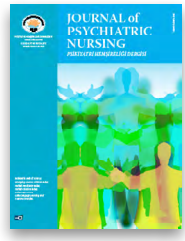
JOURNAL OF
PSYCHIATRIC NURSING

DOI: 10.14744/phd.2021.05579
J Psychiatric Nurs 2022;13(1):24-30



Original Article

The effect of reflexology treatment on anxiety

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Abstract

Objectives: The aim of this study was to determine the effect of reflexology therapy on anxiety in nursing students.

Methods: This research was a quasi-experimental pretest-posttest study that included a control group. The population consisted of 648 students enrolled in the nursing faculty of Ege University, in Izmir, Turkey. A sociodemographic information form, the Beck Anxiety Inventory (BAI), the State-Trait Anxiety Inventory (STAI), and a visual analog scale to measure perceived anxiety were used to collect the study data. Descriptive analysis was used to present the findings, as well as the results of t-tests of dependent and independent groups, one-way analysis of variance (ANOVA) testing, and repeated measures ANOVA testing.

Results: A statistically significant decrease in the BAI mean score was recorded in the case group following the application of foot reflexology in comparison with the control group. A significant difference was also seen in the mean scores of the case group in within-group comparison of the STAI state anxiety scale, but no significant difference was found in comparison with the control group. A statistically significant difference was observed between the mean perceived anxiety score of the individuals in the reflexology group.

Conclusion: Six sessions of foot reflexology treatment had a positive effect on anxiety symptoms.

Keywords: Anxiety; nursing student; reflexology.

Anxiety is an emotion that can arise as a response to a threat or something perceived as a threat, and is characterized by behavioral, cognitive, emotional, and physical symptoms.[1,2] Anxiety has a beneficial role as a protective and motivating force. However, excessive or long-lasting anxiety can become pathological and may cause emotional numbness and disruption of work[3] and social life.[4,5] An increase in the frequency of anxiety and anxiety disorders has been observed, particularly in the past few years.[6] Several complementary methods of treatment and care have been introduced and developed to assist with the management of anxiety. One such complementary treatment method is reflexology.[7,8]

Reflexology uses the application of pressure to specific points on the ears, face, hands, or soles of the feet to improve blood circulation and restore balance and health.[9–11] Each reflex point corresponds to a point on the body and the related organs.[11] The principles of reflexology are similar to those of the technique of acupuncture. The application of pressure improves blood flow, helps to expel toxins, and allows the release of energy from blocked areas of the body.[12] It can help a person to feel better, both physically and psychologically.[9,13] Studies in the international literature have evaluated the use of reflexology to reduce anxiety and depression in older female patients in a cardiac care unit,[14] to reduce anxiety in women before a cesarean delivery,[15] to evaluate body temperature, neuropathy, anxiety and depression levels in gynecological cancer patients receiving chemotherapy,[16] and to reduce anxiety in women in labor,[17] among other circumstances.

Afifi et al.[18] found that both the knowledge and attitudes of nursing students about the physiological and psychological benefits of reflexology improved after a brief educational session. Several studies in the international literature have examined the use of foot reflexology to reduce anxiety during childbirth.[17,19,20] The effectiveness of reflexology to reduce pain and

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Submitted Date: October 23, 2020 **Accepted Date:** September 15, 2021 **Available Online Date:** March 21, 2022

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What is presently known on this subject?

- Anxiety is a condition characterized by physical, emotional, cognitive, and behavioral symptoms. Anxiety has a protective and beneficial purpose, but when experienced at an excessive level, it can be limiting and even debilitating. The ability to manage a high level of anxiety is important in order to be able to conduct the daily activities of life. Reflexology is a non-pharmacological therapy that uses the gentle application of pressure to specific points on the body to stimulate blood circulation and homeostasis. Reflexology is a complementary treatment that can be used to manage anxiety.

What does this article add to the existing knowledge?

- The findings revealed a significant decrease in the mean Beck Anxiety Inventory score of the individuals in the case group that received reflexology treatment compared with the control group. A decrease was also recorded in the intragroup comparison of the mean state anxiety score of individuals in the case group and their mean anxiety perception scores, and the decrease was statistically significant.

What are the implications for practice?

