RESEARCH ARTICLE

Quality of Life of Patients in End-Stage Renal Disease Patients Undergoing Hemodialysis in Sulaimani City/Iraq

Sarwat Ahmed Abdulqader 1, Bushra Mohammed Ali 2

1 B.Sc. Community Health, Family and Community Medicine Department, College of Medicine, University of Sulaimani, Sulaymaniyah, Kurdistan region, Iraq

2 Assistant Professor, Head of Family and Community Medicine Department, College of Medicine, University of Sulaimani, Sulaymaniyah, Kurdistan region, Iraq

Corresponding author: Sarwat Ahmed Abdulqader

Email: *sarwat.abdulqader@gmail.com*

ABSTRACT

Background: End-stage renal disease patients require renal replacement therapy through hemodialysis. Hemodialysis procedure results in a loss of functional level and significantly impacts the quality of life over time.

Aim: This study aimed to assess the quality of life of patients on maintenance hemodialysis in Sulaimani city.

Methodology: A cross-sectional study was conducted in three governmental hemodialysis centers in Sulaimani city. Two hundred twenty-two patients aged 18 years or older who were clinically diagnosed with the end-stage renal disease with regular hemodialysis participated in this study. The World Health Organization Quality of Life-Brief tool assessed the quality of life. Data were analyzed using the statistical package for the social science version 25.0.

Results: The patients' mean (± SD) age was (52.35 ± 15.30) years old, ranging from 18 to 79 years old. Out of 222 patients, more male patients were recorded (n = 113, 50.9%). The quality of life domains were; physical health 39(21 - 57), social relationship 42(25 - 67), psychological 46(29 - 63), and environment (58 ± 16), respectively. Increased age, gender, education level, comorbidities, living outside the city, more years on hemodialysis, and thrice hemodialysis weekly sessions were significantly associated with poor quality of life scores.

Conclusion: The study findings revealed that hemodialysis patients had poor quality of life in all domains; physical health was the most affected.

Key Words: Quality of life, hemodialysis, chronic kidney disease, end-stage renal disease
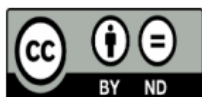
INTRODUCTION

Chronic kidney disease (CKD) has been identified as a significant public health issue worldwide (Akizawa et al., 2018). CKD is a significant source of morbidity and mortality worldwide and has enormous personal, social, and economic impacts (Joshi et al., 2017). CKD is a clinical disease defined by a gradual, progressive, and irreversible decrease in renal function. The global rise in this condition is driven mainly by an increase in diabetes, hypertension, obesity, and aging. Other factors, such as infections and herbal and environmental toxins, are still frequent in some countries (Barbosa, Moura, Lira, & Marinho, 2017; Lv & Zhang, 2019). According to National Kidney Foundation-Kidney Disease Outcomes Quality Initiative (NKF-K/DOQI) guidelines, CKD has five stages based on glomerular filtration rate (GFR) and albuminuria. The fifth stage is end-stage renal disease (ESRD) if GFR is less than 15 mL/min (Abraham, Venu, Ramachandran, Chandran, & Raman, 2012; Bilous et al., 2012). Patients with ESRD require renal replacement therapy (RRT) in the form of dialysis [hemodialysis (HD), peritoneal dialysis (PD)], or kidney transplantation to enhance physiological functioning and prolong life (Chiaranai, 2016). Hemodialysis is a procedure that uses an external dialyzer to eliminate waste and excess fluid from the blood when the kidneys are unable to do so adequately (HN, Rathwa, & Balagavi, 2020). However, this procedure may result in a loss of functional level and, as a result, a decrease in the quality of life (QOL) over time (Vanholder et al., 2017).

