



Quality of Life among Hemodialysis Patients with or Without Diabetes Mellitus at Undata Hospital, Palu

(Kualitas Hidup Pasien Yang Menjalani Hemodialisa Dengan Komplikasi dan Tanpa Komplikasi Diabetes Melitus Di RSUD Undata Palu)

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Article Info:

Received: 21 October 2023

in revised form: 24 November 2023

Accepted: 31 October 2025

Available Online: 31 October 2025

Keywords:

Diabetes mellitus

Hemodialysis

Quality of life

SF-36

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ABSTRACT

Background: Hemodialysis is a renal replacement therapy for patients with end-stage chronic kidney disease (CKD). Diabetes mellitus is a leading cause of CKD. Hemodialysis can affect health-related quality of life (HRQoL) across physical and psychological domains, which may also vary by age, sex, education, employment, comorbidities, and dialysis duration. **Objectives:** To assess HRQoL among hemodialysis patients at Undata Hospital, Palu, and examine associations with sex, age, dialysis duration, diabetes mellitus, and education level. **Methods:** An observational study was conducted among end-stage kidney disease patients receiving hemodialysis, with and without diabetes mellitus, at Undata Hospital. The sample consisted of 88 patients who met the inclusion and exclusion criteria. Data included demographic and clinical characteristics recorded on the identity sheet, and quality of life measured using the SF-36 questionnaire. **Results:** Most participants were male (55.7%), aged 31–50 years (56.8%), college-educated (36.4%), and had undergone hemodialysis for ≤1 year (54.5%). Forty patients (45.5%) had diabetes mellitus and 48 (54.5%) did not. Mean HRQoL scores were 40.62 (poor) in the diabetes group and 55.36 (good) in the non-diabetes group. HRQoL was significantly associated with age ($p=0.046$), dialysis duration ($p=0.015$), diabetes mellitus ($p=0.03$), and education ($p=0.043$), while gender was not associated ($p=0.750$). **Conclusion:** Hemodialysis patients with diabetes mellitus experienced lower HRQoL than those without. Age, dialysis duration, and education level are additional determinants of HRQoL in this population.



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How to cite (APA 6th Style):

Diana, K., Kristiono, O., & Tandah, M. R. (2025). Quality of life of patients undergoing hemodialysis with or without diabetes mellitus at Undata Hospital Palu. *Jurnal Farmasi Galenika: Galenika Journal of Pharmacy (e-Journal)*, 11(2), 125-135. doi:10.22487/j24428744.2025.v11.i2.17893

INTRODUCTION

Kidney failure, a condition affecting the kidneys, can result from diverse factors such as infections, tumors, congenital abnormalities, or metabolic and degenerative diseases. The documented prevalence of chronic kidney failure diagnosed by physicians in Indonesia stands at 0.38%. In Central Sulawesi Province, the prevalence is slightly higher at 0.52%. (Kementerian Kesehatan Republik Indonesia, 2019). In 2017, diabetic nephropathy, alternatively recognized as diabetic kidney disease, held the second position in terms of the proportion of comorbidities among individuals with chronic kidney failure (Indonesia Renal Registry, 2018).

The presence of chronic kidney disease alongside diabetes mellitus can detrimentally impact the quality of life for patients, leading to a decline in their overall well-being. This condition imposes limitations on patients, affecting their ability to engage in various activities and carry out work tasks. Additionally, the management of this health condition necessitates continuous monitoring of blood sugar levels and adherence to dietary restrictions (Wahyuni et al., 2018). Hemodialysis serves as a substitute therapy for individuals experiencing end-stage chronic kidney failure (Wiliyanarti & Muhith, 2019). Patients undergoing hemodialysis due to chronic kidney failure will encounter lifestyle adjustments, encompassing limited mobility, diminished societal engagement, and reduced productivity. These changes can have implications for their psychological well-being (Archentari et al., 2017).

In this study, we operationalize quality of life with the SF-36, which assesses eight domains, Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional, and Mental Health, providing a standardized health-related QoL profile (Essex et al., 2024). Domain scores are transformed to a 0–100 scale (higher = better) and can be summarized as the Physical Component Summary (PCS) and Mental Component Summary (MCS), enabling domain-level and summary-level comparisons between hemodialysis patients with and without diabetes mellitus (Reed et al., 2022).

