

Comparison of quality of life for Iranian hemodialysis and peritoneal dialysis patients

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Abstract

Background: Chronic diseases such as kidney failure can impact patients' quality of life. Renal replacement methods such as hemodialysis and peritoneal dialysis are important in these cases.

Objectives: The aim of this study was to compare the quality of life of Iranian hemodialysis and peritoneal dialysis patients.

Methods: The study took place between April and September 2021 and involved 84 hemodialysis and 31 peritoneal dialysis patients at a teaching hospital in Kerman, Iran. The standard KDQOL-SFTM questionnaire, consisting of 78 questions, was used to gather data and assess general and specific aspects of patients' quality of life. The data was analyzed using SPSS version 18 statistical software.

Results: The mean age of peritoneal dialysis and hemodialysis patients was 52.1 ± 18.8 and 56.8 ± 15.6 years, respectively. A larger proportion of hemodialysis patients were male compared to peritoneal dialysis patients. In most dimensions, peritoneal dialysis patients had better quality-of-life scores than hemodialysis patients. The specific dimension with the largest difference between the two groups was the effect of kidney disease, with peritoneal dialysis patients scoring 69.97 ± 24.46 and hemodialysis patients scoring 54.46 ± 23.55 ($P \leq 0.05$). The largest difference in the general dimensions of quality of life was pain, with peritoneal patients scoring 59.52 ± 23.55 and hemodialysis patients scoring 43.46 ± 28.58 ($P \leq 0.05$).

Conclusion: Due to the better quality of life scores found in peritoneal dialysis patients, healthcare professionals should encourage the use of this method where appropriate.

Keywords: Chronic Kidney Disease, Quality of Life, Peritoneal Dialysis, Renal Dialysis, Hemodialysis.

Introduction

Chronic kidney disease (CKD) is a progressive and irreversible disorder in which the kidneys' ability to eliminate metabolic wastes and maintain fluid and electrolyte balance is lost, leading to uremia.¹ CKD affects 2–3% of the world's population and is a common cause of morbidity and mortality.² The prevalence of CKD varies across different countries, with the highest rates in Taiwan, Japan, and the United States. In Iran, the prevalence of CKD is higher than the global average, at 680 people per million.³

Currently, kidney transplantation is the definitive treatment for chronic renal failure, but in cases where transplantation is not possible, dialysis is used to prolong the patient's life. Dialysis involves using an artificial device to remove waste products from the blood and is performed using various methods, including hemodialysis and peritoneal dialysis.⁴ Hemodialysis is typically performed in a hospital setting under the supervision of medical staff. During this procedure, the patient's blood is filtered through a machine and returned to the patient's body. In contrast, peritoneal dialysis is often performed at home by

the patient after they receive appropriate training. Using a device implanted in the abdomen, the peritoneal membrane is used to purify the patient's blood. The choice of dialysis method is made by the physician based on the specific medical needs and history of the patient.⁵

The latest report indicates that 95% of patients prefer hemodialysis over the peritoneal method, with the remainder opting for the latter.³ While these treatments have enabled patients to live longer lives, they are not without their challenges and can lead to a diminished quality of life.^{6,7} Physical and mental health problems can exacerbate this issue, as dialysis only mitigates the symptoms of advanced chronic kidney failure and does not entirely replace kidney function.⁸

Previous studies have affirmed that the quality of life for dialysis patients is inferior to that of healthy individuals.⁹ However, the extent to which this quality of life varies between these two groups in different cultural and geographical contexts has been explored in diverse dimensions.¹⁰ Findings from studies conducted in South Korea and Malaysia indicate that peritoneal dialysis patients have a better quality of life compared to their hemodialysis counterparts. In contrast, a study from Brazil suggests that the quality of life for both categories of patients is roughly equal.¹¹⁻¹³ In Iran, contrasting results have been obtained. One study by Zeraati et al. in Mashhad found that the quality of life for peritoneal dialysis patients is superior to the other group,¹⁴ while another study by AghaKhani in Urmia revealed that hemodialysis patients enjoy a better quality of life than peritoneal patients.¹⁵

Gathering data on the quality of life of dialysis patients can play a significant role in selecting the optimal treatment approach for both patients and healthcare providers. However, due to the disparate outcomes reported in past studies, there is a critical need to conduct further research in this area. Hence, a study was conducted in Kerman, a southeastern Iranian city renowned as a health center.

Objectives

The aim of this study was to compare the quality of life between Iranian patients who receive hemodialysis and those who undergo peritoneal dialysis.

