



Article

Pattern of Symptom Burden and Quality of Life: A Cross-Sectional Comparative Study Among Hemodialysis and Non-Dialysis Patients with End-Stage Kidney Disease

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Abstract

Background: Patients with end-stage kidney disease (ESKD) often experience significant symptom burden and reduced quality of life (QoL). This study compared these outcomes between hemodialysis (HD) and non-dialysis (ND) ESKD patients in India. **Methods:** A six-month cross-sectional study was conducted among 247 patients with ESKD aged ≥ 18 years, following Institutional Ethics Committee approval (IEC-214/2021). Symptom burden and QoL were assessed using the Edmonton Symptom Assessment System-Revised: Renal and EuroQol 5-Dimension 5-Level instruments. **Results:** HD patients reported a higher symptom burden than ND patients (81.3% vs. 65.8%), with fatigue being the most common symptom. They also had greater mobility impairment (63% vs. 45%) and lower EQ-5D-5L utility scores (0.69 ± 0.32 vs. 0.79 ± 0.27), indicating poorer QoL. Older age and lower education were associated with higher symptom burden, while poorer QoL was associated with older age, widowhood, lower education, and longer dialysis vintage ($p < 0.05$). Symptom burden was moderately correlated with poorer QoL ($r = 0.60$, $p < 0.01$). **Conclusions:** HD patients experience a greater symptom burden and poorer QoL than ND-ESKD patients. Routine symptom assessment and targeted symptom management may improve patient-centered outcomes.

Keywords: symptom burden; quality of life; end-stage kidney disease; hemodialysis; non-dialysis; non-communicable disease

1. Introduction

Globally, the number of people suffering from end-stage kidney disease (ESKD) is increasing rapidly due to aging populations and the rising incidences of diabetes and



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hypertension [1]. ESKD represents the final stage of chronic kidney disease, requiring treatment options such as hemodialysis, peritoneal dialysis, or transplantation. Conversely, owing to a shortage of available organs and financial constraints, most patients continue to undergo dialysis [2,3]. Hemodialysis is the most common kidney replacement therapy worldwide. Although dialysis can significantly prolong a patient's survival, it cannot completely restore the usual physiological kidney function or underlying disease [4]. Patients undergoing dialysis experience a substantial symptom burden related to the disease, its management, and comorbidities [5]. This burden is associated with a poor quality of life, high rates of hospitalization, and increased mortality, highlighting the importance of early intervention. However, healthcare providers sometimes underestimate the severity of symptoms in patients undergoing dialysis [6]. Some symptoms, such as fatigue and joint or bone pain, may be present throughout the continuum of CKD. However, other symptoms, such as headaches and dizziness, caused by fluid and electrolyte changes during hemodialysis administration, might not apply to non-dialysis-dependent CKD patient populations [7]. Previous studies have found that symptom discomfort is correlated with decreased health-related quality of life in patients with CKD [8]. The total symptom burden was higher in patients undergoing dialysis than in those not undergoing dialysis. Furthermore, symptom patterns differ between dialysis and non-dialysis patients with ESKD due to various factors, including older age, disease severity, lower levels of education, financial difficulties, and other health conditions [9,10].

Integrating patient-reported outcome measures (PROMs) helps identify ESKD patients' perspectives on symptom severity and health-related quality of life (HRQoL) [11]. Patients with ESKD may not reveal all their symptoms during routine visits or dialysis rounds. Ideally, symptom burden should be evaluated at initial visits and at every follow-up visit to track any additional symptoms and assess treatment [12]. Several tools have been developed to assess the symptom load. One of these instruments is the Edmonton Symptom Assessment System–Revised: Renal (ESAS-r: Renal) [13,14]. Implementing the ESAS-r: Renal in clinical settings could enhance communication between patients and physicians, potentially leading to a deeper comprehension of the medical or psychosocial factors associated with symptom experiences and assisting in the recognition of patients who might need further evaluation or support [13,15,16].

"Quality of life (QoL) is a broad multidimensional concept that includes a combination of various health domains, including the physical, psychological, and social domains that interfere with an individual's thoughts, situational perception, and feelings of enjoyment" [17]. The common areas affected in patients with ESKD include usual activities, pain, and depression. The EuroQol-5-Dimensional -5 level (EQ-5D-5L) is a generic PROM that assesses HRQoL in five categories: "getting around, taking care of oneself, routine activities, pain or discomfort, and worry/depression" [18]. Very few studies have focused specifically on symptoms and QoL in patients with ESKD, with and without dialysis [19].

