

Health-Related Quality of Life of Patients on Maintenance Hemodialysis

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Abstract

Background: hemodialysis in patients with end-stage renal disease affects various aspects of their lives, resulting in a decline in their overall quality of life (QOL). Studies measuring the QOL in patients on renal replacement therapy are limited in the Iraq. **Objective:** To identify the health-related quality of life of patients on maintenance hemodialysis. **Settings:** The study was carried out at at Ibn-Sina Dialysis Center , Baquba Teaching Hospital, Diyala Health Department and Republic of Iraq. **Tools:** One tool was used for data collection in the study. It was entitled as the Health-Related Quality of Life of Patients on Maintenance Hemodialysis Interview Questionnaire. **Results:** the majority of patients reported having a "poor overall Quality of Life" in terms of the Physical Component Summary (PCS), Mental Component Summary (MCS), Burden of kidney disease KDS, Symptoms and problems, and Effects of kidney disease on daily life. **Conclusion:** Significant positive associations have also been identified between the duration of hemodialysis and impairments to body structure and function. Nurse's awareness plays a crucial role in well-being of hemodialysis patients and their ability to cope with their condition, also collaboration among medical professionals, nursing staff, clinicians and pharmacists is necessary to enhance the quality of life for these patients. **Recommendations:** The well-being of hemodialysis patients and their ability to cope with their condition can be enhanced by nurses who are aware of their quality of life. This awareness plays a crucial role in improving patient care and satisfaction. Further research is more studies be conducted using larger sample sizes in more HD clinical settings, in order to reach more broadly applicable conclusions

Keywords: End-stage renal disease, hemodialysis, quality of life.

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Introduction

Chronic kidney disease (CKD) is a rapidly growing chronic illness that commonly occurs as a result of declining kidney function due to other chronic conditions like diabetes, hypertension, or aging.(Turaev & Rakhimov, 2023)End Stage Renal Disease (ESRD) refers to a set of clinical conditions that lead to permanent loss of kidney function. (Tinti et al., 2021). People with ESRD experience a wide range of physical, neurological, and

psychological challenges, along with social and economic problems, which significantly impact their quality of life (QOL). (Gusev et al., 2021).

Dialysis is a vital process for individuals with renal failure or acute kidney injury, but it comes with significant challenges and impacts on the quality of life for both patients and caregivers. (Lucena, 2023) Hemodialysis treatment requires a

substantial time commitment and can lead to functional and cognitive impairments in patients and caregivers. (Cardelino et al., 2023) The symptoms experienced by dialysis patients can vary in severity, affecting their overall well-being and quality of life. (Moran-Thomas, 2019; Cicolli, 2021). Demographic and comorbid factors further contribute to lower health-related quality of life in these patients. (Hinkle & Cheever, 2018) The primary objective of therapeutic interventions is to enhance the patient's quality of life (Veltkamp et al., 2023), as defined by the World Health Organization. (Brugts et al., 2020). HD nurses also face challenges and increased stress levels due to the unique characteristics of HD patients. Improving patients' health-related quality of life and reducing hospital costs require nurses to provide necessary knowledge and skills for self-care. (Guo et al., 2021) ESRD and its treatment significantly impact various aspects of a patient's life, leading to a reduction in their overall quality of life. (Lee et al., 2020)

This study's significance lies in assessing the QOL of patients with ESRD is crucial in determining disease management and the type of renal replacement therapy (RRT) required. Therefore, this study aimed to measure the QOL of hemodialysis patients and investigate the impact of various socio-demographic characteristics on QOL.

Aim of the Study

This study aim to identify the health-related quality of life of patients on maintenance hemodialysis.

Research questions

-What is the health-related quality of life of patients on maintenance hemodialysis?

-What are the factors associated with health –related quality of life of patients on maintenance hemodialysis?

Materials and Method

Materials

Design: A descriptive design was used to conduct the current study.

Setting: This study was carried out at Ibn-Sina Dialysis Center, Baquba Teaching Hospital, Diyala Health Department, Republic of Iraq.

Subjects: A convenience sample of 150 adult patients on Maintenance Hemodialysis, showing up at the previously mentioned setting and who agreed to participate in the study, were included.

Tools: one tool was employed for data collection:

This tool was, adapted from ,Kidney Disease and Quality of Life (KDQOL),(2000) and Schatell & Witten,(2012). It was used to assess HQOL of patients on maintenance hemodialysis. It consists of the following two main parts.

