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The Effect of Massage with Tellington Method Abalone Type on the Sleep Quality of Diabetic Patients having Type 2 Diabetes

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ABSTRACT

The massage therapy by nurses showed a considerable impact on the increase of the quality of life and solving the sleep problem of patients. The proficiency of applying massage lets the nurses to have medicinal follow up with patients as well as to develop the good communications with patients.

Purpose: The definition of the impact of massage therapy on the sleep quality of type 2 diabetic patients in the clinics those are associated to the "Jundishapur University of medical sciences of Ahvaz".

Research method: This research is a randomized clinical experience trial. In this research, the impact of Massage with Tellington method (abalone type) on the sleep quality of type 2 diabetic patients was investigated in the clinics associated to Jundishapur University of Ahvaz.

The samples of this research included 148 men and women with type 2 diabetes having an appropriate standard for examination. Pittsburgh sleep test as well as the descriptive statistics were utilized simultaneously (numbers, percentage, average, standard deviation) and illative statistics (fisher exact test, chi–square, independent samples t-test, paired samples t-test). The SPSS 21 software was used for data processing.

Data: The independent samples of t-test indicates that before intervention in both control and massage groups, there is no statistically significant difference in the average of patients' sleep quality with type 2 diabetes and both groups have the same sleep quality ($p>0.05$).

Independent sample t-test showed that there is observed a difference between the grade of sleep quality in every groups of massage therapy before and after the intervention. But there is no observable significance between the grades of sleep quality of control groups before and after the intervention. Also it proves that there is observed a remarkable difference between the grade of all dimensions of sleep quality (except the sleep efficiency) in both massage therapy groups before and after the intervention.

Independent sample t-test showed that there is observed a significant difference between the intervention and control groups regarding the sleep quality (except the rate of sleep) before and after intervention.

Deduction: The massage impact on the sleep quality and dimensions (except sleep efficiency) of people with type 2 diabetes.

Key words: Massage with Tellington method (abalone type), Sleep quality, Type 2 diabetes

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INTRODUCTION

The diabetes is considered as a metabolic disorder in body in which the ability of producing insulin has been lost in body or the body becomes resistant against the insulin. So the produced insulin cannot be used to do its natural task. The rate of diabetes has increased dramatically over the past 50 years alongside the obesity. By 2010, there were approximately 285 million people with this disease, up from about 30 million in 1985. By 2030, more than 438 million people will suffer from diabetes according to the reports resulting from the international federation of diabetes. The national survey of risk factors of non-epidemic diseases estimates that the prevalence of diabetes in Iran was reported as 7.7% in 2008 (95% confidence interval). WHO (World Health Organization) estimates that the number of diabetic patients will be more than 6 million by 2030 in Iran. According to the rising life expectancy in Iran, there is no doubt that the prevalence of diabetes complications becomes more day

by day. Keeping blood glucose in the suitable range is considered as the basic care for diabetes and consequently reduces its complications. The disease is expected to be one of the main causes of mortality and disability with increasing the prevalence of diabetes in the world. One of the most important of these complications here is listed as the sleep disorders. The sleep is known as a fundamental requirement for humanity like food and water and plays an important role in the operation of safety system, cognition and skeletal system too as well as it is required to maintain the health, save the energy, maintain the proper appearance, maintain the healthy physical body and increase the memory together with the wound healing.

Any disorder in the normal sleep in addition to creating mental problems can also reduce individual efficiency. In addition to the previous information, sleep is one of the most important physiological needs of a human and if not pay attention to fulfill it; would cause tension and restlessness in a person and also it reduces person's abilities. Desirable sleep preserves physical health and reduces moodiness, anxiety, ability to adapt and focus on daily activities of life from the other side sleep deprivation cause exhaustion, headache, disturbed attention and sleepiness per day. Sleep disturbances are seen in more than a quarter of the patients admitted to the internal wards and diabetics are more common in general population. However unfortunately they often stay without any care sleep disorder is associated with poor quality of life, lack of cooperation with treatment and inappropriate use of medical services in a patient with chronic medical conditions. Diabetic patients who have a low level of sleep quality have less subordination with diet and medication, poorer blood glucose control, weaker physical and mental function, more physical complications and more urgent and hospitalized and spend more on mental health expenditure. Various studies indicate that one of the problems of patients with chronic illness is poor sleep quality. Some studies have shown that complaints related to sleep from patients with chronic illnesses are reported in over 80% of cases.