A lack of regular physical activity among HD patients may be related to comorbidities such as cardiovascular disease, anemia, infections, hepatitis, bone disorders, and malnutrition, all of which increase the risk of hospitalization and mortality (Barbosa et al., 2017; Thomas, Kanso, & Sedor, 2008). The life of persons on dialysis is affected by several constraints. Pain, fluid restriction, itching, discomfort, limits in physical activity, fatigue, weaknesses, paying for treatment, feelings of inadequacy, sexual dysfunction, and depressive moods are the most common psychological and physiological challenges faced by dialysis patients (El-Habashi et al., 2020). QOL is an essential factor to consider when assessing the experience and outcomes of individuals receiving health care. Previous research on various populations has found that HD significantly impacts patients' QOL, physical function, and personal and social relationships (Hejazi, Hosseini, Ebadi, & Alavi Majd, 2021). The World Health Organization (WHO) has defined QOL as "an individual's perception of their position in life in the context of the culture and value systems in which they live and concerning their goals, expectations, standards, and concerns. It is a wide-ranging concept, influenced in a complex way by a person's physical health, psychological state, level of independence, social relations, and relationship with the salient features of their environment." (Hejazi et al., 2021; Saxena, Carlson, Billington, & Orley, 2001; World Health Organization, 1998b). Within the context of the health sciences, QOL encompasses subjective wellbeing and functioning in the physical, psychological and social domains. QOL provides information on areas of health care that "effectively reach the patient." As a result, QOL might be considered a significant endpoint for health interventions (Joshi et al., 2017; World Health Organization, 1998b, 2004). Therefore, one of the primary goals of ESRD management is to implement interventions

that improve QOL. Compromised QOL among ESRD patients could be associated with physical, social, psychological, and adherence factors (Alshogran, Shatnawi, Altawalbeh, Jarab, & Farah, 2021). To date, limited information exists about variables associated with poor QOL among HD patients in the Kurdistan region of Iraq, particularly in Sulaimani city. Thus, this study was conducted to evaluate the QOL of HD patients in Sulaimani hemodialysis centers and to determine the multiple factors such as sociodemographic characteristics and clinical variables associated with poor QOL.

PATIENTS AND METHODS

Study design and Setting

The cross-sectional study design was used to carry out the present study from October 2021 to March 2022.

Setting of the Study

The study was carried-out at the Sulaimani hemodialysis center, the hemodialysis unit at Shar hospital, and the Shorsh hemodialysis unit at Shorsh general hospital.

The Sample of the Study

A non-probability convenience sampling technique was applied in the present study. 222 patients on regular patients in three hemodialysis centers in Sulaimani city were participated in the present study.

Data collection

Data were collected through the use of a questionnaire by face-to-face interview with each patients.

Study Instruments

The patient's quality of life was measured by the world health organization's quality of life (WHOQOL-BREF) questionnaire. It comprised (26) questions/items divided into two general health and overall QOL questions and (24) questions into four different domains. The QOL domains include; the physical health domain (7 items), the psychological domain (6 items), the social relationship domain (3 items), and the environment domain (8 items) (World Health Organization, 1998b, 2004). The four domain scores were scaled on a five-point Likert scale in a positive direction (1-5) except for items number (3, 4, and 26) scaled in the adverse order (5-1). The researcher directly reversed the scores of these three questions in the questionnaire (World Health Organization, 1998b). The mean score of items within each domain was used to calculate the domain score. Finally, all the domain scores were transformed to (0-100) scales according to the (WHOQOL-BREF) instructions (World Health Organization, 1998b). The higher the scores, the better QOL (Saxena et al., 2001; Whoqol Group, 1998; World Health Organization, 1998a, 1998b, 2004). For interpreting the QOL scores, the QOL domain scores are divided into poor and good QOL. The QOL scores (< 60) indicate poor QOL and any QOL score (≥ 60) indicates good QOL. Previous research has shown that this was the best cutoff point when a division is required (Ristolainen et al., 2020; P. A. B. Silva, Soares, Santos, & Silva, 2014; S. M. Silva, Santana, Silva, & Novaes, 2019; Visweswaran et al., 2020).

