Original Article

Effect of Acupressure on Senior Nursing Students' Anxiety during the COVID-19 Pandemic: A Randomized Controlled Clinical Trial

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Abstract

Background: The transition to distance learning in nursing education during the COVID-19 pandemic, where clinical practice is critical, may have caused senior nursing students to experience a sense of graduating without sufficient skills and experience anxiety in addition to the anxiety caused by the pandemic. Non-pharmacological methods such as acupressure may be helpful in reducing students' anxiety.
Aim: This study was conducted to determine the effect of acupressure on senior nursing students' anxiety levels during the COVID-19 pandemic.
Methodology: This prospective, two-armed (1:1), randomized controlled study included fifty-two senior nursing students at a university nursing department. While the experimental group (n=26) applied acupressure to the LI4, HT7, and EX-HN3 points three times a week for four weeks, acupressure was not applied to the control group (n=26). Data were collected at baseline and at the end of four weeks using the State-Trait Anxiety Inventory (STAI).
Results: At the end of four weeks, there was no significant difference between the STAI-State and STAI-Trait scores of the experimental and control groups ($p>0.05$). The STAI-State score of the experimental group decreased significantly in the fourth week compared to the baseline ($p<0.05$).
Conclusion: Research findings revealed that self-administered acupressure by senior nursing students was effective in reducing moderate state anxiety during the pandemic, but not trait anxiety.

Key Words: Acupressure, Anxiety, COVID-19, Nursing Students

Introduction

Clinical practice is of critical importance in nursing education. Various arrangements have been made all over the world to continue nursing education effectively and efficiently during the COVID-19 pandemic. During this time, along with the United States of America and Canada, face-to-face education in nursing education was suspended in many countries (United Kingdom, Hong Kong, Australia, etc.). Students' clinical practice hours were aimed to be completed by remote patient follow-up using simulation applications, telehealth and virtual reality. In addition, with necessary precautions, volunteer students were provided the opportunity to complete their practicum hours by going to the hospitals. Some courses were graded as pass/fail with the intention of supporting post-graduation progress evaluation (Carolan et al., 2020; Chan et al., 2020; Sanli et al., 2021; Yilmaz, 2021). During the COVID-19 pandemic, face-to-face education was suspended in Turkey, as in other countries, and distance learning was utilized in the universities. The Turkish Nurses Association and Nursing Education Association ensured that the theoretical courses were carried out by distance and digital teaching methods during the pandemic and unless necessary, practicum trainings were not given remotely. However, in compulsory cases practicum training of senior students were carried out by using methods such as simulation training, skill videos, virtual classroom, project, and case analysis. It has been reported that students should make up their face-to-face clinical practice before graduation (HEMED, 2020; Vatan et al., 2020; Yilmaz, 2021). Distance learning is one of the most effective methods that can be utilized to continue

education during the pandemic. However, in undergraduate programs where applied education is compulsory such as nursing, practicum courses could be conducted as effectively in distance learning as face-to-face education (Guven Ozdemir & Sonmez, 2021; Temiz, 2020). Nursing students may be adversely affected by the process and experience anxiety due to the uncertainty of the pandemic, the inability to conduct face-to-face clinical practicum courses, or the feeling of graduating without sufficient professional skills (Aslan & Pekince, 2021; Patelarou et al., 2021; Temiz, 2020), the lack of technological conditions required to attend online courses and the unsuitability of the physical environment in which distance learning is carried out (Guven-Ozdemir & Sonmez, 2021; Temiz, 2020; Yildirim Keskin, & Molu, 2021). It has been reported in literature that nursing students did not find the distance learning method effective during the pandemic and therefore their anxiety levels were high (Akman et al., 2020; Guven-Ozdemir & Sonmez, 2021; Temiz, 2020). One of the noninvasive and complementary methods that students can use to cope with anxiety is acupressure (Chueh et al., 2018; Moosavi et al., 2009. Acupressure is applied by touching and applying sufficient pressure to certain points on the skin with the thumb, index finger or palm. It is a method based on the harmony and balance of the energy flow in the universe. Easily accessible HT7 (Shen Men), EX-HN3 (Yintang) and LI4 points are among the points used in acupressure to reduce anxiety (Beikmoradi et al., 2015; Khoram et al., 2020; Mansoorzadeh et al., 2014) and studies have shown that acupressure reduces the level of anxiety (Abadi et al., 2018; Beikmoradi et al., 2015; Chueh et al., 2018; Khoram et al., 2020; Rani et al., 2020). Studies revealed that acupressure is effective in reducing anxiety in healthy individuals (Chueh et al., 2018; Lee et al., 2021; Ro et al., 2013; Yildirim & Akman, 2021) as well as in patients with knee osteoarthritis (Rani et al., 2020), and patients undergoing open heart surgery (Khoram et al., 2020). A limited number of studies have also shown that acupressure is effective in reducing anxiety in nursing students (Chueh et al., 2018; Moosavi et al., 2009; Yildirim & Akman, 2021); however, there is a lack of studies on nursing student anxiety during the pandemic. This study was conducted to determine the effect of acupressure on the anxiety level of senior nursing students taking the surgical diseases nursing clinical practicum course remotely during the COVID-19 pandemic.

