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Research Article / Araştırma Makalesi
The Effect of Back Massage Applied to Palliative Care Patients on Sleep Quality and Pain
Palyatif Bakım Hastalarına Uygulanan Sırt Masajının Uyku Kalitesi ve Ağrıya Etkisi

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Abstract: This study was conducted between November 2021 and April 2022 to examine the effect of back massage applied to palliative care patients receiving inpatient treatment in the palliative care service of a hospital in Bilecik, Turkey on sleep quality and pain. A pretest-posttest control group randomized experimental design was used. A total of 52 volunteer patients, 26 in experimental and 26 in control groups, were recruited. A Patient Identification Form, the Pittsburgh Sleep Quality Index, and the McGill Pain Scale-Short Form were used to collect data. The experimental group was given an 18-minute a day back massage for seven days by the researcher. To evaluate the effect of the back massage, the Pittsburgh Sleep Quality Index and the McGill Pain Scale-SF were filled out. At the end of the 7th day, intra- and inter-group differences were examined. The statistical significance was accepted as p<0.05. Both groups were equivalent regarding some individual characteristics (age, gender, level of education, and medical diagnosis). The seven-day follow-up results regarding the experimental and control group patients' sleep and pain indicated a significant difference between the groups in favor of the experimental group after the 4th day (p <.001). A statistically significant difference was found between patients' mean sleep quality scores according to 2*2 MIX ANCOVA test results both in interaction (F(1,50)= 15.899, p<.001, η²=.016) and between groups (F(1,50)= 27.271, p<.001, η²=.10). There was a statistically significant difference between patients' mean pain scores according to 2*3 MIX ANOVA test results regarding both measurement time (F(1,50)= 7.619, p<.001, η²=.013) and interaction (F(1,50)= 48.751, p<.001, (η²=.083). In this study, a back massage was applied to palliative care patients for seven days, and there was a statistically significant increase in patients' sleep quality and decrease in pain levels starting from the 4th day of the application.
Keywords: Back massage, palliative care, sleep quality, pain, holistic care, nursing care

Özet: Çalışma, palyatif bakım hastalarına uygulanan sırt masajının uyku kalitesi ve ağrıya etkisini incelemek amacıyla, Kasım 2021- Nisan 2022 tarihleri arasında Türkiye'de Bilecik ilinde bir hastanenin palyatif bakım servisinde yatarak tedavi gören hastalar ile yapıldı. Ön test-son test kontrol gruplu desene sahip randomize kontrollü deneysel çalışma olarak planlandı. Örneklemi 26 deney, 26 kontrol olmak üzere toplam 52 gönüllü hasta oluşturdu. Deney grubuna 7 gün boyunca her gün 18 dk. süreyle araştırmacı tarafından sırt masajı uygulandı. Deney grubuna uygulanan sırt masajının etkisini değerlendirmek için Pittsburgh Uyku Kalitesi İndeksi, McGill Ağrı Ölçeği-Kısa Formu dolduruldu. 7. Günün sonunda grup içi ve gruplar arası farklar incelendi. İstatistiksel anlamlılık düzeyi p<0.05 kabul edildi. Deney ve kontrol grubunun sosyo-demografik özellikleri incelendiğinde, her iki grubun yaş, cinsiyet, eğitim durumu, tıbbi tanı gibi bireysel özellikler bakımından benzer olduğu görüldü. Deney ve kontrol gruplarındaki hastaların uykuya ve ağrıya ilişkin 7 günlük izlem sonuçları incelendiğinde; her iki grup arasında 4. günden sonra deney grubu lehine anlamlı farklılaşma başlamıştır (p<.001). Hastaların uyku kalitesi puan ortalamaları karşılaştırıldığında; 2*2 MİX ANCOVA test sonuçlarına göre; hem etkileşimde (F(1,50)= 15.899, p<.001, η²=.016), hem de gruplar arasında (F(1,50)= 27.271, p<.001, η²=.10) istatistiksel olarak anlamlı farklılık bulundu. Hastaların ağrı puan ortalamaları karşılaştırıldığında; 2*3 MİX ANOVA test sonuçlarına göre hem ölçüm zamanı (F(1,50)= 7.619, p<.001, η²=.013), hem de etkileşimde (F(1,50)= 48.751, p<.001, η²=.083) istatistiksel olarak anlamlı farklılık bulundu. Bu çalışmada, palyatif bakım hastalarına 7 gün boyunca sırt masajı uygulanmış, uygulamanın 4. gününden itibaren hastaların uyku kalitesinde istatistiksel açıdan anlamlı artış ve ağrı düzeylerinde ise anlamlı azalış olduğu belirlenmiştir.
Anahtar Kelimeler: Sırt masajı, palyatif bakım, uyku kalitesi, ağrı, holistik bakım, hemşirelik bakımı

