Effects of Acupuncture and Acupressure on Burnout in Health Care Workers: A Randomized Trial

Julia Afrasiabi, MSN, RN ■ Ruth McCarty, DACM, LAc ■ Jennifer Hayakawa, DNP, RN ■
Jennifer Barrows, PhD, RN ■ Kent Lee, DNP, RN ■ Nicole Plouffe, BSN, RN ■ John Schomberg, PhD

ABSTRACT

Background: Health care workers face occupational stressors that may lead to burnout and secondary traumatic stress. Strategies to mitigate the negative psychological impact on frontline workers are urgently needed.

Objective: The purpose of this study was to evaluate the effect of auricular acupuncture or acupressure, as compared with ear massage, on anxiety, burnout, and caring capacity in health care workers. Results were stratified on the basis of subject's level of belief in traditional Chinese medicine.

Methods: This prospective randomized trial with an open, parallel-group design was conducted at a 334-bed Level II pediatric trauma center. Participants were randomized to one of three groups: (1) auricular acupuncture, (2) auricular seed acupressure, or (3) auricular massage. Interventions were delivered over 3 weeks. Self-reported State-Trait Anxiety Inventory (STAI), Professional Quality of Life (ProQOL), and Caring Ability Inventory (CAI) scores were analyzed using a pre-/posttest design. Univariate analysis, Fisher's exact test, and analysis of variance (ANOVA) were performed to assess group differences.

Results: A total of 117 (36%) of 325 eligible participants consented to participate in the study. Seed acupressure treatment ($n = 14$, 35.9%, one male, 13 females) was associated with a reduction in burnout (ANOVA, $p = .04$) and secondary traumatic stress ($p = .03$). This effect remained significant after adjusting for individual pretest scores (ANOVA, $p = .05$). The studied interventions did not have a significant effect on STAI, ProQOL, or CAI scores.

Conclusions: Auricular acupressure is a safe, effective, and practical strategy to reduce burnout and secondary traumatic stress and may support health care workers' ability to develop caring relationships with patients and families.

Key Words

Acupressure, Acupuncture, Auricular massage, Burnout, COVID-19 pandemic, National Acupuncture Detoxification Association (NADA), Professional Quality of Life, Secondary traumatic stress, Traditional Chinese medicine (TCM)

The World Health Organization (2019) declared burnout a serious health issue among health care workers, with higher rates among specialists in oncology, critical care, pediatrics, and emergency medicine (Dominguez-Gomez & Rutledge, 2009; Emanuel et al., 2011; Hooper et al., 2010; Mealer et al., 2007). In addition, frontline workers in high-performing trauma centers are at high risk (Hockaday, 2017). Burnout is characterized by emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment (Maslach & Leiter, 2017). If left untreated, burnout may result in significant physical and emotional harm. Negative sequelae may include sleep disturbances, cardiovascular symptoms, aggressive behaviors, and chronic mental and physical fatigue (De Hert, 2020). A systematic review and meta-analysis by Garcia et al. (2019) found that health care teams with higher burnout scores were more likely to exhibit poor team dynamics, decreased adherence to safety protocols, and lower job satisfaction, leading to poorer-quality patient care delivery, including greater risk of medical errors and decreased patient satisfaction with the delivery of health care services (Wilkinson et al., 2017).

With the increasing burden of the COVID-19 outbreak on the mental health of frontline workers, there is an urgent need to develop mental health support strategies.

Providing effective strategies to support health care providers by reducing stress and anxiety in the workplace may increase associate and provider engagement and even improve clinical outcomes (Hall et al., 2016; Khamisa et al., 2015; Wilkinson et al., 2017). It is thus important for leaders in trauma to raise awareness and develop strategies to mitigate burnout in team members (Hockaday, 2017). The American College of Emergency Physicians (2020), the American Academy of Family Physicians (2020), and the American Nurses Association (n.d.) have published policy statements recognizing the critical need for health care organizations to implement strategies to counteract challenges exacerbated by the COVID-19 pandemic.

Traditional Chinese medicine (TCM) therapies, including acupuncture and acupressure, are increasingly used to address various clinical disorders, including stress and anxiety. The National Acupuncture Detoxification Association (NADA) protocol is commonly used for acupuncture treatment of stress and anxiety and assists in therapy for substance abuse and emotional trauma in the United States (Stuyt & Voyles, 2016). With the NADA protocol, acupuncture needles are inserted at specific target points (acupoints) along the contours of the ear. Based on the reported effectiveness of TCM, the Department of Defense and the Veterans Administration are studying the benefits of auricular acupuncture for the treatment of posttraumatic stress disorder and traumatic brain injury in military personnel (King et al., 2015; Walker et al., 2016).

Although acupuncture is beneficial in reducing emotional stress and anxiety (Errington-Evans, 2012; Tu et al., 2019; Wang & Kain, 2001), there are limited studies on its efficacy for reduction of anxiety and burnout among health care workers in a hospital setting. Walter Reed Medical Center provided auricular acupuncture to hospital staff who visited their wellness clinic to manage stress, enhance well-being, and improve job performance (Duncan et al., 2011). Overall, participants reported feeling less stressed and more relaxed, describing a feeling of calm after attending the clinic. In a study conducted in Brazil, hospital nursing staff received acupuncture, acupressure, or adhesive tape auriculotherapy twice per week for 5 weeks (Kurebayashi et al., 2017). Participants who received adhesive tape alone for auriculotherapy served as the control group for the seeds. Participants who received needle acupuncture reported a 17% reduction in anxiety as compared with those who received seed acupressure (13%) or adhesive tape (11%; $p \leq .05$; Kurebayashi et al., 2017).