- Reflexology is a safe and inexpensive technique that can be a useful method to ease anxiety in a variety of circumstances. Reduction and management of a high level of anxiety allows individuals to establish a better balance in their physical, mental, professional, and social lives, which increases productivity and motivation, strengthens their interpersonal relations, and improves quality of life.

anxiety in cancer patients also yielded positive findings.[16]

Anxiety is commonly seen during adolescence and early adulthood, a period of significant transition. For example, young adults often leave their families to study or work in a different city and face new challenges in this new environment. Worries about adapting to a new environment, making a circle of friends, and adjusting to various changes can cause anxiety.[21]

Although anxiety has an innate, protective, positive purpose, in excess, negative effects begin to appear. If a high level of anxiety is not well managed and the frequency, duration, and severity increase, it may reach the clinical level of an anxiety disorder. Therefore, early intervention is important for individuals experiencing a moderate level of anxiety.[22] Knowledge of how to manage anxiety and related behavior is important for individual success in later life and as a public mental health issue. Reflexology is one method that can be used to reduce anxiety and develop productive management behaviors.

The aim of this research was to determine the effect of the application of reflexology on anxiety in nursing students.

Materials and Method

Ethical Principles

Before commencing the research, the necessary permission was obtained from the Scientific Ethics Committee of the Nursing Faculty Dean's Office of Ege University on March 25, 2015 (no: 2015-39), and written consent was obtained from those who participated in the study.

Type of Research

This study was conducted in 2 stages. Descriptive, cross-sectional research was performed using a pretest-posttest, semi-experimental design with a control group.

Population and Sample

The population of the study consisted of nursing students studying at a university in the Aegean Region of Turkey. Nurses and nursing students are health professionals who work extensively with patients and those close to them who are often experiencing a high level of anxiety. They are therefore taught about anxiety and management of this condition in classes related to mental health and psychiatric nursing, and put this knowledge into practice on a daily basis. However, training on specific related topics, such as foot reflexology, is only available in special classes.

This study was designed to provide students with the opportunity to both experience the benefits of reflexology to ease anxiety and learn about potential applications they might find useful for themselves or for patients. The first stage of the research was to gather data from 648 students studying at a nursing faculty who met the inclusion criteria of the study. In the second stage, a case group and a control group, each consisting of 30 members, were formed by simple randomization from individuals with a self-reported high level of anxiety. Scales were administered to collect descriptive data prior to initiating the reflexology treatment program, and both groups were re-examined 1 month after the course of therapy.

Data Collection Instruments

Sociodemographic Information Form

This form developed by the researchers consisted of 6 questions to determine details of the participant's age, year of study, family/home environment structure, perception of experienced stress, knowledge of complementary treatments, and experience using any complementary methods.

Beck Depression Inventory

The Beck Depression Inventory (BDI) was developed by Beck et al.[23] to measure the risk of depression, the level of depressive signs, and the change in severity of symptoms in adults. It is a self-evaluation inventory consisting of 21 items and uses a 4-point Likert-type scale.[24,25] Validity and reliability testing of a Turkish version was performed by Hisli.[26] The inventory has a cutoff point of 17, and the Cronbach alpha coefficient was found to be 0.80. In our study, the Cronbach alpha coefficient was determined to be 0.88. For this study, the BDI was used to eliminate participants with depression.

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI) was developed by Beck et al.[27] and is a self-evaluation tool used to determine the frequency of signs of anxiety experienced. The instrument consists of 21 items scored using a 4-point Likert-type scale.[25] Validity and reliability of a Turkish version was conducted by Ulusoy et al.[28] The cutoff point of the inventory is 26, and the Cronbach alpha coefficient was found to be 0.93. The Cronbach alpha coefficient in our study was 0.92.

State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) was developed by Spielberger et al. in 1970. The inventory is a 40-item self-report scale to measure state anxiety (STAI-S) and trait anxiety (STAI-T) (20 items each). The STAI-S concerns the current state of anxiety at the time of evaluation, and the STAI-T scale reflects how the respondent feels generally, independent of a particular moment. A reliability and validity study of a Turkish version was published by Öner and Le Compte.[24] The authors reported coefficients reflecting an internal consistency and test homogeneity of 0.83-0.87 for the state anxiety scale and 0.94-0.96 for the trait anxiety scale. This study determined a Cronbach alpha coefficient for the total score of 0.72.