Part I: Socio-demographic and clinical data of patients on maintenance hemodialysis:

This part was developed and used to identify patient's socio demographic and clinical data. It consists of two sub-parts as follows:

A- Socio -demographic data:

This sub-part was used to collect personal data of patients on maintenance HD as: gender, age, educational level, marital status, occupation before disease, occupation after disease and source of family income.

B- Clinical Data

This sub-part was used to collect patient's family history, any comorbidity, medication, HD information as: onset of HD, type of vascular access, and presence of associated/arising problems such as fistula or graft failure, hypotension ,headache ,muscle cramps, hypoxemia, arrhythmia etc....

Part II: Health-Related Quality of Life of Patients on Maintenance Hemodialysis ;

This part includes a total of 36 questions/items about maintenance hemodialysis patient's health, kidney disease and effects of kidney disease on daily life. It includes the following main FIVE subscales;

1-Physical component summary (PCS) subscale.

2-Mental component summary (MCS) subscale.

3- Burden of kidney disease KDS subscale.

4-Symptoms and problems subscale.

5-Effects of kidney disease on daily life subscale.

Method

Official approvals from the Research Ethics Committee, Faculty of Nursing, Alexandria University, was obtained.

An official letter was delivered from the Faculty of Nursing, Alexandria University to the responsible authorities of the selected studying, at Baquba Teaching Hospital, Diyala, Republic of Iraq, to obtain their approval to carry out the study after explanation of the aim of the study. Validity of the tool was tested by three specialized in the field of Medical Surgical Nursing, Faculty of Nursing and two in the field of Nephrology Faculty of Medicine, Baquba Teaching Hospital, Diyala, Ministry of Health, Republic of Iraq, for content and construct validity, and comprehensiveness and the necessary modifications, were introduced, and accordingly. Test-retest reliability was established with a coefficient of 0,771.

This study was conducted at Ibn-Sina Dialysis Center, Baquba Teaching Hospital, Diyala Health Department, Republic of Iraq.

Statistical Analysis: Collected data

were coded, organized, and analyzed using IBM SPSS software (version 20.0). Descriptive statistics, including numbers, percentages, means, and standard deviations, were employed. Significance levels were set at 0.05, Chi-square test for categorical variables, to compare between different categories. Correction for chi-square when more than 20% of the cells have expected count less than 5.

Ethical Considerations: The study adhered to ethical principles, obtaining informed consent, respecting privacy, ensuring anonymity and confidentiality, and emphasizing voluntary participation and the right to refuse involvement.

Limitations: The study acknowledged limitations, including a small sample size due to identify the health-related quality of life of patients on maintenance hemodialysis and also different countries according lifestyle of patients

Results

Table 1 displays that the majority of the patients were male, within the age range of 18 to 45 years old, and had completed at least primary education. Most of them were married, had varying occupations before dialysis, and faced difficulties in continuing to work after dialysis. The primary source of family income was typically the husband's income, with smaller contributions from the wife, sons, or other sources.

Table 2 the clinical data of the studied patients revealed that a significant proportion had a family history of hypertension, while the lowest percentage had a history of cardiac disease. Hypertension was the most prevalent comorbidity, followed by diabetes mellitus and cardiac disease. The onset of hemodialysis varied, with a substantial number of patients having undergone it for three years or more. Central venous catheters were the most common type of vascular access. The patients experienced various associated or arising problems,

with headaches being the most prevalent, and infections and other issues being the least reported.

Table 3 illustrates distribution of the Quality of Life Items, specifically the Physical Component Summary (PCS) and Mental Component Summary (MCS), considering Q1 question less than half of study subjects had good health. Which provides insights into their perceived health status. When asked about their overall health, 2% of the patients described it as "excellent", 20.7% as "very good", 41.3% as "good", and a notable 36% rated their health as "poor".

Table 4 displays of the Quality of Life Items with limitations in Moderate Activities, Housework (for Women), and Work (for Men) Impact Quality of Life in Hemodialysis Patients.

Table 5 show of the Quality of Life Items with impact of limitations on Accomplishments and Work Quality in Hemodialysis Patients' Quality of Life

Table 6 illustrates many patients experienced extreme interference of pain with their normal work, had low levels of calm and peacefulness, and reported feeling downhearted most of the time. Energy levels varied, with a significant portion experiencing a moderate amount of energy. The interference of physical health or emotional problems with social activities was common. Furthermore, the burden of kidney disease was evident, as patients felt that their kidney disease significantly interfered with their lives, consumed much of their time, led to frustration, and made them feel like a burden to their family.

