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RESEARCH ARTICLE

EFFECTIVENESS OF JACOBSON'S PROGRESSIVE MUSCLE RELAXATION ON FATIGUE AND SLEEP QUALITY AMONG PATIENTS UNDERGOING HEMODIALYSIS WITH END STAGE RENAL DISEASE

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ABSTRACT

Background: Patients undergoing hemodialysis with end stage renal disease (ESRD) experiences many complications. Fatigue and sleep are the most common problems faced by them and there is a need for an effective intervention to minimize these complications. **Objective:** The purpose of this study was to assess the effectiveness of progressive muscle relaxation on fatigue and sleep quality of patients undergoing hemodialysis with ESRD. Jacobson's progressive muscle relaxation (JPMR) is a relaxation technique on the skeletal muscles by giving the sensation of tension in a skeletal muscle group and then to focus on getting the sense of relaxation. **Methods:** It is a quasi-experimental non-equivalent control group pre-test – post-test design. A total of 100 samples were selected for the study using purposive sampling technique and they were assigned to two groups namely group I with 50 samples who received JPMR therapy and group II the control group with 50 samples who received routine treatment of the dialysis unit. Outcome variables measured were fatigue and sleep quality on 1st week before intervention, end of 4th week and at the end of 8th week after the intervention. Demographic variables, Revised Piper Fatigue Scale and Pittsburgh Sleep quality Index were used to measure the outcome variables. Statistical analysis was done using the chi-square test, Student t- test, repeated measures ANOVA, F- test and Karl Pearson's correlation coefficient test. **Results:** The findings showed that there was a significant reduction in fatigue score (F=562.33, p=0.001) and improvement in the sleep quality score (F=327.66, p=0.001) in the progressive muscle relaxation group while comparing to the control group. **Conclusions:** It can be concluded that JPMR therapy had a positive effect in reducing the fatigue and improving the sleep quality of patients undergoing hemodialysis with ESRD.

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INTRODUCTION

End-stage renal disease (ESRD) is the last stage of chronic kidney disease (CKD), which is the gradual decrease of kidney function over time. Individuals with ESRD require either a regular course of dialysis or a kidney transplant to survive. Hemodialysis does not cure ESRD, it keeps the patient alive. Also, majority of patients find it hard to accept new image, habits, complete dependence on the machine for survival, changes in their physical health, limited activities, rigorous treatment plan and dietary restrictions. Eventually, their functional status, personal relationship, social and economic status are affected considerably (Kimmel, 2001; Gerogianni *et al*., 2014; Weisbord, 2007).

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Fatigue is a common and often unrecognized symptom in patients with end-stage renal disease (ESRD) undergoing maintenance dialysis (Jhamb, 2008; Liu, 2006; Bossola *et al*., 2009). Various studies have reported that fatigue affects 60 to as many as 97% of dialysis patients (Jhamb, 2008; Yngman-Uhlin, 2010). Despite its wide prevalence in the ESRD population, renal providers are largely unaware of the presence and severity of this debilitating symptom (Weisbord *et al*., 2007). Not only does fatigue severely impair physical and social functioning, it has been associated with lower quality of life and premature death in patients on chronic hemodialysis (Bonner, 2010; Jhamb, 2009). Sleep is needed to remain healthy and restore neurological, immune, and musculoskeletal functions. Approximately, 25-36% of healthy adults suffer from sleep disorders while 40-85% of CRF patients suffer from these disorders that is much higher than its prevalence rate in general population. Accumulation of uremic toxins, anemia, and nightly hypoxia are some of the reasons for sleep disorders among these patients. Sleep disorders affect individual physical and mental function adversely and cause

executive, cognitive, and memory dysfunctions (Eslami *et al*., 2014). Recently, complimentary and side effect-free therapies such as Jacobson's progressive muscle relaxation (JPMR) therapy to treat physical and mental disorders due to chronic diseases have attracted researchers' attention. JPMR is an inexpensive and accessible treatment. The present study was conducted to investigate the effect of JPMR on level of fatigue and sleep quality among patients undergoing hemodialysis with ESRD. JPMR is a type of relaxation therapy, which was developed by American physician Edmund Jacobson in the early 1920s. JPMR entails a physical and mental component. The physical component involves the tensing and relaxing of muscle groups for 10 seconds and then releases it for 20 seconds before continuing with the next muscle group. The mental component requires that the individual focuses on the distinction between the feelings of the tension and relaxation (Jacobson, 1938).

