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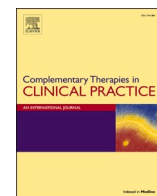
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# Effect of therapeutic touch on daytime sleepiness, stress and fatigue among students of nursing and midwifery: A randomized sham-controlled trial

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## ABSTRACT

**Objectives:** This study was conducted to assess the effect of therapeutic touch on stress, daytime sleepiness, sleep quality and fatigue among students of nursing and midwifery.

**Methods:** 96 students were randomized into three groups: the therapeutic touch (TT) group, the sham therapeutic touch (STT) group, and the control group. In this randomized sham-controlled study, the TT group was subjected to therapeutic touch twice a week for four weeks with each session lasting 20 min.

**Results:** When the TT group was compared to the STT and control groups following the intervention, the decrease in the levels of stress ( $p < 0.001$ ), fatigue ( $p < 0.001$ ) and daytime sleepiness ( $p < 0.001$ ), and the increase in the sleep quality ( $p < 0.001$ ) were found to be significant.

**Conclusion:** It was found that TT, which is one form of complementary therapy, was relatively effective in decreasing the levels of stress, fatigue and daytime sleepiness, and in increasing the sleep quality of university students of nursing and midwifery.

## 1. Introduction

During their studies, all students are subject to a range of different demands, which may be designed to help them improve themselves and develop professional maturity, but which can also have a negative impact on their health and quality of life [1]. Sleep problems that occur due to these kinds of stressors are fairly common among students, and have a deleterious effect on their mental health, quality of life, general wellbeing, and academic success [2,3]. Students of nursing and midwifery in particular face many stressors, which may include a heavy academic workload, the need to write reports and prepare for exams, fear of unknown clinical situations, uncertainty about how to use unfamiliar medical terms and new equipment/materials, and the fear that they will make mistakes while providing care. In comparison to the students in other health fields, the risk of stress, depression, fatigue and sleep disorders is higher, and quality of life quality is negatively affected as a result of stressful professional experiences, an insufficient number of nurses and midwives to support them in clinical environments, high workloads, and poor working conditions [1,4,5].

Nursing is a profession that provides support to help people meet the most fundamental human needs, including the need for sleep. Since

sleeping is an essential part of human life, and is ideally both therapeutic and rejuvenating, nurses need to plan and implement nursing practices which can help those individuals who have trouble sleeping. Nurses who treat individuals holistically, with concern for their spiritual, mental and physical dimensions, may use therapeutic touch (TT) as part of a complementary and integrated approach [6].

The concept of TT is based on the belief that “life energy” is a fundamental power that can be found in every living thing, and that this energy flows in and around the body [7]. Illnesses and their symptoms can cause disruption, clogging or deformation of this “energy field” or affect the normal rhythm of the field. Physical problems such as fatigue and sleep problems, as well as any psychological issues, can cause imbalances in the energy field [8–11]. A therapist who uses TT is able to sense and assess the energy imbalance, and then rebalance the field by consciously using their hands [8,12]. The flow of energy can be harnessed a short distance from the individual’s body surface or via direct physical contact [10,12].

TT can be defined as a holistic, evidence-based practice that involves the deliberate and compassionate use of universal energy to promote balance and well-being [13,14]. TT is ideally placed to play an important role among the independent activities undertaken by nurses,

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because it has no side effects, is reliable, easy to apply and learn and accepted internationally [6,14]. Numerous studies have noted TT's effect on symptoms such as stress, depression, anxiety, pain, vomiting, fatigue and sleep disorders, as well as blood pressure, heart rate, comfort and quality of life [6,7,10,12–16]. In a study conducted by Marta et al. (2010) it was determined that TT decreased pain, and positively affected sleep quality, as well as ameliorating symptoms of depression [12]. A study conducted by Senderovich et al. (2016) found that TT had an effect on patients' capacity to relax and levels of sleep [9]. In a study conducted on cancer patients by Aghabati et al. (2010) there was a meaningful difference between the TT group and the control and placebo groups in terms of their levels of pain and fatigue [8]. Bağcı and Yücel found that TT improved sleep quality among the elderly; however, there was no significant difference in comparison to the placebo and control groups [6].

Although studies have been conducted with regard to the use of TT for healthy individuals and for different patient populations, there has been no prior study investigating its effect on daytime sleepiness, sleep quality, stress and fatigue among healthy students of nursing and midwifery. It is important that the physical and spiritual wellbeing of nursing and midwifery students, who will themselves enter into the health care profession, be evaluated in a holistic way. This study contributes to the literature by being the first to analyze the effects of TT, which is an activity that can be undertaken independently by nurses, on daytime sleepiness, stress and fatigue among students of nursing and midwifery.