Methods

Between April and September 2021, a cross-sectional study was conducted on 92 hemodialysis and 37 peritoneal dialysis patients at the Renal Disease Treatment Center in Kerman (Sha Hospital), Iran. Patients were included if they had undergone dialysis for a minimum of 3 months and were willing to participate in the study. Those who refused to participate were excluded. Due to the limited number of eligible patients, a census approach was used to increase the study's accuracy. Ultimately, 84 hemodialysis and 31 peritoneal dialysis patients completed the questionnaire. The lower participation rate among peritoneal dialysis patients was due to the researchers' limited access to them since they underwent treatment at home and visited the hospital only once a month.

The KDQOL-SFTM standard questionnaire, established by the Research and Development Institute in 1997, was used to collect data. The questionnaire comprises two sections, the first of which provides the patients' demographic information, such as age, gender, marital status, type of insurance, employment status, and the patient's perspective on the cause of their illness. The second part comprises 24 questions (78 items) that assess the patient's general dimensions (8 dimensions) and specific dimensions (11 dimensions) that measure the quality of life of patients.¹⁶

The KDQOL-SFTM questionnaire consists of two dimensions: general and specific. The general dimension includes physical function (10 items), physical role (4 items), pain (2 items), general health (5 items), vitality (5 items), emotional role (3 items), social function (2 items), and energy/fatigue (4 items). The specific dimension includes symptoms and problems (12 items), effect of kidney disease (8 items), burden of kidney disease (4 items), work status (2 items), cognitive function (3 items), quality of social interactions (3 items), sexual performance (2 items), sleep (4 items), social support (2 items), encouragement of dialysis department staff (2 items), and patient satisfaction (1 item). The score ranges in each dimension, as well as the overall questionnaire, are between 0 and 100. A score of 0 indicates the worst quality of life, while a score of 100 reflects the best quality of life for patients. Experts in the United States determined the

validity of the KDQOL-SFTM questionnaire, and the Cronbach's alpha coefficient for the full questionnaire was 0.84.¹⁶ Yakaninejad et al. further confirmed the reliability and validity of the KDQOL-SFTM questionnaire for use in Iranian society, validating the questionnaire with experts. The Cronbach's alpha coefficient for different dimensions of the questionnaire ranged from 0.71 to 0.93, showing high internal consistency.¹⁷

To ensure a proper understanding of the patients' conditions and mood, a trained interviewer completed the questionnaire. Coordination was established with the supervisor of the dialysis department, and a nurse was trained to provide necessary explanations to patients and assist them in completing the questionnaire. Some patients completed the questionnaire with the assistance of the nurse during their visit, while others took the questionnaire home and returned it to the department during their next visit.

Statistical analysis

Independent t-test, chi-square and Fisher's exact test were used to describe the data. Also, in order to compare the structures of quality of life between the two groups by controlling demographic variables, multivariate analysis of covariance (MANCOVA) and multiple linear regression were used. All statistical analyses were performed with SPSS (version 18.0, SPSS Inc, Chicago, IL, USA). A "P-value" less than 0.05 was considered significant.

Ethical considerations

This research was registered in Kerman Medical Sciences Research Center with ethics code IR.KMU.REC.1394.355. The present study did not interfere with the process of diagnosis and treatment of patients and all participants signed an informed consent form. The patients were assured that their data will remain completely confidential.

Results

A total of 115 patients participated in this study, with 84 on hemodialysis and 31 on peritoneal dialysis. Among

hemodialysis patients, 61.9% were male, while 54.8% of peritoneal dialysis patients were male. The mean age for hemodialysis patients was 56.8 ± 15.6 years and 52.1 ± 18.8 years for peritoneal dialysis patients. Of the hemodialysis patients, 21.4% were single, and 16.1% of the peritoneal dialysis patients were single. Among hemodialysis patients, 45.2% had educational qualifications below a diploma, while 48.4% of peritoneal dialysis patients had the same qualifications. The primary reason for disease in hemodialysis patients was blood pressure for 40.5% of patients, compared to 32.3% of peritoneal dialysis patients. Additionally, 35.7% of hemodialysis patients were retired, while 29% of peritoneal dialysis patients were housewives [Table 1].