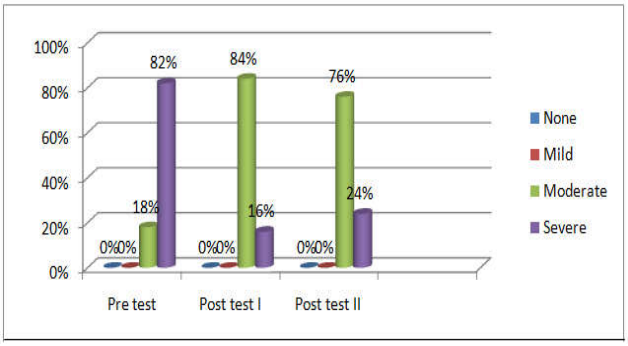

Fig 1. Pre-test, Post-test I & Post-test II level of fatigue score in JPMR Group

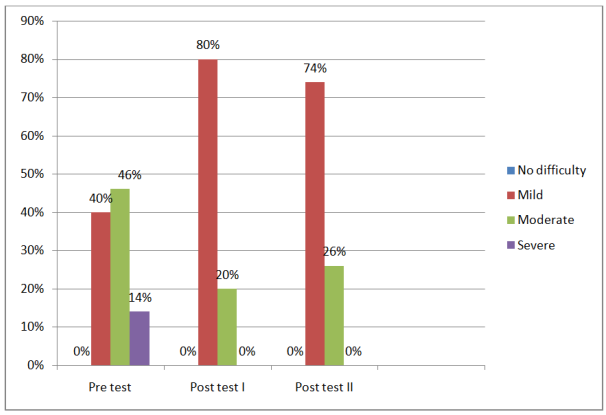

Fig. 2. Pre-test, Post-test I & Post-test II level of PSQI score in JPMR Group

Need for the study: Patients with ESRD experience different levels of discomfort in response to various types of physiological and psychosocial stressors. Hemodialysis has been proved to be the most effective choice of treatment for clients with ESRD, as it helps to increase the survival rates and maintains patients' life at a satisfactory level (Ran, 1999). During the past 3 decades, the number of persons undergoing maintenance dialysis has drastically increased worldwide (Thomas, 2015). In 2010 it was estimated that the number of patients on dialysis was more than 2 million globally, and the available data suggest this number will be more than double by 2030. Management and treatment of fatigue, sleep disorders, and mental disturbances due to hemodialysis using medication are mainly costly and are associated with lot of side effects, it is necessary to find out appropriate alternative treatments.

MATERIALS AND METHODS

Sample and Recruitment: Patients who underwent hemodialysis with ESRD in selected hospital at Madurai were recruited for this study. The sample size was 100. Fifty patients each were selected using a purposive sampling technique for the intervention group and control group. Ethical clearance was obtained from the institutional ethical committee of the selected hospital. The researcher handpicked the samples who met the following inclusion criteria: clients who were willing to participate, both the gender, aged between 20 -70 years and undergoing hemodialysis two times in a week and who know to read and write in Tamil. Clients who have hearing impairment were excluded from the study. After explaining the purpose and nature of the study, informed consent was obtained from the participation, the confidentiality of the participant was assured.

Design and intervention: The research design selected for the present study was a quasi-experimental non-equivalent control group pre-test – post-test design. There were two groups, the intervention group who received JPMR therapy, and the control group who received routine treatment of the dialysis unit.

Outcome variables

Demographic proforma: It contains 11 items which include age, gender, marital status, educational and occupational status, income, type of family, number of children, locality, and duration of ESRD and duration of dialysis therapy. These data collected to know the baseline variables.

Fatigue: It is measured by Revised Piper Fatigue Scale**.** It is composed of 22 numerically scaled, "0" to "10" items that measure four dimensions of subjective fatigue: behavioural/severity; affective meaning; sensory; and cognitive/mood. These 22 items are used to calculate the four sub-scale/dimensional scores and the total fatigue scores. The standardized alpha for the fatigue scale 22 items was 0.97, indicating excellent reliability.