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1. Introduction

Palliative care is intended to improve the quality of life of terminally ill patients, who have reached the last stage of their lives due to their illness and whose recovery is not possible, and ensure a peaceful death (1). Palliative care, according to the definition of the World Health Organization (WHO), aims at improving physical (pain, movement restrictions, weight problems, etc.) and psycho-social (anxiety, depression, death anxiety, etc.) state related to a disease in life-threatening situations faced by individuals and their environment. It is defined as care that improves the quality of life of the individual and his/her environment through early diagnosis, treatment, and evaluation (2). The most frequent problem in palliative care, where individualized care is most intensively applied, is pain (3). Pain is an unpleasant emotional experience caused by damage due to physiological changes in tissues (4). The main indicator of the quality of nursing care is to manage patients' pain and suffering well and improve their quality of life (5). Treatment and care of pain requires the combination of pharmacological and non-pharmacological approaches (6). Pharmacological treatments include oopoids, nonopoids, and adjuvant analgesics. Nonpharmacological applications can be listed as massage applications, relaxation techniques, hypnosis, acupressure, and acupuncture (7). Thanks to massage, one of the most used holistic care methods, the pain caused by contracted and tense muscles is relieved and reduced (8). In addition to relaxing the muscles, it also reduces pain by facilitating the oxygenation of tissues and the body's release of endorphins (9).

Another common complaint in palliative care patients is insomnia (10). Sleep affects quality of life and is among the life activities necessary for the individual to be physically and spiritually healthy (11,12). Sleeping disorders include difficulty falling asleep, difficulty staying asleep, early morning waking or poor sleep, and non-restorative sleep (12,13). Sleep quality is also linked to pain (13). Poor sleep quality causes decreased tolerance to pain. Sleep provided by pharmacological applications does not provide the quality of normal sleep and even reduces sleep quality (14). It is reported that massage and relaxation techniques are effective in the management of sleep disorders (14). Massage is one of the oldest care methods used to relieve many ailments (15). It is seen that there are limited studies in the literature on back massage application in palliative care patients. This research was planned as a randomized controlled experimental study with a pre-test - post-test control group design to examine the effect of back massage applied to palliative care patients on sleep quality and pain. It is thought that this study will contribute to increasing the use of massage by caregivers and support further studies in this field.

2. Materials and Methods

2.1. Purpose and type of the research

This research was planneed as a randomized controlled experimental study with a pre-test-post-test control group design to examine the effect of back massage applied to palliative care patients on sleep quality and pain.

2.2. Research Hypotheses

H_1: Back massage applied to palliative care patients has a positive effect on sleep quality.

H_2: Back massage applied to palliative care patients has a pain-relieving effect.

2.3. Sample of the research

The study consisted of palliative care patients who received inpatient treatment in the Palliative Care Service of a Training and Research Hospital in Bilecik, Turkiye, between November 2021 and April 2022. The sample included palliative care patients who voluntarily agreed to participate in the study, needed palliative care, and met the

research criteria. A power analysis was performed on the GPower 3.1 software to determine the sample size. The analysis was based on the data of the *"Randomized controlled trial of the effectiveness of using back massage to improve sleep quality among Taiwanese insomnia postpartum women"* study. As a result, the sample size was calculated as a total of 52 patients, including 26 patients in each group, based on a power value of 95% and a CI of 95%. Considering some attrition, 28 patients were included in both groups. One patient had to leave the experimental group because she could not tolerate the massage application, and another patient was excluded because she had impaired consciousness during the study phase. Two patients from the control group were excluded from the study due to early discharge and transfer to another hospital. The study was completed with 52 patients, including 26 in the experimental and 26 in the control group. The trial was registered with the ClinicialTrials.gov PRS (Protocol Registration and Results System) (Protocol number: NCT05168514).

2.4. Research inclusion criteria

- Having no communication problem, especially with accurately expressing pain and sleep status, and communicating cognitively, affectively, and verbally,

- Being over 18 years of age,

- Accepting to receive inpatient treatment in the palliative care service for at least 7 days,

- Not reacting negatively to any touch-oriented intervention, such as massage,

- Having complete tissue integrity in the area to be massaged.

2.5. Randomization Method

The Random Integer Generator method was used under the Numbersalt heading on the random.org website to divide all patients who met the research criteria into experimental and control groups. Eligible patients were referred to the study coordinator. After giving the necessary information to the patients, the study coordinator randomly assigned them to the "experimental" and "control" groups through random numbers generated on the website https://www.random.org/.

Total number of patients = Experimental group + Control group

(N) 52 = (n) 26 + (n) 26

2.6. Data collection tools

A Patient Identification Form, the Pittsburgh Sleep Quality Index, and the McGill Pain Scale-Short Form were used.

Patient Identification Form: The patient identification form was prepared by the researchers to determine participants' socio-demographic characteristics.