## 2. Materials and methods

### 2.1. Study design

This study had a randomized sham-controlled trial design. The study was conducted in a State University School of Health in the south-east of Turkey between April and July 2018.

### 2.2. Participants

The population of the study was made up of the students of nursing and midwifery in the Faculty of Health of a State University located in Turkey. The sample of the study consisted of 96 individuals from among the students who met the sampling criteria.

**Inclusion criteria:** students who were aged 18 or above, were first-, second-, third- or fourth-year students of nursing or midwifery, had not previously receive any energy therapies (reiki, healing touch, therapeutic touch), had a score above 10 on the Epworth Sleepiness Scale (ESS), did not have any communication problems, and who agreed to take part in the study were included.

**Exclusion criteria:** Students who were receiving any psychological and/or pharmacological treatment for sleep, fatigue or stress problems, who had previously received a psychiatric diagnosis, who had a current psychiatric illness, and who had previously used or were currently using anxiolytic (psychotropic) medicines were excluded from the study.

### 2.3. Randomization

The study was a single-blind randomized controlled trial, because the researchers assigned individuals to the TT and STT groups, and the

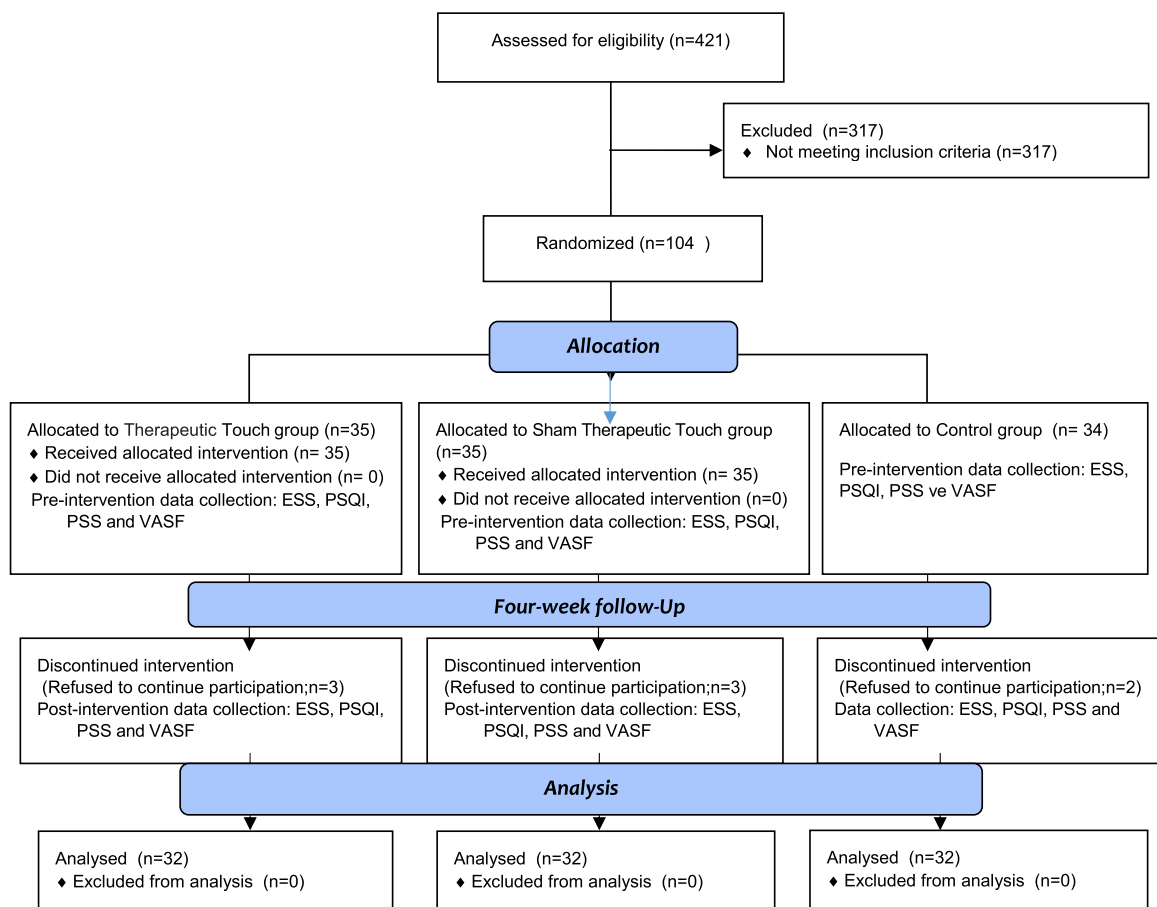


Fig. 1. Consort flow diagram.

students did not know which group they were in. The students who met the inclusion criteria were divided into three groups by the simple and stratified randomization method and according to their gender and age. There were 35 students in the TT group, 35 students in the STT group and 34 students in the control group. However, three students from the TT, three from the STT and two from the control group were excluded for not wishing to continue the study, and the study was thus completed with a total of 96 students (Fig. 1). Analysis at the end of the study showed a statistical power of 82% based on a confidence interval of 95%.

