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Quality of Life of Patients on Peritoneal Dialysis and Contributing Factors: A Cross-Sectional Study

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Abstract

In recent years, interest in Health-Related Quality of Life (HRQoL) as a major indicator of clinical efficacy and treatment outcome in patients of End-Stage Renal Disease (ESRD) has grown significantly. This study aimed to determine the contributing factors affecting the quality of life (QoL) of ESRD patients undergoing peritoneal dialysis (PD). A cross-sectional study was conducted on PD patients presented at PD centres of Al-Zahra and Noor hospitals in Isfahan, Iran, from May to August 2019. A total of 173 patients having peritoneal dialysis for more than 3 months filled the validated 36-item short-form health survey questionnaire (SF-36). Baseline demographic details and dialysis-related factors were collected from patients' medical records. The overall QoL score of patients was 50.28 ± 20.87. Male patients had a higher QoL score than female patients (58.18 in males, compared to 48.18 in females; P = 0.04). A significant association between frequency of dialysis and quality of life was observed, where three sessions of dialysis per day yielded the highest quality of life (QoL score = 59.62; P = 0.047). A significant positive correlation was discovered between QoL score and residual renal function (P = 0.013). In addition, a higher QoL score was observed in self-employed patients (60.95), compared to housewives (46.49) (P = 0.001). QoL assessment should be included as an integral part of patient follow-up to evaluate treatment outcomes and implement possible interventions to improve patient's quality of life.

Keywords: chronic kidney disease; end-stage renal disease; peritoneal dialysis; quality of life; SF-36 questionnaire

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Introduction

Chronic kidney disease (CKD) and end-stage renal disease (ESRD) are major medical and public health problems worldwide and a serious challenge for many developing countries (1, 2). In Iran, like in other developing countries, diabetes mellitus and hypertension are the leading causes of ESRD. Other common causes of ESRD include glomerulonephritis, polycystic kidney disease, and obstructive uropathy (3–8). ESRD represents a progressive clinical condition in which an irreversible loss of endogenous renal function below a sufficient degree is established, imposing permanent dependency on renal replacement therapy (RRT) to avoid life-threatening uremia and other complications. Treatment

of this disease is affected through RRT, including peritoneal dialysis (PD), hemodialysis (HD), or kidney transplantation (KT) (9–11).

Kidney transplantation has been accepted as the best RRT, contributing to the best prognosis, regarding either survival or quality of life in ESRD patients. However, owing to rapid increase in the prevalence of ESRD and the long waiting list for kidney transplantation, most patients with ESRD would go through a period of using any of the dialysis modalities in their life (12–15). It is a fact of clinical practice that while long-term survival is the center of attention of most physicians, ESRD patients care more about their health-related quality of life (HRQoL) and prefer to spend this time in satisfactory well-being, instead of achieving a longer life (16–19).

Quality of life (QoL) is a term that is difficult to define. It is both a subjective and multidimensional concept that is regarded as a useful indicator of individual's well-being in both physical and mental aspects of health. According to the World Health Organization's (WHO) definition of quality of life, it is individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns (20–25).

In recent years, more attention has been focused on the psychological consequences of maintenance dialysis therapy in patients with ESRD, and interests in HRQoL as an evaluative factor of responsiveness and effectiveness of treatment has grown significantly. Hence, evaluation of outcomes of ESRD treatment has gone beyond traditional assessments, such as morbidity, mortality, and hospitalization rate, and HRQoL has been accepted as an important outcome measure from both clinician and patient perspectives (9, 24, 26–29).

Materials and Methods

Study design

This cross-sectional study comprised ESRD patients undergoing peritoneal dialysis at the PD centers of Al-Zahra and Noor hospitals from May to August 2019. The inclusion criteria constituted patients aged more than 18 years, having ESRD, and undergoing peritoneal dialysis for at least 3 months. The exclusion criteria of the study included poor cognitive status and disability to answer questions (Figure 1). The entire study protocol was explained to all the patients having peritoneal dialysis at the centers for 3 months, that is, from May 2019 to August 2019. Written informed consent was obtained from all the patients for their anonymized information to be published in this paper. This study was approved by the ethical committee of the Isfahan University of Medical Science (IR.MUI.MED.REC.1398.425).