STATISTICAL ANALYSIS

The data were analyzed using Statistical Package for the Social Sciences (SPSS) version (25). Shapiro-Wilk test and histogram figure were used to determine the normal distribution status of the

data. The mean ± standard deviation (SD) was calculated for normally distributed continuous data. The median with interquartile range (IQR) (25th– 75th percentile) was calculated for non-normally distributed continuous data. For categorical variables, frequencies and percentages were calculated. T-test and ANOVA tests were used to test the relationship between the quantitative normally distributed variables. Mann Whitney, Wilcoxon, and Kruskal Wallis tests were used for testing the non-normally distributed quantitative variables. (P-value ≤ 0.05) considered significant.

RESULTS

Table 1. The patients' mean age ± standard deviation (SD) was 52.35 ± 15.30 years, ranging from 18 to 79 years old. More than half of the patients were male (n = 113, 50.9%). Most patients lived in the city (n = 167, 75.2%). Most of the participants were married (n = 162, 73%). Most participants were illiterate and had read and write education level (n= 75 33.8%, n= 51, 23%). Most patients (n = 123, 55.4%) underwent two weekly HD sessions. Furthermore, most patients (n = 149, 67.1%) are on HD for less than 35 months. Most patients had comorbidities (n = 204, 91.9%). The main risk factors of ESRD were hypertension (n = 105, 47.3%) followed by diabetes mellitus (n = 72, n = 32.4%) (Figure 1).

Table 2. According to the results, the following QOL domains scores were obtained; physical health had the lower QOL score of 39 (IQR = 21 - 57), followed by social relationships QOL score of 42 (IQR = 25 - 67), psychological domain QOL score 46 (IQR = 29 - 63), and environment domain had the higher mean QOL score (58 ± 16), respectively.

Table 3. There was a statistically significant differences between the QOL scores of different age groups in physical health and environment domains were observed (P = 0.043 and P = 0.022, respectively). Patients in age groups (61 – 70 years) 32.14 (IQR = 19.64 – 53.57) and (≥ 71 years) 28.57 (IQR = 14.29 – 48.96) had lower QOL scores than the other age groups in their physical health domain, and patients in age group ((≥ 71 years) had the lower QOL scores (50 ± 12.71) than the other age groups in their environment domain. The QOL domain scores decreased with increasing the patient's age. A statistically significant difference was observed in the physical health domain (P =0.001) and the psychological domain (P = 0.008) based on gender. Female patients had a lower QOL score in physical health, 35.71 (IQR = 19.64-46.43), and in psychological domains, 41.67 (IQR = 25-54.17), than male patients. Residency statistically affected QOL scores in the environment domain (P = 0.001) and the psychological domain (P = 0.008). Patients who lived outside the city had lower QOL scores in the psychological domain, 37.50 (25-54.17), and in the environmental domain (52.33 ± 13.89). A statistically significant difference was observed in the physical health, environment, and psychological domains (P = 0.001, P = 0.001, and P = 0.027, respectively) based on education level. Secondary education level patients had higher QOL scores in the physical health domain, 57.14 (IQR = 35.71-75), followed by university and post-graduated patients at 53.57 (IQR = 39.29-64.29). Secondary education level and post-graduated patients had higher QOL scores in the psychological domain [54.17, (IQR = 39.58-72.92), and 54.17 (IQR = 33.33-7.83), respectively].

Table 4. Patients that have comorbidities had lower statistically significant QOL scores in domains of physical health, 35.71 (IQR = 21.43-53.57), psychological 45.83 (IQR = 25-62.50), and environment (57.90 ± 12.07), (P = 0.001, P = 0.001, and P = 0.035, respectively).

Patients on HD for more than 73 months had statistically significantly lower QOL scores in the physical health domain than those on HD fewer times [28.57 (IQR = 10.71-42.86), P = 0.023]. The number of weekly HD sessions had a statistically significant effect on physical health and psychological domains (P = 0.002 and P = 0.030, respectively). Patients who have undergone three HD sessions per week scored lower QOL in physical health, at 32.14 (IQR = 17.86-50), and in psychological domains, at 41.67 (IQR = 25-54.17).