Reilly et al. (2014) used the NADA protocol to administer acupuncture to a group of hospital health care providers. Each participant in the study received five auricular acupuncture sessions over 16 weeks. Compared with baseline values, postintervention measurements showed a significant reduction in anxiety ($p \leq .01$), burnout

($p \leq .01$), and secondary traumatic stress ($p \leq .01$). Similarly, Buchanan et al. (2018) found that five sessions of NADA acupuncture over 16 weeks significantly improved anxiety ($p \leq .001$) and work engagement ($p \leq .001$) in health care providers at an urban hospital who had recently witnessed a traumatic event at the workplace. Significant improvement was also noted in two dimensions of the Caring Ability Inventory (CAI, $p \leq .05$), suggesting that auricular acupuncture is an effective intervention for relieving stress and anxiety in providers and that it supports a heightened capacity for caring (Reilly et al., 2014).

The NADA acupressure involves placing adhesive tape patches containing seeds, which apply focused pressure to these same auricular acupuncture points. The use of acupressure seeds allows for longer retention to chronically stimulate the auricular points. The NADA protocol demonstrates potential as a safe and affordable intervention that is acceptable to health care workers and simple to administer in the workplace setting (Lua & Talib, 2012). A trained acupuncturist can easily apply this standardized protocol without the need to make a differential diagnosis or to determine therapeutic acupoints (Stuyt & Voyles, 2016). The selection of ear acupoints makes it feasible to deliver auricular acupuncture or acupressure in a small group setting compared with other types of treatment that require a certain level of individual privacy (i.e., body acupuncture).

OBJECTIVES

The purpose of the present study was to evaluate the effect of auricular acupuncture or acupressure, when compared with ear massage, on anxiety, burnout, and caring capacity in trauma health care workers caring for pediatric patients, further stratified on the basis of their belief in TCM. The study was designed to (1) explore the impact of each treatment on professional quality of life, anxiety, and capacity for developing caring relationships with patients and families; and (2) compare the relative strengths of the effects of these different modalities. It was hypothesized that acupuncture, acupressure, and massage would promote quality of life, reduce anxiety, and enhance the capacity for caring relationships in health care professionals, thereby promoting a new value-added dimension to employee wellness programs.

METHODS

Setting and Population

This prospective randomized trial with an open, parallel-group design was conducted at a 334-bed Level II pediatric trauma center. Eligible health care workers were recruited from areas identified in the literature as having high risk for burnout: the emergency department, cardiovascular unit, and pediatric intensive care unit. Trauma

team members with the most interaction with patients and families, including nurses, physicians, technicians, scribes, child life specialists, and environmental services personnel, were invited to participate through emails, unit-based newsletters, and unit postings. Licensed acupuncturists were available to answer questions about the interventions being used in the study. The study was approved by the hospital's institutional review board.

Procedure

After providing informed consent, participants were randomly assigned to one of three treatment groups: (1) auricular acupuncture, (2) acupressure via auricular seed placement, or (3) gentle ear massage. Random assignment was achieved with the use of computer-generated numbers. The study had an open design, as both participants and licensed acupuncturists were aware of the assigned treatment condition. Prior to treatment, participants completed a preintervention survey. Pre- and postintervention surveys for all assigned groups included the State-Trait Anxiety Inventory (STAI), the Professional Quality of Life (ProQOL) measure, and the CAI.

Intervention

Treatments were administered in small group settings in a dedicated, safe, quiet space with soft lighting. A licensed acupuncturist performed all treatments.

Participants assigned to the acupuncture group received five treatments over 3 weeks. Each session lasted approximately 25 minutes. First, the external ear was cleansed with an alcohol preparation pad. Sterile, single-use, stainless-steel auricular acupuncture needles (40G) [Seiren J-Type 40-gauge Lhasa OMS] were inserted unilaterally at the five standard acupoints (*Shen men*, sympathetic autonomic, lung, liver, and kidney) per the NADA protocol (NADA, n.d.). The postintervention survey was administered once each participant had completed five sessions.

For participants assigned to NADA acupressure treatment, standard *Vaccaria* acupressure seeds (Acuzone K. S. Choi Corp, Los Angeles, California) were applied unilaterally on the same five designated NADA points as per standard protocol. Seeds were reapplied at each session and worn continuously over 3 weeks. Subjects were instructed to periodically exert firm pressure to each acupoint for 5 seconds if they recognized feelings of stress or anxiety. If a seed fell off during the 3 weeks, the seed was replaced during their next scheduled work shift. The completion survey was administered once each participant had completed the 3-week treatment period.

Participants assigned to the massage treatment received five unilateral 1-min auricular massages over a 3-week period. In addition, participants were instructed to periodically massage their own ear if they recognized feelings of stress or anxiety. The completion survey was administered once each participant had completed five sessions.

Anxiety

Anxiety was measured with the STAI, a 40-item instrument often used in research to indicate caregiver distress (Spielberger et al., 1983). The STAI, which has been shown to have excellent psychometric properties with good reliability and validity (Metzger, 1976), consists of 20 items used to measure state anxiety (i.e., momentary reactions related to adverse situations) and 20 items to measure trait anxiety (i.e., anxious personality traits). State anxiety items include the following: "I am tense; I am worried" and "I feel calm; I feel secure." Trait anxiety items include the following: "I worry too much over something that really doesn't matter" and "I am content; I am a steady person." All items are rated on a 4-point scale (e.g., from "Almost Never" to "Almost Always"). Higher scores represent greater levels of anxiety.