This study aimed to investigate the patterns of symptom burden and quality of life among patients with HD-ESKD and ND-ESKD using validated assessment tools, namely the ESAS-r: Renal and the EQ-5D-5L, and to compare these outcomes between the two groups. We are also investigating the relationships between quality of life and symptom burden, as well as the factors associated with them in the study population.

2. Materials and Methods

2.1. Study Settings

This observational cross-sectional study was conducted from October 2022 to September 2023 in the Hemodialysis Unit and Nephrology Outpatient Department of Kasturba Medical College, Manipal, at the Manipal Academy of Higher Education, Manipal, In-

dia. This study was approved by the Institutional Ethics Committee of Kasturba Medical College, Manipal (IEC No. IEC-214/2021; approval date: 22 April 2021).

2.2. Participants

The study participants included patients with ESKD who were over 18 years old, had stage 5 ESKD, were not receiving dialysis (ND-ESKD), were on maintenance HD (HD-ESKD), and were visiting the hospital for nephrology care. Participants who were unable or unwilling to participate or complete the questionnaire were excluded from the study. The investigator distributed the questionnaires, obtained written consent from all participants, and addressed any questions they had before providing their consent to participate. The author ensured that the participants' responses remained anonymous and their privacy was protected (Figure 1).

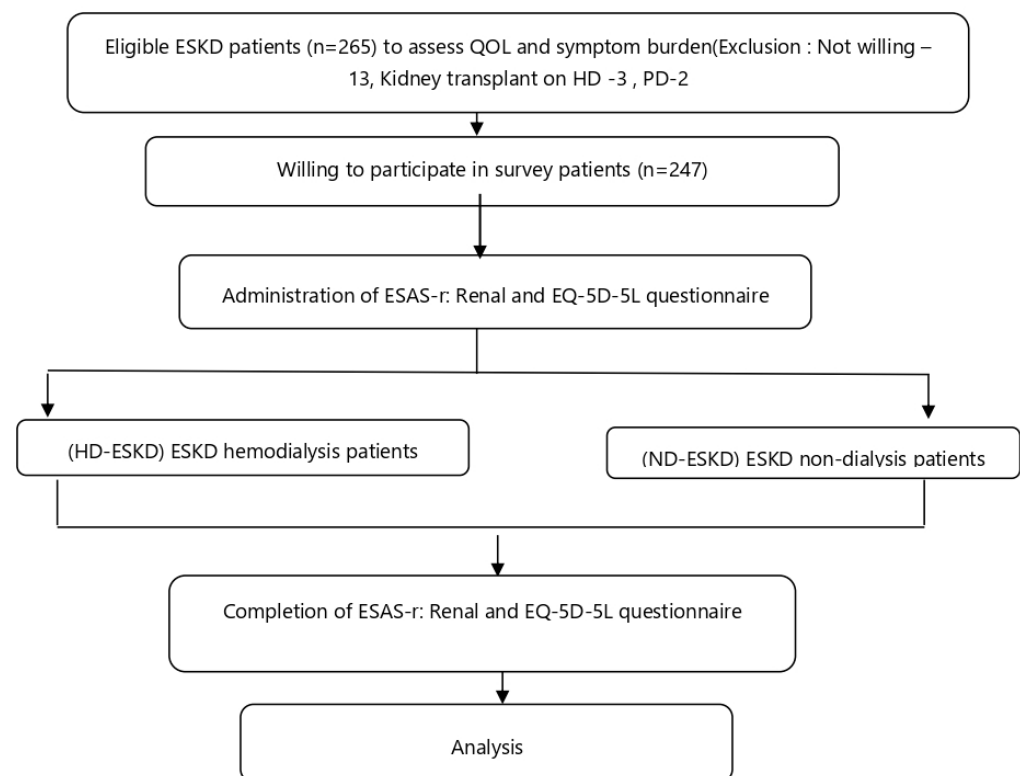


Figure 1. Flow Diagram of Study process.

2.3. Inclusion Criteria

Patients with ESKD on dialysis and non-dialysis, aged 18 years or older, visiting the hospital.

2.4. Exclusion Criteria

Acute kidney injury, peritoneal dialysis and kidney transplantation patients, and patients with ESKD who were unwilling to participate in the study.