A significant difference in the specific dimensions of quality of life was found between the two groups using MANCOVA analysis ($P=0.002$ and $F=9.63$). To determine which dimensions had significant differences between the two groups, linear regression (or ANCOVA) was used, with all demographic variables controlled for (age, gender, marital status, education, insurance status, employment status, and reason for illness). The regression results revealed that among the 11 specific dimensions of quality of life, only the dimension of social support in patients treated with hemodialysis (74.2 ± 26.3) and peritoneal dialysis (74.2 ± 26.8) is nearly equal in both groups. Results showed that the quality of life between hemodialysis and peritoneal dialysis patients was significantly different in three dimensions, specifically symptoms and problems, the effect of kidney disease, and encouragement from dialysis staff. Although the quality of life was different between these two groups of patients in seven dimensions, the difference was not statistically significant. The dimension with the highest quality of life score in both hemodialysis (86.46 ± 15.79) and peritoneal dialysis patients (92.34 ± 12.36) was related to encouragement from dialysis staff. The dimension with the lowest quality of life score in hemodialysis patients (30.36 ± 37.24) and peritoneal dialysis patients (25.81 ± 28.49) was related to work status [Table 2].

Table 1. Demographic characteristics of patients treated by hemodialysis (n=84) and peritoneal dialysis (n=31)

		Peritoneal dialysis (n=31)	Hemodialysis (n=84)	P value
Age		52.1±18.8	56.8±15.6	0.17
Sex	Male	17 (54.8)	52 (61.9)	0.49
	Female	14 (45.2)	32 (38.1)	
Marital status	Single	5 (16.1)	18 (21.4)	0.53
	Married	26 (83.9)	66 (78.6)	
Education	Illiterate	3 (9.7)	12 (14.3)	0.18
	High school	15 (48.4)	38 (45.2)	
	Diploma	13 (41.9)	25 (29.8)	
	University graduated	0	9 (10.7)	
Reason of kidney disease	I do not know	7 (22.5)	11 (13.1)	0.56
	High blood pressure	10 (32.3)	34 (40.5)	
	Diabetes	10 (32.3)	27 (32.1)	
	Polycystic kidney disease	2 (6.5)	2 (2.4)	
	Chronic glomerulonephritis	1 (3.2)	3 (3.6)	
	Other	1 (3.2)	7 (8.3)	
Job status	Employed	5 (16.1)	19 (22.6)	
	Retired	6 (19.4)	30 (35.7)	
	Disabled	7 (22.6)	13 (15.5)	
	Housewife	9 (29)	14 (16.7)	
	Other	4 (12.9)	8 (9.5)	

Table 2. Comparison of the mean score of specific dimensions of quality of life in patients treated with hemodialysis (n=84) and peritoneal dialysis (n=31)

Dimension	Group	Mean±SD	Adjusted regression coefficients (95% confidence interval)	P value
Symptoms and problems	Hemodialysis (n=84)	59.5±22.7	11.12 (2.58, 19.66)	0.011
	Peritoneal dialysis (n=31)	70.4±22.3		
Effect of kidney disease	Hemodialysis (n=84)	54.5±23.5	12.04 (3.1, 20.57)	0.006
	Peritoneal dialysis (n=31)	70±24.5		
Burden of kidney disease	Hemodialysis (n=84)	36.4±37.2	4.36 (-5.53, 14.25)	0.39
	Peritoneal dialysis (n=31)	43.1±27.9		
Job status	Hemodialysis (n=84)	30.4±37.2	0.16 (-12.54, 12.86)	0.98
	Peritoneal dialysis (n=31)	25.8±28.5		
Cognitive function	Hemodialysis (n=84)	63.2±24.8	1.54 (-7.9, 10.98)	0.75
	Peritoneal dialysis (n=31)	69±21.8		
Quality of social interactions	Hemodialysis (n=84)	67.7±20.7	4.8 (-3.4, 12.95)	0.25
	Peritoneal dialysis (n=31)	70.3±18		
Sexual function	Hemodialysis (n=84)	62.1±40.4	-6.35 (-30.47, 17.76)	0.61
	Peritoneal dialysis (n=31)	70.5±27.5		
Sleep	Hemodialysis (n=84)	54.8±23.6	4.75 (-4.35, 13.86)	0.31
	Peritoneal dialysis (n=31)	60.2±19.4		
Social support	Hemodialysis (n=84)	74.2±26.3	2.18 (-8.5, 12.87)	0.69
	Peritoneal dialysis (n=31)	74.2±26.8		
Encouraging dialysis department staff	Hemodialysis (n=84)	86.5±15.8	6.30 (0.28, 12.32)	0.04
	Peritoneal dialysis (n=31)	92.3±12.4		
Patient satisfaction	Hemodialysis (n=84)	57.1±25.1	-3.87 (-14.51, 6.94)	0.49
	Peritoneal dialysis (n=31)	54.3±24.3		