Burnout and Secondary Traumatic Stress

Compassion satisfaction and compassion fatigue were measured using the ProQOL, a 30-item instrument commonly used to identify compassion fatigue in health care professionals (Stamm, 2010). Compassion fatigue, defined as the negative aspects of being a helping professional, is measured with two subscales, burnout (10 items) and secondary traumatic stress (10 items). Secondary traumatic stress refers to the vicarious traumatization of health professionals who provide care to children and families in crisis, placing them at risk for posttraumatic stress disorder (Stamm, 2010). Subscale scores are summed to categorize the level of compassion fatigue as low, moderate, or high. Psychometric evaluation of the ProQOL is limited, yet it remains the most widely applied instrument to assess compassion fatigue across diverse teams (Geoffrion et al., 2019).

Caring Ability Inventory

The CAI is a 37-item instrument validated for use with health care professionals across a range of clinical settings for measuring perceived ability to care for others across three specific dimensions: knowing (the understanding of self and others), courage (the ability to deal with the unknown), and patience (characterized by tolerance and persistence; Nkongho, 1990, 2019). The Likert-type scale ranges from 1 to 7, with higher scores indicating a greater degree of caring. The CAI has sophisticated psychometric properties that support its use and that help ensure its measurement confidence across a variety of settings (Beck, 1999).

Data Collection

A web-based application (Research Electronic Data Capture [REDCap]) administered electronic surveys from March 2020 through June 2020. The demographic and professional data collected included age, gender, race, ethnicity, highest educational degree, specialty certification, department unit, years of experience at the organization, and total years of experience in the profession. Participant beliefs and past experiences with TCM were measured using three Likert-Type items: (1) I believe that complementary and alternative medicine is a beneficial adjunct to traditional medicine; (2) I have personally used complementary and alternative medicine either currently or in the past to enhance my well-being; and (3) I have personally found complementary and alternative medicine beneficial to enhance my well-being.

Data Analysis

Univariate descriptive statistics were computed for demographic variables and professional characteristics. A Wilcoxon rank sum test was used to compare the distribution of pretest and posttest scores and subscale scores on the STAI, ProQOL, and CAI. A Wilcoxon rank sum test was used to compare the pre-/postdifference for each ProQOL component score (compassion satisfaction, burnout, and secondary traumatic stress). Each treatment was evaluated individually; then all treatments were combined to evaluate the general effect of TCM interventions. The power to detect the statistical significance of a generalized TCM intervention (acupuncture, acupressure, or massage) was increased by pooling all treatments. In addition to univariate analysis, analysis of variance (ANOVA) was carried out on those measurements found to be significantly associated with the intervention using bivariate inferential statistics. Filtering the analysis in this way provided a control against beta error that could arise from testing multiple hypotheses. This approach was selected instead of a Bonferroni correction due to the exploratory nature of this study and the limited sample size within each treatment arm. The ANOVA models were created for each treatment subset (acupuncture, acupressure, and massage). The ANOVA models set the ProQOL component score as the ANOVA model response and identified the association between ProQOL component score and postintervention status while adjusting for individual variance. The ANOVA was performed for each combination of TCM treatment and ProQOL component score. The statistical significance was set at $p \leq .05$.

RESULTS

Of the 117 subjects enrolled, 39 completed all five required sessions and the posttest (32%, Figure 1). It is important to note that enrollment and follow-up participation occurred during the first wave of COVID-19. Although TCM practices continued without interruption, COVID-19 infections may have impacted study participation, as described later. Demographic and professional characteristics of the sample are presented in Table 1. Most participants were female (89%), registered nurses (77%), and younger than 40 years (69%). Most participants reported using TCM in the past (64%). On a 7-point Likert scale measuring the perceived benefit of TCM, with higher scores representing greater perceived benefit, the mean response and standard deviation were 5.6 (2).

There was no significant association between STAI measurements and any of the separate or pooled treatment arms. Of the 39 participants, only one had an STAI score below normal limits. No significant difference was identified in the distribution of STAI scores before or after intervention, regardless of whether treatment arms were separate or pooled for analysis. Univariate analyses measuring the association between ProQOL component score and each TCM intervention identified that the acupressure seed intervention was associated with a significant decrease in burnout and secondary traumatic stress. From pretest to posttest, the mean burnout score decreased from 23.8 (3.2) to 21.4 (3.1; $p = .04$), and secondary traumatic stress score decreased from 22.6 (4) to 19.6 (3.0; $p = .03$). When Wilcoxon rank sum analysis was performed to determine the general effect of TCM intervention on burnout and secondary traumatic stress (all treatments were pooled), TCM intervention was associated with a significant decrease in burnout (22.8 [3.7] to 21.3 [3.1]; $p = .02$). The TCM intervention was associated with a marginally significant decrease in secondary traumatic stress score (1.6 [4.5]; $p = .05$; Table 2).

When participants were analyzed according to their TCM belief and experience, the TCM intervention was associated with a significant reduction in burnout scores (2.7, $p = .01$) among self-reported nonbelievers. Conversely, in the group of participants with the strongest belief in TCM, the intervention was not significantly associated with decreased burnout ($p = .38$). However, comparing preintervention average burnout score (20.5) with postintervention average burnout score (19.2) revealed a nonsignificant reduction in burnout in those with the strongest belief in TCM. Participants with the highest stated belief in the effectiveness of TCM were also observed to have significantly lower mean pretest burnout scores than participants with lower stated belief scores (20.5 vs. 23.1, respectively; $p = .04$; Figure 2).