ESKD non-dialysis (ND-ESKD): CKD stage 5 (eGFR < 15 mL/min/1.73 m² as per CKD-EPI equation) not yet initiated on kidney replacement therapy.

ESKD on-dialysis (HD-ESKD) refers to patients with end-stage kidney disease who are undergoing hemodialysis as a form of kidney replacement therapy and have been on maintenance hemodialysis for more than three months.

Eligible patients are recruited after providing informed consent. Demographic information, including age, sex, educational qualification, marital status, family type, financial

status, and ESKD etiology, was collected. In this study, we used the ESAS-r: Renal and EQ 5D 5 L scales to assess the symptom burden and quality of life.

2.5. ESAS-r: Renal Questionnaire

Symptom burden was measured using the validated ESAS-r: Renal (English or Kannada version), a simple and brief self-administered tool that assesses nine symptoms—pain, drowsiness, itching, tiredness, nausea, loss of appetite, shortness of breath, depression, anxiety, and overall well-being and includes an optional tenth item for “other symptoms,” allowing patients to report any additional symptoms not listed above. Each question has a response option ranging from 0 (no symptoms) to 10 (worst symptoms). Any symptom with a score of 1–3 is considered mild, 4–6 is moderate, and 7–10 indicates severe intensity on the Likert scale [13,14,20].

2.6. EQ-5D-5L

QoL was assessed using this validated tool. It contains five categories: getting around, taking care of oneself, doing routine activities, dealing with pain or discomfort, and worrying or depression. There is a single question for each dimension regarding experiences today, with five possible answers: 1 = “no problems,” 2 = “slight problems,” 3 = “moderate problems,” 4 = “severe problems,” and 5 = “extreme problems” [17,18].

The Euro QoL Group provided permission for the use of this tool in both Kannada and English (Registration ID: 39396), and the validated ‘ESAS-r: Renal’ English or Kannada version was used [14,18].

2.7. Statistical Analysis

Sociodemographic characteristics, symptom burden, and quality of life of patients with hemodialysis-dependent and non-dialysis-dependent ESKD were analyzed using descriptive statistics and compared using the chi-square test. Continuous variables are reported as mean $\pm$ standard deviation (SD). The overall symptom burden score was determined by summing all the item scores and dividing by the number of items to obtain an average score. Spearman’s rank correlation analysis was employed to assess the relationship between symptom burden and QoL, with correlation coefficients > 0.7 indicating strong, 0.5 – 0.7 moderate, and < 0.5 weak correlations [21]. EQ-5D-5L utility scores were derived using the Indian EQ-5D-5L value set developed by Jyani et al., converting each participant’s health state to a utility score ranging from 0 (health states worse than death) to 1 (perfect health state) [22]. Utility scores were summarized using the mean and standard deviation. Factors associated with overall symptom burden and QoL among patients with ESKD were identified using ordinal logistic regression based on their demographic and clinical characteristics. Statistical significance was set at $p < 0.05$. All analyses were conducted using Jamovi version 2.3.28 software.

3. Results

Table 1 presents the participants’ characteristics of the study. Overall, 247 eligible participants had an average age of 52.3 years (range, 19–89 years). Of these, 77% were men. Diabetes (43%) was the most common cause of end-stage kidney disease (ESKD). Among the participants, 76 (31%) had ND-ESKD, whereas 171 (69%) had HD-ESKD. The majority (78.5%) were married, and 35.6% had completed their secondary education.

Table 1. Demographic and clinical variables of the study population.