Evidence across diverse settings indicates that hemodialysis patients with diabetes mellitus (DM) experience poorer health-related quality of life (HRQoL) than their non-diabetic counterparts. Soleymanian et al., (2017) reported significantly lower Short Form-36 (SF-36) scores in diabetic patients (45.7 ± 20.9) versus non-diabetics (52.7 ± 20.5), while Gumprecht et al., (2010) showed that the most pronounced deficits occur in physical-health domains, with other domains showing smaller or nonsignificant differences, highlighting domain-specific variation worth testing. More recently, Han et al., (2025) corroborated these disparities and identified key determinants (e.g., age, sex, family support), and earlier work by Sørensen et al. likewise noted reduced physical health among diabetic dialysis patients. Taken together, this literature supports a focused comparative aim; therefore, this study seeks

to compare HRQoL between hemodialysis patients with and without DM, with particular attention to domain-level differences and relevant contextual determinants, and concludes the background with a clear, guideline-consistent statement of objectives.

METHODS

This study was a non-experimental observational investigation conducted at Undata Hospital Palu between August 2020 and November 2021. The data were collected through a cross-sectional approach focusing on chronic kidney disease (CKD) patients undergoing hemodialysis. The study included a sample of 88 outpatients undergoing maintenance hemodialysis, selected through purposive sampling based on specific inclusion and exclusion criteria. Inclusion criteria comprised patients aged 20-65 years, undergoing hemodialysis for at least three months, with or without complications from diabetes mellitus, proficient in the local language, and capable of providing informed consent. Patients with comorbidities other than diabetes mellitus were excluded from the study.

Quality of life was assessed using the SF-36 and scored using norm-based scoring (NBS): each domain and the Physical and Mental Component Summary scores were standardized to a T-score with mean 50 and SD 10, where values <50 reflect worse-than-average health and ≥ 50 reflect at- or above-average health relative to general-population norms. We report domain profiles and PCS/MCS as continuous outcomes, and we use distribution-anchored thresholds (≈ 2.5 –5 points on the NBS scale) to interpret clinical relevance of differences and changes, avoiding arbitrary dichotomization (Bató et al., 2025; Baum et al., 2024).

Data analysis comprised univariate and bivariate procedures. The dependent variable was quality of life (SF-36), dichotomized a priori using norm-based scoring as below norm ($\text{NBS} < 50$) versus at/above norm ($\text{NBS} \geq 50$). Independent variables included age, sex, education level, patient type (diabetes vs. non-diabetes), and hemodialysis duration. Univariate analysis described each variable. Bivariate associations between QoL category and each independent variable were tested using the chi-square test with $p < 0.05$ as the threshold for statistical significance. For chi-square analyses, continuous predictors (age and hemodialysis duration) were grouped into clinically meaningful categories, and standard assumptions (independent observations and adequate expected cell counts) were verified.

RESULTS AND DISCUSSION

A. Samples Characteristics

Table 1. Characteristics of Hemodialysis Patients

Variables	frequency (n=88)	Percentage (%)
Gender		
Male	49	55,7
Female	39	44,3
Age (years)		
20-30	2	2,3
31-50	50	56,8
51-64	25	28,4
≥ 65	11	11,4
Education level		
Elementary school	12	13,6
Junior High school	13	14,8
Senior high school	31	35,2
College	32	36,4
Diabetes mellitus		
Yes	40	45,5
No	48	54,5
Hemodialysis duration		
≤1 year	48	54,5
>1 year	40	45,5

In our cohort, 55.7% were male; this mirrors national registry data from Indonesia (2016–2019) showing 55.5% male among 122,449 hemodialysis patients (mean age 52 years). Older age is consistently associated with lower HRQoL, especially in SF-36 physical domains, so we treat age as a key covariate when comparing groups (Andhika et al., 2025).

Thirty-six point four percent of respondents had college-level education. In hemodialysis cohorts scored with the SF-36, higher educational attainment is associated with better mental health scores, so we treat education as a potential confounder in HRQoL analyses. Although non-diabetic etiologies made up 55.7% of our sample, diabetes is a leading global cause of CKD/ESKD and, in SF-36, based analyses, the presence of diabetes is linked to lower physical health (PCS) scores among hemodialysis patients, which together supports our primary comparison of SF-36 outcomes between patients with and without diabetes mellitus (Machaca-choque et al., 2024).

Most participants had a dialysis duration ≤ 1 year. Dialysis “vintage” can shape early symptom burden and adaptation, so we report it to contextualize SF-36 differences by diabetes status and, where applicable, adjust or stratify analyses. This profile of characteristics, sex, age, education, and dialysis duration, therefore frames our primary objective: to compare HRQoL between hemodialysis patients with and without diabetes mellitus using the SF-36 (Yan et al., 2025)

B. Quality of Life Score for Chronic Kidney Failure Patients undergoing hemodialysis

Table 2. Quality of life score for each domain

Domains	With DM (n = 40)	Without DM (n = 48)
Physical functioning (PF)	35,00	64,48
Role functioning-physical (RP)	24,17	43,74
Role functioning-emotional (RE)	20,83	36,11
Vitality (VT)	58,75	63,18
Mental health (MH)	46,00	45,58
Social Functioning (SF)	55,94	73,44
Bodily pain (BP)	43,44	66,41
General health (GH)	40,84	49,96
Mean	40,62	55,36
Category quality of life	Medium	Good