Table 7 shows scores and levels of

Quality of Life (QoL) provides an overview of their overall well-being and the burden of kidney disease. Concerning overall Quality of Life, the highest percentage of patients (81.3%, 89.3%, 67.3%, and 75.3%) had "poor overall Quality of Life".

Regarding "The Physical Component Summary (PCS)" and "Mental Component Summary (MCS)" scores, Burden of kidney disease KDS, Symptoms and problems, Effects of kidney disease on daily life respectively.

Table 8 illustrates the relationship between the quality of life and various clinical factors. It was found that The duration of hemodialysis was found to be significantly related to the quality of life. Patients on hemodialysis for less than one year experienced a poor level of quality of life, while those on hemodialysis for three years or more had a higher likelihood of having a fair or good level of quality of life. Among the symptoms experienced by patients, nausea or vomiting, muscle cramps, and infection were associated with a lower quality of life. Other problems such as headache, hypotension, hypoxemia, arrhythmia, and others did not show significant associations with the quality of life. These findings highlight the importance of considering the duration of hemodialysis and specific symptoms in assessing and improving the quality of life for hemodialysis patients.

Discussion

Enhancing quality of life (QOL) has gained significant importance as a measure of success following the implementation of renal replacement therapies. The primary objective in patients undergoing hemodialysis is to enhance their functional abilities, enabling them to lead a fulfilling life. (Flanagan, Damery, & Combes, 2017) Numerous studies have explored different factors influencing QOL, including genetics, environment, psychosocial aspects, stress,

emotions, and coexisting medical conditions. Research has demonstrated a strong correlation between lower QOL scores and increased risks of mortality and hospitalization among individuals with end-stage renal disease (ESRD). (Cortés et al., 2022)

The provided information highlights several important points regarding hemodialysis patients. Firstly, comorbidities such as diabetes mellitus, hypertension, and cardiac disease are prevalent among these patients and can complicate their management. (Gajjala, Sanati, & Jankowski, 2015) The choice of vascular access method for hemodialysis is influenced by factors such as patient anatomy, surgery suitability, and treatment duration. (Lawson, Niklason, & Roy-Chaudhury, 2020)

It is also noted that a significant number of hemodialysis patients have a family history of diseases like diabetes mellitus, hypertension, and kidney disease. These patients experience various associated problems including nausea or vomiting, headache, hypotension, muscle cramps, hypoxemia, arrhythmia, and infections. The limitations and challenges faced by hemodialysis patients significantly impact their daily activities and overall quality of life.

Furthermore, studies have reported variations in the physical and mental health outcomes of hemodialysis patients. While some studies have shown higher scores or ratings for the physical and mental health components, the presented study suggests slightly lower mean scores for these aspects. Hemodialysis patients commonly

experience limitations in their daily activities, frequently accomplishing less than they desire and facing challenges in work and other activities. Pain interference, low energy levels, and feelings of being downhearted are frequently reported among these patients. The burden of kidney disease significantly affects the lives and relationships of hemodialysis patients.

In the same line, consistent with previous studies, although our mean scores for (PCS) and (MCS) were slightly lower when considering the confidence intervals. For example, a study conducted in Malawi (Kalembo, Kendall, Ali, & Chimwaza, 2019) with a small sample size (n = 22) reported higher scores for both PCS and MCS, while a single-center study in Colombia (Myroniuk, Kohler, & Kohler, 2021) found higher ratings for PCS. Additionally, a large study conducted in the US reported better physical and mental health outcomes in a diverse sample of patients undergoing various types of dialysis. (Brito, Machado, Reis, Carmo, & Cherchiglia, 2019)

Also, these findings emphasize the complex nature of managing hemodialysis patients, considering their comorbidities, associated problems, and the impact on their daily lives and overall well-being. Healthcare providers can utilize this information to develop targeted interventions and support strategies to improve the quality of life for hemodialysis patients and address their specific challenges.

In the same line, the result of the present study is consistent with two previous studies conducted in Ethiopia and Malawi, which also reported similar levels of frustration and interference. However, the current study results were higher compared to a study conducted in Kenya, indicating a greater level of frustration and interference among the

patients in our study. On the other hand, when comparing our results to studies conducted in the US, Europe (France, Germany, Italy, Spain, and the United Kingdom), Japan, Colombia, and Egypt, the present study participations scores were lower, indicating more frustration and interference. (Jerrim, 2023) For example healthcare systems. In Ethiopia, the healthcare system which involves lengthy procedures and numerous diagnostic tests, that may contribute to patient frustration. Additionally, restrictions on mobility, daily activities, and the potential risk of job loss due to dialysis therapy can lead to a sense of frustration and the perception of being a burden on the patient's family. (Agerskov, Bistrup, Ludvigsen, & Pedersen, 2018)