Methods

Study Design, Setting and Sample: This study was designed as a prospective, parallel, two-arm [1:1], randomized-controlled clinical trial. The population consisted of 196 senior nursing students at a university in Turkey between April 15th and May 15th, 2021. The study by Beikmoradi et al. (2015) was taken as a reference in determining the sample of the study and the effect size of the difference between the two groups' State-Trait Anxiety Inventory (STAI)-State mean scores (43.48 ± 6.82) was determined as at least 1.10 units. Considering that the effect size of acupressure application on the anxiety of student nurses will be 1.10 units, as a result of the power analysis using the trial version of G*Power 3.1.9.2, with a power of 95% and a maximum double-sided type 1 error of 5%, the study was planned to be conducted with 48 student nurses. The dropout rate of 10% was added to this number and the study was completed with 52 student nurses (experimental group=26; control group=26) (Randomizer, 2022).

Inclusion criteria: Senior nursing students based on the following criteria: taking the clinical practicum course of surgical diseases nursing through distance learning when the study was conducted, willingness to participate, not having any physical problems that would prevent acupressure application to HT7, LI4 and EX-HN3 points, not having any previous acupressure experience, not using (antidepressants, analgesics, beta adrenoreceptor antagonists, dopamine agonists, etc.), not using alcohol or drugs, not being diagnosed with COVID-19 during the study, and not having any psychiatric diagnosis (Figure 1).

Randomization and Allocation: The eligible students were randomly assigned to the experimental and control group, according to arrival sequence in blocks of two in a 1:1 ratio using the blocked randomization method. The randomization sequence was developed using a computer-generated table of random numbers. Students' group assignment and data analysis stages were blinded since they were done by a statistician independent of the study.

Outcome Measures and Instruments: The primary outcome measure of the study was the effect of acupressure on nursing students' anxiety. The data were collected using the "Demographic Characteristics Form" which was prepared by the researchers in line with the literature (Akman et al., 2020; Chueh et al., 2018; Fitzgerald & Konrad, 2021; Moosavi et al., 2009) and "The State-Trait Anxiety Inventory".

Demographic Characteristics Form: This form examines nursing students' age, gender, marital status, place of residence and people they live with during the pandemic, presence of chronic illness and status of having COVID-19, a friend having COVID-19 and having health problems during the pandemic.

The State-Trait Anxiety Inventory (STAI): This inventory was developed in 1970 by Spielberger et al. and can be applied to people over the age of 14 (Spielberger et al., 1971). The scale consists of the State-Trait Anxiety Inventory-State (STAI-S), which determines how the individual feels at a certain moment and condition, and the State-Trait Anxiety Inventory-Trait (STAI-T), which determines how the individual feels regardless of the situation and conditions. The Cronbach's alpha coefficient of the inventory, whose validity and reliability in Turkish was made by Oner and Le Compte in 1983, was 0.94 for STAI-S and 0.83 for STAI-T. STAI-S and STAI-T each consist of twenty questions and is a four-point Likert type. On the STAI-S statements are rated from 1 point; 2 points; 3 points; 4 points". On the STAI-T, statements are rated as follows "almost never = 1 point; sometimes= 2 points; often = 3 points; almost always = 4 points". Scores range from 20 to 80 points on both scales. Total score between 0-19 points indicates the absence of anxiety, 20-39 points indicates mild anxiety, 40-59 points indicates moderate anxiety, and 60-79 points indicates severe anxiety. High STAI-S and STAI-T scores indicate a high level of anxiety. Individuals who score above 60 need professional help 14 (Oner & Le Compte 1985; Spielberger et al.,

1971;). In this study, the Cronbach's alpha coefficient was 0.94 for STAI-S and 0.90 for STAI-T.