Common sleep disorders in patients with chronic illnesses includes 69% of insomnia; 24% of obstructive sleep apnea syndrome in sleep; 18% of restless leg syndrome; 13% of nightly nightmare; 12% of narcolepsy over the day; 4% of sleep walking, and narcolepsy 1%.

Some studies have shown that sleep deprivation reduces immune function, increases the release of inflammatory drugs such as IL-6, CPR, increased white blood cell count, decreased hypothalamus, pituitary and adrenal function during the days after insomnia and decreases glucose tolerance. Sleep problems also can increase mortality in patients with chronic illnesses. The quality of sleep is defined by the definition of mental indexes related to the experience of sleep, such as the satisfaction of sleep and the feeling that person has after falling asleep. Sleep quality and general health feeling a person has, related to the operation of the hypothalamus pituitary adrenal axis. And disorder in the level of hormones of this axis such as adrenal motivate cortex and cortisol that erupts in the situation like depression and negative mood can affect the quality of sleep of these people. DHEA also is another hormone secreted from the adrenal gland and is affected by ACTH and acts like cortisol, which makes and desirable sleep. As noted above in this case the performance of the HPA axis is impaired and sleep problems occurs. Also in the higher age some changes occur in the quality and structure of sleep and rhythm of circadian. These changes lead to sleep disorders and repeated complaints from it. Insomnia has a major negative impact on the quality of life of humans and causes the significant reduction in the daily functioning of the emotional social and physical aspects. On the other hand, sleep problems and undesirable sleep quality cause many physical and psychological complications. Generally undesirable sleep quality causes the reduction the level of satisfaction with life and decreases the quality of life with increased stress, irritability and dizziness. Different methods are used to treat insomnia, including the use of sedative or hypnotic drugs that treat short term insomnia. The results show that 7.4% of the adult population and 14% aged 65 to 79 years old are using prescript hypnotic drugs or without prescription needing in periods of a year. However, these drugs only relieve sleep disorders temporarily and most of them reduce sleep or reduce eye movement that are essential for mental function and relief of tension. Certain distinctions such as age, gender, and culture are involved in prescribing and using hypnotic factors. On the other hand, the researcher's experience of work in the department shows that for solving the problem of sleep only drug method is used for these patients, and they often do not feel satisfied with the results of that. For this reason, nowadays, non-pharmacological and complementary therapies such as the use of massage, music, meditation, aromatherapy and more, have been taken into consideration to improve the quality of sleep in patients, and these methods seems to help to improve sleep quality of patients in the way of relaxation and stress relief.

In studies that have been done in Iran on haemodialysis patients for the purpose of improving the quality of sleep, the effect of some factors such as using a follow-up care model on patients' sleep quality, yoga exercises, progressive muscle relaxation, acupressure and Benson's relaxation technique have been investigated as non-pharmacological methods. One of the complementary therapies used to help patient's sleep is massage. The touch of healing and massage is one of the oldest ways to reduce complications and psychological problems that can be found in ancient Chinese medical texts and in Hippocrates's writings. Using massage therapy to repair wounds is recorded in many ancient civilizations and it is one of the most common forms of complementary treatment in the United States. One of the complementary treatments was massage therapy that has been introduced in the Chinese medicine for over 2500 years in the Chinese empire. According to the information achieved from the first Chinese book on massage therapy, massage therapy includes 2 parts that are massage and the systemic hands pressure on the