#### 2.4. Intervention

TT was applied to the TT group by researchers in a room prepared within the Faculty of Health. Sessions were conducted one-on-one in a quiet, calm and noiseless environment while the students were in a seated position. Each student from the TT group was given TT a total of eight sessions via the Krieger-Kunz method; sessions took place twice a week for one month (four weeks), with one group having sessions on Mondays and Wednesdays the other on Tuesdays and Thursdays [13, 14].

TT application procedure: The procedure was explained to the student, and the student's entire body was then "scanned" from head to foot by the practitioner: keeping their hands at a distance of about 5 cm away from the body, the practitioner moved them regularly and rhythmically in order to prevent and heal imbalances in the energy field. The energy field was then re-evaluated from top to bottom and rebalanced if there was any region in which it was blocked area. Finally, the student was left to rest and their response to the treatment was observed. In studies analyzing the effect of TT on sleep quality, implementation of TT usually lasts from 10 to 20 min [6,12,13]. As a result of this, TT sessions in the current study were designed to last for 20 min and they were allowed a short period to rest at the end of the session [6,12,13]. The researcher applying the TT received TT training and certification in using the Krieger-Kunz method before the study began.

For students in the STT group, a similar duration (20 min) and frequency (two sessions a week; a total of eight sessions) of TT was applied with hands at a specific distance from the body (approximately 5 cm) but the hands were moved across the body in no specific sequence. These sessions were delivered to the STT group in a different room by the other researcher.

No interventions were given to the students in the control group.

#### 2.5. Data collection

The data were collected using the Student Identification Form, the ESS, the Pittsburgh Sleep Quality Index (PSQI), the Perceived Stress Scale (PSS) and the Visual Analogue Scale for Fatigue (VASF). The students in the TT, STT and control groups were asked to complete the ESS, PSQI, PSS, VASF and Student Identification Form at the beginning of the study before any interventions were made. The completed forms were collected by the researchers. At the end of the fourth week (the end of the eighth session), all the students were asked to repeat the ESS, PSQI, PSS and VASF. This research used a STT group and none of the participants had previous experience of TT. For this reason, the students did not know which group they had been assigned to. The completed forms were collected by the researchers.

Student Identification Form: This form, which was created by the researchers in line with relevant, related studies, was comprised of questions about the students' sociodemographic features, including age, gender, and marital status [5,7,12–17].

Epworth Sleepiness Scale: The ESS was developed by Johns [18] and its validity and reliability were tested by Ağargün et al. [19]. In the ESS, 0 points are given if there is no possibility of falling asleep, 2 points are given if there is an intermediate possibility, and 3 points are given if there is a high possibility. A total score of between 2 and 10 is considered

normal, the indicator of pathological sleepiness is a score of greater than 10, and scores of 13 or more thirteen are considered to show excessive daytime sleepiness. The Cronbach's alpha reliability coefficient of the scale was found to be 0.80 [19].

Pittsburgh Sleep Quality Index: The PSQI was developed by Buysse, Reynolds, Monk, Berman and Kupfer, and is a self-feedback scale that analyzes sleep quality and sleep disorder over the period of one month [20]. The reliability and validity of the scale in Turkey were tested by Ağargün, Kara and Anlar [21]. Its Cronbach's alpha internal consistency coefficient was found to be 0.804. In the PSQI, 18 items are scored and there are seven categories. The total score ranges from 0 to 21. If the total PSQI score is  $\leq 5$ , this indicates "good sleep quality", and if the score is  $> 5$ , this indicates "bad sleep quality" [21].

Perceived Stress Scale: The Turkish reliability and validity testing of the PSS, which was developed by Cohen, Kamarck and Mermelstein, was conducted by Eskin, Harlak, Demirkıran and Dereboy [22,23]. Its Cronbach's alpha internal consistency coefficient was found to be 0.82. The score for the PSS ranges from 0 to 40. A high score shows that the individual perceives themselves to be under an excessive amount of stress [23].

Visual Analogue Scale for Fatigue: The VASF was developed by Price, Bush, Long and Harkins [24]. The VASF is a 10 cm long visual scale that assesses the severity of fatigue in the last week. The left side of the scale is labelled "I do not feel fatigue", while the right side is labelled "I feel extreme fatigue and exhaustion". The VASF value is determined by measuring the distance between the far left side of the scale and the point marked on it [25].

#### 2.6. Ethical considerations

Ethical approval was obtained from the Ethical Committee of Mardin Artuklu University Ethical Committee (dated 18.04.2018 and No: 2018/01–4). After approval was received, the necessary written consent was obtained from the institution where the research was to take place. All the participants were informed about the study and their oral and written consent was obtained. The research conformed with the principles outlined in the Declaration of Helsinki.