Procedure: At the beginning, students came to the nursing department for clinical practicum, however with the increase in the number of COVID-19 cases, clinical practices were completed with online training. Students in both groups were interviewed face-to-face and filled out the Demographic Characteristics Form and STAI. The student nurses in the control group did not receive any intervention for four weeks. The students in the experimental group were taught and shown face-to-face how to apply acupressure by an acupressure certified researcher. After the demonstration of the application, the students were allowed to practice the application on their own. The students' questions about the application were answered and feedback was given. Photographs showing the acupressure points were sent to the participants via mobile phone messages so that they would not forget the points. "Cun" measurement unit was used to determine the points of applied acupressure. Each student's own thumb width was calculated in centimeters (cm) and one cun unit was converted to cm. The distance of the target acupressure points to the reference points was calculated in cm; the points were found by measuring with a ruler and marked with a pencil. In this study, HT7, EX-HN3 and LI4 acupressure points were used, which are reported in the literature to be effective in reducing anxiety (Beikmoradi et al., 2015; Khoram et al., 2020; Mansoorzadeh et al., 2014). HT7 point is in the wrist crease, on the radial side of the flexor carpi ulnaris tendon, between the ulna and the pisiform bones; the EX-HN3 point is located in the middle of the origins of both eyebrows; and the LI4 point is located between the 1st and 2nd metacarpal bones of the hand, in the middle of the 2nd metacarpal bone on the radial side (Oner & Le Compte, 1985). The order in which the acupressure points were used was determined by drawing lots. As a result of the draw, applications were made to the HT7 and LI4 points, first to the right and then to the left, and then to the EX-HN3 point, respectively. Since the responses of individuals will be different from each other, stiffness and pressure were adjusted according to the sensitivity of the individual not to cause tissue damage. Before starting the application, students were asked to gently rub their palms around the area to be pressured for 20-30 seconds to reduce tissue sensitivity. Students were asked to press their thumb, index or middle finger to a depth of 1-1.5 cm for 5 seconds, resting for 2 seconds and continuing the practice for 2 minutes. Consecutive pressure was applied to each acupressure point for 2 minutes. Successive pressure was applied at a frequency that did not disturb the individual, did not cause pain, and had a calming effect (Abadi et al, 2018; Beikmoradi et al., 2015; Ramaiah, 2011). Students in the experimental group practiced HT7, LI4 and EX-HN3 points (five points in total) for an average of 13 minutes, two minutes each. The acupressure application was done for four weeks on Mondays, Wednesdays and Fridays, at least two hours after dinner and when the students were calmest (Kwon & Lee, 2018). To remind the students about the application, an informative message was sent to them via their mobile phones and feedback was received on whether the application was carried out or not. Communication with the students was maintained during the study. No negative feedback was received. All the students in the experimental group participated in all sessions. Four weeks later, STAI-S and STAI-T were administered again to the students in both groups via Google Forms.

Data analysis: Descriptive variables for the control and experimental groups were expressed as mean, standard deviation, median (minimum-maximum) and number. The chi-square and Fisher's Exact Test were used to determine the difference between groups. The conformity of the scale scores used to the normal distribution was determined by the Shapiro-Wilk's normality test. Since the data were normally distributed, the independent sample t-test was used for independent groups in the comparison between groups, and the dependent sample t-test was used in the dependent groups for the within-group comparison. The significance value of statistical tests was accepted as $p<0.05$ in all analyses.

Ethical Considerations: This study was approved by the Clinical Research Ethics Committee of Mersin University (3rd March, 2021, Number: 07/273) and the institution (Date: 12th April, 2021, No:E-66693300-605.01-1631645). Also, written permission was obtained from the Scientific Research Platform of the Ministry of Health of Turkey. Prior to the study, all the participants were informed about the nature of the study and the possibility to withdraw from the study at any time. A written informed consent was obtained from all participants. The study was conducted in accordance with the principles of the Declaration of Helsinki (World Medical Association, 2013). The study was registered at ClinicalTrials.gov.

Results

The descriptive characteristics of the students in the study and control groups were similar ($p>0.05$) (Table 1).