tissues of the body, which accelerates the recovery. There are several types of massage treatments. One of them is a kind of massage named Shelly method. The shelly massage was first used by Linda Tellington Jones in 1978 for domesticating animals such as horses, dogs and cats. Five years later, in 1983, this method was used on humans. The benefits of this method are simple learning and easy to use, without the need for learning human anatomy or additional tools. Other benefits of shelly massage include reducing stress, reducing the neck, leg and shoulder pain and migraine pain and reducing depression, controlling arthritis pain, improving quality of life and deep interpersonal communication. The method of doing this kind of massage is using the fingers in the situation that the palm is not completely tangent to the surface of the body, we rub the wanted area one round and a quarter in a clockwise direction. Therefore, the researcher's goal was to find a simple solution without stress on the patient and within the scope of independent nursing proceeding so that she could take an effective step toward patient comfort. Berry, quoted by Richards et al. [1] believed that massages can be beneficial for relaxation and pain relief, but suggested that more research should be done on how to reduce sleep disorders in patients who are in the intensive care unit (ICU). A number of studies have reported that massage has been effective in reducing moderate to acute chronic pain in the short term (15-20 minutes); however, it has a small effect on anxiety and sleep disorders. Castro et al., [2] reported that massage therapy reduces the pain of patients with fibromyalgia and with reducing the limitation of the tendinous muscles, causes to decrease the anxiety and improving the quality of sleep and physical functioning of these patients. Bauer et al. [3] reported that patients had cardiovascular surgery will experience pain, anxiety, and problems with sleep disorder in the post-operative period, and massage therapy can reduce their sleep disorders by reducing pain and anxiety. Buttagat et al. [4] indicated that traditional massage therapy in the muscles of the back increases comfort; reduces stress and increases the activity of parasympathetic nerves in patients with back musculoskeletal pain. Also, Eungpinichpong [5] pointed out that massage therapy can increase blood circulation, reduce blood pressure, decrease heart rate, relieve pain and increase comfort. The shelf model of Tellington massage has many uses like patient relaxation, anxiety relief, stress reduction, pain relief, deep breathing help, sleep improvement, muscle relaxation and it helps babies' sleep. "Tellington massage can be useful for humans and their tissue damage". The Tellington massage can have many usages in special situations, such as painful experiences, anxious people, and other symptoms among patient caregivers. It's also hypothesized that Tellington massage can be used in cases such as home care, caring for a patient under mechanical ventilation, trauma, toothache, emotional recovery, childbirth and also moribund people, in spite of the need to combine multiple components such as rotational contacts, long beats and tensile stretching together in the Tellington method. This method is approximately easy to learn. Massage by an experienced and trained person, such as nurses, can be affective. Strada et al. [6] reported that massage therapy by nurses has a significant effect on improving the quality of life and improving sleep disorders of inpatients. Massage skill allows nurses to have a therapeutic contact and at and allows to have a meaningful relationship with patients. Message is actually a manipulation or injection of purposeful pressure and vibration to the body and includes manual massage or using a massager or electric vibration. This method requires at least training for patient cares and it is inexpensive. The benefits of massage include relaxation, stress relief, loss of weakness, sleep and pain relief; usually after massage the scales that show activity of the sympathetic nervous system, such as heart rate, respiratory rate and blood pressure, become less. Among the previous studies, a study that investigated the effects of Massage with Tellington method type abalone on the sleep quality of patients with type 2 diabetes in Iran was not found and there is a lack of information in this context. According to this issue and also, the inconsistencies of researchers that is about the effect of massage on the quality of sleep and the lack of message time in the previous studies, researcher decided to do a research about the effect of message therapy on the sleep quality of patients with type 2 diabetes in the clinics were related to Ahvaz Jundishapur University of medical sciences. It hoped that the results of this study can be used in clinical settings and be a positive step towards improving the quality of care and helping to reduce sleep disorders and its symptoms in diabetic patients.

METHODOLOGY

This research was conducted with a license from the Iranian Center for Testing Registration (IRCT2017040633265N1) and the Code of Ethics from the Ethics Committee of the Jundishapur University of Ahvaz (IR.AJUMS.REC.1396.545 Date of License, 1396/04/31, 2017.07.22). This research is a randomized clinical trial study. On this study, the effects of massages (Tellington method type abalone) on diabetic type 2 patients were examines by health centres affiliated to the Jundishapur University of medical science of Ahwaz. The community of this research was every diabetic type 2 patient in health centres affiliated to the Jundishapur University of medical science of Ahwaz. The environment of this study was the health centres affiliated to the Jundishapur University of Ahwaz. The sample of this research was formed of 148 diabetic type 2 men and women visiting the health centres affiliated to the Jundishapur University of Ahwaz who had the standards of entering the research. These people were randomly put in two groups of the test (receivers of massage) and control. For specifying the volume of sample, the comparison of two averages formula was used which on the formula $\alpha=0.05$ and $\beta=0.1$ and according to previous results and similar studies:

X1=-2.04, X2=+0.23, S1=4.25, S2=2.85 was considered in which the primary sample volume was two groups of 55 people.