Variables included age, body mass index (BMI), gender, marital status, having separate room for peritoneal dialysis, employment, level of education, duration of the disease, comorbidities, duration of dialysis, type of solution used for peritoneal dialysis, and residual renal function (residual kidney clearance was approximated as the average of creatinine clearance [K_{rc}] and urea clearance [K_{ru}]). For calculating K_{ru}, patient was required to collect complete urine of 24 h:

$$K_{ru} = \frac{UUN}{SUN} \times \text{urine flow rate (mL/min)},$$

where UUN was the urine urea nitrogen concentration and SUN was serum urea nitrogen concentration.

Creatinine clearance (Cr_{cl}) was computed as the ratio of the per minute urine generation rate (from a 24-h urine collection) and the mean plasma level:

$$Cr_{cl} = \frac{UV}{P},$$

where UV = urine flow rate × urine creatinine concentration, and P was the mean plasma concentration of creatinine during the collection period.

Dialysis adequacy was calculated by the index of Kt/V. Peritoneal Kt/V was calculated by a 24-h collection of dialysate effluent and measuring its urea content. This was then divided by the average plasma urea level for the same 24-h period to give the clearance term, Kt. Residual renal Kt urea was calculated in the same manner using a 24-h collection of urine. Peritoneal and renal Kt results were then combined to arrive at total Kt per day, and divided by the estimated volume of distribution of urea using anthropometric equations for total body water (Watson's equation).

Therefore, peritoneal Kt = daily drain volume × D/P urea,

$$\text{renal urea clearance} = \text{renal Kt urea},$$
$$\text{total Kt/V} = \text{peritoneal Kt/V} + \text{renal Kt/V},$$
$$\text{V (by Watson's equation)} = 2.447 - 0.09516\,A + 0.1704\,H + 0.3362\,W \text{ (in males)},$$
$$V = -2.097 + 0.1069\,H + 0.2466\,W \text{ (in females)},$$

where A = age (years), H = height (cm), and W = weight (kg) (30). Frequency of dialysis and hemoglobin levels were taken from patients' medical records. In addition, patients were asked about their quality of life using a 36-item short-form health survey questionnaire (SF-36).

SF-36 Health Survey questionnaire

The SF-36 health survey questionnaire has a set of multipurpose, generic, and easily administered quality-of-life

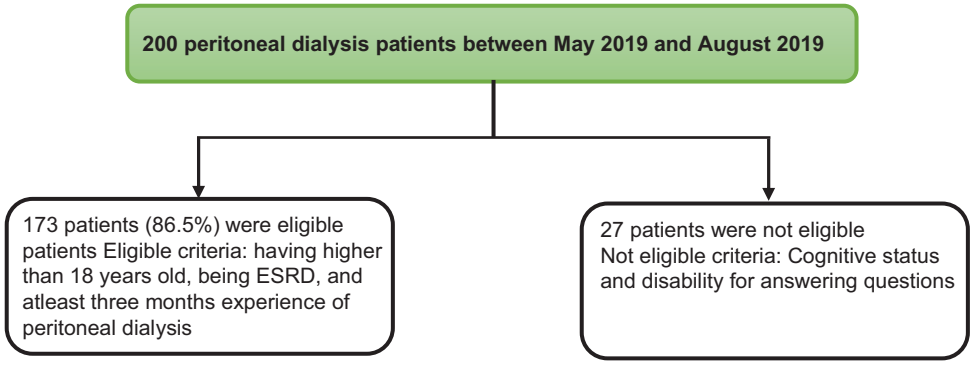

Figure 1: Study flow chart showing the inclusion and exclusion criteria of patients.

measures. These measures are based upon patient's self-reported status and are used for routine monitoring and assessment of treatment outcomes in adult patients. It consists of 36 items, which are divided into eight sub-scales: physical functioning (PF, 10 items), role physical (RP, four items), bodily pain (BP, two items), general health (GH, five items), vitality (VT, four items), social functioning (SF, two items), role emotional (RE, three items), and mental health (MH, five items). The scores of first four sub-scales are summed to create the physical composite score (PCS), while the scores of the last four sub-scales are summed to create the mental composite score (MCS). The format of questions is a combination of 5-point and 3-point scales, and dichotomous (yes/no) items. The higher total scores indicate a better HRQoL. The validity and reliability of the Persian's version of SF-36 questionnaire was confirmed by Montazeri et al. in 2005 (31).

