Mangalayatan Journal of
Scientific and Industrial Research

Man. J. Sci. Ind. Res.
Volume 2 (2) (2025), 25306
ISSN: 3049-2815

Article

Prevalence of Fatigue and poor Quality of Life in Hemodialysis Patients: hospital – based, cross-sectional study

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Abstract

Background: *Fatigue and poor quality of life (QoL) are important burdens of hemodialysis (HD) patients, but definitive data on these issues in developing countries is scarce*

Aim: *Identify the prevalence of fatigue and its association with QoL in patients with HD in North Bengal.*

Methods: *Cross-sectional study carried out in Dr. Chhang's Super-specialty Hospital, Siliguri with 165 HD patients and convenience sampling technique was used. Tool used for data collection were Standardized: Fatigue Severity Scale (FSS) to assess the level of fatigue and SF-36 questionnaire for (QoL). Statistical analysis involved frequency, percentage, mean and standard deviation, chi-square and Pearson correlation*

Findings: *The results showed that there is a high prevalence of fatigue among patients (79.39% of patients were reported as having severe fatigue (Mean=5.84±0.25) and 9.70% of the patients reported clinically significant fatigue). Energy/fatigue domains were most affected by QoL (Mean=38.39±7.16). There was a significant negative relationship between fatigue and overall QoL (r = -0.47, p=0.001). The severity of fatigue was significantly correlated with marital status (χ^2=97.13, p=0.00001), dialysis duration (χ^2=26.18, p=0.0002), and intradialytic physical complaints (χ^2=52.68, p=0.00001).*

Conclusion: *fatigue is prevalent and negatively correlated with QoL in this population. Factors that relate to treatment and psychosocial factors also play a central role in determining the level of fatigue. These findings demonstrate the necessity of the incorporation of systematic fatigue evaluation and management guidelines into the routine HD care to enhance patient outcomes and overall well - being.*

Keywords: *Fatigue, Quality of Life, Hemodialysis, SF-36, Chronic Kidney Disease.*

1. Introduction

Chronic kidney disease (CKD) is a public health problem on the global level and hemodialysis (HD) is one of the main modalities in the treatment of end-stage renal disease (ESRD). In HD patients, fatigue is associated with several factors that are interconnected with anemia, uremic toxins, chronic inflammation,

Received: 15 October, 2025; Accepted: 19 November, 2025

problems of sleep, and depression [1]. Although HD keeps the patient alive by eliminating waste products and extra fluids, there is considerable symptom burden attributed to HD especially fatigue and reduced quality of life (QoL) [2]. Fatigue is experienced in 60-90 percent of HD patients that devastatingly constrains their physical activity, emotional health, and social interactions. The rigorous HD treatment also leads to post-dialysis fatigue which then decreases the functional ability of patients. Fatigue is still underrated in the field and much of the dilemma lies in the clinical profession with most of the attention

being on the biochemical parameter issues and not much is paid to the patient reported outcomes [3,4]. Likewise HD patients also commonly have low QoL because of stressors related to treatment, comorbidities, and restrictions imposed on their lifestyle. The case of impaired QoL among this group of people is quite documented, with reports indicating that impaired QoL is associated with an increased rate of hospitalization and mortality [5]. Nonetheless, the majority of evidence is based on the western population, and very little information is available about developing countries in which the healthcare situation and experience of a patient can be quite different. Moreover, fatigue and QoL are frequently not routinely assessed in the current clinical practice that provides an opportunity to intervene at an early stage [6]. Identifying the factors influencing and increasing the number of these conditions is crucial to designing specific interventions in order to enhance patient care and outcomes.

The proposed study would help identify the most frequent and significant HD fatigue and low QoL among HD patients. The increased awareness of these aspects of the dialysis care that tend to be overlooked, the research will promote a holistic, patient-centered approach, which should be applied in the practice of nephrology, thus, ultimately enhancing patient wellness and clinical outcomes [6].

1. Literature Review

Fatigue occurs in 60-90 percent of HD patients, especially in developing countries where anemia, uremic toxins, and chronic inflammation are poorly controlled. Post-dialytic fatigue is caused by the hemodialysis process itself, due to fluid and membrane bio-incompatibility [7]. In developing countries, catastrophic treatment costs bring families into poverty, which directly affects the QoL. Patients cannot work, travel, eat, and a cycle of poverty starts with illness establishing poverty. These socioeconomic stressors tend to override medical determinants of patient well-being and adherence to treatment [8]. Fatigue is highly correlated with low physical, mental, and social QoL. It restricts daily function, is associated with depression, and results in social isolation [9].