The MANCOVA analysis revealed a significant difference between the general dimensions of quality of life in the two groups ($P = 0.002$ and $F = 10.27$). To determine which dimensions had significant differences between the two groups, linear regression (ANCOVA) was used, with all demographic variables controlled for (age, gender, marital status, education, insurance status, employment status, and reason for illness). The regression results found that out of the 8 general dimensions of quality of life, the mean quality of life score in the dimension of physical performance was almost identical between hemodialysis patients (44.52 ± 26.10) and peritoneal dialysis patients (44.68 ± 26.23). Statistically significant differences were observed in the quality of life of hemodialysis and peritoneal dialysis patients in terms of physical role, pain, emotional role, general health, and social function. While there was a difference in mean quality of life scores for vitality and energy/fatigue between these two groups, the difference was not statistically significant. The emotional role dimension had the highest quality of life score in both

hemodialysis patients (55.65 ± 27.63) and peritoneal dialysis patients (73.66 ± 24.10). On the other hand, the physical role dimension had the lowest quality of life score in hemodialysis patients (21.43 ± 27.75) and peritoneal dialysis patients (38.71 ± 29.47) [Table 3].

To evaluate the assumptions of the regression analysis conducted, the variance inflation index (VIF) was calculated for all regressions and each variable in the model. Results show that the VIF values fell between 1 and 2, which is below the cut-off value of 10. This indicates a lack of collinearity between variables. Furthermore, the skewness and kurtosis indices of all the residuals for the fitted regression models were between -1 and 1, signifying normality assumptions were met.

Moreover, the Durbin-Watson index values were close to 2, confirming the independence of errors. Overall, the important presuppositions of the regression analysis for comparing two groups while controlling for other variables are established and deemed acceptable.

Table 3. Comparison of the mean scores of general aspects of quality of life in patients treated with hemodialysis (n=84) and peritoneal dialysis (n=31)

Dimension	Group	Mean±SD	Adjusted regression coefficients (95% confidence interval)	P value
Physical performance	hemodialysis (n=84)	44.52±26.1	0.35 (-10.1, 10.76)	0.95
	peritoneal dialysis (n=31)	44.68±26.23		
Role—Physical	hemodialysis (n=84)	21.43±27.75	18.86 (7.1, 30.63)	0.02
	peritoneal dialysis (n=31)	38.71±29.47		
Pain	hemodialysis (n=84)	46.43±28.58	15.31 (4.38, 26.23)	0.006
	peritoneal dialysis (n=31)	59.52±23.55		
General health	hemodialysis (n=84)	42.56±15.34	7.51 (1.37, 13.66)	0.017
	peritoneal dialysis (n=31)	50±15.66		
Vitality	hemodialysis (n=84)	52.57±22.22	5.62 (-2.7, 13.94)	0.18
	peritoneal dialysis (n=31)	57.81±18.21		
Role emotional	hemodialysis (n=84)	55.65±27.63	13.56 (3.7, 23.41)	0.007
	peritoneal dialysis (n=31)	73.66±24.1		
Social Performance	hemodialysis (n=84)	52.23±25.01	11.63 (1.84, 21.42)	0.02
	peritoneal dialysis (n=31)	62.9±20.8		
Energy/fatigue	hemodialysis (n=84)	43.33±20.7	6.77 (-1.67, 15.21)	0.12
	peritoneal dialysis (n=31)	29.84±21.54		

Discussion

Renal replacement therapies such as hemodialysis and peritoneal dialysis have been proven to significantly enhance the quality of life of patients. With quality of life

being a crucial outcome for patients who undergo renal replacement therapy, it is essential to evaluate the living conditions of individuals with kidney failure and take appropriate measures to improve their quality of life.

The results of the present study indicate that quality of life was poorer for hemodialysis patients compared to peritoneal dialysis patients, consistent with the findings of Amirkhani et al. in Iran¹⁹ and Sathvik et al. in Iran.²⁰ However, De Abreu et al.'s study in Brazil²¹ reported similar quality of life between peritoneal dialysis patients, despite them being older and having more diabetic diseases than the hemodialysis patients. The poorer quality of life observed in our study for hemodialysis patients may be largely due to their older age and dependence on frequent visits and dialysis machines.