Visual Analog Scale for Anxiety

The Visual Analogue Scale for Anxiety (VAS-A) uses a line 10 centimeters in length with "not at all anxious" and "very anxious" at the left and right extremes, respectively. Individuals are asked to indicate their perceived level of anxiety using this scale of 0-10. A higher score indicates greater anxiety.[29]

Data Collection

In the first stage of the research, the participants were asked to complete the sociodemographic information form, the inventories, and the VAS-A perceived anxiety scale (n=648). The BDI was administered in the first stage of the research to exclude individuals with scores indicating depression. Individuals who scored ≥26 on the BAI[30,31] and ≥37 on the STAI-T[24] formed the sample group (n=78) in the second stage of the research. The data included in the case and control groups were first analyzed using the Shapiro-Wilk test according to age groups. Once normalcy of distribution was confirmed for the groups and all individuals, the Student t-test was applied. No significant difference between the 2 independent groups was seen in terms of mean age (t=0.46, p>0.05).

In the second stage of the research, 16 of the 78 students to be enrolled into the sample group declined to participate in the study. Two of the remaining 62 students did not complete the requirements, and the research was completed with a total of 60 individuals: 30 in the case group and 30 in the control group. Both groups were given a training class on reflexology and the case group received foot reflexology in 6 sessions of 20 minutes delivered 3 times a week. The participants were asked to complete the VAS-A perceived anxiety scale after each session. The BAI and the STAI were administered at the conclusion of treatment and 1 month later at the end of the study to both groups.

Data Analysis

Evaluation of the research data was performed using SPSS for Windows, Version 15.0 software (SPSS Inc., Chicago, IL, USA). The data were analyzed and presented using descriptive analyses (number, percentage, and mean), a chi-squared homogeneity test between groups, the Kruskal-Wallis and Mann-Whitney tests, independent sample t-tests, paired-sample t-tests, and repeated measures analysis of variance.

Results

The mean age of the students was 20.50±1.50 years. All of the students were female, 51.2% were in their first year of nursing study, and 89.4% lived in a nuclear family. Of the group, 60% perceived themselves to be under stress. Examination of their knowledge of complementary treatments revealed that 66.8% did not know about complementary treatments, and that 59.9% had not used them (Table 1).

In this study, 70% of the students in the case group and 66.7% of those in the control group were in their first year of study. An affirmative response was recorded in replies to the question, "Do you perceive yourself to be under stress?" in 90% of the students in the case group and 93.3% of those in the control group. The results indicated that 50% of individuals in the case group and 33.3% in the control group knew about complementary treatments. When asked, "Have you used complementary treatments other than drug treatment?" 73.3% of individuals in the case group and 70.0% of those in the control group responded negatively. There was no statistically significant difference in the data of the 2 groups (p>0.05) and homogeneity was confirmed (Table 2).

Individuals in the case group were given a total of 6 sessions of reflexology, and before and after each session, their anxiety score was evaluated with the VAS-A perceived anxiety scale. A statistically significant difference was found in the mean

Table 1. Distribution of sociodemographic characteristics of students (n=648)

Characteristics	n	%
Year of nursing study		
1st	332	51.2
2nd	153	23.6
3rd	163	25.2
Family living environment		
Nuclear	579	89.4
Extended	55	8.5
Other	14	2.2
Self-perception of stress		
No	259	40.0
Yes	389	60.0
Knowledge of complementary therapies		
No	433	66.8
Yes	215	33.2
Use of complementary therapies		
No	388	59.9
Yes	260	40.1
Total	648	100.0

Table 2. Distribution of sociodemographic characteristics of the experimental and control group students (n=60)

Characteristics	Experimental group		Control group	
	n	%	n	%
Year of nursing study				
1st	21	70	20	66.7
2nd	3	10	3	10.0
3rd	6	20	7	23.3
Self-perception of stress				
Yes	27	90.0	28	93.3
No	3	10.0	2	6.7
Knowledge of complementary therapies				
No	15	50.0	10	33.3
Yes	15	50.0	20	66.7
	X^2=0.082	p>0.05		
Use of complementary therapies				
Yes	8	26.7	9	30.0
No	22	73.3	21	70.0
	X^2=1.714	p>0.05		
Total	30	100.00	30	100.00