Sleep: Sleep quality is assessed by Pittsburgh Sleep Quality Index (PSQI). This scale Consists 19 items, the PSQI measures several different aspects of sleep, offering seven component scores and one composite score. The component scores consist of subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each item is weighted on a 0–3 interval scale. The global PSQI score is then calculated by totalling the seven component scores, providing an overall score ranging from 0 to 21, where lower scores denote a healthier sleep quality. The PSQI has internal consistency and a reliability coefficient (Cronbach's alpha) of .83 for its seven components. Numerous studies using the PSQI have supported high validity and reliability (Smyth, 1999).

Data Collection

Group I– (JPMR): Data collected for the patients in the group I was carried out in the dialysis unit of the selected hospital at Madurai, Tamil Nadu. The pre-test data such as demographic variables, level of fatigue and sleep quality were collected by

using the standard instruments, which took about 20- 30 minutes for each patient. Following this, the JPMR therapy was given to each patients individually which was carried out by the investigator for about 20 minutes along with routine nursing care of the dialysis unit during hemodialysis therapy. JPMR therapy was given by investigator for 2 times a week for 4 weeks. Information booklet was given to the patients regarding the steps and techniques of JPMR therapy. Self-administered JPMR therapy for 2 times a week for next 4 weeks was practiced by the patients. The patients were asked to record their performance on the self-diary, which was noted by the investigator during each follow-up. Encouragement during visits and reinforcement through telephonic conversation was given every week to achieve regular performance. The post-test I and post-test II data were collected at the end of 4th week and at the end of 8th week of intervention. Thus a total of 50 patients were selected.

Group II – (Control Group): Data such as demographic variables, level of fatigue, and sleep quality were collected by using the structured interview schedule and the standard instruments, which took about 20- 30 minutes for each patient. These patients were given only the routine nursing care of the dialysis unit during hemodialysis therapy. Post-test data were collected at the end of the 4th week and the end of the 8th week from the pre-test. A total of 50 patients were selected.

RESULTS

Data in table 1 shows that majority of the subjects with ESRD were belonged to age group of 50 -70 years in both the groups. More than half of them, 72% of subjects in study group and 74% of subjects in control group were males. The larger number of subjects in both the groups had a high school education. Majority of them, 86% in JPMR group and 94% in control group were married. Most of them were from the nuclear family 68% and 72% respectively in the study and in the control group. Many of the subjects were belonged to urban area (38% and 48%) in both the groups. Hypertension (38%) and Diabetes Mellitus (44%) were the most common risk factor for ESRD in both groups. The duration of ESRD for most of the subjects in study group was 2-3 years and in control group was 6 months. Similarities of demographic variables distribution between JPMR Group and control group patients were assessed using chi square test.

Figure 1 depicts that most of the subjects (82%) were having severe level of fatigue before JPMR therapy. Whereas, after 4 weeks of JPMR therapy, the majority of subjects fatigue level reduced, and 84% of subjects had only moderate level of fatigue at post-test I. Followed by, JPMR therapy was continued by patients for next 4 weeks and their fatigue level was measured at end of 8th week (post-test II), most of them (76%) had only moderate level of fatigue. Figure 2 depicts that most of the subjects (46%) were having moderate difficulty, 40% of the subjects had mild difficulty and 14% of subjects had severe difficulty in getting sleep before JPMR therapy. Whereas, after 4 weeks of JPMR therapy, the majority of subjects sleep quality improved, and 80% of subjects had only mild difficulty in sleep at post-test I. Followed by, JPMR therapy was continued by patients for next 4 weeks and their sleep quality was measured at end of 8th week (post-test II), most of them (74%) had only mild difficulty in getting sleep.

Data in table 2 shows that there is significant reduction in the total fatigue score as well as in the behavioural/severity subscale score, affective meaning subscale score, sensory subscale score, and cognitive/mood subscale score in the study group at the end of 4th week P=0.001 and it was maintained until at the end of 8th week evaluation P=0.001, whereas subjects in the control group had higher mean level of fatigue score during both the evaluations. Data in table 3 shows that, there is significant improvement in the global PSQI score as well as in all the component scores such as sleep quality, sleep latency , sleep duration, sleep efficiency, sleep disturbances, sleeping medication, and daytime dysfunction in the study group at the end of 4th week P=0.001 and it was maintained until at the end of 8th week evaluation P=0.001, whereas subjects in the control group had higher mean level of sleep quality score during both the evaluations which means worse sleep quality. Data in table 4 depicts, patients in JPMR group had statistically significant reduction in fatigue score and PSQI score at P=0.001 level of significance. It was confirmed using nonparametric repeated measures Friedman test. JPMR had significant effect in reducing the fatigue and improving sleep quality. Data in table 5 illustrates, in JPMR group, there is a significant, positive, fair correlation between fatigue reduction score and PSQI reduction score. Whereas in control group, there is non-significant, positive, poor correlation between fatigue reduction score and PSQI reduction score.

