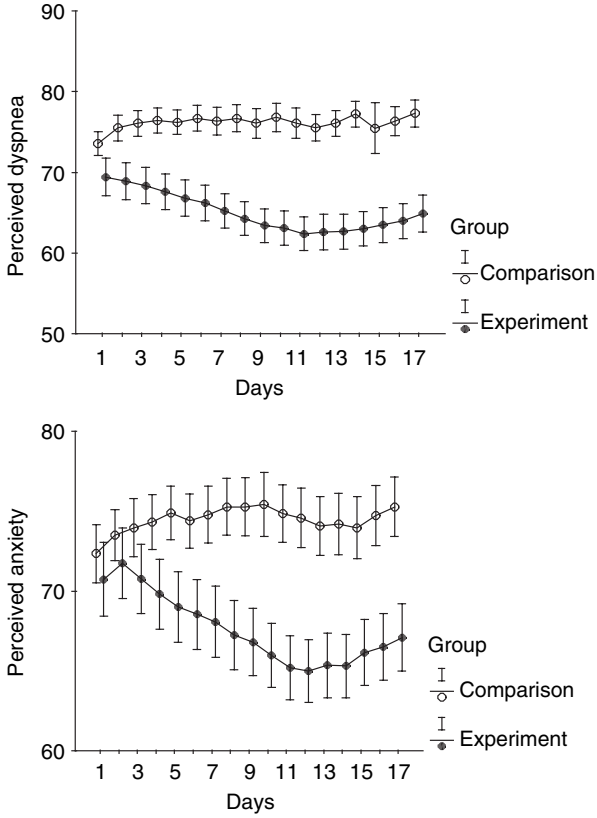

Figure 3 Changes in perceived dyspnoea and anxiety over time at baseline (day 1), and during (days 2–10) and follow-up (days 11–17). The data are shown as mean ± SEM (error bars).

Changes in dyspnoea and anxiety over time

Mean perceived dyspnoea for the VAS (0–100) at baseline was 69·42 (SD = 12·03) for the experimental group and 73·58 (SD = 7·59) for the comparison group, and indicating that study participants had high levels of perceived dyspnoea; however, there was no statistically significant difference between the groups ($t = 1{\cdot}49$, $P = 0{\cdot}14$).

The profile of changes in mean perceived dyspnoea differed for experimental and comparison groups. In the experimental group, perceived dyspnoea gradually declined overtime, reaching the lowest value at 11 days (the last day of therapy), and slowly rose during the follow-up period. In contrast, in the control group, perceived dyspnoea increased overtime from baseline throughout the follow-up period (Figure 3). The GEE results demonstrate that the value changes for mean perceived dyspnoea were statistically significantly lower ($-6{\cdot}77$, $P = 0{\cdot}009$) in the experimental group than the comparison group. The time-dependent changes were also a statistically significant indication that values for the experimental group decreased by an additional 0·38 points daily ($P < 0{\cdot}0001$). Furthermore, an interaction term (group difference × time) was also noted, revealing that patients receiving acupressure therapy had further decreased breathlessness over time (0·46, $P < 0{\cdot}0001$). All these results support the efficacy of acupressure therapy in decreasing perceived dyspnoea (Table 3).

Level of anxiety as measured by the VAS (0–100) at baseline was 70·73 (SD = 11·73) for the experimental group and 72·54 (SD = 11·73) for the comparison group, and indicated that patients using mechanical ventilation had high levels of perceived anxiety. There was no statistically significant difference between groups at baseline ($t = 0{\cdot}61$, $P = 0{\cdot}54$). In the experimental group, anxiety level gradually decreased from day 2 to a lower level on day 12 and then gradually increased in the follow-up period. Conversely, comparison group anxiety levels gradually increased over time (Figure 3). The GEE results indicate that anxiety in the experimental group was statistically significantly lower ($-6{\cdot}74$, $P = 0{\cdot}011$) compared with the comparison group over time. The time-dependent changes were also statistically significant and indicated that anxiety in the experimental group decreased by 0·15 points daily ($P < 0{\cdot}001$). Female patients expressed less anxiety ($-3{\cdot}0$, $P = 0{\cdot}02$) than male

What is already known about this topic

- Patients with chronic obstructive pulmonary disease who are using prolonged mechanical ventilation are at increased risk of intubation-associated complications and mortality.
- Anxiety and dyspnoea are major factors that interfere with weaning trials, and lead patients to long-term dependence on a respirator.
- Few documented intervention studies have addressed symptoms of anxiety and dyspnoea in patients using mechanical ventilation support.

What this paper adds

- A non-invasive intervention protocol of acupressure therapy to assist patients with chronic obstructive pulmonary disease who use mechanical ventilation.
- Acupressure therapy can decrease sympathetic stimulation and improve perceived dyspnoea and anxiety in patients with chronic obstructive pulmonary disease who are using prolonged mechanical ventilation.
- Nurses, patients and their families could be easily trained to administer this acupressure therapy.

patients over time. All these results support the effectiveness of acupressure therapy in decreasing perceived anxiety.