#### 2.7. Statistical analysis

Data were analyzed in the Statistical Package for Social Sciences 22.0 (SPSS, IBM Corp., Armonk, NY, USA). The conformity of the data to normal distribution was analyzed through the Shapiro-Wilk test. Numbers and percentages were used to evaluate the descriptive characteristics. The chi-square test was used to test homogeneity. The Kruskal-Wallis and one-way ANOVA tests were utilized to compare the mean scores (pre-post) for the ESS, PSQI, stress and fatigue between the three groups. The Bonferroni or Mann-Whitney *U* test was used for intergroup dual comparisons. The *t*-test or Wilcoxon test was used for dependent groups during intergroup comparisons. The results obtained were assessed with a confidence interval of 95% and significance was accepted as  $p < 0.05$ .

### 3. Results

#### 3.1. Sociodemographic characteristics

No significant difference was found between groups in terms of their sociodemographic characteristics. All three groups were homogenous in terms of their sociodemographic characteristics ( $p > 0.05$ ) (Table 1).

#### 3.2. Perceived Stress Scale

There was no significant difference between the groups prior to TT with regard to their PSS average scores ( $p = 0.473$ ). Significant differences were found post-TT between the TT, STT and control groups with

**Table 1**  
Demographic characteristics of participants (N = 96).

	TT group (n = 32) n(%)	STT group (n = 32) n(%)	Control group (n = 32) n(%)	x <sup>2</sup>	p
Gender				.13	.93
Female	25(78)	26(81,3)	26(81,3)		
Male	7(22)	6(18,8)	6(18,8)		
Department				.08	.95
Nursing	16(50)	17(53,1)	16(50,0)		
Midwifery	16(50)	15(46,9)	16(50,0)		
Class				24.16	.061
1.	5(16)	3(9)	8(25)		
2.	14(43)	10(31)	7(22)		
3.	10(31)	14(44)	2(6)		
4.	3(9)	5(16)	15(47)		
Marital Status				.52	.77
Single	30(94)	31(97)	31(97)		
Married	2(6)	1(3)	1(3)		
Chronic Disease				.42	.81
Yes	2(6)	2(6)	1(3)		
No	30(94)	30(94)	31(97)		
Smoking				.27	.87
Yes	3(9)	2(6)	3(9)		
No	29(91)	30(94)	29(91)		
Alcohol Consumption				.42	.81
Yes	2(6)	2(6)	1(3)		
No	30(94)	30(94)	31(97)		
Caffeine Consumption				5.046	.28
Yes	10(31)	9(28)	8(25)		
Sometimes	18(56)	19(59)	14(44)		
No	4(13)	4(13)	10(31)		
Place of Stay				5.175	.27
with family	5(16)	9(28)	4(13)		
with friend/s	2(6)	5(16)	3(9)		
at dormitory	25(78)	18(56)	25(78)		
Age (years)	21.12 ±	20.78 ±	22.50 ± 4.21	5.407	.067
Mean ± SD	1.62	1.38			

TT: Therapeutic Touch, STT: Sham Therapeutic Touch.

regard to their PSS average scores (p < 0.001). Pair-wise comparison of the groups (post-hoc Bonferroni) showed that there were significant differences between the TT and STT groups, and the TT and control groups (p < 0.001) (Table 2).

### 3.3. Epworth Sleepiness Scale

There was no significant difference between the groups prior to TT with regard to their ESS median scores (p = 0.621). Significant differences were found post-TT between the TT, STT and control groups in regard to their ESS score medians (p < 0.001). Pair-wise comparison of the groups showed that there were significant differences between the

**Table 2**  
Comparison of pre- and post TT PSS values among TT, STT and Control groups.

PSS	TT group Mean ± SD	STT group Mean ± SD	Control group Mean ± SD	F & p-value	Bonferroni
Pre-intervention	22.00 ± 2.59	22.59 ± 3.56	22.96 ± 3.30	F = 0.755 p = 0.473	TT-STT: p < 0.001 **
Post-intervention	18.81 ± 3.46	22.62 ± 2.75	24.09 ± 4.21	F = 19.07 p < 0.001	STT-C: p > 0.05 **
Pre-and post test comparison of groups	t = 4.416 p < 0.001	t = -0.061 p = 0.951	t = -1.714 p = 0.097		TT-C: p < 0.001 **

TT and STT groups, and the TT and control groups (p < 0.001) (Table 3).