Pittsburgh Sleep Quality Index: Buysse et al. developed the Pittsburgh Sleep Quality Index (PSQI) (16). The validity and reliability study of the scale in Turkish was carried out by Ağargün et al. (17). The PSQI is a 19-item scale that is used to evaluate sleep quality. Each item is scored between 0 and 3. The scale consists of seven subsections that are used to evaluate objective sleep quality, sleep latency, time spent asleep, sleep habits, sleep disorders, use of sleeping pills, and loss of daytime functionality. By summing the scores from these subsections, a PSQI score between 0 and 21 is obtained. A PSQI total score that is greater than 5 indicates that the individual's sleep quality is inadequate, with a sensitivity of 89.6% and a specificity of 86.5% and that there is a severe sleep disorder in at least two out of seven areas or moderate sleep disorder in three (16,17).

McGill Pain Scale - Short Form: McGill Pain Scale-Short Form was developed by Melzack (18). The Turkish validity-reliability study of the scale was conducted by Yakut et al. (19). The short form of the McGill Pain Scale provides information about the sensory dimension, intensity, and felt effects of pain. In this regard, the scale has three dimensions. The first part

includes 15 descriptive items expressing the characteristics of pain. Of these 15 items, 11 are used to assess the sensory dimension of pain, and 4 are used to evaluate the perceptual dimension. These items are rated with expressions indicating intensity between 0 and 3 (0 = none, 1 = mild, 2 = moderate, 3 = excessive). In the first part, the sensory pain score is between 0 and 33, the perceptual pain score is between 0 and 12, and the total pain score is between 0 and 45. An increase in the total score indicates an increase in pain. In the second part, there are five-word groups ranging from "mild pain" to "unbearable pain" to determine the intensity of pain felt by the patient. In the third part, the patient's instantaneous pain intensity is evaluated through visual comparison (18,19).

2.7. Ethical approval

Ethical approval for the study was obtained from Eskisehir Osmangazi University Non-interventional Clinical Research Ethical Committee (Ref.nr: 2021/04). Institutional permission (Ref. nr: 2021/28) was obtained from the institution where the study was conducted. Voluntary informed consent forms were obtained from the participants, and the study was conducted in accordance with the principles of the Declaration of Helsinki.

2.8. Application of Research

In the study data collection began after obtaining the necessary institutional and ethical permissions. During admission, the research coordinator explained the purpose, scope, duration, and method of the research to the patients who came to the institution where the research was conducted and met the research criteria. Then, verbal and written permission was obtained from patients (or their legal guardians) who agreed to participate in the study voluntarily. Volunteer patients were assigned to experimental and control groups via randomization by the research coordinator. In the research, the nurse among the researchers applied all the back massages to be given to the experimental

group. This nurse had acquired massage application skills during undergraduate and postgraduate education, was authorized as a massage practitioner by national laws and regulations (20), and had no other massage training. The guideline specified in the study protocol was followed to ensure equal application among patients. Data forms for both groups were filled out by the research coordinator. The final analysis was done using the data set by a statistician who did not know the participants.

Study protocol

Patients assigned to both groups filled out the "Patient Identification Form", "Pittsburgh Sleep Quality Index", and "McGill Pain Scale - Short Form" as a pretest on the first day.

No massage was applied to the control group. Treatment and care practices in the routine of the palliative care clinic continued.

The experimental group was given a massage by the researcher nurse for 18 minutes a day for 7 days.

The massage application sequence was performed as effleurage, petrissage, friction, percussion, and vibration and ended with effleurage again.

Each massage maneuver took 3 minutes.

Liquid petroleum jelly was used as a massage solution.

The Pittsburgh Sleep Quality Index and the McGill Pain Scale-Short Form were filled out to evaluate sleep quality and pain after massage. In this way, the application took 7 days.