Table 1 Sociodemographic and clinical characteristics of the studied population

Variables		Number (%) N = 222
Age (year) Mean ± SD		52.35 ± 15.30
Age (Year)	<20	7 (3.2)
	20-30	15 (6.8)
	31-40	34 (15.3)
	41-50	30 (13.5)
	51-60	55 (24.8)
	61-70	65 (29.3)
	≥71	16 (7.2)
Gender	Male	113 (50.9)
	Female	109 (49.1)
Residency	Inside City	167 (75.2)
	Outside City	55 (24.8)
Marital Status	Single	27 (12)
	Married	162 (73)
	Divorced/ Widowed	33 (15)
Education Level	Illiterate	75 (33.8)
	Read and write	51 (23)
	Primary School	36 (16.2)
	Secondary School	41 (18.5)
	University and post-graduate	19 (8.6)
Comorbidities	Yes	204 (91.9)
	No	17 (8.1)
The number of HD sessions per week	Once a week	3 (1.4)
	Two times a week	123 (55.4)
	Three times a week	96 (43.2)
Duration of hemodialysis (month)	(3-35)	149 (67.1)
	(36-72)	58 (26.1)
	Above 73	15 (6.8)
Total		222 (100)

*(IQR): Interquartile range   SD: Standard deviation

Table 2 The Quality-of-life domain scores

Quality of life domains	(Mean ± SD)	(Median ± IQR)
Physical Health Domain		33 (21 – 57)
Psychological Domain		46 (29 - 63)
Social Relationships Domain		42 (25 - 67)
Environment Domain	58 ± 16	

Table 3 Quality-of-life domain scores according to sociodemographic characteristics.

Variables		Quality of life domains			
		Physical Health Median (IQR)	Psychological Median (IQR)	Social Relationships Median (IQR)	Environment Mean ± SD
Age groups	<20 (year)	42.86 (35.71-57.14)	58.33 (50-79.17)	41.67 (16.67-50)	63.39 ± 10.63
	20-30 (year)	39.29 (28.57-57.14)	54.17 (33.33-70.83)	50 (33.33-58.33)	59.17 ± 14.30
	31-40 (year)	48.21 (34.82-64.29)	41.67 (23.96-62.50)	50 (31.25-68.75)	65.35 ± 15.26
	41-50 (year)	33.93 (16.96-51.79)	45.83 (25-66.67)	41.67 (25-58.33)	54.27 ± 10.43
	51-60 (year)	42.86 (25.60.71)	45.83 (25-62.50)	50 (25-66.67)	58.98 ± 15.31
	61-70 (year)	32.14 (19.64-53.57)	41.67 (29.17-64.58)	41.67 (25-66.67)	57.74 ± 17.90
	≥71 (year)	28.57 (14.29-41.07)	37.50 (22.92-48.96)	41.67 (27.08-47.92)	50.00 ± 12.71
	P-value	**0.043**[*]	0.307[*]	0.481[*]	**0.022**[**]
Gender	Male	50 (25-64.29)	50 (31.25-57.83)	41.67 (20-62.50)	58.99 ± 16.67
	Female	35.71 (19.64-46.43)	41.67 (25-54.17)	50 (25-66.67)	57.91 ± 14.36
	P-value	**0.001**[*]	**0.008**[*]	0.349[*]	0.608[**]
Residency	Inside City	39.29 (25-57.14)	45.83 (29.17-66.67)	41.67 (33.33-66.67)	60.48 ± 15.58
	Outside City	35.71 (21.43-60.71)	37.50 (25-54.17)	41.67 (25-58.33)	52.33 ± 13.89
	P-value	0.357[*]	**0.008**[*]	0.056[*]	**0.001**[**]
Marital status	Single	42.86 (35.71-64.29)	54.17 (33.33-75)	41.67 (16.67-66.67)	63.43 ± 13.70
	Married	39.29 (21.43-58.04)	45.83 (28.13-62.50)	41.67 (31.25-66.67)	58.60 ± 15.61
	Divorced/widowed	28.57 (17.86-50)	37.50(27.08-54.17)	41.67 (20.83-50)	58.46 ± 15.56
	P-value	0.051[*]	0.188[*]	0.216[*]	0.053[**]
Educational level	Illiterate	35.74 (17.86-53.57)	41.67 (25 – 58.33)	41.67 (33.33-58.33)	53.88 ± 16.29
	Read and write	32.14 (17.86 - 50)	41.67 (25 – 54.17)	41.67 (25 – 66.67)	55.70 ± 13.57
	Primary School	33.93 (19.64-48.21)	45.83 (26.04 – 64.58)	41.67 (25 – 64.58)	56.42 ± 13.63
	Secondary School	57.14 (35.71 - 75)	54.17 (39.58 – 72.92)	58.33 (29.17 - 75)	68.06 ± 12.72
	University and post-graduate	53.57 (39.29-64.29)	54.17 (33.33 – 70.83)	50 (25 – 66.67)	67.11 ± 15.53
	P-value	**0.001***	**0.027***	0.333*	**0.001****