The study found that peritoneal dialysis patients had a better quality of life than hemodialysis patients in most of the specific dimensions, but the results were statistically significant only for three dimensions: symptoms and problems, effects of kidney disease, and encouragement of dialysis staff. The favorable conditions in the dimensions of symptoms, problems, and effects of kidney disease in peritoneal dialysis patients may be due to their decreased frequency of visits and fewer connected devices compared to hemodialysis patients, who are required to be connected to the device three times for four hours each time, causing discomfort and pain. The low score in the pain dimension among hemodialysis patients supports this claim. The higher motivation index of dialysis staff may be attributed to the special treatment conditions of peritoneal patients, as they are less dependent on medical staff and are responsible for their own care, motivating caregivers to train them. A study conducted by De Abreu et al. in Brazil found that peritoneal patients scored higher on this dimension.²¹

In this study, both hemodialysis and peritoneal dialysis patients showed similar levels of social support. However, a study by Czyżewski found that peritoneal patients had more social support.²² Although not significant, Okpechi et al. found that hemodialysis patients may have slightly better social support.²³

The present study found that hemodialysis patients had relatively better scores than peritoneal patients in only two specific dimensions. However, when compared to peritoneal patients, one of these aspects, work status, was not statistically significant, as seen by the frequency of replies in Table 1. In a similar study, Czyzewski et al. found

that hemodialysis patients scored higher than peritoneal patients on the specified dimension.²² Conversely, in the study of Fructuoso et al., the score of quality of life in peritoneal patients was significantly better than that of hemodialysis patients in terms of this dimension. Hemodialysis patients had a better score than peritoneal patients in terms of patient satisfaction.²⁴ Contrastingly, a study conducted in Brazil showed that peritoneal patients had a better score than hemodialysis patients in this dimension despite being older.²¹ The difference between that study and the present study may be attributed to the larger statistical population and cultural differences between the societies.

In terms of overall quality of life, the two groups of patients were similar, except for physical performance, where there was almost no difference. However, peritoneal patients had a higher quality of life in five dimensions: social function, physical role, pain, general health, and emotional role, and this difference was statistically significant according to studies by Czyżewski et al.²² and Fructuoso et al.²³ Okpechi et al.²⁴ found no significant difference between the dimensions listed in Table 3. Given that patients' perceptions of their quality of life can be influenced by their personality, culture, religion, and social background, and that previous studies were carried out in different geographical, cultural, and social contexts, these observed differences may be partly justified.

A study by Noshad et al.,²⁵ which employed a GHQ-28 questionnaire, found that peritoneal dialysis patients had better survival and quality of life than hemodialysis patients. However, among diabetic patients undergoing dialysis, hemodialysis patients had better survival rates and lower mortality rates than peritoneal dialysis patients.

Although this study found that peritoneal dialysis patients had a better quality of life compared to hemodialysis patients and that peritoneal dialysis is a simple, convenient, and cost-effective treatment, a large majority of patients in Iran still undergo hemodialysis. In fact, 95% of patients are treated with hemodialysis, while only 5% receive peritoneal dialysis. The reasons for this preference for hemodialysis may include a higher number of available hemodialysis centers, greater physician expertise in hemodialysis, and concerns over the risk of

peritonitis associated with peritoneal dialysis.²⁶ To promote the use of peritoneal dialysis, it is recommended to provide necessary resources and support to patients.

In many European countries, employing psychologists in the dialysis team has been implemented to improve the quality of life for patients.²⁷ Since psychological issues can impact the quality of life of dialysis patients, psychologists can establish a friendly relationship with patients and provide psychoanalytical support to enhance their well-being. It is advisable to incorporate these specialists into Iranian dialysis centers to alleviate patients' pain and improve their emotional state. However, due to the high number of questionnaire questions and unfavorable patient conditions on visit days, completing the questionnaire may be delayed until the next visit.

Conclusions

To enhance the quality of life for patients, healthcare providers should encourage susceptible patients to perform peritoneal dialysis, as it has demonstrated better results. The providers should also provide the necessary training to patients and consider their conditions when deciding the most suitable method for them. However, if, for any reason, patients or providers choose hemodialysis, necessary facilities should be provided to ensure patients feel comfortable during treatment. Since patients spend the majority of their time at home, proper training should be given to family members to help them provide adequate care to the patients. This will ensure that the patients receive the necessary support and care, even when they are not receiving medical assistance.

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Competing interests

The authors declare that they have no competing interests.

Abbreviations

Multivariate analysis of covariance: MANCOVA;

Variance Inflation Index: VIF;

Authors' contributions

All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

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Availability of data and materials

The data used in this study are available from the corresponding author on request.

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. Institutional Review Board approval (IR.KMU.REC.1394.355) was obtained. The present study did not interfere with the process of diagnosis and treatment of patients and all participants signed an informed consent form.

Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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