There was a significant difference among treatments in the proportion of participants who reported belief in the efficacy of TCM ($p = .04$). Of those participants receiving acupuncture treatment, 71.43% reported strong belief in the efficacy of TCM treatment, while 28.57% expressed some doubt in TCM efficacy. Of the participants assigned to the acupressure seed intervention, 48.27% reported
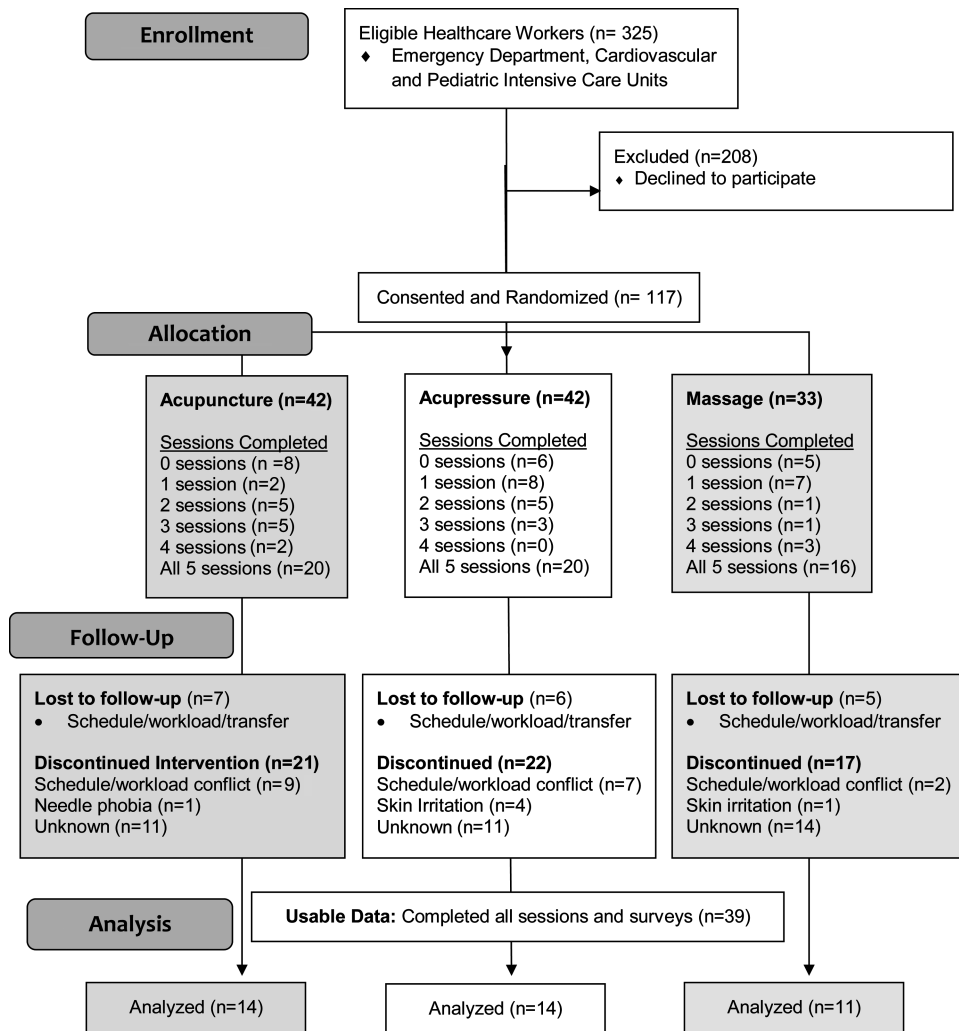
Figure 1. Study flowchart.

strong belief, while 51.73% expressed some doubt in TCM efficacy. Of those participants experiencing the massage intervention, 36.36% expressed strong belief and 63.64% expressed some doubt regarding the efficacy of TCM.

When ANOVA models were constructed to investigate individual variance, acupressure seed therapy was the only treatment associated with significant reductions in burnout ($p = .03$) and secondary traumatic stress ($p = .02$). When acupressure seed was pooled with acupuncture and massage treatments, a general TCM treatment effect was found to be significantly associated with a reduction in burnout ($p = .01$) and secondary traumatic stress ($p = .05$). No other association between treatment and ProQOL component score was identified after performing ANOVA (Table 3).

No significant association between CAI measurements and any of the separate or pooled treatment arms was identified. No significant difference was identified in the distribution of CAI scores in all CAI domains, before or after intervention, regardless of whether treatment arms were separate or pooled for analysis. A positive shift in mean from preintervention to postintervention was observed in pooled treatments across CAI domains (Caring, Patience, Knowledge); however, this shift did not reach the prescribed statistical significance criteria for any CAI domain.

DISCUSSION

Compassion fatigue and burnout are exhibited at higher rates in subsets of health care professions such as emergency medicine and pediatric nursing (Wilkinson et al., 2017). Pediatric nurses especially must navigate a complex environment, given the challenges unique to young infants and children (Davis et al., 2013). In these settings, health care providers are inundated with stressors and expected to perform at the highest professional levels consistently. Therefore, it is imperative to identify and implement effective strategies to mitigate professional burnout