Due to the probability of fall of about 0.25 of people (patients) during the study, the volume of final sample was estimated about two groups of 74 people (total of 148 people). At first, the list of diabetic type 2 people of health centres affiliated to the Jundishapur University of medical science of Ahwaz was gathered. Then, permuted block randomization method was used for allocating people into two groups which is explained below: the test group was considered "A" and control group was considered "B", and different chain permutations of AB were written and coded. Codes were named the way below: ABAB code 1, BBAA code 2, BAAB code 3, AABB code 4, BBAA code 5 and BABA was named code 6. On each allocation of people of groups, with the use of randomized numbers table, one number was chosen randomly from 1 to 6. With choosing each number, the pattern of letters placements and the order of allocating people to groups were defined. For example: if the number 4 was chosen, it meant that 1st person was placed in group A, 2nd person in group A, 3rd person in group B and the 4th person was placed in group B. with the same method, numbers were randomly chosen from 1 to 6 until the final volume of each group was concluded.

The criterions of entering the research include informed consent for entering the study, final recognition of diabetes type 2 and at least 6 months history of infection, age of above 30, low quality of sleep (score is 5 or below), lack of known mental disorders, lack of vision and hearing disorder, physical ability for posing the intended interpositions: massage, lack of previous experiences for participating similar researches, having a companion who is fixed and treatable for massaging and lack of any sort of disorders in the areas of neck and shoulder. The criterions of exiting the research include immigrating to another city, death and having severe disease side-effects.

One of the most common tools of self-report which is designed and built in the area of recognizing sleep quality is Pittsburg sleep quality index (PSQI). This index is made by Buysse et al. [7] in psychological institute of Pittsburg. This index is a standard index and has 19 questions and 7 components which include: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication and daytime dysfunction. The first component is about the mental quality of sleep which would be specified by one question (number 9). The second component is about the delay of falling asleep which its grade would be specified by two questions meaning the average of question number 2 and part A of question number 5. The third component is about the duration of sleeping which would be specified by one question (number 4). The fourth component is about the efficiency and effectiveness of sleep and its grade is computed by the division of the whole hours slept and the whole hours of a person being in bed and multiplied to 100. The fifth component is about sleep disorders and with calculating average of question 5 details. The sixth component is about using sleep medicines and is specified with one question (number 6). The seventh component is about inappropriate performance during the day which is specified with two questions (the average of number 7 and 8 grades). These items would be graded to from 0 to 3 to people who are studied, so the scores will be from 0 to 21. The higher scores indicated worse sleep quality. According to the belief of index designers, the grades above 5 indicate undesired sleep quality.

The higher the score is, the lower the sleep quality.

Buysse et al. [7] presented this questionnaire for the first time. The internal consistency of the questionnaire was established by using the Cronbach's alpha of 0.83 in some studies, the reliability of the questionnaire has been reported based on Cronbach's alpha of 0.77 and 0.81.

The Persian version of the Pittsburgh sleep quality questionnaire has been studied in several researches in Iran and its validity and reliability have been proven in many studies.

In the study by Malek et al. [8] the questionnaire was originally translated into Persian by the researchers and returned to English in order to confirm its accuracy and its validity and reliability were confirmed and Caronbach's alpha coefficient was 0.78 to 0.82.

In an article published by Saeedi et al. [9] in purpose of processing the effect of muscle relaxation on the quality of sleep in patients undergoing haemodialysis, the validity and reliability of this questionnaire were evaluated in the way that the credibility of the content of the index was evaluated by comments from eleven exports.

Also its reliability was examined with two methods named internal consistency and test-retest. In a test-retest method, a questionnaire was given to the fifteen haemodialysis patients in two weeks intervals, and then the Pearson correlation coefficient was calculated to determine the reliability level.

The reliability of this questionnaire was calculated 78% by the test-retest method and 85% by the internal consistency (Caronbach's alpha) method. The study was conducted as a clinical trial with control group. Data collection was started after coordination with the head nurse of the department and doctor and permission of the head of health centres affiliated to Jundishapur University of medical of sciences of Ahvaz. The purpose of the research was explained to them and a written informed consent was received from them. Sampling was easy and patients were assigned randomly to groups.

First, a list of patients was provided in health centres of Jundishapur University of medical of sciences of Ahvaz. Then a random block method was used to allocate people to the two groups that are as follows:

The test is marked with letter A, the control group with letter B, and the various AB chain permutations are written and coded.