The present study verified that the highest percentage of patient were extremely bothered from cramps, loss of appetite, shortness of breaths, faintness or dizziness, numbness in hands or feet. These current study finding asses not in line with Poku et al 2022. who confirmed that the most prevalent symptoms reported with the SPKD subscale were "itchy skin. (Poku et al., 2022)

Patients in present study rated the effects of the disease using the EKD subscale, and their ratings were similar to those reported in a study conducted in Colombia (Chertow et al., 2016). However, the current study sample scores were lower compared to studies conducted in various parts of the world. The need for hemodialysis patients to visit medical facilities three times a week for several hours can significantly interfere with their ability to carry out daily activities independently,

including work. This interference may contribute to lower health-related quality of life (HRQOL) scores. (Daugirdas et al., 2015)

Also, it was revealed that as age increases, both the mean (PCS) scores and EKD scores decrease. This finding is consistent with previous studies. It can be explained by the reduced physical function, strength, energy, and self-care ability that often occur with aging. (Gebrie, Asfaw, Bilchut, Lindgren, & Wettergren, 2023)

Patients are more likely to experience complications such as heart disease, anemia, high blood pressure, pulmonary edema, and decreased immune response, leading to increased pain and further declines in energy and physical functioning. (Zhang, Zhuang, Qin, Yang, & Song, 2023) On the other hand, younger patients with shorter disease duration may have higher HRQOL scores, potentially due to fewer complications and better overall health. This facts support many finding, obtained through the current study findings.

According to distribution of patients based on their scores and levels of Quality of Life (QoL) provides a comprehensive understanding of their overall well-being and the burden imposed by kidney disease. The average scores for (PCS) and (MCS) indicated that patients had low levels of QoL. The majority of patients experienced a high burden of kidney disease, with a significant proportion reporting a high level of symptoms and problems. The impact of kidney disease on daily life was substantial, as nearly three-quarters of patients reported a high level of impact. These findings highlight the significant challenges and consequences of kidney disease on patients' well-being, underscoring the importance of targeted interventions and support to improve their QoL.

The present study findings revealed that adhering to the standard recommendation of attending hemodialysis sessions three times a week was linked to lower ratings of physical health. A similar finding was edited in a study conducted in Brazil, which observed a higher prevalence of symptoms, increased burden of kidney disease, and lower PCS scores among patients attending hemodialysis sessions. Additionally, Al-Rajhi and AlSalmi 2022 reported that the health-related quality of life (HRQOL) scores of hemodialysis patients decreased with a higher frequency of dialysis sessions. (Al-Rajhi & Al Salmi, 2022) This association may be attributed to the patients' health condition, as severely ill patients are more likely to undergo hemodialysis three times a week.

These findings of socio-demographic factors had minimal influence on the QoL of the studied patients. In the same line, a positive association between medication adherence and health-related quality of life (HRQOL) specifically related to the EKD subscale. This finding aligns with a previous research findings. (Tao, 2015)

The study differs in its, suggesting that non-adherence to medication among end-stage renal disease (ESRD) patients hinders them from experiencing the full benefits of prescribed medications (Kvarnström, Westerholm, Airaksinen, & Liira, 2021).

The duration of hemodialysis treatment is significantly related to quality of life, with individuals on dialysis for less than one year having a poorer level of quality of life,

while those on dialysis for three years or more are more likely to have a fair or good level of quality of life. The presence of certain associated problems, including nausea or vomiting, muscle cramps, and infection, were associated with a poorer level of quality of life. However, the presence of headache, hypotension, hypoxemia, arrhythmia, and other problems didn't show significant associations with the quality of life. (Himmelfarb et al., 2020), had similarly finding.

In the same line, the duration of hemodialysis treatment was found to have a significant impact on the (HRQOL) of our study life patients. The current study revealed that a duration of one year or longer was associated with lower scores on the SPKD and EKD subscales, which is consistent with the findings. (Kvarnström et al., 2021) Similarly, a research group in the US indicated that patients who had been on hemodialysis for a longer duration had lower functional status, higher rates of hospital readmissions, and poorer HRQOL. These findings can be attributed to negative emotions that arise from the lifelong nature of the treatment, monotonous living conditions, feelings of exhaustion and frustration, and difficulties in coping with dialysis symptoms. (Rezaei, Jalali, Jalali, & Sadeghi, 2020) Consequently, as the duration of hemodialysis increases, patients are more likely to continue experiencing these adverse effects, which can further diminish their HRQOL (Aguiar, Pei, Qureshi, & Lindholm, 2019).