TABLE 1 Descriptive Statistics for the Study Population (*n* = 39)[a]				
	Total, *n* (%)	Acupuncture, *n* (%)	Seed, *n* (%)	Massage, *n* (%)
Age (years)				
<30	14 (35.89)	4 (28.5)	8 (57.1)	2 (18.1)
30–39	13 (33.33)	4 (28.5)	3 (21.4)	6 (54.5)
40–49	8 (20.51)	5 (35.7)	1 (7.14)	2 (18.1)
50–59	4 (10.25)	1 (7.14)	2 (14.2)	1 (9.09)
Years of experience				
0–3	11 (28.20)	3 (25)	7 (58.3)	1 (10)
4–6	10 (25.64)	3 (25)	3 (25)	4 (40)
7–10	5 (12.82)	2 (16.6)	0 (0)	3 (30)
11–20	8 (20.51)	4 (33.3)	2 (16.6)	2 (20)
21+	5 (12.82)	2 (16.6)	2 (16.6)	1 (10)
Years of experience at current institution				
0–3	20 (51.28)	5 (35.7)	11 (78.5)	4 (36.3)
4–6	10 (25.64)	2 (14.2)	2 (14.2)	6 (54.5)
7–10	6 (15.38)	4 (28.5)	1 (7.14)	1 (9.09)
11–20	3 (7.692)	3 (21.4)	0 (0)	0 (0)
Gender				
Male	4 (10.25)	1 (7.14)	1 (7.14)	2 (18.1)
Female	35 (89.74)	13 (92.8)	13 (92.8)	9 (81.8)
Race				
White	24 (61.53)	7 (58.3)	9 (64.2)	8 (72.7)
Black	0 (0)	0 (0)	0 (0)	0 (0)
Asian/Pacific Islander	7 (17.94)	3 (25)	2 (14.2)	2 (18.1)
Native American	1 (2.564)	0 (0)	1 (7.14)	0 (0)
More than one race	4 (10.25)	2 (16.6)	2 (14.2)	0 (0)
Decline to state	1 (2.5%)	0 (0)	0 (0)	1 (9.09)
Ethnicity				
Non-Hispanic	31 (79.48)	11 (78.5)	11 (78.5)	9 (81.8)
Hispanic	8 (20.51)	3 (21.4)	3 (21.4)	2 (18.1)
Role				
Registered nurse	30 (76.92)	10 (71.4)	11 (78.5)	9 (81.8)
Physical/occupational/speech therapist	1 (2.56)	1 (7.14)	0 (0)	0 (0)
Doctor of medicine/physician's assistant	1 (2.56)	0 (0)	1 (7.14)	0 (0)
Environmental services	1 (2.56)	1 (7.14)	0 (0)	1 (9.09)
Diagnostics	3 (7.69)	1 (7.14)	1 (7.14)	0 (0)
Unit secretary	3 (7.69)	1 (7.14)	1 (7.14)	1 (9.09)
Belief that TCM is beneficial, mean (*SD*)	5.61 (2.04)	5.9 (2.1)	5.7 (1.7)	5.0 (2.2)
Have personally used TCM				
True	25 (64.10)	11 (78.5)	8 (57.1)	6 (54.5)
False	14 (35.89)	3 (21.4)	6 (42.8)	5 (45.4)

Note. TCM = traditional Chinese medicine.

[a]*Belief that TCM is beneficial was rated on a scale from 1 to 7, with higher scores representing greater perceived benefit.*

TABLE 2	Distribution of Professional Quality of Life Component Scores Across Intervention Phase and Treatment		
Ear Massage			
	Preintervention	**Postintervention**	***p***
Compassion satisfaction, mean (*SD*)	41.2 (3.8)	42.9 (4.6)	.38
Compassion satisfaction (mild)	0 (0%)	0 (0%)	
Compassion satisfaction (moderate/extreme)	11 (100%)	11 (100%)	
Burnout, mean (*SD*)	22.6 (3.6)	20.8 (2.6)	.13
Burnout (mild)	6 (54.5%)	10 (90.9%)	
Burnout (moderate/severe)	5 (45.4%)	1 (9.09%)	
Secondary traumatic stress, mean (*SD*)	19 (3.2)	17.8 (3.4)	.44
Secondary traumatic stress (mild)	10 (90.9%)	10 (90.9%)	
Secondary traumatic stress (moderate/severe)	1 (9.09%)	1 (9.09%)	
State Anxiety Inventory, mean (*SD*)	51 (3.2)	48.7 (3.4)	.11
State Anxiety Inventory (Normal)	11 (100%)	11 (100%)	
State Anxiety Inventory (abnormal)	0 (0%)	0 (0%)	
Caring Ability Inventory Courage, mean (*SD*)[a]	61.5 (12.6)	65 (12.2)	.52
Caring Ability Inventory Courage (Normal)	5 (50%)	7 (70%)	
Caring Ability Inventory Courage (Abnormal)	5 (50%)	3 (30%)	
Caring Ability Inventory Knowledge, mean (*SD*)[a]	78.3 (10.5)	81.45 (8.62)	.46
Caring Ability Inventory Knowledge (Normal)	5 (45.4%)	6 (54.5%)	
Caring Ability Inventory Knowledge (Abnormal)	6 (54.5%)	5 (45.4%)	
Caring Ability Inventory Patience, mean (*SD*)[a]	60 (5.5)	60.4 (4.9)	.86
Caring Ability Inventory Patience (Normal)	3 (30%)	3 (30%)	
Caring Ability Inventory Patience (Abnormal)	7 (70%)	7 (70%)	
Acupuncture			
	Preintervention	**Postintervention**	***p***
Compassion satisfaction, mean (*SD*)	41.4 (5.2)	42 (5.2)	.79
Compassion satisfaction (mild)	14 (100%)	14 (100%)	
Compassion satisfaction (moderate/extreme)	0 (0%)	0 (0%)	
Burnout, mean (*SD*)	21.9 (2.5)	21.6 (2.8)	.74
Burnout (mild)	11 (78.5%)	12 (85.7%)	
Burnout (moderate/severe)	3 (21.4%)	2 (14.2%)	
Secondary traumatic stress, mean (*SD*)	20.8 (5.2)	19.2 (4.8)	.48
Secondary traumatic stress (mild)	10 (71.4%)	12 (85.7%)	
Secondary traumatic stress (moderate/severe)	4 (28.5%)	2 (14.2%)	
State Anxiety Inventory, mean (*SD*)	48.2 (6.3)	49.9 (4.4)	.41
State Anxiety Inventory (Normal)	13 (92.8%)	14 (100%)	
State Anxiety Inventory (Abnormal)	1 (7.1%)	0 (0%)	
Caring Ability Inventory Courage, mean (*SD*)	65.9 (12.5)	64.7 (9.9)	.77
Caring Ability Inventory Courage (Normal)	10 (71.4%)	7 (50%)	
Caring Ability Inventory Courage (Abnormal)	4 (28.5%)	7 (50%)	