Statistical analysis

Qualitative variables were reported as frequency and frequency proportions, whereas quantitative variables were reported as mean values and standard deviation for normal variables and median and interquartile range for non-normal variables. The Kolmogorov–Smirnov test was used to assess the normality of variable distributions. To determine the correlation between QoL scores and other quantitative variables, Pearson and Spearman correlation tests were expended according to the normality of variables. To compare QoL scores and its sub-scales between different variables with two subgroups, independent Student's *t*-test or Mann–Whitney U test was used. For variables with more than two subgroups, one-way ANOVA test with the Tukey post hoc test was used for normal variables and the Kruskal–Wallis nonparametric test for non-normal variables. Multivariable stepwise linear regression was used to investigate the simultaneous association of variables on QoL score. All statistical analyses were performed using Statistical Package for the Social Sciences 24.0 (SPSS Inc., Chicago, IL, USA). $P < 0.05$ was considered as statistically significant.

Results

The present study comprised 173 CKD patients who underwent peritoneal dialysis for at least 3 months. The characteristics of patients of the study are shown in Table 1. The mean age of the patients was 56.14 ± 16.55 years, 107 (61.8%) were males, and 130 (75.1%) patients were married. Most of the patients were housewives (34.9%), and the level of education of most of them was elementary (48%).

The mean duration of kidney disease in all patients was 109.71 ± 99.9 months, and the mean duration of dialysis was 35.63 ± 35.04 months. The mean dialysis adequacy score was 1.91 ± 0.48, and their mean residual renal function was 2.64 ± 2.68. Most of the patients were dialyzed three (39.8%) or four (42.1%) times a day, and 115 (67.3%) of them had a separate room for dialysis at their home. Their mean hemoglobin level was 11.07 ± 2.06 g/dL. The most common comorbidity in the study participants was diabetes mellitus (35.9%). The overall QoL score of the participants was 50.28 ± 20.87 (Table 1).

Next, we assessed the association of demographic and dialysis-associated factors with QoL scores. Male patients had a higher QoL score, compared to female patients (58.18 [males] vs 48.18 [females]; P = 0.04). Considering the number of dialysis per day, a significant association was observed between frequency of dialysis and quality of life (P = 0.047), where three sessions of dialysis per day yielded the highest quality of life (QoL score = 59.62, P = 0.047). No statistically significant relationship was observed between quality of life and marital status, level of education, having comorbidities, solution type, or having a separate room for dialysis. As Table 1 shows, most of the patients were housewives. A higher QoL score in self-employed patients was ascertained,

Table 1: Demographic and dialysis-associated characteristics of participants.

Characteristics		Mean	SD	Count	Percentage
Age (years)		56.14	16.55	–	–
BMI (kg/m^2)		24.53	4.10	–	–
Gender	Male	–	–	107	61.8
	Female	–	–	66	38.2
Marital status	Single	–	–	43	24.9
	Married	–	–	130	75.1
Disease duration (months)		109.71	99.9	–	–
Duration of dialysis (months)		35.63	35.04	–	–
Dialysis adequacy		1.91	0.48	–	–
Residual renal function (mL/min. 1.37m^2)		2.64	2.68	–	–
Hb (g/dL)		11.07	2.06	–	–
QoL score		50.28	20.87	–	–
Dialysis frequency (per day)	1 or 2	–	–	14	8.2
	3	–	–	68	39.8
	4	–	–	72	42.1
	5 or 6	–	–	17	9.9
Solution type	Solution 1	–	–	49	28.5
	Others (mix of icodextrin and conventional solution)	–	–	123	71.5
Having separate room for peritoneal dialysis	Yes	–	–	115	67.3
	No	–	–	56	32.7
Employment	Housewife	–	–	59	34.9
	Retired	–	–	36	21.3
	Self-employed	–	–	52	30.8
	Employee	–	–	10	5.9
	Unemployed	–	–	7	4.1
	Student	–	–	5	3.0
Education	Ignorant	–	–	30	17.3
	Elementary	–	–	83	48.0
	Diploma	–	–	41	23.7
	University	–	–	19	11