*By Kruskal-Wallis test, ** By ANOVA -test, [*] By Mann-Whitney U test, [**]By t-test

Table 4 Quality-of-life domain scores according to clinical characteristics.

Variables		Quality of life domains			
		Physical Health Median (IQR)	Psychological Median (IQR)	Social Relationships Median (IQR)	Environment Mean ± SD
Comorbidities	Yes	35.71 (21.43-53.57)	45.83 (25 – 62.50)	41.67 (25 – 66.67)	57.90 ± 12.07
	No	64.29 (48.21-78.57)	66.67 (48.96 – 84.38)	54.17 (33.33-66.67)	64.76 ± 15.73
	P-value	**0.001**[*]	**0.001**[*]	0.371[*]	**0.35**[**]
Months on HD	(3-35) months	42.86 (25 -58.93)	45.83 (27.08 – 62.50)	50 (25 – 66.67)	59.17 ± 16.03
	(36-72) months	35.71 (20.54-57.14)	45.83 (33.33 – 62.50)	41.67 (25 – 58.33)	56.84 ± 15.51
	Above 73 months	28.57 (10.71-42.86)	41.67 (25 – 62.50)	41.67 (33.33-58.33)	57.71 ± 10.29
	P-value	**0.023**[*]	0.927[*]	0.448[*]	0.618[**]
HD sessions per week	Once a week	42.86 (39.29-46.25)	62.50 (28.33 – 79.85)	50 (28.33 – 66.67)	73.96 ± 24.27
	Two times a week	42.86 (28.57-60.71)	50 (33.33 – 66.67)	41.67 (33.33-66.67)	59.81 ± 14.47
	Three times a week	32.14 (17.86 - 50)	41.67 (25 – 54.17)	41.67 (25 – 66.67)	56.25 ± 16.33
	P-value	**0.002**[*]	**0.030**[*]	0.769[*]	0.053[**]