Variables	ESKD Non-Dialysis (N = 76) (%) (ND-ESKD)	ESKD on Hemodialysis (N = 171) (%) (HD-ESKD)	Total (N = 247) (%)
Age (mean $\pm$ SD) (in Years)	52.1 $\pm$ 15.6	51.9 $\pm$ 14	52.3 $\pm$ 14.5
Dialysis Vintage	0.00 $\pm$ 0.00	4.94 $\pm$ 3.51	3.42 $\pm$ 3.7
Gender			
Male	56(73.7%)	134 (78.4%)	190 (76.9%)
Female	20 (26.3%)	37 (21.6%)	57 (23.1%)
Etiology of ESKD			
Diabetes Mellitus	37 (48.7%)	69 (40.3%)	106 (43%)
Hypertension	12 (15.7%)	18 (10.5%)	30 (12.1%)
Chronic Glomerulonephritis	17 (22.4%)	57 (33.4%)	74 (30%)
Chronic Interstitial nephritis	9 (11.9%)	14 (8.2%)	23 (9.3%)
ADPKD	-	6 (3.5%)	6 (2.4%)
Others	1 (1.3%)	7 (4.1%)	8 (3.2%)
Education Status			
No Education	5 (6.6%)	11 (6.4%)	16 (6.5%)
Primary Education	29 (38.2%)	54 (31.6%)	83 (33.6%)
Secondary Education	28 (36.8%)	60 (35.1%)	88 (35.6%)
Higher Education	14 (18.4%)	46 (26.9%)	60 (24.3%)
Marital Status			
Married	61 (80.3%)	133 (77.8%)	194 (78.5%)
Single	9 (11.8%)	31 (18.1%)	40 (16.2%)
Widowed	6 (7.9%)	7 (4.1%)	13 (5.3%)
Religion			
Hindu	72 (94.7%)	145 (84.7%)	217 (87.9%)
Muslim	2 (2.7%)	14 (8.2%)	16 (6.5%)
Christian	2 (2.7%)	12 (7%)	14 (5.7%)
Region			
Rural	47 (61.8%)	100 (58.5%)	147 (59.5%)
Urban	29 (38.1%)	71 (41.6%)	100 (40.5%)
Types of Family			
Joint	27 (35.5%)	45 (26.3%)	72 (29.1%)
Nuclear	49 (64.5%)	126 (73.7%)	175 (70.9%)

3.1. Symptom Burden Characteristics

The overall mean symptom burden of patients with HD-ESKD and ND-ESKD was 2.16 ± 0.90 , ranging from 0 to 13. The HD-ESKD group demonstrated a significantly higher overall symptom burden of 81.3% compared with 65.8% in the ND-ESKD group ($p < 0.01$).

Fatigue emerged as the most prevalent symptom, affecting $> 80\%$ of patients across both ESKD groups ($p < 0.01$). In the HD-ESKD group, the most common symptoms after

fatigue were depression, pain, sleep disorders, anxiety, and lack of appetite, respectively. In contrast, patients with ND-ESKD primarily report mild symptoms of fatigue, followed by depression, anxiety, sleep disorders, and pain (Supplementary Table S1).

When analyzing the subgroup of only moderate-to-severe symptoms (>4 scores), it was found that patients with HD-ESKD had a significantly higher moderate-to-severe symptom burden compared to the ND-ESKD group ($p < 0.01$) (Figure 2).