(continues)

TABLE 2 Distribution of Professional Quality of Life Component Scores Across Intervention Phase and Treatment *(Continued)*

Acupuncture			
	Preintervention	**Postintervention**	***p***
Caring Ability Inventory Knowledge, mean (*SD***)**	76.8 (12.0)	80.5 (7.9)	.35
Caring Ability Inventory Knowledge (Normal)	9 (64.2%)	9 (64.2%)	
Caring Ability Inventory Knowledge (Abnormal)	5 (35.7%)	5 (35.7%)	
Caring Ability Inventory Patience, mean (*SD*)	60.2 (8.3)	62.85 (4.5)	.32
Caring Ability Inventory Patience (Normal)	10 (71.4%)	7 (50%)	
Caring Ability Inventory Patience (Abnormal)	4 (28.5%)	7 (50%)	
Acupressure Seed			
	Preintervention	**Postintervention**	***p***
Compassion satisfaction, mean (*SD*)	39.5 (6.22)	41.4 (6.11)	.43
Compassion satisfaction (mild)	14 (100%)	14 (100%)	
Compassion satisfaction (moderate/extreme)	0 (0%)	0 (0%)	
Burnout, mean (*SD*)	23.8 (2.6)	21.4 (2.5)	.04
Burnout (mild)	7 (50%)	12 (85.7%)	
Burnout (moderate/severe)	7 (50%)	2 (14.2%)	
Secondary traumatic stress, mean (*SD*)	22.6 (5.2)	19.6 (3.23)	.03
Secondary traumatic stress (mild)	8 (57.1%)	13 (92.8%)	
Secondary traumatic stress (moderate/severe)	6 (42.8%)	1 (7.14%)	
State Anxiety Inventory, mean (*SD*)	48.8 (5.2)	51.0 (5.04)	.27
State Anxiety Inventory (Normal)	14 (100%)	14 (100%)	
State Anxiety Inventory (Abnormal)	0 (0%)	0 (0%)	
Caring Ability Inventory Courage, mean (*SD*)[a]	61.5 (8.9)	65 (7.9)	.52
Caring Ability Inventory Courage (Normal)	6 (46.1%)	9 (69.2%)	
Caring Ability Inventory Courage (Abnormal)	7 (53.8%)	4 (30.7%)	
Caring Ability Inventory Knowledge, mean (*SD*)[a]	78.3 (9.9)	81.4 (9.3)	.46
Caring Ability Inventory Knowledge (Normal)	7 (58.3%)	6 (50%)	
Caring Ability Inventory Knowledge (Abnormal)	5 (41.6%)	6 (50%)	
Caring Ability Inventory Patience, mean (*SD*)[a]	61.0 (5.5)	62.2 (3.6)	.53
Caring Ability Inventory Patience (Normal)	7 (53.8%)	7 (53.8%)	
Caring Ability Inventory Patience (Abnormal)	6 (46.1%)	6 (46.1%)	
	Preintervention	**Postintervention**	**Total, *p***
Compassion satisfaction, mean (*SD*)	40 (5.2)	42 (5.2)	.32
Compassion satisfaction (mild)	39 (100%)	39 (100%)	
Compassion satisfaction (moderate/extreme)	0 (0%)	0 (0%)	
Burnout, mean (*SD*)	22.8 (2.9)	21.3 (2.6)	.02
Burnout (mild)	24 (61.5%)	33 (84.6%)	
Burnout (moderate/severe)	15 (38.4%)	6 (15.3%)	

(continues)

TABLE 2	Distribution of Professional Quality of Life Component Scores Across Intervention Phase and Treatment *(Continued)*		
	Preintervention	**Postintervention**	**Total, *p***
Secondary traumatic stress, mean (*SD*)	20.8 (4.7)	19.2 (4.3)	.05
Secondary traumatic stress (mild)	28 (71.7%)	36 (92.3%)	
Secondary traumatic stress (moderate/severe)	11 (28.2%)	3 (7.69%)	
State Anxiety Inventory, mean (*SD*)[a]	49.2 (5.2)	49.9 (4.3)	.52
State Anxiety Inventory (Normal)	37 (97.3%)	37 (97.3%)	
State Anxiety Inventory (Abnormal)	1 (2.6%)	1 (2.6%)	
Caring Ability Inventory Courage, mean (*SD*)[a]	62.7 (11.4)	64.2 (9.6)	.53
Caring Ability Inventory Courage (Normal)	21 (56.7%)	23 (62.1%)	
Caring Ability Inventory Courage (Abnormal)	16 (43.2%)	14 (37.8%)	
Caring Ability Inventory Knowledge, mean (*SD*)	77.5 (10.6)	80.5 (8.4)	.18
Caring Ability Inventory Knowledge (Normal)	21 (56.7%)	21 (56.7%)	
Caring Ability Inventory Knowledge (Abnormal)	16 (43.2%)	16 (43.2%)	
Caring Ability Inventory Patience, mean (*SD*)[a]	60.4 (6.5)	61.9 (4.3)	.25
Caring Ability Inventory Patience (Normal)	15 (40.5%)	17 (45.9%)	
Caring Ability Inventory Patience (Abnormal)	22 (59.4%)	20 (81.0%)	
[a]*Not all participants completed all domains of Caring Ability Inventory.*			

