QUALITY OF LIFE AMONG END-STAGE RENAL DISEASE PATIENTS UNDERGOING MAINTENANCE HEMODIALYSIS IN A TERTIARY HOSPITAL

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ABSTRACT

End-stage renal disease (ESRD), the most advanced form of chronic kidney disease, severely impacts patients' quality of life (QoL), especially in low- and middle-income countries like Nepal. This study aimed to assess the QoL of ESRD patients undergoing maintenance hemodialysis at Chitwan Medical College. A cross-sectional quantitative study was conducted from October 2024 to January 2025 among 107 ESRD patients on hemodialysis for at least six months. QoL was measured using the WHOQOL-BREF tool across four domains: physical, psychological, social, and environmental. Descriptive and inferential statistics were used for analysis. The overall mean QoL score was 48.36 ± 7.44. The environmental domain scored highest (53.85 ± 11.10), followed by social (51.65 ± 11.85), physical (46.06 ± 7.46), and psychological (41.59 ± 8.19). ESRD patients undergoing dialysis in Nepal experience moderate to poor QoL, particularly in psychological and physical domains. Targeted, age-sensitive interventions are essential to enhance their well-being.

KEYWORDS

End stage kidney disease, hemodialysis, Nepal, quality of life

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INTRODUCTION

The most severe form of chronic kidney disease (CKD), known as end-stage renal disease (ESRD), occurs when a patient is dependent on dialysis or a kidney transplant because their kidneys are unable to keep their body in a balanced state.[1] In technical terms, CKD is defined as a state that lasts for at least three months and is characterized by a glomerular filtration rate (GFR) of less than 60 mL/min per 1.73 m2 and/or a urine ratio of more than 30 mg/g of albumin to creatinine, regardless of any underlying cause.[2,3]

CKD is a significant public health concern that presents challenges to global health systems. According to the 2023 ISN-GKHA, a global survey on the burden of kidney disease, globally 850 million people have CKD, people of all ages and races are impacted by CKD, with those from underprivileged groups being more vulnerable.[4] In the 2015 global burden of disease (GBD) research, CKD was placed 17th globally in terms of causes of mortality (i.e., 192 deaths per 100,000 people, age-standardized annual death rate).[5]

Quality of life (QoL) is a concept which aims to capture the well-being, whether of a population or individual, regarding both positive and negative elements within the entirety of their existence at a specific point in time.[6] The physical, psychological, and social aspects of health that are impacted by an individual's experiences, beliefs, expectations, and perceptions are represented by health-related QOL (HRQOL).[7]

Chronic renal failure can have a major impact on a person's QOL, particularly on their social, financial, and mental health.[8] Hemodialysis therapy is costly, time-consuming, and necessitates dietary and hydration restrictions. Extended dialysis treatment frequently leads to diminished autonomy, reliance on care-givers, disturbances in social, marital, and family life, as well as a decrease or discontinuation of earnings.[9] Research on the burden of individual illnesses and the QOL resulting from end-stage renal disease is scarce in low- and middle-income nations such as Nepal.[10]

Despite technological advancements, ESRD patients still report poor QOL, making it essential to investigate the factors influencing their well-being to enhance patient care and outcomes. By assessing these aspects through a cross-sectional study design and analyzing the data with both descriptive and inferential statistics, this research seeks to offer insights into the challenges faced by these patients. The findings are expected to inform targeted interventions aimed at improving their QoL and will be shared through publications and presentations to relevant stakeholders. So, the primary aim of the study is to find out the quality of life among patients with ESRD attending Chitwan Medical College and Teaching Hospital (CMCTH) in Chitwan.

MATERIALS AND METHODS

The study was an institution-based descriptive, cross-sectional study conducted among patients diagnosed with ESRD and undergoing maintenance hemodialysis at CMCTH, Chitwan, Nepal. The Department of Nephrology at CMCTH provides comprehensive renal replacement therapy services for patients from across the country. Permission for data collection was obtained from the hospital administration prior to the commencement of the study. The study was conducted over a period of six months, from 1st October 2024 to 30th January 2025. The sample size was determined using the pooled standard deviation of 18.76 obtained from three previous studies that utilized the WHOQOL-BREF scale.[11-13]