DISCUSSION

The present study has been conducted to evaluate the effectiveness of JPMR on fatigue and sleep quality of patients undergoing hemodialysis with ESRD**.** The present study shows that most of the subjects (72%) with ESRD were males and 33% in study group and 30% in control group were aged between 50-70 years. Majority of the subjects 86% of JPMR group and 94% of control group were married and they were residing in urban area. This findings are consistent with the previous study conducted in Athens to assess the level of fatigue among ESRD patients undergoing hemodialysis where, most of the subjects were males (59.7%), their mean age was 56.02 years, 59.7% were married and 89.9% were from urban area (Zyga, 2015).

In the present study, most of the subjects (around 40%) in both groups had history of hypertension and diabetes mellitus as a risk factor for ESRD, these findings are consistent with the previous study conducted in south India, where most of the subjects had diabetes (45 subjects) and hypertension (158 subjects) as most common comorbidities (Manavalan, 2017). The present study highlights that the there is significant reduction in total fatigue score and its subs score levels after JPMR intervention with a p value of 0.001. These findings are supported by the previous study conducted in Iran among 90 patients undergone hemodialysis with ESRD, which showed that there was a significant difference in level of fatigue between the PMR group and control group at $p<0.001$ level (Basiri Moghadam, 2013). The current study findings are also consistent with a double blinded control trial conducted in Iran to find the effect of JPMR and aerobic exercise on anxiety, fatigue, and sleep quality, which demonstrated that the post test level of fatigue score was significantly lower than the pretest score at $p <0.001$ in JPMR group (Amini, 2016).

Table 1. Baseline characteristics of participants

Demographic variables		Group				Chi square test	p value
		JPMR (n=50)		Control (n=50)			
		n	%	n	%		
Age	20-30 years	7	14.00%	6	12.00%	$\chi2$=2.26	P=0.68
	31-40 years	4	8.00%	5	10.00%		
	41-50 years	6	12.00%	9	18.00%		
	51-60 years	18	36.00%	12	24.00%		
	61-70 years	15	30.00%	18	36.00%		
Sex	Male	36	72.00%	37	74.00%	$\chi2$=0.05	P=0.82
	Female	14	28.00%	13	26.00%		
Educational status	Illiterate	5	10.00%	2	4.00%	$\chi2$=2.95	P=0.22
	Primary school	10	20.00%	9	18.00%		
	High school	12	24.00%	17	34.00%		
	Higher secondary	9	18.00%	3	6.00%		
	Diploma	1	2.00%	4	8.00%		
	Graduate	11	22.00%	13	26.00%		
	Post graduate	2	4.00%	2	4.00%		
Marital status	Single	6	12.00%	3	6.00%	$\chi2$=7.16	P=0.30
	Married	43	86.00%	47	94.00%		
	Widow/ Widower	1	2.00%	0	0.00%		
Number of children	One	7	14.00%	5	10.00%	$\chi2$=2.17	P=0.33
	Two	18	36.00%	19	38.00%		
	Three	11	22.00%	7	14.00%		
	> Three	6	12.00%	13	26.00%		
	No children	8	16.00%	6	12.00%		
Monthly income	< Rs. 5000	13	26.00%	8	16.00%	$\chi2$=7.17	P=0.33
	Rs. 5001-10000	10	20.00%	3	6.00%		
	Rs. 10001-15000	5	10.00%	8	16.00%		
	Rs. 15001-20000	10	20.00%	16	32.00%		
	>Rs. 20000	12	24.00%	15	30.00%		
Occupation	Skilled worker	10	20.00%	6	12.00%	$\chi2$=11.64	P=0.07
	Unskilled worker	6	12.00%	2	4.00%		
	Professional	7	14.00%	6	12.00%		
	Unemployed	3	6.00%	5	10.00%		
	Retired	7	14.00%	16	32.00%		
	Housewife	12	24.00%	5	10.00%		
	Self-employed/Business	5	10.00%	10	20.00%		
Type of family	Joint family	16	32.00%	14	28.00%	$\chi2$=0.19	P=0.66
	Nuclear family	34	68.00%	36	72.00%		
Locality	Rural	16	32.00%	14	28.00%	$\chi2$=1.04	P=0.59
	Urban	19	38.00%	24	48.00%		
	Semi Urban	15	30.00%	12	24.00%		
Risk factors	Nil	5	10.00%	7	14.00%	$\chi2$=4.13	P=0.53
	History of hypertension	19	38.00%	22	44.00%		
	History of diabetes	22	44.00%	14	28.00%		
	History of proteinuria	1	2.00%	4	8.00%		
	History of renal disease	2	4.00%	2	4.00%		
	History of overweight	1	2.00%	1	2.00%		
Duration of suffering with ESRD	< 6 month	7	14.00%	15	30.00%	$\chi2$=4.51	P=0.47
	6-12 months	7	14.00%	6	12.00%		
	1- 2 years	7	14.00%	5	10.00%		
	2- 3 years	13	26.00%	8	16.00%		
	3- 5 years	11	22.00%	1	22.00%		
	> 5 years	5	10.00%	5	10.00%		
Duration of dialysis treatment	< 6 month	9	18.00%	19	38.00%	$\chi2$=9.31	P=0.10
	6-12 months	12	24.00%	8	16.00%		
	1- 2 years	10	20.00%	7	14.00%		
	2- 3 years	9	18.00%	6	12.00%		
	3- 5 years	9	18.00%	5	10.00%		
	> 5 years	1	2.00%	5	10.00%		