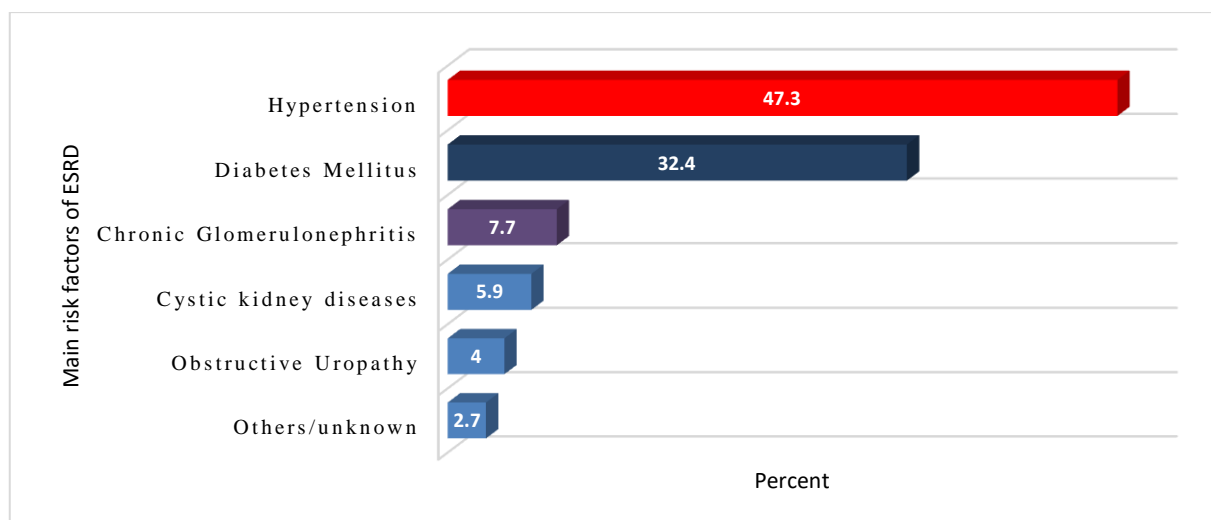*By Kruskal-Wallis test, ** By ANOVA -test, [*] By Mann-Whitney U test, [**]By t-test

Figure 1 Prevalence of risk factors of ESRD among the patients.

DISCUSSION

Quality of life assessment has become critical for assessing regular HD patients' satisfaction and improving therapeutic efficacy. The present study demonstrates the QOL of HD patients in different domains and the factors responsible for poor QOL scores.

Increased age, gender, living outside the city, occupation, education level, comorbidities, longer time spent on HD, and HD sessions per week were significantly associated with poor QOL in different domains.

The present study found that HD patients had poor QOL in all domains, and physical health was the most affected domain. Consistent with previous studies that used WHOQOL-BREF, many studies (Alhajim, 2018; Idosos & Idosos, 2021; Joshi et al., 2017; Ravindran, Sunny, Kunnath, & Divakaran, 2020) found that HD patients had poor QOL, and the physical health domain was the most affected. Also, in previous studies that used different QOL assessment tools (Alshogran et al., 2021; Masoud Rayyani, Forouzi, & Razban, 2014), similar results were reported that HD patients had poor QOL, and the physical health components were the most affected. In agreement

with previous studies (Barbosa et al., 2017; Clark, 2013; Idosos & Idosos, 2021; Masoud Rayyani et al., 2014; Rauf Omru, 2021), hypertension and diabetes mellitus were the main risk factors of ESRD in the present study.

The present study revealed that the number of male patients was more than females. These results were similar to previous studies (Abraham et al., 2012; Alhajim, 2018; Alshogran et al., 2021; Joshi et al., 2017). The explanation for the finding is that smoking and drinking were more prevalent among males than females.

The present study's findings demonstrate that older patients had significantly lower QOL than younger patients regarding physical health and environment domains. Similar results were found in earlier studies (Acaray & Pinar, 2005; Alshogran et al., 2021; Bayoumi et al., 2013; Nayana et al., 2017); the patients' QOL scores were negatively affected by age. The reason for that could be that the old-aged patients had less physical capability than younger patients. They needed family and caregiver support, had more chronic health problems, and had pain, and discomfort increased at this age as they had lower QOL than the other age groups.

In agreement with the previous studies (Acaray & Pinar, 2005; Joshi et al., 2017; Nayana et al., 2017; Valderrábano, Jofre, & López-Gómez, 2001), the current study revealed that female patients had significantly lower QOL than male patients in the physical and psychological domains. We could explain that biological and physiological factors may have a role in these differences, as pain and discomfort were more experienced by females, and alteration in body appearances is an essential factor that psychologically more adversely affects females.