The WHOQOL-BREF scores were calculated according to the standard WHO scoring procedure. Each item was rated on a five-point Likert scale, and the raw scores for each domain were computed first. These raw domain scores were then linearly transformed into a 0–100 scale to facilitate interpretation and comparison across domains. Higher transformed scores indicated better QOL, whereas lower scores reflected poorer QOL. For the purpose of interpretation in this study, the transformed WHOQOL-BREF scores were graded into three levels: poor QOL, moderate QOL, and good QOL. Scores below 45 were considered poor, scores from 45 to 65 were categorized as moderate, and scores above 65 were interpreted as good QOL. This grading system was used to summarize the overall and domain-specific QOL status of patients undergoing maintenance hemodialysis.[11]

The pooled value was calculated using the weighted pooled standard deviation formula for three groups. The required sample size (n) was then computed using the formula $n = (Z^2 \times \sigma^2) / d^2$, assuming a 95% confidence level ($Z = 1.96$), a pooled standard deviation (σ) of 18.76, and a margin of error (d) of four points. The calculated minimum sample size was 85. To account for an anticipated 20% non-response rate, the final sample size was adjusted to 107 participants.

A consecutive sampling technique was adopted to include all eligible patients meeting the selection criteria during the study period. Patients aged 18 years and above who had been on maintenance hemodialysis for at least six months were included to ensure stable treatment patterns and reliable assessment of quality of life. Patients with severe cognitive impairment or diagnosed psychiatric disorders that could hinder their ability to comprehend or respond accurately to the questionnaire were excluded from the study.

Independent variables of the study included demographic characteristics such as age, sex, marital status, education, occupation, and socioeconomic status, as well as illness-related characteristics including duration of illness, frequency of dialysis, and presence of comorbidities. The dependent variable was the health-related QOL score across the four domains of the WHOQOL-BREF tool.[14] In this study, 'current illnesses' referred to any additional acute or co-existing medical condition present at the time of interview (e.g., infection, cardiovascular event, or other acute symptoms), apart from the underlying diagnosis of ESRD.

Data were collected through a structured questionnaire comprising two parts: socio-demographic and clinical information, and the Nepali-translated version of the WHOQOL-BREF scale. The WHOQOL-BREF consists of 26 items distributed across four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items). Each item is rated on a five-point Likert scale (1–5), with higher scores representing better quality of life. Domain scores were transformed into a 0–100 scale according to WHO scoring guidelines. The WHOQOL-BREF has been validated for use in Nepal and has demonstrated good psychometric properties, including a Cronbach's alpha of 0.91.[15] A pretest was conducted among 10 ESRD patients undergoing hemodialysis at CMCTH to assess clarity and appropriateness of the tool. Necessary modifications were made based on feedback from participants, and the reliability coefficient (Cronbach's alpha) for the pretested tool was 0.88.

After obtaining ethical clearance and written informed consent, data collection was conducted during the patients' scheduled hemodialysis sessions. Participants were first briefed about the objectives and procedures of the study, and those consenting were provided with the Nepali-translated WHOQOL-BREF questionnaire for self-administration. Assistance was given whenever participants had difficulty understanding any item. Each participant took approximately 30 minutes to complete the questionnaire, which was checked immediately upon submission for completeness and accuracy. Data were collected by trained enumerators under close supervision of the investigators.

Ethical approval for the study was obtained from the Institutional Review Committee of Chitwan Medical College (Ref. No.: CMC-IRC/081/082-020). The purpose of the study was clearly explained to each participant, and confidentiality of the information obtained was strictly maintained. Participation was voluntary, and respondents were assured of their right to withdraw at any time without any effect on their treatment. The study involved minimal risk to participants.

Data were entered and analyzed using SPSS-16. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe socio-demographic and clinical variables, as well as quality of life scores. Each domain of the WHOQOL-BREF was scored according to WHO guidelines and linearly transformed to a 0–100 scale. The mean ± standard deviation (SD) was calculated for each domain, and associations between selected independent variables and QOL scores were analyzed using appropriate statistical tests, with a p-value <0.05 considered statistically significant.

RESULTS

A total of 107 participants were included in the study. The majority of participants were aged 35–60 years (62.6%), followed by those above 60 years (22.4%). Over half were male (54.2%) and most were married (84.1%). In terms of education, 43.9% had primary-level education, while 17.8% were illiterate. A large proportion (86.9%) had experienced illness for 3 months to 1 year (Table 1).