Back massage application and filling out of the scales were performed before an analgesic agent was administered to the patients (before 10:00 in the morning).
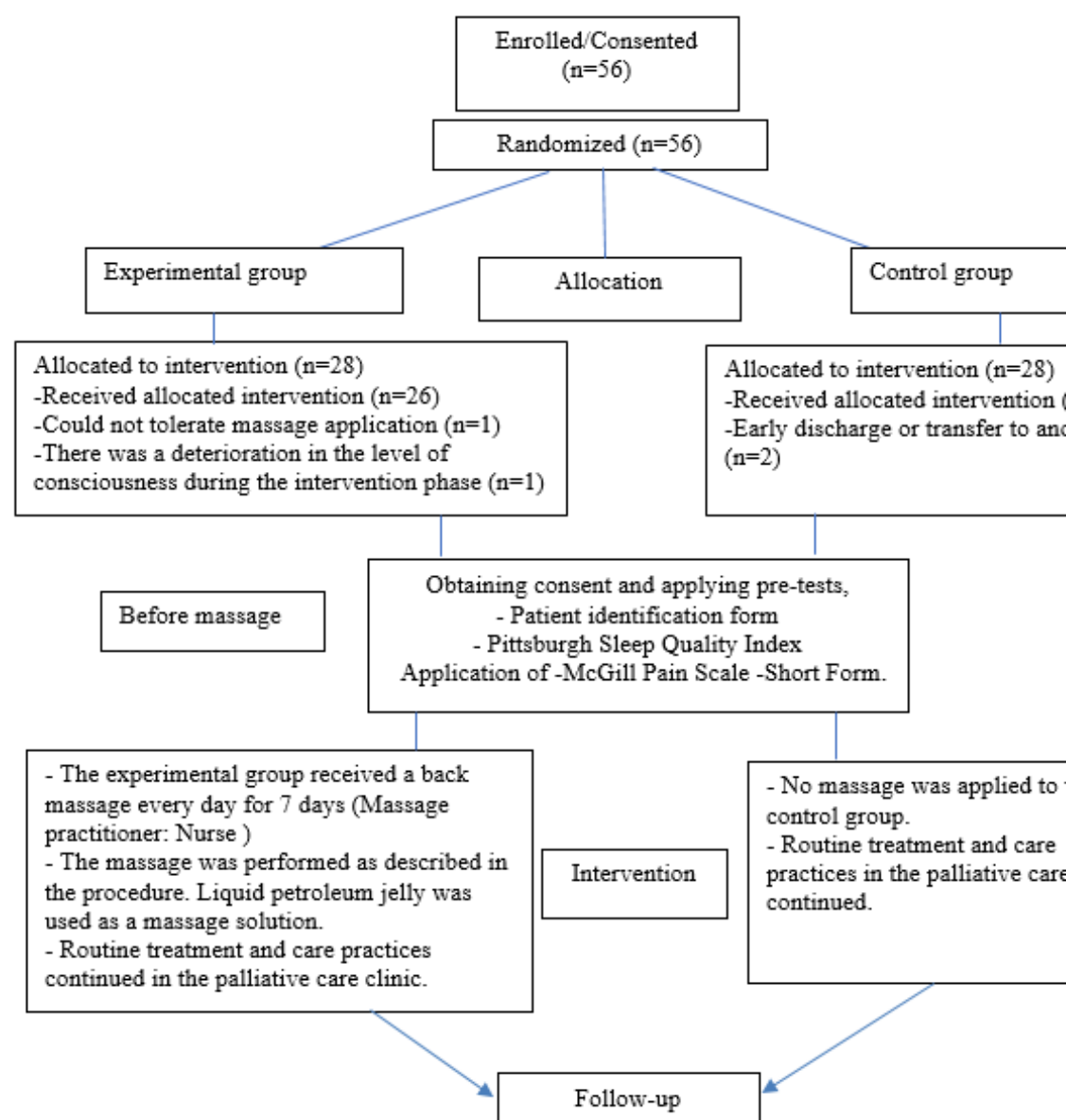
The scales were completed by the control group simultaneously with the experimental group.

Application guidelines for back massage

1. The patient is informed about the application before the massage application is initiated.

2. The materials required for massage application are brought.

3. A screen is placed around the bed to protect patient privacy.

4. The door of the room where the patient is located is closed.

5. The nurse removes her/his rings and washes hands.

6. Since the back massage is applied to the upper extremity, the patient's upper underwear is removed and he/she is placed in the prone position. The legs and hips are covered with a sheet.

7. The bed height is adjusted to a level that will not tire the massage nurse.

8. The nurse takes some liquid petroleum jelly in the palm of his/her hand to reduce friction and relax the body during the massage. In order not to irritate the patient, it should be warmed by holding it in the palm of the hand for a while.