Consistent with the previous study (Al-Baghdadi DD, 2018), the present study results showed that

the patients living outside the city had lower QOL scores in all QOL domains, significantly in psychological and environmental domains. The HD process had many limitations regarding the work capability; limited free time, fear of complications, and dependence on caregivers could be psychologically more affected by the patients living outside the city. Far from dialysis centers, traveling two or three days per week for dialysis could lead to tiredness and badly affect the environment domain score. In contrast, patients living in cities could get medical services quickly and faster than patients from rural areas.

The present study showed that divorced/widowed patients had lower scores in all QOL domains, while the differences were nonsignificant statistically. The finding of our study was in line with the results of other studies that found widowed and divorced patients had lower QOL scores than married and single patients (El-Habashi et al., 2020; Iqbal et al., 2020). HD patients need more social and psychological support because they have lost most of their physical capabilities and are psychologically tired, especially since it is more difficult for anyone living alone with this condition.

In the present study, the education level significantly affected the QOL scores in physical health, environment, and psychological domains. The results showed that illiterate, read-and-write, and primary school education level patients had lower scores for all QOL domains. In contrast, the secondary school and post-graduated patients had higher QOL scores. The findings of our study were similar to the results of many studies worldwide that education level had a positive correlation with good QOL among HD maintenance patients (Al-Baghdadi DD, 2018; Iqbal et al., 2020; Masoud Rayyani et al., 2014; Mohammad, 2006). These results showed how

important the education level was in understanding the nature of the HD process, following the health education regarding the fluid and diet restriction schedules, and following the scheduled HD timeline instructions.

In the present study, the comorbidities significantly impaired the QOL scores in physical health, psychological, and environmental domains. The present study's finding was consistent with earlier studies (Al-Baghdadi DD, 2018; Alhajim, 2018; Babatsikou, 2014; Barbosa et al., 2017; Delmas et al., 2018) that showed comorbidities significantly lowered QOL scores in all domains.

The duration of time patients spent on HD gradually affected the QOL domain scores and significantly affected the physical health domain score. The present study's finding was in line with the results of other studies (Alhajim, 2018; Alshogran et al., 2021; Anees, Hameed, Mumtaz, Ibrahim, & SAEED, 2011; Bayoumi et al., 2013; Bohlke et al., 2008; Nayana et al., 2017), which found that the QOL domain scores gradually decreased while the duration of time patients spent on HD increased. At the beginning of the HD process, the patients were too tired because of ESRD complications; when the fluid overload and metabolic wastes were removed, the patient's health conditions returned to better health. But when the HD process becomes a part of the patient's daily life, physically, psychologically, and economically adversely affected by the patients, the QOL of patients also been affected.

In agreement with the findings of earlier studies (Anees et al., 2011; Nayana et al., 2017), patients who underwent three HD sessions weekly had lower QOL scores for all domains, significantly in physical and psychological domains. Reverse to the present finding, Al-Baghdadi et al. found no significant association between the number of HD

sessions and QOL score (Al-Baghdadi DD, 2018). The negative association between the lower QOL with longer HD years could be related to HD complications, developing comorbidities, and increased economic impact with longer years under HD.

CONCLUSION

The study findings revealed that hemodialysis patients had poor QOL through different domains, and the physical health domain was primarily impaired. Different sociodemographic and clinical variables negatively affected the QOL scores in different domains. Increased age, gender, residency, illiterate and low education level, comorbidities, extended periods on HD sessions, and pre-week HD sessions were all significantly associated with poor QOL among the studied patients. Hypertension and diabetes mellitus were the main risk factors of ESRD; these two factors were modifiable through early detection and prevention and controlled the progress of the diseases.

ETHICAL CONSIDERATIONS

Ethical permission was obtained from the ethics committee at the college of medicine, University of Sulaimani. The participants were informed about the research's purpose and ensured anonymity and confidentiality of the information. A written informed, voluntary participation consent was obtained from each participant.

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AUTHOR'S CONTRIBUTIONS

Study concept, Writing, Reviewing the final edition by all authors.

DISCLOSURE STATEMENT

The authors report no conflict of interest.

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