Regarding the respondents' perceived QOL, the majority rated their QOL as either poor (43.0%) or neither poor nor good (39.3%). Only 11.2% reported having a good QOL, while 6.54% described it as very poor. Notably, none of the respondents rated their QOL as very good. Similarly, satisfaction with overall health was generally low, with 43.0% expressing dissatisfaction and 28.1% reporting a neutral stance (neither satisfied nor dissatisfied). Only 2.8% were satisfied with their health,

Table 1: Demographic characteristics of the respondents (n=107)

Characteristics	n (%)
Age in years	
18–34	16 (15.0)
35–60	67 (62.6)
>60	24 (22.4)
Gender	
Male	58 (54.3)
Female	49 (45.7)
Marital status	
Married	90 (84.1)
Unmarried	17 (15.9)
Education level	
Illiterate	19 (17.8)
Primary	47 (43.9)
Secondary	32 (29.9)
Higher secondary	9 (8.2)
Duration of illness	
3 months – 1 year	93 (86.9)
>1 year	14 (13.9)

Table 2: Perceived QOL and health satisfaction (n=107)

Characteristics	n (%)
Perceived QOL	
Very poor	7 (6.5)
Poor	46 (43.0)
Neither poor nor good	42 (39.3)
Good	12 (11.2)
Very good	0 (0.0)
Perceived health satisfaction	
Very dissatisfied	7 (6.5)
Dissatisfied	46 (43.0)
Neither satisfied nor dissatisfied	30 (28.1)
Satisfied	3 (2.8)
Very satisfied	0 (0.0)

and no respondents reported being very satisfied. These findings indicate a substantial burden of poor self-perceived QOL and health dissatisfaction among the study population (Table 2).

The overall WHOQOL-BREF score was 48.4±7.4, indicating a moderate QOL. Among domains, the environmental score was highest (53.9±11.1), followed by social (51.7±11.9), physical (46.1±7.5), and psychological (41.6±8.2), with the latter reflecting the poorest outcomes. These findings suggest the need for targeted interventions, especially to enhance psychological and physical well-being (Table 3).

The box plot of WHOQOL-BREF domain scores showed highest variability in the social (53.9±11.1) and Environmental (51.8 ± 11.9) domains, indicating diverse experiences. physical (46.1 ± 7.4) and psychological (41.7 ± 8.2) domains had lower means and narrower spreads, reflecting more consistent but lower satisfaction in those areas (Fig. 1).

The comparison of WHOQOL-BREF domain scores by gender and illness status revealed no statistically significant differences. Physical health scores were nearly identical between

Table 3: Level of QOL of respondents according to various domains (n=107)

Domain	Min	Max	Mean±SD
Physical	28.6	64.3	46.1±7.5
Psychological	25.0	58.4	41.6±8.2
Environmental	25.0	75.0	53.9±11.1
Social	21.9	81.3	51.7±11.9
Overall	30.1	62.2	48.4±7.5

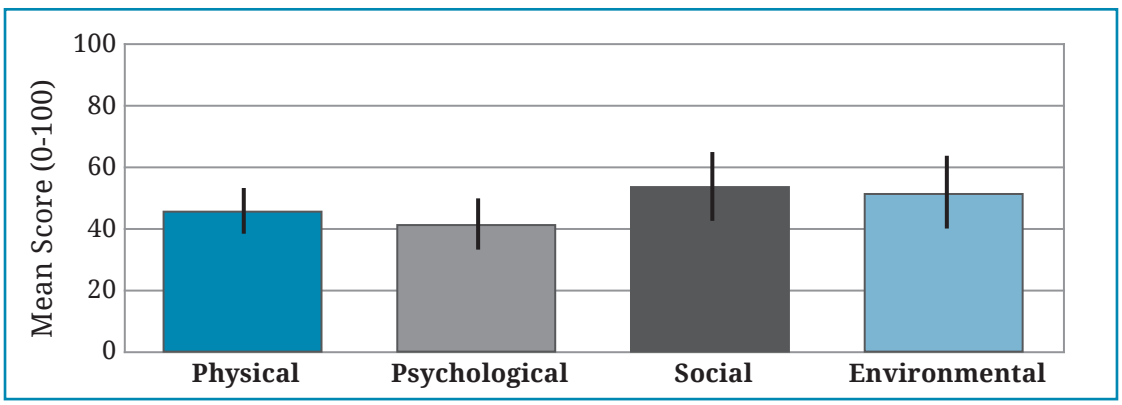

Fig. 1: WHOQoL-BREF Domains

Table 4: WHOQOL-BREF domain scores by socio-demographic characteristics

Variable group	WHOQOL-BREF domain			
	Physical health	Psychological health	Social relationships	Environmental health
Gender				
Male (n = 58)	46.1 (7.0)	42.0 (8.5)	54.8 (9.9)	52.3 (12.8)
Female (n = 48)	46.0 (8.09)	41.1 (7.9)	53.5 (12.5)	50.9 (10.6)
p-value	0.93	0.55	0.75	0.56
Current illness				
No illness (n = 92)	45.9 (7.4)	41.4 (8.1)	54.5 (10.9)	51.7 (11.8)
Current illness (n = 14)	46.94 (8.0)	42.6 (9.0)	49.4 (11.5)	51.6 (12.5)
p-value	0.64	0.64	0.11	0.98