(*continues*)

Table 1: Continued.

Characteristics		Mean	SD	Count	Percentage
Comorbidities	Diabetes mellitus	–	–	11	6.4
	Kidney stone/cyst	–	–	5	2.9
	Diabetes mellitus + Hypertension	–	–	51	29.5
	Others	–	–	103	59.5
Daily urinary volume (mL/day)		471.47	539.09		

compared to housewives (60.95 [self-employed] vs 46.49 [housewives]; P = 0.001). In addition, no statistically significant association was discovered between QoL score and level of education (P = 0.36; Table 2).

As presented in Table 3, no statistically significant relationship was determined between the QoL score in peritoneal dialysis patients and age, BMI, hemoglobin level, disease duration, dialysis duration, and dialysis adequacy. Although residual renal function was associated with QoL scores in patients undergoing peritoneal dialysis (P = 0.013), a correlation coefficient of 0.230 accorded with a weak direct correlation between them (Table 3).

Next, controlling the effects of gender, age, and BMI, we investigated the association of dialysis-associated variables with QoL score. Only residual renal function significantly associated with QoL scores (regression coefficient = 2.17 (0.71, 3.64, P = 0.046). No other variables showed any significant association with QoL scores.

Next, we assessed the association of contributing factors with SF-36 questionnaire sub-scales, including physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Males and females were different in physical functioning, and males had a higher score (70 [males] vs 55 [females]; P = 0.010), they also had a better score for role physical (50 [males] vs 0 [females]), bodily pain (87.5 [males] vs 77.5 [females]), general health (50 [males] vs 40 [females]), and role emotional (66.66 [males] vs 0 [females]). However, marriage was not shown to be significantly associated with any of the sub-scales. BMI of patients also showed no significant association with any of the sub-scales. A significant association was found between age and physical functioning (P< 0.001). In addition, no significant association was discovered between comorbidities and any of the sub-scales. Self-employed patients yielded a better function in most of the domains, compared with housewives, and showed a better physical functioning (69.9 [self-employed] vs 49.71 [housewives], P = 0.003), role physical (75 [self-employed] vs 0 [housewives], P = 0 < 001), general health (54.18 [self-employed] vs 44.23 [housewives], P = 0.014), role emotional (66.66 [self-employed] vs 0 [housewives], P = 0.007), mental health (64.94 [self-employed] vs 59.23 [housewives], P = 0.007). They also suffered from less bodily pain (P = 0.042). Frequency of dialysis resulted in significant changes in general health (P < 0.001), vitality (P = 0.011), social functioning (P = 0.017), and mental health (P = 0.009), and three sessions of dialysis per day resulted in better general health (55.58), vitality (55.5), social functioning (75), and mental health (68.26). Having a separate room for dialysis also had a significant association with better scores of general health (50 [self-employed] vs 40 [housewives], P = 0.023), social functioning (75 [self-employed] vs 62 [housewives], P = 0.015), VT (55 [self-employed] vs 45 [housewives], P = 0.048), RE (66 [self-employed] vs 0 [housewives], P = 0.002), and MH (68 [self-employed] vs 54 [housewives], P = 0.014). No relation was observed between patients level of Hb and quality of life; however, higher levels of Hb in patients were associated with a better role physical (P = 0.007).