Intra-Group Comparison of Anxiety Scores: The STAI-S score of the students in the control group after four weeks (41.23±11.09) increased compared to the baseline score (40.85±9.76); however, the difference was not significant ($p>0.05$). The anxiety level was moderate at baseline and after four weeks. The STAI-S score of the students in the experimental group, which was moderate at the beginning (45.31±9.78), decreased significantly to mild (39.96±10.65) after four weeks ($p<0.05$) (Table 2). The STAI-T score (44.92±10.09) of the students in the control group was higher than the initial score (42.65±9.43), but the difference was not significant ($p>0.05$). STAI-T score (43.12±9.14) of the students in the experimental group decreased compared to the initial score (43.23±6.20) after four weeks, but the difference was not significant ($p>0.05$) (Table 2).

Intergroup Comparison of Anxiety Scores: There was no significant difference between the STAI-S and STAI-T mean scores of the experimental group and control group at the beginning and four weeks later ($p>0.05$) (Table 2).

Table 1. Comparison of students' descriptive characteristics (n=52)

Characteristics of patients	Control group x̄ ±SD		Experimental group x̄ ±SD		Test	p
Age (Year)(Min:20 Max:26)	22.58±1.21		22.00±1.02		-1.863*	0.068
Gender	**n**	**%**	**n**	**%**		
Female	11	42.3	16	61.5	1.233€	0.267
Male	15	57.7	10	38.5		
Marital status						
Single	25	96.2	26	100	1.020¥	1.000
Married	1	3.8	0	0		
Place of living during the pandemic process						
Province	12	46.2	12	46.2	0.150€	0.928
County	9	34.6	8	30.8		
Village	5	19.2	6	23.0		
People living together during the pandemic process						
With alone	1	3.8	1	3.8	1.133€	0.567
With family	24	92.4	22	84.7		
With friends	1	3.8	3	11.5		
Presence of chronic disease						
Yes	6	23.1	3	11.5	1.209¥	0.465
No	20	76.9	23	88.5		
The state of being COVID-19						
Yes	3	11.5	4	15.4	0.165¥	1.000
No	23	88.5	22	84.6		
COVID-19 status of relatives						
Yes	24	92.3	21	80.8	1.486¥	0.419
No	2	7.7	5	19.2		
Situation of experiencing health problems during the pandemic process						
Yes	4	15.4	4	15.4	0.000¥	1.000
No	22	84.6	22	84.6		

*Independent sample t test; € Chi-square test; ¥Fisher's Exact Test; Min: Minimum; Max: Maximum; SD: Standart deviation.

Table 2. Comparison of students' state (STAI-S) and Trait (STAI-T) anxiety scores (n=52)

	Assessment time	Control Group x̄ ±SD	Experimental Group x̄ ±SD	Test*	p
STAI-S	Baseline	40.85±9.76	45.31±9.78	1.646	0.106
	After 4 Weeks	41.23±11.09	39.96±10.65	-0.421	0.676
	Test**	-0.222	2.111		
	p	0.826	**0.045**		
STAI-T	Baseline	42.65±9.43	43.23±6.20	0.261	0.796
	After 4 Weeks	44.92±10.09	43.12±9.14	-0.677	0.501
	Test**	-1.717	0.097		
	p	0.098	0.924		

*Independent sample t test; **t test; STAI-S: State Trait Anxiety Inventory-State; STAI-T: State Trait Anxiety Inventory-Trait; SD: Standart deviation