*p-values calculated using independent samples t-test. Values presented as Mean (Standard Deviation)., Scores are transformed to a 0–100 scale.

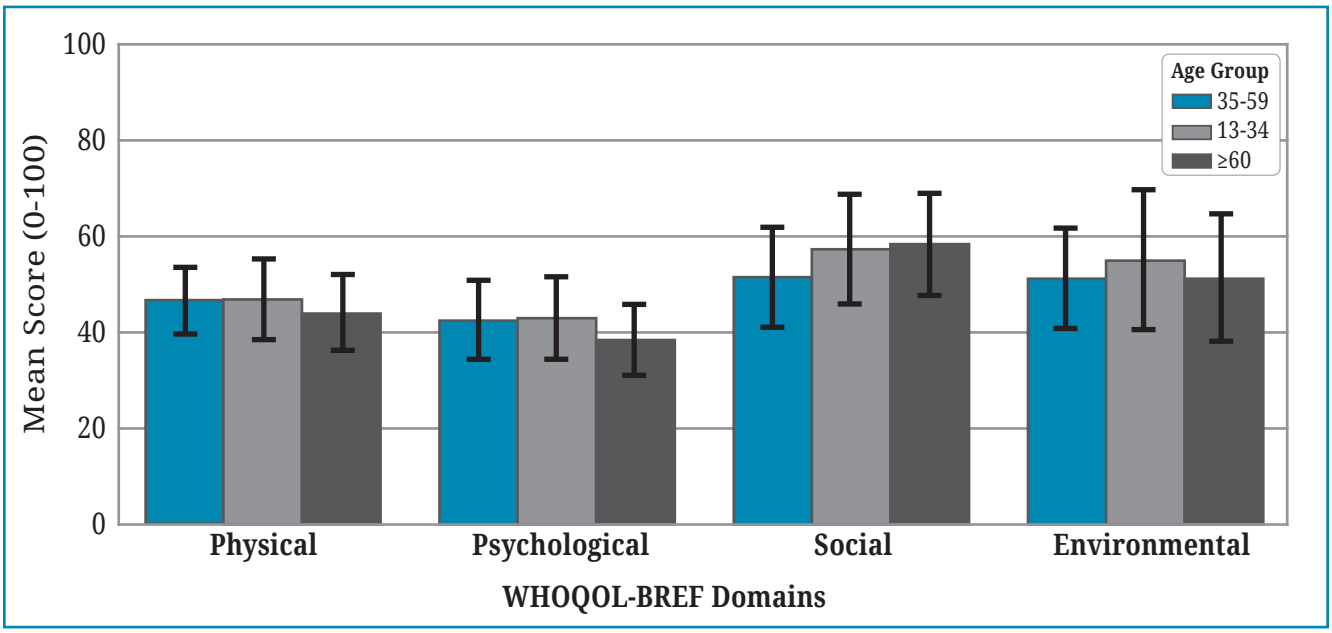

Fig. 2: WHOQOL-BREF domain scores by age group

males (46.1) and females (46.0; p = 0.93). Psychological domain scores also showed no gender-based difference (p = 0.55). Social relationship scores were slightly higher in males, but not significantly so (p = 0.75). Environmental health scores were similar between genders (p = 0.56). Participants with current illness (acute or co-existing medical condition present at the time of, apart from the underlying diagnosis of ESRD) had comparable scores to those without illness across all domains. A non-significant trend toward higher social scores was noted in those without illness (p = 0.19). Overall, QOL perceptions did not significantly differ by gender or illness status (Table 4).

The WHOQOL-BREF domain scores varied notably across age groups. Participants aged 13–34 reported the highest scores in all domains, indicating better overall well-being. This group scored 47.4 (physical), 48.4 (psychological), 59.7 (social), and 54.3 (environmental). Those aged 35–59 showed moderate scores across domains. Older adults (60+) had the lowest scores, especially in physical (37.6) and psychological (38.6) health. The decline in quality of life with age was most evident in health-related domains. Lower social and environmental scores were also observed in older individuals. These findings highlight the need for age-specific interventions, especially for older adults (Fig. 2).