The mean quality of life score for the group of patients without diabetes mellitus complications, consisting of 48 patients across 8 domains, indicated a good quality of life (55.36). In contrast, in the group of patients with diabetes mellitus complications (40 patients), the domains showed a poor quality of life, with an average score of 40.62. This is in line with research by Wahyuni et al. (2018). Patients experiencing chronic kidney failure alongside diabetes mellitus can mitigate the progression of their condition by imposing limitations on their activities. The use of insulin or other oral antidiabetic medications, ongoing monitoring of blood sugar levels, and adherence to dietary restrictions can impact the overall quality of life for these patients.

Within the table pertaining to patients without complications of diabetes mellitus, the average score for the physical function domain is 64.48. This domain evaluates abilities related to activities such as walking, climbing stairs, bending, lifting, and general body movements. This value is included in the high/good quality category, indicating that the patient does not experience any limitations in carrying out physical activity, whether light or heavy physical activity. Meanwhile, in patients with diabetes mellitus complications, the physical function domain has an average of 35.00, categorized as poor/low quality of life, indicating limitations in performing various activities such as walking, lifting objects, and climbing stairs.

In the table concerning patients without complications of diabetes mellitus, the average score for the physical role domain, which assesses the extent to which physical health can impede work and other daily activities, is recorded as 43.74. This value falls within the poor/low-quality category. Notably, this is comparable to the average quality of life score for the group of patients with diabetes mellitus complications, which stands at 24.17, also categorized as poor/low-quality. Both groups of patients encounter challenges wherein deteriorating physical health hinders various daily activities, leading to difficulties in performing work efficiently, limitations in certain activities, and complications in task completion. This aligns with a study conducted by Sulistini et al. (2019) in the physical domain, revealing

an average score of 50.05. The decline in physical activity among hemodialysis patients may be attributed to the impact of uremia on muscle function, leading to atrophy, anemia, bone disease, malnutrition, and the fatigue experienced by patients post-hemodialysis therapy. (Lolowang et al., 2021).

In the emotional role domain, which assesses the extent to which emotional issues disrupt work or other daily activities, the average score for patients without complications of diabetes mellitus was 36.11, indicating a low value and low quality. Similarly, for the group of patients with diabetes mellitus complications, the average was 20.83, categorized as poor/low-quality. Both patient groups Both groups reported that emotional issues reduce productivity, work performance, and the ability to complete tasks.

In the energy domain, assessing fatigue and energy levels, patients without diabetes scored 63.18 (good quality), indicating no limitations in daily activities. They report feeling full of energy and enthusiasm in their daily pursuits. Similarly, for the group of patients with complications of diabetes mellitus, the average score was 58.75. In both groups, there were no observed limitations in this domain, with the value categorizing as good quality, suggesting similar levels of energy and enthusiasm.

Moreover, in the mental health domain section table for patients without complications of diabetes mellitus, assessing depression, anxiety, and emotional control habits, the average score was 45.48. This places the value in the poor/low-quality category, indicating that these patients encounter depression or anxiety in their daily lives. Similarly, for the group of patients with diabetes mellitus complications, the average was 46.00, categorized as poor/low quality. Both groups reported mental health challenges affecting their lives. Chronic kidney failure can evoke feelings of hopelessness, helplessness, anxiety, and loss of meaning, diminishing overall quality of life (Fatma, 2018).

Subsequently, in the social function domain within the group of patients without complications of diabetes mellitus, the average score was 73.44. This categorizes as good quality, signifying that these patients did not encounter any limitations in this domain. Similarly, for the group of patients with diabetes mellitus complications, the average was 55.94, also indicating good quality. Both patient groups reported no disruptions in this domain while engaging in social activities such as visiting friends, meeting neighbors, or connecting with relatives.

Next, in the pain domain, which assesses the intensity of pain and its impact on regular activities both at home and outside, patients without complications of diabetes mellitus reported an average score of 66.41. This categorization as good quality suggests that these patients did not encounter limitations due to pain. On the other hand, for the group of patients with diabetes mellitus complications, the average was 43.44, placing it in the poor/low-quality category. This indicates that these patients experience pain

sensations that may hinder or interfere with their activities. This finding aligns with Teli (2017), who reported that 66.4% of patients with diabetes mellitus experienced pain due to chronic complications such as peripheral neuropathy, causing a loss of sensitivity to pressure and temperature. Consequently, some patients frequently endure pain or cramps in their legs, significantly affecting their ability to engage in various activities.