In general hemodialysis patient, also need mental support to adapt to their current status. Therefore, nurses' awareness of the quality of life can affect the care of these patients and increase patients' satisfaction; notably, the quality of the provided nursing care is an important indicator of nurses' involvement in the care program

Conclusion

Based on the findings of the present study, it could be concluded that Collaboration among medical professionals, nursing staff, clinicians, and pharmacists is necessary to enhance the quality of life for hemodialysis patients.

Comprehensive care, improved patient experiences, and overall enhancement of quality of life for hemodialysis patients can be achieved through teamwork and collaboration among healthcare providers.

Recommendations

Based on the findings of the current study, the following recommendations are suggested:

- New nurses' comprehensive orientation programs related health issues are required.
- Implementation of nursing care seminars for staff nurses to expand better involvement patient in care, education, and communication, is advocated.
- Future research should be more studies be conducted using larger sample sizes to reach more broadly applicable for broader generalization.

Table (1): Distribution of the studied patients according to socio -demographic data

Socio -demographic data	No.	%
Gender		
Male	84	56.0
Female	66	44.0
Age (years)		
≤ 18	22	14.7

≤ 25	39	26.0
≤ 35	18	12.0
≤ 45	71	47.3
Educational level		
Neither read nor write	16	10.7
Read and write	33	22.0
Primary	39	26.0
Secondary	24	16.0
University	36	24.0
Post graduate	2	1.3
Marital status		
Single	32	21.3
Married	108	72.0
Divorced	3	2.0
Widow	7	4.7
Occupation before the dialysis		
Government employee	35	23.3
Free profession	43	28.7
Retired not working	23	15.3
Housewife	48	32
Not working	1	0.7
Occupation after dialysis		
I work	35	23.3
I don't work	115	76.7
Sources of family income		
Husband	83	55.3
Wife	6	4.0
Sons	22	14.7
Others	39	26.0

Table (2): Distribution of the studied adult patients according to their clinical data (n = 150)

Clinical data	No	%
Family history #		
Diabetes mellitus	56	37.3
Hypertension	82	54.7
Kidney disease	60	40.0
Cardiac disease	29	19.3

Others	1	0.7
Comorbidity #		
Diabetes mellitus	53	35.3
Hypertension	106	70.7
Kidney disease	0	0.0
Cardiac disease	59	39.3
Others	1	0.7
Onset of hemodialysis		
Less than one year	25	16.7
Less than two year	43	28.7
Less than three years	35	23.3
Three years or more	47	31.3
Type of vascular access		
Arteriovenous fistula	42	28.0
Arteriovenous graft	51	34.0
Central venous catheter	57	38.0
Presence of associated /arising problems #		
Fistula or graft failure	28	18.7
Nausea or vomiting	59	39.3
Headache	77	51.3
Hypotension	52	34.7
Muscle cramps	60	40.0
Hypoxemia	43	28.7
Arrhythmia	61	40.7
Infection	12	8.0
Others	1	0.7

Table (3): Distribution of the studied patients according to Quality of Life items (n= 150)

Quality of Life Items	No.	%
Physical component summary (PCS) and Mental component summary (MCS)		
Q1. In general, would you say your health is		
Excellent	3	2.0
Very good	31	20.7
Good	62	41.3
Poor	54	36.0

Table (4): Distribution of the studied patients according to Quality of Life Items (n= 150)

Quality of Life Items	Yes, limited a lot		Yes, limited a little		No, not limited at all	
	No.	%	No.	%	No.	%
Physical component summary (PCS) and Mental component summary (MCS)						
2 Moderate activities, house work for women and work for men	68	45.3	53	35.3	29	19.3
3 Climbing several flights of stairs	80	53.3	45	30.0	25	16.7

Table (5): Distribution of the studied patients according to Quality of Life Items (n= 150)

Quality of Life Items	Yes		No	
	No.	%	No.	%
Physical component summary (PCS) and Mental component summary (MCS)				
4 Accomplished less than you would like	121	80.7	29	19.3
5 Were limited in the kind of work or other activities	116	77.3	34	22.7
6 Accomplished less than you would have liked	118	78.7	32	21.3
7 Didn't do work as carefully as usual	115	76.7	35	23.3

Table (6): Distribution of the studied patients according to Quality of Life items (n= 150)