Discussion

We found that levels of perceived dyspnoea and anxiety were quite high in our study participants. These results, along with those of similar studies, show that patients with COPD requiring mechanical ventilation have highly stressful experiences, and the resulting anxiety and dyspnoea might interfere with weaning from mechanical ventilation (Mazzeo 1995, Rotondi *et al.* 2002). For that reason, interventions to decrease perceptions of anxiety and dyspnoea become vital in this population.

Our data revealed that patients with COPD in the acupressure therapy group experienced a statistically significant improvement in perceived dyspnoea and anxiety and in physiological indicators as compared to those in the comparison group. This difference may be due to the effect of acupressure therapy on various acupoints, such as the Neiguan (PC6), Hegu (LI4) and Shenmen (HT7). Acupuncture therapy promotes the release of neurotransmitters and adrenocorticotropic hormones and is thought to contribute to relaxation and anxiety reduction, such that perception of breathlessness may be improved (Hsu 1996, NIH 1997). The state of relaxation was further supported by the improvement in the physiological indicators of HR and RR over time in this study.

Our data demonstrated that non-invasive acupressure reduced the state of anxiety and dyspnoea among mechanically ventilated patients with COPD; no previous study has tested acupressure therapy in patients requiring mechanical ventilation support. Acupressure studies conducted with community patients with COPD have shown that this treatment might improve dyspnoea and anxiety (Jobst *et al.* 1986, Maa *et al.* 1997, Wu *et al.* 2004). Our study adds empirical support for the effectiveness of acupressure therapy in COPD populations.

The study was conducted at two large respiratory care units in medical centres, and the findings may therefore not be generalizable to broader COPD populations requiring mechanical ventilation support. Nevertheless, the study, a randomized controlled clinical trial, offers valid data to support the possible effectiveness of acupressure therapy.

Conclusions

In conclusion, our results suggest that acupressure therapy might effectively relieve perceived dyspnoea and anxiety and reduce physiological indicators of HRs and RRs in patients with COPD using ventilators. The study provides a research-based intervention model for clinicians caring for patients with COPD requiring mechanical ventilatory support. The application of these findings might have important implications for patients with COPD with high levels of perceived

Table 3 Generalized linear model* on the effect of dyspnoea and anxiety for acupressure therapy ($n = 52$)

	Dyspnoea			Anxiety		
Variable	β	SE	*P* value	β	SE	*P* value
Group (experimental vs. comparison)	−6·77	2·59	0·009	−6·74	2·68	0·011
Gender (female vs. male)	−3·47	2·65	0·190	−3·00	2·67	0·026
Time (day)	−0·38	0·04	< 0·0001	−0·15	0·00	0·001
Time × Group (experimental vs. comparison)	−0·46	0·06	< 0·0001	NS	NS	NS

*Using generalized estimation equations for repeated measurements and the correlation structure exchangeable. β, Coefficient of modelling; NS, non-significant.

dyspnoea and anxiety. Assessment of dyspnoea and anxiety levels of these patients should be an essential part of nursing practice, and clinicians might want to consider providing acupressure therapy as a method for improving symptoms of dyspnoea and anxiety. Nurses, patients and their families could be easily trained to administer this acupressure therapy.

The protocol for acupressure therapy is very simple, involving only three acupoints (Figure 1) located on the hands and ears. Acupressure techniques can be easily learned and applied in clinical settings. Following this study, we trained many respiratory care nurses and they are now routinely implementing the acupressure therapy in caring for patients with COPD who require mechanical support for breathing. They have reported positive and promising results. Nursing managers might want to establish intensive care unit (ICU) policies or protocols that involve acupressure therapy as a standard of care for patients with prolonged mechanical ventilation.

This study provides a foundation for future studies of acupressure therapy in managing patients with COPD using mechanical ventilation. Future researchers should replicate and expand upon the study to address basic research questions, and include a larger sample with longitudinal design in order to state with confidence that massage treatment and acupressure therapy are responsible for lower perceptions of dyspnoea and anxiety in patients with COPD. Subsequently, participants should be followed up to assess whether those who received acupressure therapy stayed on the ventilator for a shorter length than those having on treatment. This might add still more empirical data to support the effectiveness of acupressure therapy. Finally, in studies of ICU patients who are suffering from dyspnoea and anxiety, difficulties may be encountered in gaining agreement to participate; however, for ethical reasons, patients and family members should be fully informed and give their consent.

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Author contributions

SLT, JCW and ULC designed and conceived the study. SLT and JCW performed the data collection, drafted the manuscript and obtained funding. SLT, JCW and KCL performed the data analysis. SLT, KCL and ULC made critical revisions to the paper. SLT and KCL provided statistical expertise. SLT and ULC provided administrative support and supervision.

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