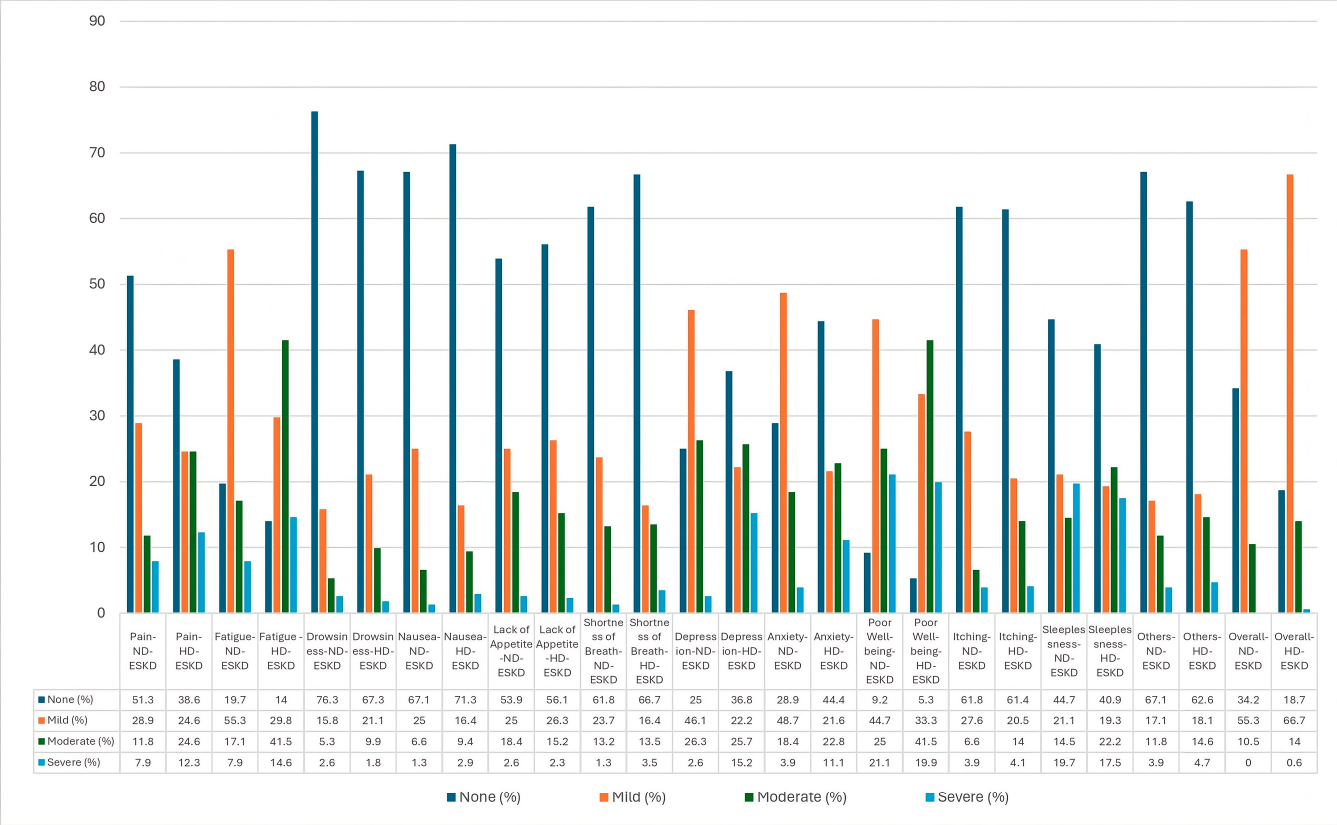


Figure 2. Comparison of Symptom Severity Distribution Between Hemodialysis and Non-Dialysis ESKD Patients.

3.2. Participant Characteristics and Quality of Life Measures

Quality of life of patients with HD-ESKD and ND-ESKD was evaluated using EQ-5D-5L questionnaire, as detailed in Supplementary Table S2. In total, 68% of patients with HD-ESKD and 57% of patients with ND-ESKD reported issues in one or more EQ-5D-5L dimensions. The QoL of HD-ESKD patients were significantly lower than that of ND-ESKD patients ($p < 0.01$). While most patients with ND-ESKD experienced slight problems, moderate-to-severe issues were more prevalent among patients with HD-ESKD. An analysis of individual dimensions revealed that mobility was significantly more impaired in HD-ESKD patients (63%) than in ND-ESKD patients (45%) ($p < 0.01$) (Supplementary Table S2). Additionally, the mean EQ-5D-5L utility score was lower in HD-ESKD patients (0.69 ± 0.32) than in ND-ESKD patients (0.79 ± 0.27), reflecting a poorer health-related quality of life in the hemodialysis group (Figure 3).

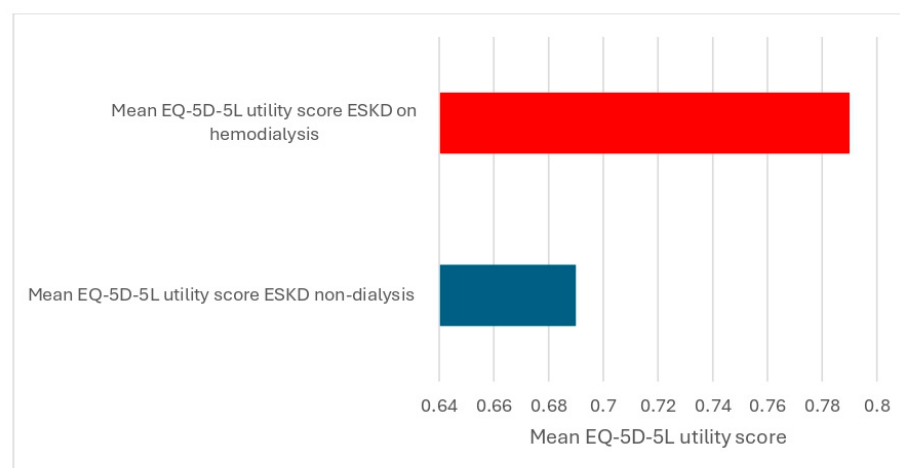


Figure 3. Comparison of Mean EQ-5D-5L Utility Scores Between ESKD Patients on Hemodialysis and Non-Dialysis.