Table 3. Comparison of perceived anxiety scores of the case group before and after reflexology (n=30)

		Experimental group					
Variable	Number (n)	Pre		Post		t*	p
		Mean	SD	Mean	SD		
Session 1	30	6.70	2.13	4.03	1.69	8.98	<0.001
Session 2		6.70	2.15	3.76	2.07	7.65	<0.001
Session 3		6.56	1.75	3.70	1.64	10.29	<0.001
Session 4		6.13	1.71	3.20	1.44	9.33	<0.001
Session 5		5.60	1.83	3.00	1.50	10.71	<0.001
Session 6		5.30	2.26	2.76	1.52	7.90	<0.001

*Paired-sample t-test. SD: Standard deviation.

scores measured before and after each reflexology session (p<0.01) (Table 3).

A statistically significant difference was found between the mean BAI scores of the case and control groups before and after the reflexology sessions and at the final follow-up (F=56.245, p<0.01; F=18.498). While a statistically significant difference was found between the mean STAI-S score of the individuals in the case group (F=8.37, p<0.01), no significant difference was seen in the control group (F=0.14, p>0.05). No statistically significant difference was recorded in the mean STAI-T score of individuals in the case group (F=3.34, p≥0.05); however, a significant difference was seen in the mean STAI-T score of individuals in the control group (F=4.55, p<0.05) (Table 4).

Comparison of the mean inventory scores of the case and control group administered before reflexology revealed no significant difference in the BAI (t=-0.468, p>0.05), the STAI-S(t=-1.926, p>0.05), or the STAI-T (t=0.260, p>0.05). A significant difference was seen in the mean BAI score of the case and control groups after reflexology (t=-4.222, p<0.01). No statistically significant difference between the mean score of the inventories in the case and control groups was seen in the 1-month follow-up (Table 4).

Discussion

In the first stage of the research, more than half of the participants reported that they saw themselves as stressed. In

Table 4. Intragroup and intergroup comparison of reflexology therapy in the experimental and control group

Inventory totals		Experimental group	Control group	Inter-group Student t-test
		Mean±SD	Mean±SD	
Pre	Beck Anxiety Inventory	32.70±6.99	33.46±5.61	t=-0.468 p≥0.05
	State Anxiety Inventory	37.90±5.35	40.83±6.39	t=-1.926 p≥0.05
	Trait Anxiety Inventory	51.40±6.91	50.96±5.97	t=0.260 p≥0.05
Post	Beck Anxiety Inventory	13.00±7.13	24.93±13.73	t=-4.222 p<0.001
	State Anxiety Inventory	42.46±4.25	41.30±8.00	t=0.705 p≥0.05
	Trait Anxiety Inventory	49.16±5.25	49.76±6.63	t=-0.388 p≥0.05
Follow-up	Beck Anxiety Inventory	17.06±9.89	21.33±11.16	t=-1.566 p≥0.05
	State Anxiety Inventory	40.30±4.67	40.50±6.08	t=-0.143 p≥0.05
	Trait Anxiety Inventory	48.63±6.28	47.70±5.14	t=0.630 p≥0.05
Dependent intragroup repeated measure ANOVA	Beck Anxiety Inventory	F=56.245 p<0.001	F=18.498 p<0.001	
	State Anxiety Inventory	F=8.37 p<0.01	F=0.14 p≥0.05	
	Trait Anxiety Inventory	F=3.34 p≥0.05	F=4.55 p<0.05	

ANOVA: Analysis of variance.

the second stage of the research, it was observed that the 6 sessions of foot reflexology administered to individuals in the case group lowered the mean BAI score, and that the BAI reduction was statistically significantly different in a comparison of the case and control groups. Students in the case and control groups were homogeneously distributed according to sociodemographic characteristics, which supports the strength of the research findings.

The results demonstrated a statistically significant difference in the case group mean perceived anxiety scores before and after each session. Bagheri-Nesami et al.[32] measured state anxiety and anxiety perception levels after foot reflexology treatment and observed a reduction in state anxiety and anxiety perception levels. Our research findings were not similar to their state anxiety level results, but were consistent in the reduction in anxiety perception. Reflexology treatment had a positive effect on the individual perception of anxiety. In a study by Öztürk et al.[33] examining the effects of 20 minutes of foot reflexology to reduce anxiety and pain in patients who had undergone an abdominal hysterectomy, it was noted that the therapy provided a reduction in the patients' state anxiety and pain levels.