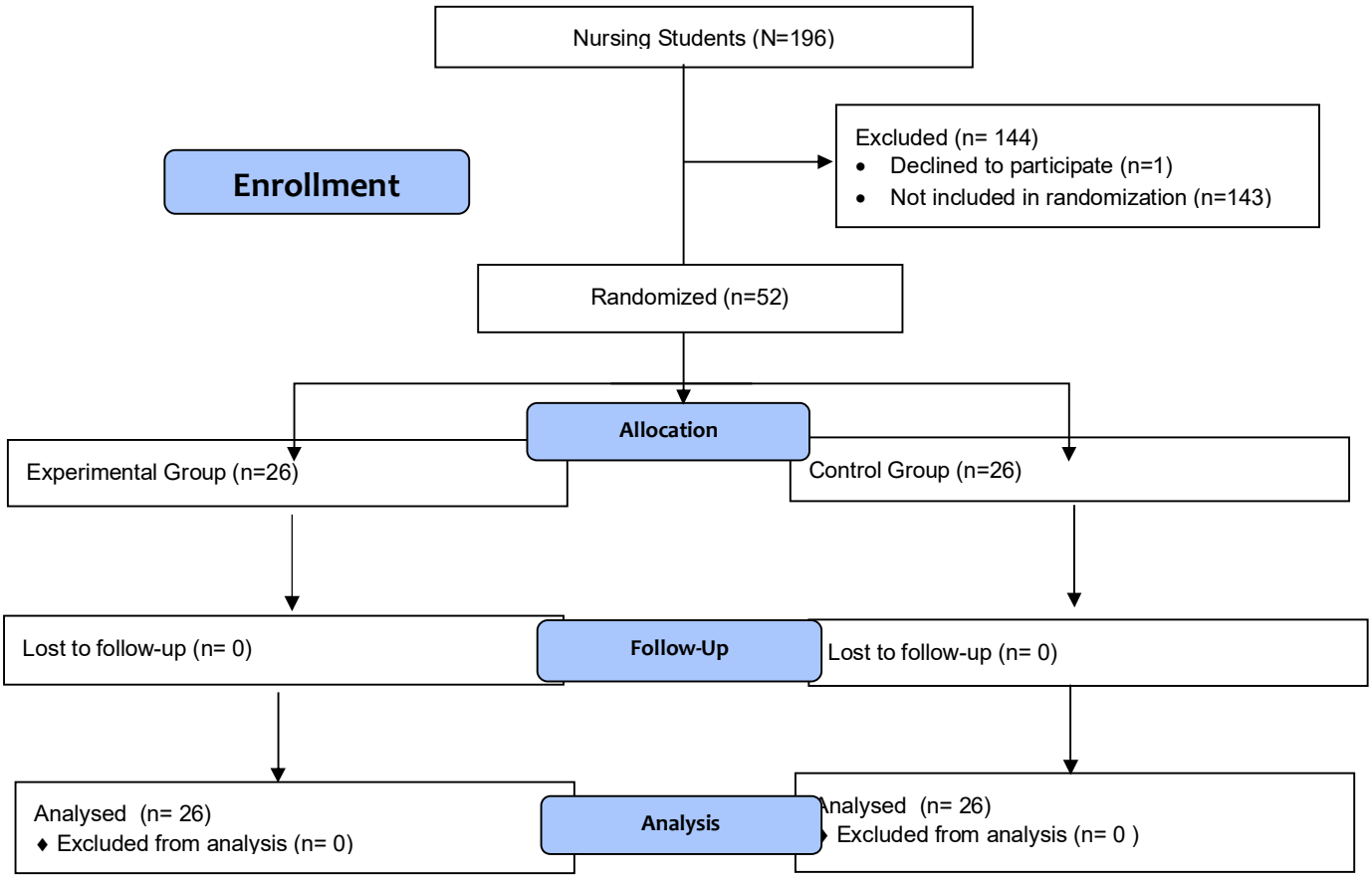

Figure 1. Consolidated Standards of Reporting Trials (CONSORT) Flow Diagram of participants through trial.

Discussion

This study was conducted to determine the effect of acupressure on the anxiety level of senior nursing students who took the clinical practice course of surgical diseases nursing remotely during the COVID-19 pandemic. To manage the process effectively during the COVID-19 pandemic and to ensure that students graduate without losing a semester, distance learning has been considered as a method that could be applied quickly and prevent grievances. In addition, it was particularly important to ensure the graduation of nursing students to support healthcare professionals who worked on the front lines during the pandemic and were exhausted due to the intense workload (Carolan et al., 2020; Chan et al., 2020). Although distance learning is thought of a beneficial application for the student, it can cause a sense of professional inadequacy and anxiety in nursing students as a result of inadequate clinical practice and the inability to blend theoretical education with practice (Akman et al., 2020; Aslan & Pekince, 2021; Fitzgerald & Konrad, 2021; Patelarou et al, 2021; Temiz, 2020).

In the current study, the initial state and trait anxiety of the senior nursing students in the experimental and control group was moderate. Acupressure, which is an easy and economical method, is known to be effective in reducing the level of anxiety in both sick and healthy individuals (Abadi et al., 2018; Aygin & Sen, 2019; Beikmoradi et al., 2015; Chueh, 2018; Coutaux, 2017; Genc & Tan, 2015; Hmwe, 2015; Lee et al., 2021; Mansoorzadeh et al., 2014; Rani et al., 2020; Rong et al., 2021; Sharifi Rizi, 2017; Yildirim & Akman, 2021).