9. Massage is started with the first manipulation movement, the effleurage maneuver.

10. Back massage is continued with petrissage, friction, percussion, and vibration maneuvers.

11. Three minutes are allocated for each maneuver.

12. Massage application is terminated with effleurage.

13. The nurse should observe skin integrity or redness while applying back massage.

14. After the application, the nurse removes the excess lotion (liquid petroleum jelly) with a towel.

15. The patient is dressed.

16. The patient is given a suitable position to rest after the massage.

17. At the end of the massage, the nurse washes his/her hands.

18. Used materials are removed.

19. The application is recorded on the patient's observation sheet (11).

2.9. Data analysis

Evaluation of the data was done on the Statistical Package for Social Sciences (SPSS) 22.0 software. Descriptive statistical methods, such as frequency, percentage, mean, and SD, were used in data analysis. The suitability of the data for normal distribution was tested with the Shapiro-Wilk test. Since the data showed a normal distribution, 2*2 MIX ANCOVA, Post hoc Tukey Test, and 2*3 MIX ANOVA parametric tests were used.
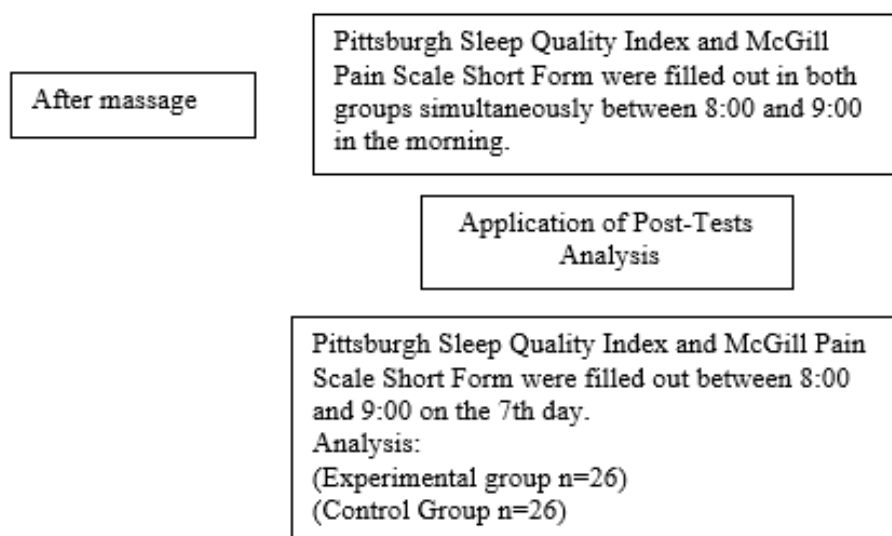
Enrolled/Consented
(n=56)

Randomized (n=56)

Experimental group

Allocation

Control group

Allocated to intervention (n=28)
-Received allocated intervention (n=26)
-Could not tolerate massage application (n=1)
-There was a deterioration in the level of
consciousness during the intervention phase (n=1)

Allocated to intervention (n=28)
-Received allocated intervention (
-Early discharge or transfer to an
(n=2)

Before massage

Obtaining consent and applying pre-tests,
- Patient identification form
- Pittsburgh Sleep Quality Index
Application of -McGill Pain Scale -Short Form.

- The experimental group received a back
massage every day for 7 days (Massage
practitioner: Nurse)
- The massage was performed as described in
the procedure. Liquid petroleum jelly was
used as a massage solution.
- Routine treatment and care practices
continued in the palliative care clinic.

Intervention

- No massage was applied to
control group.
- Routine treatment and care
practices in the palliative care
continued.

Follow-up

After massage

Pittsburgh Sleep Quality Index and McGill Pain Scale Short Form were filled out in both groups simultaneously between 8:00 and 9:00 in the morning.

Application of Post-Tests
Analysis

Pittsburgh Sleep Quality Index and McGill Pain Scale Short Form were filled out between 8:00 and 9:00 on the 7th day.
Analysis:
(Experimental group n=26)
(Control Group n=26)

Figure 1. Study flow chart

3. Results

When the distribution of socio-demographic characteristics between the groups was examined, it was seen that the mean age of the patients in the experimental group was 63.7, 53.8% were male, 42.3% were married, 38.4% were primary school graduates, 34.6% were retired, and that 71.2% had cancer. The average age of the patients in the control group was 60.7, 53.8% were male, 61.5% were married, 42.3% were secondary school graduates, 34.6% were retired, and that 88.4% had cancer. Both groups were found to be equivalent in terms of individual characteristics, such as age, gender, educational status, and medical diagnosis (Table 1).

Table 1. Findings regarding the descriptive statistics of the scales

Variables	Experimental group (n=26)		Control group (n=26)	
Age Mean±SD/ Min-Max	63.731±*9.648* (48-84)		60.731±12.880 (30-78)	
	n	**%**	**n**	**%**
Gender				
Female	12	46.154	12	46.154
Male	14	53.846	14	53.846
Marital status				
Single	15	57.692	10	38.461
Married	11	42.308	16	61.538
Educational Status				
Primary school	10	38.461	7	26.923
Middle School	5	19.231	11	42.308
High school	9	34.615	4	15.385
Higher education	2	7.692	4	11.538
Job				
Unemployed	7	26.923	8	30.769
Civil servant	3	11.538	2	7.692
Employee	7	26.923	7	26.923
Retired	9	34.615	9	34.615

Since parametric tests were used in the research, normal conditions were examined. Statistics on sleep quality and pain level variables were given (Table 2). All variables of the study were distributed normally in the experimental and control groups, and skewness and kurtosis values were within a normal range, as shown by Shapiro-Wilk test results. Histograms and Q-Q plots were examined, and normality was observed. Additionally, means, standard deviations, and highest and lowest values regarding sleep quality and pain levels were given (Table 2).