DISCUSSION

ESRD and its treatment through long-term hemodialysis significantly affect multiple dimensions of patients' lives, often leading to compromised QOL, including physical, psychological, and social well-being. Studies on the QOL among ESRD patients undergoing hemodialysis consistently show compromised QOL across various domains. The WHOQoL-BREF is a 26-question instrument designed to assess QOL.[6,13]

The study revealed a high proportion of patients rating their QOL as poor or neither poor nor good, with very few reporting it as good and none as very good. Similarly, dissatisfaction with overall health was prominent, highlighting the perceived health burden among hemodialysis patients. These findings align with previous studies conducted in Nepal and other low-resource settings, which also reported low perceived quality of life and health satisfaction among ESRD patients undergoing hemodialysis. Such patterns may be attributed to the physical, emotional, and economic challenges faced by this population, including fatigue, dietary restrictions, financial burdens, and dependency on lifelong treatment.

Our study assessed the QOL among hemodialysis patients using the WHOQoL-BREF tool and revealed domain-specific mean scores of 46.1±7.4 (physical), 41.7±8.2 (psychological), 53.9±11.1 (social), and 51.8±11.9 (environmental). These findings highlight a moderate impairment in QOL, particularly in the psychological domain, which emerged as the most affected. This is consistent with previous studies using the WHOQoL-BREF tool in similar populations, such as one reporting domain means of 45.93±16.90 (physical), 51.2±18.6 (psychological), 49.9±21.6 (social), and 53.2±15.6 (environmental), with psychological domain tends to score lower in dialysis and chronically ill populations, as supported by existing literature.[14] In our findings, where psychological scores were the lowest, reflect the possible burden of long-term illness, treatment dependency, and emotional stress in dialysis patients. Although the physical domain in our study was also lower than that in some comparative studies, the social and environmental domains showed relatively better performance, mirroring earlier results.[14]

In terms of gender differences, our findings indicated slightly higher mean social domain scores in males (54.2±9.9) than females (53.5±12.5), though the difference was not statistically significant (p=0.75). This aligns with prior observations where gender differences in QOL tend to be subtle and often not statistically conclusive.[4,5]

The observed variation in WHOQOL-BREF scores across age groups underscores the significant impact of aging on QOL among ESRD patients. Younger individuals (13–34 years) reported higher scores across all domains, indicating better physical, psychological, social, and environmental well-being. This aligns with previous literature that recognizes age as a key determinant of health-related QOL in chronic conditions like ESRD.[7,8,12] The marked decline in physical and psychological scores among older adults (60+) reflects the cumulative burden of comorbidities, reduced functional capacity, and diminished resilience-trends consistent with global reports on aging and kidney disease.[2,3,10] These findings are also echoed in local studies from Nepal and neighboring regions, which highlight deteriorating QOL with advancing age.[13,14] The reduced social and environmental domain scores in older patients may be attributed to decreased mobility, financial dependency, and limited access to supportive services.[6,12] This age-related disparity in QOL emphasizes the need for age-sensitive, comprehensive care models to address the multidimensional needs of older ESRD patients and mitigate their vulnerability to poor outcomes.[5,12]

A noteworthy finding from prior research suggests that patients with higher income levels (e.g., NPR 5 to 10 lakhs annually) tend to report better scores in the psychological (65.0±17.1), environmental (62.3±15.6), and general health domains (3.4±0.7).[14]

In conclusion, our study demonstrated that patients with ESRD undergoing hemodialysis experience moderate impairment in their overall QOL, with the psychological domain being most affected. Advancing age was associated with poorer outcomes across all domains, whereas gender differences were minimal. These findings emphasize the importance of integrating psychosocial and age-specific interventions into routine dialysis care. Strengthening mental health support, counseling, and holistic management strategies may help enhance the overall well-being of this vulnerable population.

Limitations: This study has several limitations. First, its cross-sectional design limits the ability to establish causal relationships between patient

characteristics and QOL. Second, the study was conducted in a single tertiary hospital with a relatively small sample size, which may limit the generalizability of the findings to all ESRD patients undergoing hemodialysis in Nepal. Third, data were collected using a self-reported questionnaire, which may be subject to recall and response bias. Also, our study did not include income stratification, this underscores the socioeconomic gradient in QOL perception.

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