Although the duration of dialysis did not demonstrate significant association with any of the QoL sub-scales, dialysis adequacy established a significant association with vitality (P = 0.06) and social functioning (P = 0.029), where higher dialysis adequacy provided better outcomes. Duration of disease was also associated with physical functioning (P = 0.017), and patients with a shorter duration of kidney disease had a better physical functioning. In addition, residual renal function was significantly associated with better role physical (P = 0.24) and mental health (P = 0.035) (see Table 4).

The mean sub-scale scores across contributing factors are presented in Table A1.

Discussion

This study discovered that the most significant characteristics independently associated with quality of life were gender, employment, frequency of dialysis, and residual renal function. In the present study, males had a higher total QoL score than females (58.18 in males, compared to 48.18 in females). On the other hand, in subgroup analysis, males had a better score for physical functioning than females (70 in males,

Table 2. Difference in quality of life according to their contributing factors.

Variable		QoL score	P*
Gender	Male	58.18 (19.84)	0.04 (independent Student's *t*-test)
	Female	48.18 (21.15)	
Marital status	Married	55.64 (20.48)	0.157 (independent Student's *t*-test)
	Single	50.048 (21.78)	
Dialysis frequency	1 or 2	54.95 (21.49)	0.047 (ANOVA–Tukey post hoc test)
	3	59.62 (20.04)	
	4	51.69 (21.14)	
	5 or 6	45.30 (18.69)	
Having a separate room for dialysis	Yes	56.15 (22.10)	0.086 (Mann–Whitney test)
	No	50.53 (18.29)	
Employment	Housewife	46.49 (20.11)	0.001(ANOVA)
	Retired	58.45 (21.59)	
	Employed	60.95 (18.49)	
Education	Ignorant	48.17 (20.72)	0.36 (ANOVA)
	Elementary	56.27 (20.16)	
	Diploma	54.74 (24.05)	
	University	55.38 (17.11)	
Education	Ignorant	48.17 (20.72)	0.36 (ANOVA)
	Elementary	56.27 (20.16)	
	Diploma	54.74 (24.05)	
	University	55.38 (17.11)	
Education	Ignorant	48.17 (20.72)	0.36 (ANOVA)
	Elementary	56.27 (20.16)	
	Diploma	54.74 (24.05)	
	University	55.38 (17.11)	
Comorbidities	Diabetes mellitus	48.02 (23.96)	0.67 (ANOVA)
Solution type	Diabetes mellitus + hypertension	54.79 (21.49)	0.184 (Independent Student's *t*-test)
	Others	54.76 (21.49)	
	1	57.99 (18.31)	
	Others (mix of icodextrin and conventional solution)	52.81 (21.65)	

*Considered significant at $P < 0.05$.

Table 3: Correlation between the QoL scores and contributing variables (Pearson and Spearman correlation).

Quality of life	Age	BMI	Dialysis adequacy	Disease duration	Hb	Duration of dialysis	Residual renal function
Correlation coefficient	–0.089	–0.040	0.095	–0.123	0.103	–0.031	0.230*
P-value	0.279	0.628	0.248	0.139	0.208	0.712	0.013*
N	151	151	150	145	151	148	115