Quality of Life Items	Not at all		A little bit		Moderately		Extremely	
	No.	%	No.	%	No.	%	No.	%
Physical component summary (PCS) and Mental component summary (MCS)								
8 During the past 4 weeks, how much did pain interfere with your normal work (including both housework and work outside the home)?	10	6.7	25	16.7	40	26.7	75	50.0
	All of the time		Most of the time		Some of the time		None of the time	
9 Have you felt calm and peaceful?	23	15.3	25	16.7	48	32.0	54	36.0
10 Did you have a lot of energy?	19	12.7	18	12.0	61	40.7	52	34.7
11 Have you felt downed?	86	57.3	31	20.7	26	17.3	7	4.7
12 During the past 4 weeks, how much of the time, has your physical health or	87	58.0	39	26.0	20	13.3	4	2.7

emotional problems interfered with your social activities (like visiting with friends and relatives)?									
Burden of Kidney Disease		Definitely true		Mostly true		Don't know		Definitely false	
13	My kidney disease interferes too much with my life.	110	73.3	31	20.7	7	4.7	2	1.3
14	Too much of my time is spent dealing with my kidney disease.	114	76.0	22	14.7	8	5.3	6	4.0
15	I feel frustrated dealing with my kidney disease	123	82.0	13	8.7	9	6.0	5	3.3
16	I feel like a burden to my family.	120	80.0	15	10.0	11	7.3	4	2.7

Table (7): Distribution of the studied patients according to scores and level of Quality of Life (n = 150)

Quality of Life	Poor (<50%)		Fair (50 - <75%)		Good (≥75%)		Total score			Average score
	No	%	No	%	No	%	Score Range	Min – Max.	Mean ± SD.	Mean ± SD.
Physical component summary (PCS) and Mental component summary (MCS)	122	81.3	21	14.0	7	4.7	(12 – 38)	15.0 – 34.0	23.71 ± 3.66	1.98 ± 0.30
Burden of kidney disease KDS	134	89.3	15	10.0	1	0.7	(4 – 16)	4.0 – 13.0	5.35 ± 2.33	1.34 ± 0.58
Symptoms and problems	101	67.3	26	17.3	23	15.3	(12 – 48)	15.0 – 48.0	31.25 ± 6.73	2.60 ± 0.56
Effects of kidney disease on daily life	113	75.3	22	14.7	15	10.0	(8 – 32)	13.0 – 31.0	20.11 ± 3.52	2.51 ± 0.44
Overall Quality of Life	119	79.3	19	12.7	12	8.0	(36 – 134)	57.0 – 111.0	80.42±11.99	2.23 ± 0.33

Table (8): Relations between level of Quality of Life and the studied patients clinical data (n = 150)

Studied patients clinical Data	Level of Quality of Life						χ ²	p
	Poor (n = 119)		Fair (n = 19)		Good (n = 12)			
	No.	%	No.	%	No.	%		
Family history[#]								
Diabetes mellitus	43	76.8	9	16.1	4	7.1	0.973	0.615
Hypertension	67	81.7	9	11.0	6	7.3	0.642	0.725
Kidney disease	48	80.0	9	15.0	3	5.0	1.560	0.458
Cardiac disease	20	69.0	6	20.7	3	10.3	2.838	MC _p =0.255
Others	0	0.0	1	100.0	0	0.0	5.293	MC _p =0.213
Comorbidity[#]								
Diabetes mellitus	39	73.6	9	17.0	5	9.4	1.756	0.416
Hypertension	87	82.1	12	11.3	7	6.6	1.740	0.419
Cardiac disease	46	78.0	10	16.9	3	5.1	2.464	0.292
Others	1	100.0	0	0.0	0	0.0	1.624	MC _p =1.000
Onset of hemodialysis								
Less than one year	13	52.0	7	28.0	5	20.0	20.376	MC _p =0.001
Less than two year	37	86.0	3	7.0	3	7.0		
Less than three years	25	71.4	6	17.1	4	11.4		
Three years or more	44	93.6	3	6.4	0	0.0		
Type of vascular access								
Arteriovenous fistula	31	73.8	8	19.0	3	7.1	3.783	MC _p =0.438
Arteriovenous graft	39	76.5	7	13.7	5	9.8		
Central venous catheter	49	86.0	4	7.0	4	7.0		