Table 2. Findings on the descriptive statistics of the scales

	Pittsburgh1		Pittsburgh4		Pittsburgh7		McGill1		McGill4		McGill7	
	Experimental Group	Control Group	Experimental Group	Control Group	Experimental Group	Control Group	Experimental Group	Control Group	Experimental Group	Control Group	Experimental Group	Control Group
Distortion	-0.662	-0.309	-0.487	-0.270	-0.385	-0.040	-0.580	0.213	-0.534	0.464	-0.169	0.650
Kurtosis	0.410	0.071	-0.173	0.168	-0.555	-0.233	-0.450	-0.068	-1.178	-0.540	-1.029	-0.266
Shapiro-Wilk	0.944	0.978	0.964	0.976	0.967	0.978	0.951	0.976	0.895	0.956	0.939	0.944
Shapiro-Wilk (p value)	0.170	0.823	0.477	0.786	0.539	0.828	0.242	0.791	0.062	0.325	0.130	0.167
Lowest value	7.000	6.000	5.000	7.000	1.000	9.000	13.000	14.000	8.000	25.000	5.000	25.000
Highest value	21.000	21.000	21.000	21.000	21.000	21.000	54.000	52.000	49.000	53.000	50.000	57.000

When the 7-day follow-up results regarding sleep quality in the experimental and control group palliative care patients were examined, it was seen that differentiation began between both groups after the 4th day. The positive effect of back massage on sleep quality in the experimental group was observed on the 4th day of the massage application. At the same time, sleep quality started to increase. An increase in the total score on the "Pittsburgh Sleep Quality Index (PSQI)" indicates that sleep quality is inadequate. The PSQI score of the experimental group started to decrease after the 4th day, showing that sleep quality started to increase. In the control group where back massage was not applied, the PSQI total score started to increase from the 4th day, meaning a slight decrease in sleep quality was observed. On days 5-6-7 of the massage application, the difference in PSQI scores of both groups widened, and it was observed that the sleep quality of the patients in the experimental group increased significantly (Figure 1).
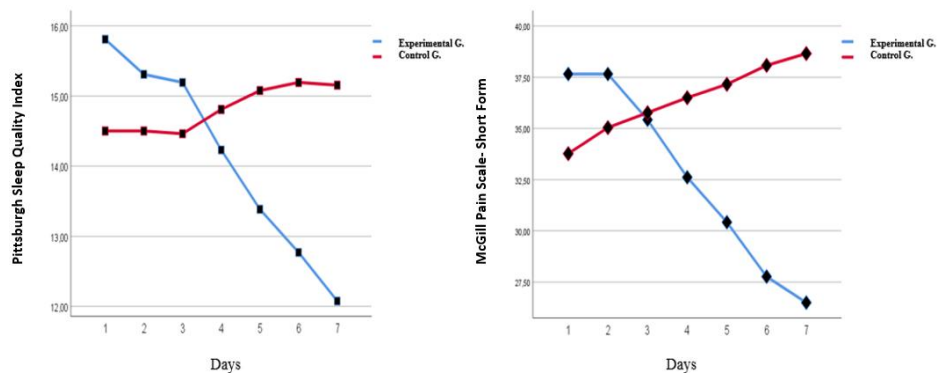
Figure 1. Findings related to sleep quality in experimental and control group patients

Figure 2. Findings related to pain score in experimental and control group patients

When the 7-day follow-up results regarding the pain score in the experimental and control group palliative care patients were examined, it was observed that the day when the pain-reducing effect of the back massage application began to be seen in the experimental group was the 4th day of the massage application. In the control group that did not receive back massage, there was a slight increase in pain scores. An increase in the total score obtained from the McGill Pain Scale indicates that the patient's pain also increases. On days 5-6-7, the difference in pain scores of both groups widened, and while the pain scores of the control group increased, the pain scores of the patients in the experimental group decreased significantly (Figure 2).

When the mean sleep quality scores of the experimental and control groups were compared, statistically significant differences were found both in interaction $(F(1.50)= 15.899, p<.001, \eta^2=.016)$ and between groups $(F(1.50)= 27,271, p<.001, \eta^2=.10)$ according to the 2*2 MIX ANCOVA test results (Table 3). The post hoc Tukey Test was performed to find the difference in sleep quality (Table 4). The sleep quality curve is shown in Figure 3.

Table 3. 2*2 Mix ANCOVA analysis results of sleep quality

Source of variance	KT	Sd	KO	F	p	η^2
Intra-group						
Measurement time	0.062	1	0.062	0.026	0.872	0.000
Measurement time ✱ group	**37.329**	**1**	**37.329**	**15.899**	**.001**	**0.016**
Measurement time ✱ Pittsburgh1	0.588	1	0.588	0.251	0.619	0.000
Residual	115.046	49	2.348			
Inter- group						
Group	**237.804**	**1**	**237.804**	**27.271**	**.001**	**0.102**
Pittsburgh1	1.078.967	1	1.078.967	123.734	.001	0.464
Error	427.283	49	8.720			