3.3. Association Between Symptom Burden and Quality of Life

Patients with ESKD demonstrated a significant positive correlation between overall symptom burden and mean EQ-5D-5L dimension scores in both the HD-ESKD and ND-ESKD groups (Spearman's rho, $r = 0.60$, $p < 0.01$). As higher EQ-5D-5L dimension scores indicate greater health-related impairment, patients with a higher symptom burden reported more problems across the five EQ-5D-5L dimensions, reflecting a poorer quality of life (Table 2).

Table 2. Association with symptom burden with QoL.

EQ-5D-5L Score Distribution	ESKD Non-Dialysis (ND-ESKD) (N = 76)%					ESKD on Hemodialysis (HD-ESKD (N = 171)%)				
	ESAS-r: Renal Score				χ^2 (p-Value)	ESAS-r: Renal Score				χ^2 (p-Value)
	None (0) N (%)	Mild (1–3) N (%)	Moderate (4–6) N (%)	Severe (7–10) N (%)		None (0) N (%)	Mild (1–3) N (%)	Moderate (4–6) N (%)	Severe (7–10) N (%)	
No Problems (N%)	15 (19.7)	15 (19.7)	3 (3.9)	0 (0)	16.25 (0.001) *	20 (11.6)	30 (17.5)	5 (2.9)	0 (0)	45.6 (0.001) *
Slight Problems (N%)	8 (10.5)	23 (30.2)	2 (2.6)	0 (0)		11 (6.4)	54 (31.5)	4 (2.3)	0 (0)	
Moderate Problems (N%)	3 (3.9)	3 (3.9)	3 (3.9)	0 (0)		1 (0.5)	26 (15.2)	10 (5.8)	1 (0.5)	
Severe Problems (N%)	0 (0)	1 (1.3)	0 (0)	0 (0)		0 (0)	3 (1.7)	5 (2.9)	0 (0)	
Extreme Problems (N%)	0 (0)	0 (0)	0 (0)	0 (0)		0 (0)	1 (0.5)	0 (0)	0 (0)	

*: $p < 0.05$ was considered statistically significant.

3.4. Association of Sociodemographic Factors with Overall Symptom Burden and Quality of Life in ESKD Patients

Ordinal logistic regression analyses were conducted to examine the associations between demographic and clinical variables with overall symptom burden and quality of life (Table 3). Age and educational status were significant predictors of both symptom burden and QoL. Specifically, older patients and those with lower educational status had higher odds of experiencing a greater symptom burden and poorer quality of life. Additionally, widowed patients were more likely to report a poorer QoL than married patients ($p < 0.05$).

Patients with a dialysis vintage of more than six years had higher odds of poorer QoL than those on dialysis for 6 months to 3 years (OR = 2.109, 95% CI: 1.005–4.483, $p < 0.05$).

Table 3. Prediction of the overall symptom burden and overall quality of life of ESKD patients.

Predictors	Overall Symptom Burden (McFadden $R^2 = 0.096$; AIC = 448; Deviance = 410)			Overall Quality of Life (McFadden $R^2 = 0.121$; AIC = 465; Deviance = 429)		
	Odds Ratio	95% CI	p -Value	Odds Ratio	95% CI	p -Value
Age (>60 years, Reference)						
Below 60 years	0.411	0.216–0.772	0.006 *	0.366	0.196–0.675	0.001 *
Gender Male Reference						
Female	0.923	0.484–1.761	0.808	0.980	0.513–1.854	0.951
Marital Status Married-Reference						
Single	0.753	0.354–1.609	0.462	0.592	0.267–1.268	0.185
Widowed	1.951	0.549–6.927	0.300	3.209	0.9–10.9	0.05 *
Education Status No education-Reference						
Higher education	0.162	0.047–0.546	0.003 *	0.159	0.046–0.535	0.003 *
Secondary Education	0.434	0.135–1.383	0.158	0.543	0.177–1.671	0.284
Primary Education	0.592	0.190–1.842	0.364	1.118	0.372–3.390	0.842
Religion Hindu-Reference						
Christian	0.260	0.051–1.09	0.056	0.459	0.137–1.453	0.192
Muslim	0.719	0.243–2.123	0.551	0.626	0.213–1.729	0.377
Region Rural-Reference						
Urban	0.890	0.500–1.581	0.691	1.094	0.629–1.907	0.751
Types of Family Joint-Reference						
Nuclear Family	1.912	0.54–3.522	0.06	1.170	0.655–2.106	0.597
Dialysis Vintage 6 months–3 years (Reference)						
6year above	1.588	0.742–3.430	0.236	2.109	1.005–4.483	0.05 *
3–5 years	1.113	0.490–2.536	0.797	1.508	0.680–3.350	0.311
No dialysis	0.518	0.245–1.085	0.083	1.118	0.548–2.282	0.759
CKD Etiology Diabetes Mellitus						
Hypertension	1.151	0.649–2.044	0.630	1.346	0.772–2.355	0.295
Renal Disease (CGN, CIN)	0.520	0.211–1.281	0.155	1.211	0.512–2.838	0.660