compared to 55 in females). Similar to our findings, studies in North America showed males to be associated with better quality of life (32, 33). In addition, some European studies using the SF-36 discovered an association between males and better QoL (34, 35). In contrast, other studies conducted in the United Kingdom and Turkey determined that scores for males were independently associated with a lower score for all QoL dimensions (9, 24). Previous studies demonstrated that faster decline in kidney function in males than in females could have a negative impact on HRQoL in males, while changes in the hypothalamic–pituitary–gonadal hormones status could make females more prone to problems such as sleep disorders, depression, and cognitive dysfunction (36, 37). On the other hand, males socialized in a different manner than females, more independent and self-controlled, especially in Middle East cultures, while females are taught to be more emotionally expressive, dependent, and concerned with their physical appearance to be accepted by the society (38). It seems that gender roles are not rigid or fixed and depend on some qualitative issues, such as ethnicity, culture, family dynamics, coping mechanisms, educational and social factors as well as physiologic hormonal status. Further studies are required to explore gender roles on quality of life in PD patients. In the present study, notwithstanding the previous studies (34, 39), married patients had no significantly better quality of life, indicating that most patients, either single or married, experienced good support through family ties, maybe due to traditional Iranian culture. According to results of the present study, frequency of dialysis was significantly associated with quality of life. It was not surprising to observe the negative effects of frequency of dialysis on the quality of life of patients because of the time required to spend on dialysis. Self-employed patients were significantly associated with a higher QoL score in our population. It was documented that employment not only provided economic benefits but increased self-esteem, sense of control, and social value (24, 40). On the other hand, the Brazilian peritoneal dialysis multi-center study demonstrated that quality of life was not significantly associated with family income (41), while other aspects of working beyond financial matters might influence more the quality of life. In the present study, patients who were self-employed and could schedule their working time themselves, experienced better quality of life than those working for others. Another factor that was not associated with QoL score in our population was education. However, poor educational status was shown to have a negative effect on the quality of life of PD patients in other studies (24, 33–35). The most common comorbidity in patients of the present study was diabetes mellitus. In the present study, comorbidities were not associated with any sub-scale of quality of life, while another study showed that diabetic patients scored significantly worse on the physical function scale. Although in certain surveys, some comorbidities were related to some QoL sub-scale scores, other possible reasons could be observed for lacking a significant association between the QoL sub-scale scores and diseased condition (24, 34). It appeared that quality of life was not determined merely by the absence or presence of comorbidities; however, it was influenced by patients' perception of their position in different aspects of life, and many non-disease health-related factors play important roles (42). Besides, the severity of comorbidities should be considered in the future studies. Our study demonstrated no significant association between age and QoL score. However, a Spanish study showed that advanced age adversely affects the QoL score (34). It is important to note that in the present study, a significant association between mental health sub-scale and residual renal function was established. This result was consistent with the results of previous studies, indicating that higher residual renal function was associated with improved HRQoL of PD patients, particularly in mental health domains (43, 44). Dialysis adequacy was significantly associated with social functioning and vitality sub-scales. Scarce data were available regarding the effect of dialysis adequacy on the physical and mental domains of quality of life (45, 46), whereas other studies showed no significant association (24, 47).

In contrast with other studies, no statistically significant relationship was observed in the present study between Hb level and the QoL score in peritoneal dialysis patients (2, 48, 49). However, higher Hb levels were associated with a better score of role physical sub-scale ($P = 0.007$). This result was consistent with another study, where greater Hb concentration was related to better QoL scores on physical dimension (35).

Table 4: Association of each contributing factor with SF-36 QoL questionnaire sub-scales.

SF-36 subscales	Gender[a]	Marriage[a]	Dialysis frequency[b]	Seperate room for dialysis[a]	Employment[b]	Age[c]	BMI[c]	Duration of dialysis	Residual renal function	Dialysis adequacy	Hemoglobin (g/dL)[c]	Disease duration[c]	Comorbidities[c]
PF	0.010*	0.217	0.235	0.798	0.003*	<0.001*	0.811	0.902	0.020*	0.535	0.148	0.017*	0.394
RP	<0.001*	0.328	0.732	0.051	<0.001*	0.923	0.740	0.663	0.024*	0.334	0.007*	0.621	0.403
BP	0.033*	0.278	0.681	0.40	0.042*	0.171	0.425	0.352	0.093	0.166	0.099	0.511	0.334
GH	0.049*	0.112	<0.001*	0.023*	0.014*	0.315	0.946	0.911	0.108	0.827	0.250	0.111	0.468
VT	0.163	0.520	0.011*	0.048*	0.169	0.763	0.544	0.868	0.075	0.06*	0.606	0.304	0.377
SF	0.788	0.260	0.017*	0.015*	0.860	0.882	0.236	0.774	0.177	0.029*	0.494	0.393	0.477
RE	0.016*	0.888	0.065	0.002*	0.007*	0.236	0.705	0.863	0.201	0.211	0.126	0.490	0.769
MH	0.122	0.111	0.009*	0.014*	0.007*	0.064	0.372	0.448	0.035*	0.469	0.381	0.586	0.670

PF: physical functioning, RP: role limitations due to physical health, BP: bodily pain, GH: general health, VT: energy/fatigue vitality, SF: social functioning, RE: role limitations due to emotional problems, MH: mental health, emotional well-being. *The test is significant at P = 0.05.