Pittsburgh1: Pittsburgh Sleep Quality Index (PSQI)

Table 4. Post hoc test results of sleep quality

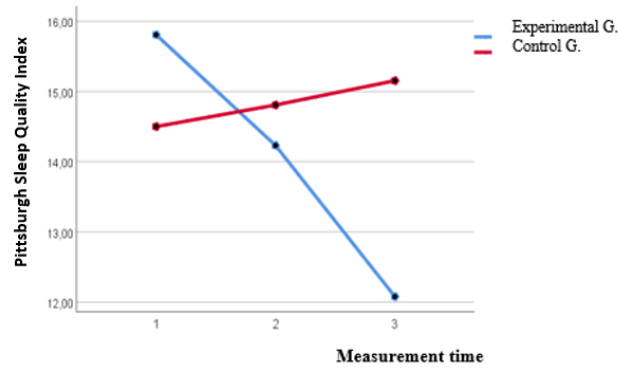| Measurement time	Grup		Measurement time	Group	Mean difference	SE	df	t	p_{tukey}
DAY4	Experimental		DAY7	Experimental	**2.125**	**0.429**	**49.000**	**4.953**	**.001**
DAY4	Control	-	DAY7	Control	**-0.317**	**0.429**	**49.000**	**-0.739**	**.881**
DAY4	Experimental	-	DAY4	Control	**-1.860**	**0.460**	**49.000**	**-4.047**	**.001**
DAY7	Experimental	-	DAY7	Control	**-4.302**	**0.820**	**49.000**	**-5.246**	**.001**

Figure 3. Sleep quality measurement results for day 1, 4, and 7 in experimental and control group patients

Firstly, the examination of the intra-group results showed that there was a significant increase in sleep quality in the experimental group from the 4th day to the 7th day (p <.001). In the control group, there was no significant change in sleep quality between the 4th and 7th days (p>.001, Table 4).

The examination of the inter-group results showed that the sleep quality of the patients in the experimental group increased significantly on the 4th and 7th days (p<.001, Table 4).

When the mean pain scores in the experimental and control groups were compared, both measurement time (F(1,50)= 7.619, p<.001, η^2=.013) and interaction (F(1, 50)= 48.751, p<.001, η^2=.083) difference was found according to the 2*3 MIX ANOVA results (Tablo 5). The post hoc Tukey Test was performed to find the difference in sleep quality (Table 6). The mean pain score curve is shown in Figure 4.

Table 5. 2*3 Mix ANOVA analysis results of the pain score

Source of variance	KT	Sd	KO	F	p	η^2
Intra-group						
Measurement time	**261.397**	**2**	**130.699**	**7.619**	**< .001**	**0.013**
Measurement time ✳ group	**1.672.551**	**2**	**836.276**	**48.751**	**< .001**	**0.083**
Error	1.715.385	100	17.154			
Inter- group						
Group	640.103	1	640.103	2.023	0.161	0.032
Error	15.824.154	50	316.483			

Table 6. Post hoc test results of the pain dimension

Measurement time	Group		Measurement time	Group	Mean difference	SE	df	t	p_{tukey}
DAY1	Experimental	-	**DAY4**	Experimental	5.038	0.908	50.000	5.548	.001
DAY4	Experimental	-	**DAY7**	Experimental	6.115	1.099	50.000	5.565	.001

DAY1	Experimental	-	**DAY7**	Experimental	**11.154**	**1.388**	**50.000**	**8.037**	**.001**
DAY1	Control	-	**DAY4**	Control	**-2.731**	**0.908**	**50.000**	**-3.00**	**0.045**
DAY1	Experimental	-	DAY1	Control	**3.885**	**2.794**	**50.000**	**1.391**	**0.732**
DAY4	Experimental	-	DAY4	Control	**-3.885**	**3.003**	**50.000**	**-1.29**	**0.787**
DAY7	Experimental	-	DAY7	Control	**-12.154**	**3.188**	**50.000**	**-3.81**	**0.005**
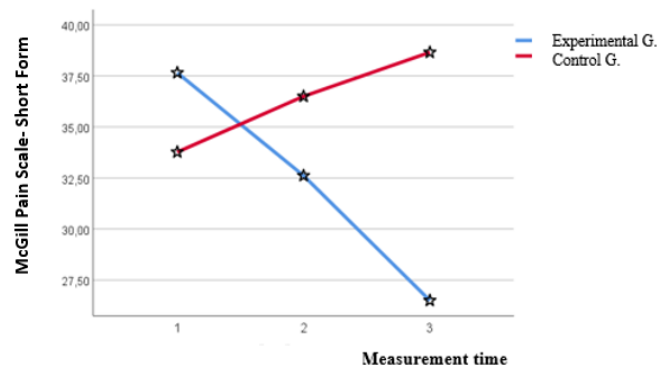
Figure4. The measurement results of the pain score on the 1st, 4th, and 7th days in the experimental and control group patients

Firstly, the examination of the intra-group results indicated that there was a decrease in the mean pain score in the experimental group from day 1 to day 4 (p = .001, Table 6). Also, it was observed that there was a decrease in the mean pain score from the 4th day to the 7th day in the experimental group (p = .001, Table 6). Finally, it was observed that there was a decrease in the mean pain score in the experimental group from day 1 to day 7 (p=.001, Table 6). In the control group, there was no change in pain scores, but an increase in pain scores was observed from day 1 to day 4 (p=.045, Table 6).