The codes were: ABAB Code 1, BBAA Code 2, BAAB Code 3, AABB code 4, BBAA Code 5, and BABA Code 6. At each time allocation of individuals groups, using a random number table, one number was cached between 1 up to 6 will be selected.

By selecting any number, the pattern of the letters determines the order of assignment of individuals groups. For example, if number 4 was selected, this meant that the first person was in group A, the second in group A, the third in group B and the fourth was in group B. similarly, between 1 and 6 numbers were randomly selected, finally the final volume was obtained in each group.

Medical records, appendant diagnosis in the file, clinical characteristics of the patient and individual characteristics of all patients were recorded in the list and the quality of sleep was measured using the Pittsburgh sleep quality test, which was completed by the patient.

Massage was performed in intervention groups on the second day after admission and permission was issue by a practitioner in a private setting (private room or drainage around the patient).

Massage therapy was performed in intervention groups on the second day after hospitalization and permission from doctor in a private ambiance (private room or drainage around the patient).

In the experimental group after the patient was selected, the patient completed the consent. After that individual and clinical data from the file (which was necessary) were recorded in the checklist by the researcher. And also the Pittsburgh sleep quality test was completed by the patient.

The experimental group received a massage therapy session for about 20 minutes by a researcher (who had already completed a massage therapy course and received a degree in massage therapy). Ten minutes after the massage, the questionnaire was completed by patients in both groups.

The experimental group receives the massage and the intervention group does not receive it. It is worth noting that for the observance of ethical values, the intervention was provided by female researcher for female patients and male researchers for male patients.

72 hours after a 20-minutes intervention, the teammate who was liable for the measurement of Pittsburgh sleep quality, and was not aware of the patients' groups (in order to prevent partiality), measured and recorded the level of sleep quality in person or by telephone.

Data was analysed by using descriptive and analytic tests in SPSS 21 software. To compare the average of the data between the two groups, the t-test was used to compare the sleep quality between the two experimental group and control group from the Mann-Whitney test; the Wilcoxon test was used to compare the sleep quality before and after each group and to compare the qualitative characteristics of the groups Chi-square test and Fisher's exact test were used.

Descriptive statistics (number, percentage, mean, standard deviation) and inferential (Chi-square and Fisher exact test, independent t-test and paired t-test) were used in this study. SPSS 21 software was used to analyse the data.

RESULTS

Most of the samples were male. the results of the Chi-square test showed that there was no significant difference between two groups in terms of gender and the two groups were appropriately sorted (P>0.05). Most of the samples were married. The results of Fisher's exact test showed that there was no significant difference between the two groups in term of marital status and the two groups were properly sorted (P>.05).

The majority of participants in the massage therapy group were at the diploma and higher levels. In the control group they were at the illiterate level. However, the results of the Fisher's exact test to check the status of education matching showed that there was no significant difference between the two groups in terms of education (P>0.05).

The majority of participants were both housewives, Chi-square test showed that there was no significant difference between the two groups in terms of occupational status (P>0.05) (Table 1). Independent t-test showed that there was no significant difference between the two groups in terms of age and the two groups were appropriately sorted (P>0.05) (Table 2).

Table 1: Distribution of gender, marital status, educational status, occupational status of the samples by type of test and control groups

P-value	Chi-square	Simulation		Control Group (N=74)		Massage Therapy Group (N=74)		Group/Variable
		Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	
0/454	0/148	54.7	81	51.4	38	58.1	43	male
		45.3	67	48.6	36	41.9	31	female
0/703	0/382	2.7	4	62.2	46	5.4	4	single
		59.5	88	16.2	12	56.8	42	married

		16.2	24	21.6	16	16.2	12	widow
		21.6	32	0	0	21.6	16	divorced
0/830	0/148	23.6	35	23	17	24.3	18	illiterate
		40.5	60	40.5	30	40.5	30	literacy in reading and writing (under the diploma)
		35.8	53	36.5	27	35.1	26	diploma and higher
0/893	0/114	29/52	31	20	7	40	14	unemployed
		43/80	46	57/1	20	37/1	13	housewife
		20	21	14/3	5	22/9	8	retired
		6/66	7	8/6	3	0	0	employed

Table 2: Comparison of average and standard deviation of the age of the studied samples by the experimental and control groups

Groups	Standard Deviation ± Mean (Mean ± SD)	T	P-Value
Massage therapy group	50/05 ± 10/92	1/06	0/111
Control group	47/12 ± 11/33		

Independent t-test showed that there was no significant difference in the average of sleep quality score of diabetic patients before and after intervention in both groups (massage and control) and the two groups had similarities in the quality of sleep before the study (P>0.05).