A statistically significant difference was seen between the intragroup mean BAI score of individuals in the case and control groups: The mean BAI score of the case group after foot reflexology sessions was much lower than that of the control group. Analysis of the mean STAI-S scores of the individuals in the case and control groups revealed a statistically significant difference in the mean inventory scores of the students in the case group, but no statistically significant difference was found between the mean inventory scores of the control group. An increase was seen in the mean STAI-S scores of students in the case group after reflexology. This may have been related to the fact that the research implementation stage was at the time of the students' exams, and that the researcher was the students' teacher. In a study examining the effect of reflexology on nausea, pain, anxiety, and depressive symptoms in individuals with breast cancer divided into case and control groups, Wyatt et al.[34] found that reflexology had no effect on the state anxiety level. Our research findings were consistent. Analysis of the mean STAI-T scores within the group of students in the case and control groups indicated that there was a statistically significant difference between the mean score of the students

in the case and control groups. The trait anxiety scores of both groups were lower, and the reduction was greater in the case group after 6 sessions of foot reflexology, but the difference was not statistically significant. Our research findings are similar to others in the literature, such as the reduction in state anxiety level in the case group observed by Bagheri-Nesami et al.[32] Moghimi-Hanjani et al.[35] also found a similar reduction in STAI scores after reflexology.

A statistically significant reduction was observed in the mean BAI scores after foot reflexology therapy between the case and control groups. Our review of the literature disclosed no previous study using the BAI to examine the relationship between reflexology and anxiety. Most studies using the STAI concern the anxiety experienced by individuals due to physical illness.

The significant difference between the case and control groups after foot reflexology seen in our findings illustrates that the intervention had an effect. However, the lack of significance between the case and control group BAI control follow-up scores suggests that foot reflexology was not effective in the long term. In order to obtain a lasting effect, the use of reflexology may need to be sustained and become a behavior. More study on the topic is needed.

The literature includes some studies that have investigated the effect of reflexology on biochemicals. The research has focused on the stress hormone, cortisol, and qualitative data were used to analyze the individual anxiety levels. There was a significant reduction in cortisol levels after reflexology.[36,37] Our study did not collect data on the cortisol level, but this is an important area to research in future studies.

Studies to date have primarily been conducted to assess the efficacy of reflexology interventions for symptoms such as anxiety, pain, or nausea experienced by individuals in relation to physical illnesses. The participants in our study did not have a physical illness, but generally had a high anxiety level, which may be a risk for mental health difficulties in the future. The existing studies in the literature showing increased anxiety levels related to physical illness demonstrate the necessity of our research. However, the lack of similar studies in the literature made it impossible for us to compare our research with other work.

Student populations such as ours are often experiencing a time of significant stress; they are adapting to a new environment and simultaneously worrying about the future. Techniques that can be easily adapted will enable them to cope more effectively with current stressors and problems they may face in the future, and may also represent a useful tool for patient care.

Conclusion

In the first stage of the research, the findings indicated that more than half of the students reported that they considered themselves to be under stress. In the second stage of the research, a statistical difference in the mean BAI score was seen after foot reflexology in the case and control groups; the mean score of the case group was lower than that of the control group. The use of foot reflexology had an effect on the anxiety of individuals in this study.

Recommendations

A number of recommendations can be made based on the research data indicating that reflexology reduced anxiety. Nurses should be appropriately trained in complementary treatments and use them in their work. The duration and the number of sessions should be determined according to the level and type of anxiety. In general, the potential benefits of complementary treatments, such as reflexology, merit further investigation and greater use in the field of psychiatric nursing.

Conflict of interest: There are no relevant conflicts of interest to disclose.

Peer-review: Externally peer-reviewed.

Authorship contributions: Concept – M.U., A.D.; Design – M.U.; Supervision – A.D.; Data collection &/or processing – M.U.; Analysis and/or interpretation – M.U., A.D.; Literature search – M.U.; Writing – M.U.; Critical review – A.D.

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