### 3.4. Pittsburgh Sleep Quality Index

No significant difference was found pre-TT between the groups with regard to their PSQI average scores (p = 0.159). There were significant differences post-TT between the TT, STT and control groups with regard to PSQI average scores (p < 0.001). Pair-wise comparison of the groups showed that there were significant differences between the TT and STT groups, and the TT and control groups (p < 0.001) (Table 4).

### 3.5. Visual Analogue Scale for Fatigue

No significant difference was found pre-TT between the groups in regard to the fatigue median scores (p = 0.621). There were significant differences post-TT between the TT, STT and control groups with regard to the fatigue median scores (p < 0.001). Pair-wise comparison of the groups showed that there were significant differences between the TT and STT groups, TT and control groups (p < 0.001) (Table 5).

## 4. Discussion

The results of this randomized study showed that TT, a non-pharmacological complementary and holistic approach, had significant positive effects on stress, daytime sleepiness, sleep quality and fatigue in students of nursing and midwifery.

The study found that TT was significantly more effective in decreasing stress levels among the students of nursing and midwifery than STT or no intervention (the control group). Additionally, while there was a significant decrease in stress levels of the TT group in the intergroup comparisons, there was no significant decrease in the other two groups. In a study conducted by Olson et al. assessing the effectiveness of TT in decreasing the negative immunological effects of stress on healthy university students of medicine and nursing, a difference in IgG levels was found, but it was not significant [26]. In a pilot study conducted by McElligott et al. with 24 working nurses, TT was found to be effective in decreasing stress, increasing self-awareness, and improving self-care [27]. In a study by Woods, Beck and Sinha on patients with dementia, it was determined that TT significantly decreased behavioral symptoms such as uneasiness, as well as decreasing levels of cortisol, which are related to the body's response to stress [28]. In general, the other studies in literature show that TT decreases anxiety [7,10,16], and these results show similarity with those of the current

**Table 3**  
Comparison of pre- and post-TT Daytime Sleepiness levels among TT, STT and Control groups.

ESS	TT group Median (Min ± Max)	STT group Median (Min ± Max)	Control group Median (Min ± Max)	X <sup>2</sup> & p-value	Pair-wise comparison of the groups
Pre-intervention	14.21 (11.00 ± 20.00)	14.06 (11.00 ± 19.00)	13.93 (11.00 ± 22.00)	X <sup>2</sup> = 0.952 p = 0.621	TT-STT: p < 0.001 *
Post-intervention	7.18 (2.00 ± 15.00)	12.68 (4.00 ± 24.00)	12.53 (4.00 ± 24.00)	X <sup>2</sup> = 24.72 p < 0.001	STT-C: p = 0.618 *
Pre-and post test comparison of groups	Z = -4.944 p < 0.001	Z = -1.103 p = 0.270	Z = -1.144 p = 0.253		TT-C: p < 0.001 *

Z: Wilcoxon test, KW: Kruskal Wallis test, \*: Kruskal-Wallis test followed by Mann-Whitney U test, p < 0.05 Significance level, TT: Therapeutic Touch, STT: Sham Therapeutic Touch, C: Control.

**Table 4**  
Comparison of pre- and post-TT PSQI levels among TT, STT and Control groups.

PSQI	TT group		STT group		Control group		Test istatstđđ & p-value	Pair-wise comparison of the groups
	Mean $\pm$ SD	Median (Min $\pm$ Max)	Mean $\pm$ SD	Median (Min $\pm$ Max)	Mean $\pm$ SD	Median (Min $\pm$ Max)		
Pre-intervention	7.59 $\pm$ 2.51	8.00(3.00 $\pm$ 13.00)	7.81 $\pm$ 3.12	7.00(3.00 $\pm$ 16.00)	6.56 $\pm$ 2.58	7.00(2.00 $\pm$ 12.00)	F = 1.877 p = 0.159	TT-STT: p < 0.001
Post-intervention	3.65 $\pm$ 2.93	3.00(0.00 $\pm$ 13.00)	7.18 $\pm$ 2.99	7.00(3.00 $\pm$ 16.00)	6.18 $\pm$ 1.99	6.00(2.00 $\pm$ 10.00)	X <sup>2</sup> = 24.78 p < 0.001	STT-C: p > 0.05
Pre-and post test comparison of groups	Z = -4.161 p < 0.001		Z = -2.064 p = 0.039		Z = -1.224 p = 0.221			TT-C: p < 0.001

Z: Wilcoxon test, F= One way ANOVA test statistics, KW: Kruskal Wallis test, Kruskal-Wallis test followed by Mann-Whitney U test, p < 0.05 Significance level, TT: Therapeutic Touch, STT: Sham Therapeutic Touch, C: Control.