Independent t-test showed that there was a significant difference between the average of scores of sleep quality in the post-intervention phase in both groups (massage therapy and control) (P<0.05) (Table 3).

Table 3: Comparison of the average of sleep quality score before and after the intervention in the experimental and control groups

Time	Group	Standard Deviation ± Mean (Mean ± SD)	T	P
Before the intervention	Massage therapy group	13/68 ± 5/11	1/86	0/16
	Control group	14/87 ± 3/41		
After the intervention	Massage therapy group	6/00 ± 3/45	45/95	0/0001
	Control group	14/22 ± 4/72		

The results of paired t-test showed that the score of sleep quality in each massage group was different in two phases before and after the intervention (P<0.05). However, there was no significant difference in the score of sleep quality of control group before and after the intervention (P<0.05) (Table 4).

In Table 5, the results of paired t-test showed that there was a significant difference in the score of the sleep quality (except for sleep efficiency) in both groups of massage therapy before and after intervention (p=/000>05). The results of Independent t-test showed that there was a significant difference in sleep quality score (except for sleep efficiency) between the two groups of massage and control after intervention (p=/000>/05).

Table 4: Comparison of mean and standard deviation of sleep quality score in both groups before and after massage therapy

Groups	Massage Therapy Group	Control Group	T	P
The sleep quality statistic	Standard Deviation ± Mean (Mean ± SD)	Standard Deviation ± Mean (Mean ± SD)		
Before	13/68 ± 5/11	14/87 ± 3/41	1/86	0/16
After	6/00 ± 3/45	14/22 ± 4/71	45/95	0/0001
The results of paired t-test	t=7/25	t=0/518	-	
	df=73	df=73		

	p=0/0001	p=0/421

Table 5: Comparison of mean and standard deviation of sleep quality dimensions in intervention group and control group before and after massage therapy based on sub-scales

Quality Of Sleep	Groups	Massage Therapy Group	Control Group	The Results Of Independent t-Test
		Standard Deviation ± Mean (Mean ± SD)	Standard Deviation ± Mean (Mean ± SD)	
Mental quality of sleep	Before intervention	1/97 ± 1/01	2/16 ± 0/98	t=1/83; p=0/071
	After intervention	0/86 ± 0/49	2/06 ± 0/49	t=33/6; p=0/001
Results of paired t-test		p=0/0001	p=0/421	-
Delay to fall asleep	Before intervention	1/82 ± 0/513	1/20 ± 0/9	t=1/34; p=0/101
	After intervention	0/86 ± 0/49	0/57 ± 0/7	t=15/34; p=0/001
Results of paired t-test		p=0/002	p=0/51	-
Sleep time	Before intervention	2/00 ± 1/13	1/83 ± 1/07	t=1/89; p=0/81
	After intervention	0/86 ± 0/49	1/39 ± 1/31	t=16/8; p=0/001
Results of paired t-test		p=0/003	p=0/55	-
Sleep efficiency	Before intervention	1/21 ± 0/06	0/28 ± 0/74	t=0/97; p=0/99
	After intervention	0/17 ± 0/45	0/26 ± 0/54	t=0/17; p=0/19
Results of paired t-test		p=0/86	p=0/47	-
Sleep disorders	Before intervention	2/31 ± 0/72	2/31 ± 0/72	t=2/97; p=0/061
	After intervention	0/86 ± 0/49	2/43 ± 0/78	t=27/9; p=0/008
Results of paired t-test		p=0/007	p=0/097	-
Use hypnotic drugs	Before intervention	1/99 ± 1/12	1/91 ± 1/17	t=1/08; p=0/096
	After intervention	0/88 ± 0/43	2/01 ± 0/87	t=39/38; p=0/001
Results of paired t-test		p=0/74	p=0/06	-
Enough sleep	Before intervention	2/00 ± 1/02	2/11 ± 1/12	t=2/08; p=0/191
	After intervention	0/91 ± 0/51	2/11 ± 0/78	t=42/58; p=0/001
Results of paired t-test		p=0/04	p=0/097	-

CONCLUSION

Nightly sleep quality is an important sign of quality of life that can positively or negatively affect the physical and mental abilities of individuals. Insufficient sleep is associated with a decrease in physical health and a risk to the health and mortality. Chronic insomnia causes disease progression and it is associated with a major impairment in performance, inability to do daily work, and increased use of health services [10].