*: $p < 0.05$ was considered statistically significant.

4. Discussion

This study examined symptom burden and QoL in patients with hemodialysis (HD-ESKD) and non-dialysis ESKD (ND-ESKD). Understanding symptoms and QoL patterns can improve overall well-being, making this aspect essential for effective patient care management. This study showed that patients with HD and non-HD ESKD have a high overall symptom burden and reduced quality of life, which aligns with similar findings in previous studies [10].

4.1. Symptom Burden

In the hemodialysis group, the symptoms most frequently reported after fatigue were depression, pain, sleep disturbances, anxiety, and loss of appetite. Our findings demonstrate a substantial symptom burden among patients with ESKD, with fatigue emerging as the most prevalent symptom in both hemodialysis and non-dialysis groups. This finding is consistent with that of Almutary et al., who reported that 84.8% of patients undergoing dialysis experienced fatigue. Similarly, Jhamb et al. identified high levels of fatigue among non-dialysis ESKD patients, highlighting fatigue as a common symptom across different stages of chronic kidney disease [10,23]. In contrast, patients in the non-dialysis group primarily reported mild fatigue, followed by depression, anxiety, sleep disturbance, and pain. Similarly, Almutary et al. reported that 54.2% of non-dialysis patients experienced fatigue as a common symptom, followed by worry, itching, and joint pain [10]. Fatigue may serve as an indicator of a poor health-related quality of life (HRQoL). Early identification and management of fatigue may help reduce the burden of associated symptoms such as sleep disturbances and depression [10]. The high prevalence of fatigue among patients with ESKD may be attributed to multiple factors, including anemia, uremic toxin accumulation, chronic inflammation, reduced physical activity, comorbidities, and malnutrition [24]. Previous studies have shown that symptom severity increases as chronic kidney disease progresses, with patients receiving dialysis experiencing a significantly greater symptom burden [10,25]. Consistent with these findings, patients in the hemodialysis group in the present study reported a higher prevalence of moderate-to-severe symptoms, whereas those in the non-dialysis group predominantly experienced milder ones.

4.2. Quality of Life

When a chronic disease such as ESKD has no known cure, improving the quality of life should be the top priority for healthcare providers. Unfortunately, compared with that of the general population, the HRQOL of people with ESKD remains significantly lower.

Our study found that the overall QoL of patients undergoing hemodialysis was poorer than that of non-dialysis patients. Patients undergoing hemodialysis reported greater impairment in the physical aspects of quality of life, particularly mobility, which may be associated with metabolic disturbances, comorbid conditions, and dialysis-related complications [26,27]. Almutary et al. and Ram et al. reported that quality of life scores were lower in the dialysis group than in the non-dialysis group [19,28].

Comparing the quality of life and symptom burden between patients undergoing hemodialysis and those not undergoing hemodialysis with ESKD is inherently challenging [10]. Patients with advanced CKD may experience few symptoms, even when their kidney function is significantly impaired before starting dialysis. However, hemodialysis introduces additional burdens related to treatment, including frequent hospital visits, transportation issues, complications from vascular access, a higher risk of infection, and challenges in managing fluid levels. These factors are associated with a higher symptom burden and poorer quality of life among patients undergoing hemodialysis, highlighting the severity of the disease and challenges associated with its treatment [29,30].