**Table 5**  
Comparison of pre- and post-TT Fatigue levels among TT, STT and Control groups.

VASF	TT group	STT group	Control group	X <sup>2</sup> & p-value	Pair-wise comparison of the groups
	Median (Min $\pm$ Max)	Median (Min $\pm$ Max)	Median (Min $\pm$ Max)		
Pre-intervention	6.68 (4.00 $\pm$ 10.00)	6.81 (4.00 $\pm$ 10.00)	6.12 (3.00 $\pm$ 10.00)	X <sup>2</sup> = 2.789 p = 0.248	TT-STT: p < 0.001
Post-intervention	3.78 (2.00 $\pm$ 7.00)	6.93 (4.00 $\pm$ 10.00)	7.06(5 $\pm$ 10.00)	X <sup>2</sup> = 55.02 p < 0.001	STT-C: p > 0.05
Pre-and post test comparison of groups	Z = -4.905 p < 0.001	Z = -0.765 p = 0.444	Z = -3.919 p < 0.001		TT-C: p < 0.001

Z: Wilcoxon test, KW: Kruskal Wallis test, p < 0.05 Significance level, TT: Therapeutic Touch, STT: Sham Therapeutic Touch, C: Control.

study. This is said to be a result of TT enabling the free flow of energy by restoring energy imbalances and blockages, which stimulates the body's self-recovery process, enables the integration of the physical, emotional, mental and spiritual dimensions, and decreases stress and anxiety [7,10,27].

The results of the current study show that the TT was significantly more effective in decreasing daytime sleepiness and improving sleep quality in students than STT or no intervention. Similar to the current study, Marta et al. [12] and Senderovich et al. [9] also determined that TT increased sleep quality, although Bađcı and Yücel [7] did not find any significant difference.

There are limited number of studies in literature analyzing TT's effect on fatigue management. In the current study, there was a significant decrease in the fatigue levels of the students in the TT group in comparison to the STT and control groups. While there was a significant decrease in the fatigue levels of the TT group, and a significant increase in those of the control group, there was no significant difference in the STT group. In Aghabati et al.'s study of cancer patients, a significant difference was also found in the fatigue levels of the TT group in comparison to the control and STT groups [8]. Wong et al. determined that using Healing Touch (HT) on pediatric oncology patients, their parents and their caregivers had positive effects on their levels of pain, stress and fatigue [29]. Similarly, Post-White et al. stated that HT had positive effects on pain and fatigue in cancer patients [30]. On the other hand, it was stated by FitzHenry et al. [31], with regard to patients with breast cancer receiving radiotherapy treatment, and by Rexilius et al. [32], with regard to caregivers of patients who had had autologous hematopoietic stem cell transplantation, that HT did not have a positive impact on fatigue.

As a result of this study, it can be suggested that physical and psychological problems such as fatigue cause an imbalance in individuals' energy fields, and that TT provides relaxation and relief by balancing the energy flow and thereby reducing fatigue [8–11].

**4.1. Limitations**

The limitation of this study is the fact that the results cannot be generalized for students of nursing and midwifery studying at other institutions, as it was conducted in a single university. Another limitation is that it only evaluates the effectiveness of TT. In future studies, the effectiveness of TT should be compared with different techniques. It is recommended that this study be repeated as a multicenter study involving different universities and with a larger sample size.

**5. Conclusion**

It was found that TT, one of the techniques used in complementary therapy, was moderately effective in decreasing the levels of stress, fatigue and daytime sleepiness, and in increasing the sleep quality of university students of nursing and midwifery. TT can be given independently by nurses, and is a complementary technique that is non-pharmacological, non-invasive, has no side effects, requires no additional expenditure, can be easily integrated into general health care activities, and is internationally accepted.

Although studies of TT have been conducted on different sample groups, the fact that no prior research has sampled students of nursing and midwifery demonstrates the uniqueness of the current study. It is important that students of nursing and midwifery, who will go on to become tomorrow's health care professionals, are physically and spiritually healthy and that they maintain their wellbeing. Nursing and midwifery students who are suffering from stress, daytime sleepiness, poor sleep quality and fatigue should be identified, and TT should be provided to them.

**Ethical approval**

Ethical approval was obtained from the Mardin Artuklu University Ethical Committee (Dated 18.04.2018 and No: 2018/01–4). Written permission was attained from the Health School where the study was conducted.

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**CRedit authorship contribution statement**

**Birgöl Vural Dođru:** Conceptualization, Methodology, Formal analysis, Writing - original draft, Visualization. **Hediye Utli:** Conceptualization, Methodology, Resources, Data curation. **Fisun Şenuzun**

**Aykar:** Conceptualization, Writing - review & editing, Data curation, Supervision.

### Declaration of competing interest

No conflict of interest has been declared by the authors.

F= One way ANOVA test statistics; t: paired samples test, \* \*: One-Way ANOVA test followed by bonferroni,  $p < 0.05$  Significance level, TT: Therapeutic Touch, STT: Sham Therapeutic Touch, C: Control.