Strength and limitations of the study

We conducted a multi-center study and applied the SF-36 questionnaire that has been widely used in various studies so that the results could reflect local conditions. No information was collected on the psychological features of the patients, structure of services, patients' satisfaction with healthcare services, and healthcare profession–patient relationship. The future studies should consider these aspects for a comprehensive view of the quality of life of PD patients.

Conclusion

Our study showed that the most significant characteristics that were independently associated with patient's quality of life were gender, employment, residual renal function, and frequency of dialysis. Evaluation of quality of life should be incorporated in clinical follow-up of PD patients The above-mentioned factors should be considered to a greater extent for implementing strategies and possible interventions to improve certain aspects of quality of life in our population.

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Conflict of interest

The authors declared no potential conflicts of interest with respect to research, authorship and/or publication of this article.

Availability of data and materials

The datasets during and/or analyzed during the current study available from the corresponding author on reasonable request.

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Author contributions

Niloofar Nili and Mojgan Mortazavi researched literature and conceived the study. SM Hosseini and M Kazemi Naeini did data analysis. Niloofar Nili and Mojgan Mortazavi wrote the first draft of the manuscript, and the latter revised the article. All authors were involved in protocol development. Finally, all authors reviewed and edited, and approved the final version of the manuscript.

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Appendix

Table A1: Mean (SD) values of each contributing factor regarding each of SF-36 QoL questionnaire sub-scales.

Subscales of questionnaire		PF	RP	BP	GH	VT	SF	RE	MH
Gender	Male	70 (35)	50 (75)	87.5 (36.88)	50 (25)	50 (30)	62.5 (25)	66.66 (100)	68 (31)
	Female	55 (65)	0 (50)	77.5 (55)	40 (35)	50 (30)	62.5 (50)	0 (100)	60 (44)
Having separate room	Yes	70 (50)	25 (75)	80 (55)	50 (35)	55 (35)	75 (35.5)	66.66 (100)	68 (32)
	No	65 (40)	0 (50)	77.5 (45)	40 (22.5)	45 (20)	62.5 (25)	0 (100)	54 (34)
Employment	Housewife	49.71 (31.64)	0 (100)	77.5 (52.5)	44.23 (19.63)	48.65 (19.73)	67.06 (23.48)	0 (58.33)	59.23 (22.60)
	Retired	59 (22.46)	62.5 (100)	77.5 (47.5)	48.83 (19.83)	54.66 (19.38)	66.66 (21.60)	100 (100)	70.66 (17.61)
	Employed	69.09 (22.13)	75 (75)	90 (35)	54.18 (16.46)	52.63 (18.45)	69.09 (20.95)	66.66 (100)	64.94 (22.37)
Dialysis frequency	1 or 2	70 (48.75)	0 (75)	95 (35)	51.66 (19.22)	55.41 (17.11)	75 (46.88)	0 (100)	66.66 (24.73)
	3	75 (43.75)	23 (75)	77.5 (45)	55.58 (17.70)	55.5 (17.36)	75 (37.5)	50 (100)	68.26 (19.66)
	4	55 (45)	0 (75)	77.5 (45)	44.95 (19.42)	47.98 (21.02)	62.5 (25)	0 (100)	59.87 (23.58)
	5 or 6	60 (23.75)	12.5 (50)	77.5 (15)	34.37 (11.52)	39.37 (17.11)	50 (12.5)	0 (50)	50.25 (18.64)

PF: physical functioning, RP: role limitations due to physical health, BP: bodily pain, GH: general health, VT: energy/fatigue vitality, SF: social functioning, RE: role limitations due to emotional problems, MH: mental health, emotional well-being. Median (interquartile range) was reported for non-normal variables, and mean (SD) was reported for normal variables.