JPMR – Jacobson's progressive muscle relaxation; ESRD – End stage renal disease

Table 2. Comparison of means of domain wise fatigue score before and after intervention

Time point of measurement	Domains of Fatigue	JPMR		Control		Student independent	p value
		Mean	SD	Mean	SD	t-test	
Pre test	Behavioural/severity	8.01	.60	8.22	.66	t=1.66	P=0.10
	Affective meaning	7.82	.75	8.13	.60	t=1.80	P=0.07
	Sensory	8.13	.57	8.28	.49	t=1.69	P=0.09
	Cognitive/mood	7.74	.63	7.91	.73	t=1.24	P=0.21
	Total fatigue	7.92	.56	7.95	.62	t=0.25	P=0.80
Post-test I	Behavioural/severity	6.10	.65	7.60	.74	t=10.99	P=0.001***
	Affective meaning	5.07	.74	7.69	.76	t=17.46	P=0.001***
	Sensory	5.06	.86	7.85	.59	t=18.91	P=0.001***
	Cognitive/mood	5.34	.68	7.66	.80	t=15.62	P=0.001***
	Total fatigue	5.39	.71	7.70	.71	t=16.23	P=0.001***
Post-test II	Behavioural/severity	5.90	0.99	7.58	.70	t=9.79	P=0.001***
	Affective meaning	5.76	0.97	7.62	.78	t=10.56	P=0.001***
	Sensory	5.66	1.05	7.58	1.24	t=8.35	P=0.001***
	Cognitive/mood	5.12	0.88	7.88	.79	t=16.50	P=0.001***
	Total fatigue	5.61	.97	7.67	.69	t=12.24	P=0.001***

JPMR – Jacobson's progressive muscle relaxation *** Highly Significant

Table 3. Comparison of means of Global PSQI score and its component scores before and after intervention