When we looked at the results between groups, on the first day of the back massage applied to the experimental group, there was no difference between the experimental and control groups (p=.732, Table 6). When the pain scores on the 4th day were examined, a difference began to occur in the pain scores of the experimental group (Figure 4). The day when the pain started to decrease was the 4th day of the back massage application. Finally, the pain score decreased in the experimental group on the 7th day (p=.005, Table 6).

4. Discussion

Massage application has been accepted as one of the most popular complementary care methods used in palliative care centers, especially in recent years (21). There is ongoing research into whether this method does not harm the clinical course of the patient, but its benefit needs to be confirmed, as well (22). The purpose of this study was to examine the effect of back massage applied to palliative care patients on sleep quality and pain.

Considering the 7-day follow-up findings regarding the sleep quality of the experimental and control groups in this study, the back massage applied showed its effect from the 4th day, and the sleep quality of the experimental group increased. In the remaining 3 days, the sleep quality of the experimental group continued to increase, while it decreased in the control group. This shows the positive

effect of back massage applied to palliative care patients on sleep quality. As a result, the hypothesis (H_1) "Back massage applied to palliative care patients has a positive effect on sleep quality" was confirmed. The back massage showed its effect on the 4th day of the application, and the effect continued to increase over time. As can be understood from this result, at least 4 days of application is required to see the positive effect of massage application. In the study of Kashani and Kashani, it was stated that there was a significant relationship between massage therapy application and sleep quality (23). In the study of Miladinia et al., it was reported that back massage significantly reduced sleep disturbance, pain, and fatigue and improved sleep quality over time (24). In the study by Ünal and Akpınar', foot reflexology and back massage were applied twice a week for 4 weeks, and as a result, it was stated that foot reflexology and back massage improved the sleep quality of hemodialysis patients (25). Other studies in the literature have shown statistically and clinically significant effects of massage on sleep (26-28). The literature supports the results of our study.

When we looked at the findings regarding the pain scores of palliative care patients in the experimental and control groups, the mean McGill Pain Scale scores in the experimental group remained similar on the 1st and 2nd days but decreased from the 3rd day. According to the 7-day follow-up findings regarding the mean pain scores of the experimental and control groups, the back massage applied showed its effect from the 4th day, and the pain of the patients in the experimental group decreased. In line with these results, the hypothesis (H_2) that "Back massage applied to palliative care patients has a pain-relieving effect" was accepted. The back massage showed its effect on the 4th day of the application and it continued to increase over time. At least 4 days of application is required to see the pain-relieving effect of massage application. In the study of Büyükyılmaz and Aştı, it was found that relaxation techniques and back massage applied for 3 days were effective in reducing pain and anxiety (29). In the study by Han and Lee, in which the effect

of back massage on the degree of pain, anxiety, and sleep quality was examined, it was stated that the level of pain decreased significantly and sleep quality increased significantly, compared to the first day after surgery (30). As a result of Mok and Woo's research, it was reported that slow-stroke back massage reduced anxiety and shoulder pain (31). When other studies in the literature were examined, the effect of massage on pain was evaluated and a significant difference was reported in favor of massage (24, 27, 31-35). The results of our research were in parallel with the literature. Some studies in the literature support the view that the effect of massage on pain is limited (22, 36, 37). We believe that this difference in the literature may be due to factors, such as diversity in study populations, diagnostic differences, the presence of patients with metastatic pain, the inclusion of patients with depression and psychosocial disorders in the sample groups, and differences in research methods.

Another striking point in our research findings was that the sleep quality of palliative care patients, whose pain decreased, increased simultaneously. On the 4th day of the back massage application, the pain level decreased statistically and clinically significantly, and the sleep quality of the patients, whose pain decreased, began to increase. Similar studies in the literature showed that reduced pain levels had a positive effect on patients' physiological parameters, such as insomnia, depression, and anxiety levels and this supports our study finding (27, 30, 32,38,39).

5. Conclusion

In conclusion, the study showed that back massage application improved sleep quality and reduced pain in palliative care patients. The most visible effect of the back massage was on the 4th day of the application. By the 7th day, it was observed that the positive effect gradually increased. Studies in which massage is applied for a longer period with larger sample groups are recommended. The cost of the application is low and its effect is high. We believe that caregivers of palliative care patients can use massage more effectively.

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