Anxiety was significantly reduced in groups that applied acupressure to LI4, HT7, EX-HN3 points (Abadi et al., 2018; Aygin & Sen, 2019; Beikmoradi et al., 2015; Chueh, 2018; Khoram et al., 2020; Lee et al., 2021; Mansoorzadeh et al., 2014; Moosavi et al., 2019; Rani et al., 2020; Sharifi Rizi, 2017; Yildirim & Akman, 2021) and auricular points before (Abadi et al., 2018; Khoram et al., 2020) and after surgery (Aygin & Sen, 2019), individuals with cancer (Beikmoradi et al., 2015¸Genc & Tan, 2015), individuals on hemodialysis (Hmwe et al., 2015), in patient groups with knee osteoarthritis (Rani et al., 2020) and healthy individuals (Chueh, 2018; Lee et al., 2021; Yildirim & Akman, 2021).

In studies conducted with university students, positive effects were observed on the stress level and depressive mood of students when acupressure was applied to EX-HN3 and different points (Das et al., 2011; Honda et al.,

2012; Yasuhiro et al., 2012). In studies examining the effect of acupressure applied to the HT7 and LI4 points on the anxiety level of nursing students, anxiety decreased significantly in the experimental groups (Chueh et al., 2018; Corsetti, 2021; Yildirim & Akman, 2021). In this study, the state anxiety of the students in the experimental group decreased significantly after acupressure was applied to LI4, HT7 and EX-HN3 points; which can be explained by the fact that students touch and apply pressure to certain points they gain awareness (Corsetti, 2021), and that prevents the increase in cortisol levels (Hackett et al., 2020) and reduces the related stress (Dreisoerner et al., 2021).

While the state anxiety of the students in the experimental group decreased significantly, there was no significant change in their trait anxiety. Self-administered acupressure decreased the anxiety level momentarily but was not effective in reducing the long-term anxiety level. In different studies, continuous acupressure [every day for 10 days (Beikmoradi et al., 2015), five days a week (Rani et al., 2020), every day for 28 days (Honda et al., 2012) or three times a day (Yasuhiro et al., 2012)] has been reported to significantly reduce the level of anxiety. Considering the aforementioned studies, level of trait anxiety could be reduced by increasing the number and frequency of acupressure applications.

There was no significant difference between the two groups' state and trait anxiety after the application of acupressure. However, the anxiety of the experimental group, which was moderate before acupressure, decreased to a mild level after the application. This showed that acupressure is an effective application in reducing short-term anxiety. The fact that the initial state anxiety of the experimental group was higher than that of the control group may have been effective in the absence of statistical significance in state anxiety between the two groups. At the end of 4 weeks in the study, while the state anxiety of the students in the control group increased, the anxiety of the students in the experimental group decreased, despite that there was no statistical difference.

On the other hand, the reasons for the lack of difference in trait anxiety between the groups might be that the pandemic period was long, students had high concerns about finding a job because they were seniors, it was difficult to follow the course with distance learning due to technical problems and limited internet access, and online exam anxiety Celik Eren et al., 2021; Kurtuncu & Kurt, 2020; Wang et al., 2020). In addition, the fact that fewer applications were made in this study than in previous studies (Beikmoradi et al., 2015; Rani et al., 2020; Yasuhiro et al., 2012; Hoang et al., 2022) in which acupressure was applied for a longer period and more frequently which may have had an effect on it.

Limitations of the Study: The results cannot be generalized to all nursing students since the study was conducted in a single center and included only senior surgical nursing students. The other limitation of the study is that although they were taught face-to-face, students did acupressure on their own without having acupressure certification. Another limitation is that acupressure application was limited to four weeks (12 sessions).

Conclusion: In conclusion, self-administered acupressure on HT7, LI4 and EX-HN3 points reduced senior nursing students' moderate state anxiety to a mild level. For this reason, the use of acupressure, an easy and effective method, can be recommended in reducing the state anxiety of nursing students. However, acupressure was not effective on students' trait anxiety. Future studies with longer and more frequent acupressure applications are recommended to determine the effect of acupressure on trait anxiety. In addition, there is not an adequate number of studies to determine the effect of acupressure on reducing the anxiety levels of nursing students who received distance learning during the COVID-19 pandemic. New studies on the subject are recommended.

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