In the table for the general health domain, which assesses various aspects such as current health, feelings about health, and disease resistance, patients without complications of diabetes mellitus achieved an average score of 49.96. This low/poor quality score implies a decline in the patient's health. Conversely, for the group of patients with complications of diabetes mellitus, the average value was 40.84, falling into the poor/low quality category. Both groups expressed a perception that their health was deteriorating on a daily basis. This observation may be correlated with the aging factor, as a majority of respondents are advancing in age. During this stage, changes occur in the body's anatomy, physiology, and biochemistry (Musnelina et al., 2021).

The least favorable outcomes in the group of patients without complications of diabetes mellitus were observed in the emotional role domain, with an average score of 36.11, assessing the extent to which emotional issues disrupt work or other daily activities. Similarly, in the group of patients with diabetes mellitus complications, the lowest average was recorded in the emotional role domain, with a score of 20.83. Both scores fall within the poor/low-quality category. However, a limitation of this study is that the researchers did not examine the impact of hemodialysis session frequency on quality of life.

C. Correlation of Respondent Characteristics on Quality of Life

Table 3. Influence of Respondent Characteristics on Quality of Life

Variables	Quality of Life Category				Sig.
	Good		Poor		
	n	%	n	%	
Gender					
Female	14	35,89	25	64,10	0,750
Male	16	32,65	33	67,34	
Age (years)					
20-30	1	50	1	50	0,046
31-50	22	44	28	56	
51-64	6	24	19	76	
≥ 65	1	9,09	10	90,9	
Hemodialysis duration					
≤1 Year	11	22,91	37	77,09	0,015
> 1 Year	19	47,50	21	52,50	
Diabetes mellitus					
Yes	7	17,5	33	82,5	0,003
No	23	47,91	25	52,09	
Education Level					
Elementary School	2	16.66	10	83.34	0,043
Junior High School	2	15.39	11	84.61	
Senior High School	10	32,25	21	67,74	
College	16	50.00	16	50.00	

Using chi-square tests, gender showed no association with QoL ($p = 0.750$), indicating comparable HRQoL between men and women in our sample—despite earlier work that reported gender differences (Ipo et al., 2016). Factors mapping chiefly to the physical dimension were significant: age ($p = 0.046$) and dialysis duration ($p = 0.015$). The age association is consistent with prior observations that kidney function changes across the life course (Rustandi et al., 2018; Suparti & Solikhah, 2016). Shorter vs. longer time on dialysis may also relate to symptom burden and adaptation (Barzegar et al., 2017; Sarastika et al., 2019). For the patient-type comparison central to this study, diabetes status was significantly associated with QoL ($p = 0.003$), with lower QoL among patients with diabetes, in line with previous reports (Masi & Kundre, 2018; Wahyuni et al., 2018). In the psychosocial/education domain, higher educational attainment was associated with better QoL ($p = 0.043$), echoing evidence that education facilitates health information seeking and self-management (Suparti & Solikhah, 2016; Wua et al., 2019).

Taken together, these results show that differences in physical (age, diabetes, dialysis duration) and psychosocial (education) determinants align with our objective to compare SF-36 outcomes with and without diabetes mellitus, while acknowledging that gender did not distinguish QoL in this dataset (Ipo et al., 2016; Masi & Kundre, 2018; Wahyuni et al., 2018).

Findings are based on bivariate chi-square analyses, which do not adjust for potential confounders such as glycemic control, dialysis adequacy, anemia, inflammation, depression, employment/income, and social support; residual confounding is therefore possible (relevant background in Rustandi et al., 2018; Wahyuni et al., 2018). The study used a single-center, non-random sample, which may limit generalizability and introduce selection bias. Finally, dichotomizing QoL can reduce information compared with continuous scoring and may affect power and interpretation (Suparti & Solikhah, 2016; Wua et al., 2019). The limitations of this study include the use of a general questionnaire, namely the SF-36, rather than a disease-specific instrument for kidney conditions, and the fact that data collection was conducted during the pandemic, which may have affected patients' quality-of-life scores.

CONCLUSION

The research findings indicate that hemodialysis patients without diabetes mellitus generally exhibit a good quality of life, whereas those with diabetes mellitus tend to have a poorer quality of life. Several characteristics of the respondents, including age, hemodialysis duration, presence of diabetes mellitus complications, and education levels, are identified as influencing factors on the patient's quality of life. On the other hand, the patient's gender does not appear to have a significant impact on their quality of life.

ACKNOWLEDGEMENT

The authors sincerely thank the Pharmacy Department of Tadulako University for supporting our research. We thank all participants for their help and cooperation during the study period.

CONFLICT OF INTEREST

The authors declare no conflict of interest

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