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### References

- [1] S.B.T. Benavente, R.M. Silva, A.B. Higashi, L.A. Guido, A.L.S. Costa, Influence of stress factors and sociodemographic characteristics on the sleep quality of nursing students, *Rev. Esc. Enferm. USP* 48 (3) (2014) 512–518, <https://doi.org/10.1590/S0080-623420140000300018>.
- [2] R. Alimirzae, M.A. Forouzi, F. Abazari, A.A. Haghdoost, Prevalence of quality of sleeping and its determinants among Students of Kerman Razi School of nursing and midwifery, *Asian J. Nursing Educ. Resear.* 4 (2014) 176–180.
- [3] V. Gianfredi, D. Nucci, A. Tonzani, R. Amodeo, A.L. Benvenuti, M. Villarini, M. Moretti, Sleep disorder, Mediterranean Diet and learning performance among nursing students: inSOMNIA, a cross-sectional study, *Ann. Ig.* 30 (6) (2018) 470–481, <https://doi.org/10.7416/ai.2018.2247>.
- [4] C.J. Chen, Y.C. Chen, H.C. Sung, T.C. Hsieh, M.S. Lee, C.Y. Chang, The prevalence and related factors of depressive symptoms among junior college nursing students: a cross-sectional study, *J. Psychiatr. Ment. Health Nurs.* 22 (8) (2015) 590–598, <https://doi.org/10.1111/jpm.12252>.
- [5] P. Hiremath, V.R. Mohite, P. Naregal, S. Pawar, M. Mulik, A. Katti, T. Bhosale, Depression, anxiety and stress among newly admitted undergraduate nursing student at Krishna Institute of Nursing Sciences Karad, *LJHSR* 6 (6) (2016) 233–237.
- [6] H. Bađci, ř.Ç. Yücel, Effect of therapeutic touch on sleep quality in elders living at nursing homes, *J. Relig. Health* (2019) 1–19, <https://doi.org/10.1007/s10943-019-00831-9>.
- [7] ř.Ç. Yücel, G.G. Arslan, H. Bađci, Effects of hand massage and therapeutic touch on comfort and anxiety living in a nursing home in Turkey: a randomized controlled trial, *J. Relig. Health* (2019) 1–14, <https://doi.org/10.1007/s10943-019-00813-x>.
- [8] N. Aghabati, E. Mohammadi, Z.P. Esmail, The effect of therapeutic touch on pain and fatigue of cancer patients undergoing chemotherapy, *Evid. Based Compl. Altern. Med.* 7 (3) (2010) 375–381, <https://doi.org/10.1093/ecam/nen006>.
- [9] H. Senderovich, M.L. Ip, A. Berall, J. Karuza, M. Gordon, M. Binns, S. Wignarajah, D. Grossman, L. Dunal, Therapeutic Touch® in a geriatric palliative care unit—A retrospective review, *Compl. Ther. Clin. Pract.* 24 (2016) 134–138, <https://doi.org/10.1016/j.ctcp.2016.06.002>.
- [10] A. Tabatabaee, M.Z. Tafreshi, M. Rassouli, S.A. Aledavood, H. AlaviMajd, S. K. Farahmand, Effect of therapeutic touch in patients with cancer: a literature review, *Med. Arch.* 70 (2) (2016) 142, <https://doi.org/10.5455/medarh.2016.70.142-147>.
- [11] J. Younus, M. Lock, O. Vujovic, E. Yu, J. Malec, D. D'Souza, L. Stitt, A case-control, mono-center, open-label, pilot study to evaluate the feasibility of therapeutic touch in preventing radiation dermatitis in women with breast cancer receiving adjuvant radiation therapy, *Compl. Ther. Med.* 23 (2015) 612–616, <https://doi.org/10.1016/j.ctim.2014.11.003>.
- [12] I.E. R. Marta, S. Baldan, A.F. Berton, M. Pavam, M.J.P.D. Silva, The effectiveness of therapeutic touch on pain, depression and sleep in patients with chronic pain: clinical trial, *Rev. Esc. Enferm. USP* 44 (4) (2010) 1100–1106, <https://doi.org/10.1590/S0080-62342010000400035>.
- [13] D. Kunz, D. Krieger, *The Spiritual Dimension of Therapeutic Touch*. Kindle eBooks, Bear & Co, Rochester, VT, 2004.
- [14] P. Matourypour, Z. Zare, V. Mehrzad, A. Musarezaie, M. Dehghan, Z. Vanaki, An investigation of the effects of therapeutic touch plan on acute chemotherapy-induced nausea in women with breast cancer, *J. Educ. Health Promot.* 4 (2015) 61, <https://doi.org/10.4103/2277-9531.162380>.