and secondary traumatic stress in the pediatric emergency trauma setting. This pilot study coincidentally opened enrollment and began intervention 3 weeks before the beginning of the COVID-19 pandemic. In addition to obvious health concerns for the health care workers and their families, statewide school closures and stay-at-home orders created additional personal stressors related to online learning, decreased availability of childcare, and increased family responsibilities. COVID-19 highlighted the importance of supporting mental resilience and overall mental, physical, and spiritual wellness during periods of heightened anxiety and fear.

The findings from our study are similar to studies published previously, which showed that auricular acupressure is effective in mitigating stress, anxiety, and other mental health outcomes in health care professionals (de Oliveira et al., 2021; Olshan-Perlmutter et al., 2019). Specifically, Araújo et al. (2018) found a significant reduction in self-reported stress among hospital nursing assistants who received 8 weekly sessions of auricular acupuncture
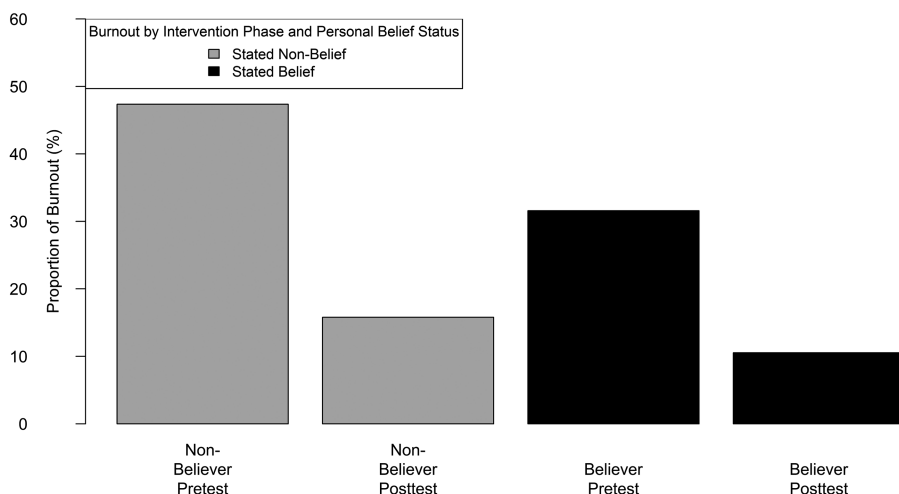

Figure 2. Distribution of pre-/postintervention burnout scores, according to level of belief in traditional Chinese medicine.

	df	Sum Sq	Mean Sq	F	p
ProQOL components ear massage intervention					
Compassion satisfaction					
Between group	1.00	14.73	14.73	0.88	.35
Within group	19.00	315.34	16.60		
Burnout					
Between group	1.00	26.20	26.18	1.54	.23
Within group	19.00	321.20	16.90		
Secondary traumatic stress					
Between group	1.00	8.90	8.90	0.41	.52
Within group	19.00	403.80	21.25		
ProQOL components acupressure seed intervention					
Compassion satisfaction					
Between group	1.00	0.60	0.57	0.01	.91
Within group	10.00	511.00	51.10		
Burnout					
Between group	1.00	52.42	52.42	5.01	.03
Within group	26.00	271.77	10.45		
Secondary traumatic stress					
Between group	1.00	65.80	65.80	5.54	.02
Within group	26.00	308.70	11.80		
ProQOL components acupuncture intervention					
Compassion satisfaction					
Between group	1.00	2.90	2.89	0.10	.74
Within group	25.00	673.30	26.93		
Burnout					
Between group	1.00	6.04	6.03	0.62	.43
Within group	25.00	241.18	9.64		
Secondary traumatic stress					
Between group	1.00	17.30	17.29	0.65	.42
Within group	25.00	658.30	26.33		
ProQOL components general TCM intervention					
Compassion satisfaction					
Between group	1	35.4	35.44	1.31	.25
Within group	76	2046	26.92		
Burnout					
Between group	1	72.4	72.44	5.87	.01
Within group	76	936.7	12.33		
Secondary traumatic stress					
Between group	1	78.3	78.3	3.93	.05
Within group	76	1514	19.92		

TABLE 3 Analysis of Variance Analysis, Pre- and Post-national Acupuncture Detoxification Association Intervention

Note. ProQOL = Professional Quality of Life; TCM = traditional Chinese medicine.

applied to *Shen men* and brain stem acupoints ($p \le .05$). Guan et al. (2018) detected a significant improvement in compassion satisfaction ($p \le .01$), burnout ($p \le .01$), and secondary traumatic stress ($p \le .001$) in medical residents who received three sessions of auricular acupuncture over 1 month. Others found significant improvement in anxiety ($p \le .01$), burnout ($p \le .01$), secondary traumatic stress ($p \le .01$), caring ability ($p \le .05$), and work engagement ($p \le .001$) in health care providers who received five NADA sessions over 16 weeks (Buchanan et al., 2018; Reilly et al., 2014). Finally, Dias et al. (2012) reported significant improvement in burnout ($p \le .05$), depression ($p \le .01$), sleep ($p \le .01$), and perceived physical health ($p \le .01$) in medical students who received 20-minute electroacupuncture sessions once per week over 8 weeks. Auricular acupressure is a subtype of acupuncture that provides gentle stimulation with seeds, magnets, or beads applied to acupoints located on the ear (Zhang et al., 2014). This approach to auriculotherapy may be particularly acceptable to individuals with a fear of needles (Stuyt & Voyles, 2016). Taping the seeds in place can provide a longer duration of therapy over time and across situations, with the ability to self-administer acupressure as needed in response to stress (Stuyt & Voyles, 2016). Although the increased effectiveness of auricular acupressure over acupuncture was an unexpected finding of our study, it could be explained by perceived control over self-treatment in the participants assigned to seed therapy.