Arteriovenous fistula	31	73.8	8	19.0	3	7.1		
Presence of associated /arising problems[#]								
Fistula or graft failure	19	67.9	7	25.0	2	7.1	4.407	^{MC} p=0.106
Nausea or vomiting	40	67.8	10	16.9	9	15.3	9.437*	0.009*
Headache	58	75.3	12	15.6	7	9.1	1.619	0.445
Hypotension	43	82.7	6	11.5	3	5.8	0.688	0.709
Muscle cramps	53	88.3	4	6.7	3	5.0	4.988	0.083
Hypoxemia	35	81.4	6	14.0	2	4.7	0.956	0.620
Arrhythmia	47	77.0	9	14.8	5	8.2	0.426	0.808
Infection	6	50.0	4	33.3	2	16.7	6.883*	^{MC} p=0.028*
Others	0	0.0	0	0.0	1	100.0	6.213	^{MC} p=0.084

χ^2 : Chi square test MC: Monte Carlo
 p: p value for comparison between the studied categories
 *: Statistically significant at $p \leq 0.05$

References

- Agerskov, H., Bstrup, C., Ludvigsen, M. S., & Pedersen, B. D. (2018). Experiences of living kidney donors during the donation process. *Journal of renal care*, 44(2), 96-105.
- Aguiar, R., Pei, M., Qureshi, A. R., & Lindholm, B. (2019). Health-related quality of life in peritoneal dialysis patients: A narrative review. *Seminars in dialysis*,
- Al-Rajhi, W., & Al Salmi, I. (2022). Quality of Life and Health-related Quality of Life in Patients with End-stage Kidney Disease Undergoing Hemodialysis: A Literature Review. *Saudi Journal of Kidney Diseases and Transplantation*, 33(Suppl 2), S184-S230.
- Brito, D. C. S. d., Machado, E. L., Reis, I. A., Carmo, L. P. d. F. d., & Cherchiglia, M. L. (2019). Depression and anxiety among patients undergoing dialysis and kidney transplantation: a cross-sectional study. *Sao Paulo Medical Journal*, 137, 137-147.
- Brugts, J. J., Veenis, J. F., Radhoe, S. P., Linssen, G. C. M., Van Gent, M., Borleffs, C. J. W., van Ramshorst, J., van Pol, P., Tukkie, R., & Spee, R. F. (2020). A randomised comparison of the effect of haemodynamic monitoring with CardioMEMS in addition to standard care on quality of life and hospitalisations in patients with chronic heart failure: Design and rationale of the MONITOR HF multicentre randomised clinical trial. *Netherlands Heart Journal*, 28, 16-26. <https://doi.org/10.1007/s12471-019-01341-9>
- Cardelino, B. O., Scabora, R., e Silva, T. O., & Corrêa, J. A. (2023). Clinical-epidemiological characterization of patients submitted to hemodialysis according to the national kidney foundation, the kidney disease outcomes quality initiative–KDOQI in a hemodialysis reference center in the metropolitan region of São Paulo, Brazil. *Journal of Human Growth and Development*, 33(2), 267-276. <https://doi.org/10.36311/jhgd.v33.14836>
- Chertow, G. M., Levin, N. W., Beck, G. J., Daugirdas, J. T., Eggers, P. W., Klinger, A. S., Larive, B., Rocco, M. V., & Greene, T. (2016). Long-term effects of frequent in-center hemodialysis. *Journal of the American Society of Nephrology: JASN*, 27(6), 1830.
- Cicolli, V. (2021). Exploring the Meaning of the Experience of Patients with End Stage Renal Disease Undergoing Hemodialysis [The Chicago School of Professional Psychology].
- Cortés, H., Rojas-Márquez, M., Del Prado-Audelo, M. L., Reyes-Hernández, O. D., González-Del Carmen, M., & Leyva-Gómez, G. (2022). Alterations in mental health and quality of life in patients with skin disorders: a narrative review. *International journal of dermatology*, 61(7), 783-791.
- Daugirdas, J. T., Depner, T. A., Inrig, J., Mehrotra, R., Rocco, M. V., Suri, R. S., Weiner, D. E., Greer, N., Ishani, A., & MacDonald, R. (2015). KDOQI clinical practice guideline for hemodialysis adequacy: 2015 update. *American Journal of Kidney Diseases*, 66(5), 884-930.
- Flanagan, S., Damery, S., & Combes, G. (2017). The effectiveness of integrated care interventions in improving patient quality of life (QoL) for patients with chronic conditions. An overview of the systematic review evidence. *Health and quality of life outcomes*, 15(1), 1-11.
- Gajjala, P. R., Sanati, M., & Jankowski, J. (2015). Cellular and molecular mechanisms of chronic kidney disease with diabetes mellitus and cardiovascular diseases as its comorbidities. *Frontiers in immunology*, 6, 150995.
- Gebrie, M. H., Asfaw, H. M., Bilchut, W. H.,