The purpose of this study was to investigate the effect of massage on sleep quality in diabetic patients. In this study, 148 diabetic patients, aged between 30 and 60 years old, participated. The research was done in the health centres related to Jundishapur University of Medical Sciences of Ahvaz.

The subjects were randomly assigned into two groups of massage therapy and control group that the numbers of subjects in each group were 74. The characteristics of the subjects including age, gender, marital status, educational level, and the use of sleep medications were studied and it was found that they did not differ significantly, so any differences would indicate the effect of intervention. In this section, the findings of the study were investigated and discussed based on the specific purposes of the study.

According to the results of the study, there was no significant difference between the intervention and control groups in terms of sleep quality score ($p>0.05$). The mean and standard deviation of the overall score of patients' sleep quality in the pre-test stage was 14.86 ± 4.53, indicating that sleep quality of patients is in the moderate level.

The results of the study of Niet et al. [11] also showed that the sleep quality of the patients was in moderate level. The results of this study showed that massage therapy had a positive effect on night sleep quality of patients who have type 2 diabetes. So, the score of sleep quality in patients after intervention was decreased in both groups, but there was no significant change in the score of sleep quality in control group.

This finding has also been confirmed in other studies. The results of the study by Castro et al. [2] in Iceland showed that the use of massage in patients with fibromyalgia significantly reduced the sleep score in the intervention group compared to the control group on the morning of the third day [2].

The results of the studies of Nerbass et al. showed that massage therapy is effective on sleep quality after coronary artery bypass graft surgery [12]. Also a quasi-experimental study has been done in the Mubarak Hospital, affiliated with the University of Tenet in Egypt, in purpose of investigating the effect of relaxation techniques on sleep quality of haemodialysis patients in 2014. And Data analysis showed that these techniques improved sleep score and reduced sleep disorders in these patients [12].

A study in Iran, in 2012 was done in purpose of investigating the effect of acupressure on the quality of sleep in haemodialysis patients. This study showed that sleep quality in acupressure group has increased and nocturnal awakening has decreased [13].

In explaining these results, it can be said that massage has a positive effect on the mind and anxiety of the diabetic patient with its soothing feature and therefore it can be predicted that massage therapy improves sleep quality. It can also be said that massage reduces the anxiety of diabetic patients and improves their sleep quality.

According to the Hemmati et al. study in 2015, massage may stimulate alpha waves of the brain, which may cause calm mood or may release endorphins in the brain, which subsequently reduces pain and causes physiological responses such as lowering blood pressure and heart rate [14]. Massage can also promote sleep and rest by creating a relaxed atmosphere. The results of a study in Taiwan in 2012 aimed at measuring the effect of massage on adult sleepers suffering from chronic insomnia showed that those who fell asleep underwent massage has much better sleep than the others and had a longer REM sleep [15]. Therefore, massage has a positive effect on the quality of sleep in diabetic patients.

Considering the positive effect of massage on the quality of sleep and its effect on having better daily performance in social and psychosocial and physical matters, through this study and studying the results of that, it is possible to determine which of these two methods has a better effect on increasing the score of sleep quality of observed patients. The present study shows that massage has an impressive effect on sleep quality in diabetic patients.

Massage can also promote sleep and rest by creating a relaxed atmosphere. The psychological and physical benefits of massage are due to the relaxation response. The sedative massage causes a Hypo metabolic response that changes the function of the autonomic system, the immune system and the endocrine. The relaxation response reduces heart rate and reduces metabolism. Massage can decrease pain, stress and anxiety and improve sleep quality by reducing the activity of sympathetic and neuroendocrine system [9]. Therefore, massage can improve the quality of sleep in patients.

In the present study, there was no significant difference in terms of changes in the score of the sleep quality between males and females, which were similar to the study of Kady et al., Orsal et al. and Orhan et al. [16-18].

Of course, some studies have reported significant differences in the quality of sleep between males and females. The quality of sleep in women was more unfavourable than men [16-19]. This difference in results can be due to differences in the socio-cultural characteristics of different countries [17].