Time point of measurement	Sleep components	JPMR		Control		Student independent	p value
		Mean	SD	Mean	SD	t-test	
Pre test	Sleep quality	1.68	.82	1.52	.76	t=1.01	P=0.31
	Sleep latency	1.92	.67	1.72	.88	t=1.28	P=0.20
	Sleep duration	.58	.70	.58	.73	t=0.01	P=0.99
	Sleep efficiency	.04	.28	.04	.20	t=0.00	P=1.00
	Sleep disturbance	1.42	.50	1.60	.48	t=1.83	P=0.07
	Sleep medicine	1.56	.93	1.52	.79	t=0.23	P=0.81
	Daytime dysfunction	1.88	.69	1.70	.76	t=1.24	P=0.21
	Global PSQI	9.08	3.63	8.68	3.79	t=0.53	P=0.50
Post-test I	Sleep quality	.68	.62	1.90	.58	t=10.15	P=0.001***
	Sleep latency	.98	.55	1.34	.63	t=3.04	P=0.001***
	Sleep duration	.02	.14	.24	.52	t=2.90	P=0.01**
	Sleep efficiency	.00	.00	.08	.34	t=1.66	P=0.10
	Sleep disturbance	1.04	.20	1.56	.50	t=6.82	P=0.001***
	Sleep medicine	.96	.61	1.88	.65	t=7.29	P=0.001***
	Daytime dysfunction	1.20	1.04	1.84	.59	t=3.78	P=0.001***
	Global PSQI	4.88	2.13	8.84	2.63	t=8.24	P=0.001***
Post-test II	Sleep quality	1.16	.47	1.86	.61	t=6.46	P=0.001***
	Sleep latency	1.14	.35	1.44	.70	t=2.69	P=0.01**
	Sleep duration	.02	.14	.28	.45	t=3.87	P=0.001***
	Sleep efficiency	.00	.00	.12	.48	t=1.76	P=0.08
	Sleep disturbance	1.04	.20	1.44	.58	t=4.63	P=0.001***
	Sleep medicine	1.10	.46	1.78	.62	t=6.24	P=0.001***
	Daytime dysfunction	1.34	.88	2.08	.49	t=5.19	P=0.001***
	Global PSQI	5.80	1.31	9.00	2.67	t=7.60	P=0.001***

JPMR – Jacobson's progressive muscle relaxation; PSQI – Pittsburgh Sleep Quality Index *** Highly Significant

Table 4. Effectiveness of JPMR therapy on fatigue and sleep quality among patients undergoing hemodialysis in Group I

	JPMR group (Group I)						Mean Difference	Repeated measures ANOVA F-test	p value
	Pre test		Post-test I		Post-test II				
	Mean	SD	Mean	SD	Mean	SD			
Fatigue	7.92	.56	5.39	.71	5.61	.97	-2.31	F=140.52	P=0.001***
PSQI	9.08	3.63	4.88	2.13	5.80	1.31	-3.28	F=64.31	P=0.001***

JPMR – Jacobson's progressive muscle relaxation; PSQI – Pittsburgh Sleep Quality Index; ANOVA – Analysis of variance *** Highly Significant

Table 5. Correlation between level of fatigue and PSQI score

Group	Correlation	Mean ±SD	Karl pearson correlation coefficient	p value	Interpretation
JPMR	FatigueVs PSQI	2.31±0.83 Vs 3.28±1.44	r=0.31	p=0.001***	Fair correlation
Control	FatigueVs PSQI	0.28±0.19 Vs -0.16±0.07	r=0.11	p=0.64	poor correlation

PSQI – Pittsburgh Sleep Quality Index; JPMR – Jacobson's progressive muscle relaxation *** Highly Significant

The current study shows that there is a significant improvement in the sleep quality, with significant difference in the global PSQI score and it's component scores between control group and JPMR group at end of 4 weeks of intervention and it was maintained until the end of 8 weeks of JPMR therapy with p value 0.001.This finding is supported by the previous study conducted by Amini E *et al*. to investigated the effect of JPMR on sleep quality of hemodialysis patients, and found that the mean total score for sleep quality after the JPMR was significantly lower than the pre-test score with p

value 0.001 (Amini *et al*., 2016). HouYongmei *et al*. conducted a randomized control trial among 103 patients with maintenance hemodialysis therapy to find the effect of cognitive behavioral therapy on insomnia, which showed that the total scores for PSQI were (12.63 ± 2.3/16.40 ± 2.2); which is significantly lower in the treatment group compared with the control group at p 0.000 (Hou *et al*., 2014).

Conclusion

According to the findings of this study, it can be concluded that patients on hemodialysis had severe fatigue and poor sleep quality. Also, professional nurses have an important role in addressing and evaluating the fatigue and sleep quality in hemodialysis patients. Based on these study findings it can be concluded that JPMR therapy had a positive effect in reducing the fatigue and improving the sleep quality of patients undergoing hemodialysis with ESRD.

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REFERENCES

Kimmel PL. 2001. Psychosocial factors in dialysis patients. Kidney international. 59(4):1599-613.

Gerogianni S, Babatsikou F, Gerogianni G, Grapsa E, Vasilopoulos G, Zyga S. *et al*., 2014. 'Concerns of patients on dialysis: A Research Study'. *Health Science Journal*., 8(4):423.