- Lindgren, H., & Wettergren, L. (2023). Health-related quality of life among patients with end-stage renal disease undergoing hemodialysis in Ethiopia: a cross-sectional survey. *Health and quality of life outcomes*, 21(1), 1-11.
- Gusev, E., Solomatina, L., Zhuravleva, Y., & Sarapultsev, A. (2021). The pathogenesis of end-stage renal disease from the standpoint of the theory of general pathological processes of inflammation. *International Journal of Molecular Sciences*, 22(21), 11453. <https://doi.org/10.3390/ijms222111453>
 - Himmelfarb, J., Vanholder, R., Mehrotra, R., & Tonelli, M. (2020). The current and future landscape of dialysis. *Nature Reviews Nephrology*, 16(10), 573-585.
 - Jerrim, J. (2023). Has Peak PISA passed? An investigation of interest in International Large-Scale Assessments across countries and over time. *European Educational Research Journal*, 14749041231151793.
 - Kalembo, F. W., Kendall, G. E., Ali, M., & Chimwaza, A. F. (2019). Prevalence and factors associated with emotional and behavioural difficulties among children living with HIV in Malawi: a cross-sectional study. *BMC psychiatry*, 19(1), 1-14.
 - Kidney Disease and Quality of Life [KDQOL]. (2000). *Your Health – and – Well-Being: Kidney Disease and Quality of Life (KDQOL™-36)*. RAND and the University of Arizona.
 - Kvarnström, K., Westerholm, A., Airaksinen, M., & Liira, H. (2021). Factors contributing to medication adherence in patients with a chronic condition: a scoping review of qualitative research. *Pharmaceutics*, 13(7), 1100.
 - Lawson, J. H., Niklason, L. E., & Roy-Chaudhury, P. (2020). Challenges and novel therapies for vascular access in haemodialysis. *Nature Reviews Nephrology*, 16(10), 586-602.
 - Lee, K. H., Xu, H., & Wu, B. (2020). Gender differences in quality of life among community-dwelling older adults in low- and middle-income countries: results from the Study on global AGEing and adult health (SAGE). *BioMed Central Public Health*, 20, 1-10. <https://doi.org/10.1186/s12889-020-8212-0>
 - Lucena, R. (2023). Water use and water saving strategies in dialysis, room for improvement. *Portuguese Journal of Nephrology and Hypertension*, 37(10), 1-7.
 - Moran-Thomas, A. (2019). Struggles for maintenance: Patient activism and dialysis dilemmas amidst a global diabetes epidemic. *Glob Public Health*, 14(6-7), 1044-1057. <https://doi.org/10.1080/17441692.2019.1596292>
 - Myroniuk, T. W., Kohler, H.-P., & Kohler, I. V. (2021). Marital dissolutions and changes in mental health: Evidence from rural Malawi. *Demographic research*, 44, 993.
 - Poku, E., Harnan, S., Rooney, G., James, M. M.-S., Hernández-Alava, M., Schaufler, T., Thokala, P., & Fotheringham, J. (2022). The relationship between chronic kidney disease-associated pruritus and health-related quality of life: a systematic review. *Clinical Kidney Journal*, 15(3), 484-499.
 - Rezaei, Z., Jalali, A., Jalali, R., & Sadeghi, M. (2020). Haemodialysis patients' experience with fatigue: a phenomenological study. *British Journal of Nursing*, 29(12), 684-690.
 - Schatell, D., & Witten, B. (2012). Measuring dialysis patients' health-related quality of life with the KDQOL-36™. *Medical Education Institute, Inc.*
 - Tao, X. (2015). The effects of a nurse-led case management program on home exercise training for hemodialysis patients: a randomized controlled trial.
 - Tinti, F., Lai, S., Noce, A., Rotondi, S., Marrone, G., Mazzaferro, S., Di Daniele, N., & Mitterhofer, A. P. (2021). Chronic kidney disease as a systemic inflammatory syndrome: update on mechanisms involved and potential treatment. *Life*, 11(5), 419. <https://doi.org/10.3390/life11050419>
 - Turaev, S. Z. I., & Rakhimov, S. (2023). Assessment of the quality of life in patients with chronic kidney disease in the practice of hemodialysis. *Journal of Modern Educational Achievements*, 6(6), 103-109.
 - Veltkamp, D. M. J., Wang, Y., Meuleman, Y., Dekker, F. W., Michels, W. M., van der Boog, P. J. M., & de Vries, A. P. J. (2023). Age and gender differences in symptom experience.