- [15] G. Mueller, C. Palli, P. Schumacher, The effect of therapeutic touch on back pain in adults on a neurological unit: an experimental pilot study, *Pain Manag. Nurs.* 20 (1) (2019) 75–81, <https://doi.org/10.1016/j.pmn.2018.09.002>.
- [16] M. Zolfaghari, S. Eybpoosh, M. Hazrati, Effects of Therapeutic Touch on anxiety, vital signs, and cardiac dysrhythmia in a sample of Iranian women undergoing cardiac catheterization, *J. Holist. Nurs.* 30 (4) (2012) 225–234, <https://doi.org/10.1177/0898010112453325>.
- [17] G. Demir, Daytime sleepiness and related factors in nursing students, *Nurse Educ. Today* 59 (2017) 21–25, <https://doi.org/10.1016/j.nedt.2017.08.003>.
- [18] M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale, *Sleep* 14 (1991) 540–545, <https://doi.org/10.1093/sleep/14.6.540>.
- [19] M.Y. Ağargün, A.S. Çilli, H. Kara, M. Bilici, M. Telciođlu, Ü.B. Semiz, C. Bařođlu, Validity and reliability of the epworth sleepiness scale, *Turkish J. Psychiatr.* 10 (4) (1996) 261–267.
- [20] D.J. Buysse, C.F. Reynolds, T.H. Monk, S.R. Berman, D.J. Kupfer, The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research, *Psychiatr. Res.* 28 (2) (1989) 193–213, [https://doi.org/10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4).
- [21] M.Y. Ağargün, H. Kara, O. Anlar, The Validity and reliability of the pittsburgh sleep quality index, *Turkish J. Psychiatr.* 7 (2) (1996) 107–115.
- [22] S. Cohen, T. Kamarck, R. Mermelstein, A global measure of perceived stress, *J. Health Soc. Behav.* 24 (1983) 385–396, <https://doi.org/10.2307/2136404>.
- [23] M. Eskin, H. Harlak, F. Demirkuran, Ç. Dereboy, The Adaptation of the perceived stress scale into Turkish: a reliability and validity analysis, *New Symp. J.* 51 (3) (2013) 132–140.
- [24] D.D. Price, F.M. Bush, S. Long, S.W. Harkins, A comparison of pain measurement characteristics of mechanical visual analogue and simple numerical rating scales, *Pain* 56 (2) (1994) 217–226, [https://doi.org/10.1016/0304-3959\(94\)90097-3](https://doi.org/10.1016/0304-3959(94)90097-3).
- [25] R. Eğlence, N. Karatař, S. Tađci, The effect of acupuncture on the level of fatigue in hemodialysis patients, *Alternative Ther. Health Med.* 19 (6) (2013).
- [26] M. Olson, N. Sneed, M. LaVia, G. Virella, R. Bonadonna, Y. Michel, Stress-induced immunosuppression and therapeutic touch, *Alternative Ther. Health Med.* 3 (2) (1997) 68–74.
- [27] D. McElligott, M.B. Holz, L. Carollo, S. Somerville, Margarita Baggett, S. Kuzniewski, Q. Shi, A pilot feasibility study of the effects of touch therapy on nurses, *JNY State Nurses Assoc.* 34 (1) (2003) 16–24.
- [28] D.L. Woods, C. Beck, K. Sinha, The effect of therapeutic touch on behavioral symptoms and cortisol in persons with dementia, *Forsch Komplementmed* 16 (3) (2009) 181–189, <https://doi.org/10.1159/000220479>.
- [29] J. Wong, A. Ghiasuddin, C. Kimata, B. Patelesio, A. Siu, The impact of healing touch on pediatric oncology patients, *Integr. Canc. Ther.* 12 (1) (2013) 25–30, <https://doi.org/10.1177/1534735412446864>.
- [30] J. Post-White, M.E. Kinney, K. Savik, J.B. Gau, C. Wilcox, I. Lerner, Therapeutic massage and healing touch improve symptoms in cancer, *Integr. Canc. Ther.* 2 (4) (2003) 332–344, <https://doi.org/10.1177/1534735403259064>.
- [31] F. FitzHenry, N. Wells, V. Slater, M.S. Dietrich, P. Wisawatapnimit, A. B. Chakravarthy, A randomized placebo-controlled pilot study of the impact of healing touch on fatigue in breast cancer patients undergoing radiation therapy, *Integr. Canc. Ther.* 3 (2) (2014) 105–113, <https://doi.org/10.1177/1534735413503545>.
- [32] S.J. Rexilius, C.A. Mundt, M.E. Megel, S. Agrawal, Therapeutic effects of massage therapy and healing touch on caregivers of patients undergoing autologous hematopoietic stem cell transplant, *Oncol. Nurs. Forum* 29 (3) (2002) E35–E44, <https://doi.org/10.1188/02.ONF.E35-E44>.