4.3. Association Between Symptom Burden and Quality of Life

This study identified a significant association between total symptom burden and QoL, particularly highlighting that patients with ESKD in both groups experienced greater symptom burden and greater difficulties in the physical domains of QoL. These symptoms are associated with patients' ability to function and shape their overall perception of their health and quality of life. Previous studies have acknowledged the relationship between symptoms and QoL [31–33].

4.4. Predicting the Overall Symptom Burden and QOL of ESKD Patients with Demographic Parameters

Symptom burden and quality of life among patients with ESKD were significantly associated with older age and lower educational status. As individuals age, their physiological functions naturally decline, reducing their quality of life (QOL). This decline in physiological function is a natural part of the aging process [10,34]. In addition to age, education level plays a significant role in the quality of life of patients with ESKD. Individuals with lower levels of education may face unique challenges in managing their health, which can further affect their quality of life, consistent with previous studies [35,36]. Widowhood was associated with poorer QoL outcomes in our study. Previous research has shown that married individuals tend to have a better quality of life because of the support they receive from their spouses [37]. Patients with longer dialysis vintage were more likely to experience a poorer quality of life than those with a shorter duration of dialysis. This finding is consistent with previous studies that have reported an association between prolonged dialysis duration and reduced QoL among patients undergoing maintenance hemodialysis [38,39]. These findings suggest that social and cultural factors may play a significant role in this subgroup of patients, emphasizing the importance of assessing symptom burden and quality of life in the management of ESKD. It also highlights the need for physicians to provide timely management through kidney supportive care interventions.

4.5. Strengths and Limitations

Our study utilized the validated and culturally adapted symptom burden tool, ESAS-r: Renal, and the QoL tool EQ-5D-5L in the local language (Kannada) and the English version. Our study highlights the importance of using an objective approach and highlights the point that both hemodialysis and non-dialysis patients have an enormous symptom burden and compromised QOL. To the best of our knowledge, this is the first-of-its-kind study in India to compare the dialysis and non-dialysis groups using both the EQ 5D 5 L and the ESAS r: Renal, providing a comprehensive assessment of QoL and detailed symptom burden, and investigating the association between symptom burden and QoL.

The limitations of this study include its single-center cross-sectional design and the exclusion of patients receiving peritoneal dialysis, which may restrict the generalizability of the findings to other healthcare settings and patient populations. Additionally, data on comorbidity burden, hemoglobin levels, serum albumin, residual kidney function (urine output), and dialysis-related parameters, including dialysis prescription and small solute clearance, were not available.

5. Conclusions

Patients with ESKD face a significant symptom burden and compromised QoL on objective assessment. Fatigue is a common symptom in both HD and non-HD ESKD patients. The symptom burden patterns varied between the dialysis and non-dialysis groups. Patients undergoing hemodialysis experience significantly higher moderate-to-severe symptom burden and poorer QOL than those not undergoing hemodialysis. In the hemodialysis group, the most common symptoms after fatigue were depression, pain, sleep disorders, anxiety, and lack of appetite, whereas non-dialysis patients primarily reported mild fatigue, followed by depression, anxiety, sleep disorders, and pain. Factors such as lower education, widowhood, and longer dialysis vintage played a crucial role in impaired physical QoL in patients with ESKD, both on hemodialysis and non-dialysis patients. Our findings highlight the severity, pattern, and close relationship between symptom burden and QoL in patients with ESKD, emphasizing the need for comprehensive

symptom management strategies, including routine objective assessment, to improve overall well-being.

Supplementary Materials: The following supporting information can be downloaded at <https://www.mdpi.com/article/10.3390/kidneydial6030062/s1>, Table S1: ESAS-r: Renal Symptoms Score Distribution; Table S2: EQ-5D-5L score distribution for the QoL of the study population.

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Abbreviations

The following abbreviations are used in this manuscript:

CKD	Chronic Kidney Disease
ESKD	End-Stage Kidney Disease
HD	Hemodialysis
HD-ESKD	Patients with Hemodialysis End-Stage Kidney Disease
ND-ESKD	Non-Dialysis End-Stage Kidney Disease
PROMs	Patient-Reported Outcome Measures
HRQoL	Health-Related Quality of Life
QoL	Quality of Life
ESAS-r: Renal	Edmonton Symptom Assessment System–Revised: Renal
EQ-5D-5L	EuroQol Five-Dimensional Five-Level Questionnaire
KDQOL	Kidney Disease Quality of Life

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