Although this study found significant improvement in burnout and secondary traumatic stress following 3 weeks of seed acupressure, this effect did not reach statistical significance for participants who received needle acupuncture. In contrast, Kurebayashi et al. (2017) noted a greater effect for acupuncture than for acupressure for improving anxiety and pain in hospital nursing staff. The discrepancy between the findings reported by Kurebayashi et al. and our results indicates that the optimal strategy to alleviating anxiety and pain in health care workers may require the use of a multimodal approach. Stuyt and Voyles (2016) emphasized that to achieve maximum effectiveness, NADA interventions must be delivered with adequate frequency (at least several times per week for several weeks) and always in conjunction with appropriate levels of usual psychosocial or medical care. Study designs that use insufficient amounts of intervention or stand-alone approaches are not consistent with the NADA protocol and thus may not be effective (Stuyt & Voyles, 2016). Future studies may consider intensifying the intervention dose by increasing the frequency of NADA sessions or by increasing the duration of treatment. Combining NADA acupuncture with other approaches to mental health could enhance efficacy. Alternatively, seed acupressure and ear massage study participants were encouraged to self-stimulate when stressful or anxious feelings arose, allowing for an immediate response. In contrast, needle acupuncture therapy was limited to treatment sessions. As described previously, increased frequency of needle acupuncture treatments may increase efficacy.

In addition to specifying therapeutic acupoints for intervention, the NADA protocol involves a style of engagement in which the practitioner's intention and the environment influence treatment outcome. The NADA treatments are usually delivered in a group setting to create a supportive environment that is sufficiently reassuring and validating to enhance caring ability (Stuyt & Voyles, 2016). This socially supportive environment is considered a key component of the NADA protocol. Although this study was conducted in a small-group setting, COVID-19 guidelines placed restrictions on the number of individuals who could participate, and these participants were socially distanced during each session. These restrictions may have influenced the social support component of the NADA intervention.

Although a significant effect was observed for general TCM on burnout in participants who reported doubt about its effectiveness, this effect was not observed for those who reported full belief in TCM. One explanation for this is that "nonbelievers" had a worse baseline measurement of burnout than believers. We may not have observed a significant effect in believers because they had more favorable burnout scores at baseline, so more power would be required to detect a smaller improvement. The fact that we observed an effect for TCM in those participants who expressed some doubt about TCM efficacy indicates that further research is needed to determine whether TCM efficacy in modifying burnout is mediated by participant belief.

LIMITATIONS
This study presents several limitations. These include missing data across ProQOL components and categorical features, a lack of variability in ProQOL scores (extreme values were not observed), and the use of multiple comparisons in data analysis. Although this instrument is extensively used in nursing research, there is limited evidence to support its validity. The lack of blinding to treatment conditions may have contributed to multiple sources of bias (Chen et al., 2019). The study's major limitation is that the sample sizes for the final analysis are too small to allow for firm conclusions to be drawn. It is difficult to conclude in a statistically meaningful way when comparing data from 13 subjects with data from 11 subjects. As only approximately 32% of randomized participants were available for the final analysis, the risk of confounding and related effects on internal validity cannot be ignored.

Furthermore, the use of a self-reported survey methodology may have overestimated or underestimated

responses. It remains unclear why the study had such a high withdrawal rate and why certain disciplines did not choose to participate. The concurrent COVID-19 pandemic may have significantly affected enrollment and subsequent participation. Additional factors may be related to barriers such as scheduling and workload, a lack of understanding of the value of self-care, fear of needles, or disinterest in the use of alternative medicine. Attempts to mitigate these limitations included offering multiple treatment times on both day and night shifts and the licensed acupuncture team rounding on the units to answer questions about the study and its interventions. Competing priorities associated with the pandemic may have also been a factor. Conclusions based on the data presented previously may not be generalized to the whole population of interest, given that the sample of participants included in the analytic data set may not be representative. Nevertheless, the results of this study provide an impetus supporting further research across multiple institutions to test the external validity of these results.

CONCLUSIONS

The mental health and well-being of the clinical team are important to a trauma center's effectiveness and resilience for safeguarding patients. This pilot study provides evidence that even in a time of unprecedented challenges precipitated by the emergence of the COVID-19 pandemic, TCM modalities are safe and practical and can be implemented to reduce burnout and secondary traumatic stress in the frontline workers. Further research on the use of acupressure and acupuncture to reduce burnout and compassion fatigue in health care professionals in a trauma center is supported by these results.

KEY POINTS

- Health care workers face occupational stressors that may lead to burnout and secondary traumatic stress.
- Burnout may interfere with health care workers' ability to develop caring relationships, negatively impacting patient outcomes.
- With the increasing burden of the COVID-19 pandemic on mental health, strategies are urgently needed to mitigate burnout.
- Auricular acupressure may be a safe and affordable strategy to reduce burnout and secondary traumatic stress in health care workers.

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