There was no statistically significant relationship between age and quality of sleep. This finding is inconsistent with the study of Zeithofer et al. [19], as the study suggests that as the age increases, the quality of sleep decreases. But this finding, at the same time, is similar to the studies of Kady et al. [16], Orsal et al. [17], Orhan et al. [18], and Eizadi et al. [20], which say that changes in the age range do not change the quality of sleep.

The quality of sleep score did not correlate with the level of education, while the results of the Kord et al. study showed that those with lower levels of education experience more life problems that can negatively influence the quality of sleep and lifestyle [21].

In the present study, there was no significant relationship between marital status and quality of sleep, which was similar to the results of the Kady et al. [16] and Orsal et al. [17]. In the study of Makhlouf et al. [22] and Bazargan [23], individuals with divorce and widow status and Su et al. studies [24] found that single subjects had a poorer sleep quality than married ones. This difference can be due to cultural differences or because of differences in sample size. Therefore, comparisons are recommended for future studies in larger and larger sample sizes and in diverse communities.

The majority of the participants were housewives in all three groups. In this study, there was no correlation between the quality of sleep and occupation. The result of the study by Babahaji et al. in 2014, entitled "The study of the effect of yoga exercises on the quality of sleep in haemodialysis patients", also showed that there was no significant relationship between sleep quality of patients and their occupational status [13]. Of course, in the study of Orsal et al. [17], it was also reported that the economic situation of people does not affect the quality of sleep.

Some studies have shown that there is a direct relationship between job status and sleep quality, a study by Babahaji et al. showed that poor economic status leads to poor sleep quality [13]. The majority of participants in all three groups did not use sleep medications and had no particular habit before going to sleep. The purpose of a particular habit during sleep is, for example, absolute silence in the room or at home, the absolute darkness in the sleep environment, and so on. The quality of sleep score was not significantly correlated with any of the two variables.

According to the results of a study done by MolaHosseini et al. in Iran in 2005, the study of the abundance of sleep disturbance and restless legs syndrome in patients referred to the haemodialysis departments of hospitals affiliated to Tehran University of Medical Sciences [25], There was no statistically significant correlation between sleep disorders and demographic characteristics of individuals the findings are correlated to the results of this study.

USAGE OF RESULTS

Education

Nursing is a unique occupation because it identifies the response of individuals and families to promoting health, maintaining health and health problems. Nurses have many multitasking roles, including providing direct care, clinical decision making, seeking support for the patient and family, and education, but educating the patient is one of the most important roles of nurses Employed in health care and it is recognized as an independent function and nursing care standards. Training by nurses to patients is a good way to improve sleep quality. Because they teach that massage improves the quality of sleep in patients, and also the information and knowledge required in this field, can be useful in improving sleep disorders in patients.

The results of this study can be effective in teaching nursing students and also in continuous education of nurses. Providing non-pharmacological solutions such as massage as a low-cost and safe approach can be part of nursing education.

Management

This study shows the importance of massage training to improve the quality of sleep in a health care system. Therefore, nursing managers can provide facilities for upgrading these programs and in order to better implement of these programs, managers must educate some people for the purpose of providing massage, correctly and on the basis of scientific principles proportionate to the needs of learners.

Clinical services

The results of this study can be used to improve the sleep quality of patients in different wards, especially in Rheumatology. Considering the increasing attention to complementary medicine and alternative methods, massage can be used as a convenient and cost effective method.

Research

In order to emphasize and remind more of the importance of using massage therapies on the improvement of sleep disorders and, consequently improving the quality of life of patients, it is necessary to carry out more extensive research in this field in order to make this an important and influential issue operational for all individuals. In particular, planners have applied to improve the health and quality of sleep in patients. And they have been led to pay more attention to patients and to intervene more efficiently in their education so that this is an important step in improving overall health of these patients. On the other hand, the results of this study can also be used in further researches about patients' sleep problems.

SUGGESTIONS FOR THE NEXT RESEARCH

Future research could be directed towards-

- The effect of massage on the quality of sleep of diabetic patients with long-term follow-up
- The effect of massage on sleep quality of other acute and chronic diseases.
- The effect of massage therapy on complications of disease and diabetes in diabetic patients.
- The effect of other non-pharmacological methods on the sleep quality of diabetic patients.
- The effect of different types of massage therapies on sleep quality of patients.
- Comparison between the effect of selective and non-selective patient's massage therapy on sleep quality.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this paper.

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