Weisbord SD, Fried LF, Mor MK, Resnick AL, Kimmel PL, Palevsky PM, *et al*., 2007. Associations of race and ethnicity with anemia management among patients initiating renal replacement therapy. *Journal of the National Medical Association.,* 99(11):1218.

Jhamb M, Weisbord SD, Steel JL, Unruh M., 2008. Fatigue in patients receiving maintenance dialysis: a review of definitions, measures, and contributing factors. American *Journal of kidney diseases*. 52(2):353-65.

Liu H. 2006. Fatigue and associated factors in hemodialysis patients in Taiwan. *Research in nursing & health*., 29(1):40-50.

Bossola M, Luciani G, Tazza L. 2009. Fatigue and its correlates in chronic hemodialysis patients. Blood *purification.,* 28(3):245-52.

Yngman-Uhlin P, Friedrichsen M, Gustavsson M, Fernström A, Edéll-Gustafsson U. 2010. Circling around in tiredness: perspectives of patients on peritoneal dialysis. Nephrology Nursing Journal: *Journal of The American Nephrology Nurses Association.,* 37(4):407-13.

Weisbord SD, Fried LF, Mor MK, Resnick AL, Unruh ML, Palevsky PM, *et al*., 2007. Renal provider recognition of symptoms in patients on maintenance hemodialysis. *Clinical Journal of the American Society of Nephrology*., 2(5):960-7.

Bonner A, Wellard S, Caltabiano M., 2010. The impact of fatigue on daily activity in people with chronic kidney disease. *Journal of clinical nursing*. 19(21-22):3006-15.

Jhamb M, Argyropoulos C, Steel JL, Plantinga L, Wu AW, Fink NE, *et al*., 2009. Correlates and outcomes of fatigue among incident dialysis patients. *Clinical Journal of the American Society of Nephrology.,* 4(11):1779-86.

Eslami AA, Rabiei L, Khayri F, Nooshabadi MRR, Masoudi R. 2014. Sleep quality and spiritual well-being in hemodialysis patients. *Iranian Red Crescent Medical Journal.,* 16(7).

Jacobson E. 1938. Progressive muscle relaxation. Interview Behaviour" Journal of Abnormal Psy-University of Chicago Piess, Chicago chology., 75(1):18.

Ran KJ, Hyde C. 1999. Nephrology nursing practice: more than technical expertise. EDTNA-ERCA *Journal*., 25(4):5-8.

Thomas B, Wulf S, Bikbov B, Perico N, Cortinovis M, De Vaccaro KC, *et al*., 2015. Maintenance dialysis throughout the world in years 1990 and 2010. *Journal of the American Society of Nephrology*. 26(11):2621-33.

Liyanage T, Ninomiya T, Jha V, Neal B, Patrice HM, Okpechi I, *et al*., 2015. Worldwide access to treatment for end-stage kidney disease: a systematic review. *The Lancet*., 385(9981):1975-82.

Smyth C. 1999. The Pittsburgh sleep quality index (PSQI). Journal of gerontological nursing. 25(12):10-.

Zyga S, Alikari V, Sachlas A, Fradelos EC, Stathoulis J, Panoutsopoulos G. *et al*., 2015. Assessment of fatigue in end stage renal disease patients undergoing hemodialysis: prevalence and associated factors. *Medical Archives*., 69(6):376.

Manavalan M, Majumdar A, Kumar KH, Priyamvada P. 2017. Assessment of health-related quality of life and its determinants in patients with chronic kidney disease. *Indian journal of nephrology*., 27(1):37.

Basiri Moghadam M, Madadkar Dehkordi S, Mohammadpour A, Vaezi AA. 2013. Effect of progressive muscle relaxation technique on fatigue in patients undergoing hemodialysis. Preventive Care in Nursing & Midwifery Journal., 3(2).

Amini E, Goudarzi I, Masoudi R, Ahmadi A, Momeni A. 2016. Effect of progressive muscle relaxation and aerobic exercise on anxiety, sleep quality, and fatigue in patients with chronic renal failure undergoing hemodialysis. *International Journal of Pharmaceutical and Clinical Research.,* 8(12):1634-9.

Hou Y, Hu P, Liang Y, Mo Z. 2014. Effects of cognitive behavioral therapy on insomnia of maintenance hemodialysis patients. *Cell biochemistry and biophysics*., 69(3):531-7.

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