Fatigue is strongly associated with low QoL in physical, mental, and social spheres. It restricts activities in everyday life, is associated with depression and leads to social withdrawal. Fatigue has a higher effect on the quality of life in developing nations where family support systems are essential since they become a burden to the household [10].

In developing countries, western QoL measures tend to overlook cultural issues of particular concern, including stigma and family roles. Cultural adaptation is essential to

effective interventions, including low-cost exercise options and peer support in the community that targets local economic and psychosocial stressors.

The cross-national research shows that the level of fatigue and the quality of life are highly correlated in patients with CKD. It highlights that treating the problem of fatigue is not only essential to physical health but also raises the energy levels and general health of this population.

Methodology

Study Design

This study employed a hospital-based, cross-sectional design to assess the prevalence of fatigue and quality of life (QoL) among hemodialysis (HD) patients.

Study Setting, Population and Sample Size: The study was conducted at the dialysis unit of Dr. Chhang's Super-speciality Hospital, Siliguri, North-Bengal.

Sample Size

The required sample size is 165.

Sampling technique:

According to sampling criteria, 165 haemodialysis patients who met the inclusion criteria will be selected through non-probability (convenience sampling technique) was employed in this present study.

Data Collection Instruments

Part 1: Demographic variables of the patients on haemodialysis include age, gender, educational status, family income, residential type, comorbidities, time of diagnosis of disease, cause of kidney disease, duration of Haemodialysis and number of haemodialysis treatment per week.

Part 2:

Tool 1: Fatigue Assessment: The Fatigue Severity Scale (FSS), a validated 9-item questionnaire, was used to measure fatigue levels. Scores ≥4 indicate clinically significant fatigue.

Tool 2: Quality of Life Measurement: SF-36 was administered to assess the quality of life among the hemodialysis patient.

Data Collection Procedure

Data were collected over 2 months during patient's scheduled HD sessions.

The eligible participant was approached, explained the study objectives, and obtained informed consent. Data were collected through interview Schedule lasted 20–30 minutes.

Statistical Analysis

Data were analyzed using descriptive statistics summarized participant characteristics and (chi-square tests and Pearson correlation) to identify an associations between fatigue and QoL.

Ethical Considerations

The study received permission to conduct study from the Institution. Participation was voluntary, with written informed consent obtained from all participants. Confidentiality was maintained through anonymized data collection and secure storage.

Table 1: Distribution of Demographic and Clinical Variables among Hemodialysis Patients"

(n = 165)

Sl.No	Demographic Characteristics	Frequency	Percentage
1)	**Age**		
	1) 30– 45 years	31	18.79
	2) 45– 60 years	65	39.39
	3) 60 years and above	69	41.82
2)	**Gender**		
	1) Male	138	83.64
	2) Female	27	16.36
3)	**Marital status**		
	1) Single	5	3.03
	2) Married	149	90.30
	3) Divorced/ Separated	4	2.42
	4) Widowed	7	4.24
4)	**Educational status**		
	1) No formal education	25	15.15
	2) Primary	22	13.33
	3) Secondary	13	7.88
	4) Higher secondary	99	60
	5) Graduate and above	6	3.64

5)	**Occupation**		
	1) Unemployed	96	58.18
	2) Daily wage earner	26	15.76
	3) Homemaker	12	7.27
	4) Government job	18	10.91
	5) Retired	13	7.88
6)	**Residential type**		
	1) Rural	16	9.70
	2) urban	149	90.30
7)	**Duration of diagnosis of disease**		
	1) Less than 1 year	13	7.88
	2) 1 year -3 year	19	11.52
	3) 3 years and above	133	80.61
8)	**Length of Hemodialysis**		
	1) <6 months	3	1.82
	2) 6 months–1 year	18	10.91
	3) 1–2 years	131	79.39
	4) >2 years	13	7.88
9)	**Number of Hemodialysis per week** 1) Twice a week	145	87.88
	2) Thrice in a week	20	12.12
10)	**Physical complaints during dialysis** 1. Absent	12	7.27
	2. Present		
	a) Hypotension	32	19.39
	b) Shortness of breath	23	13.94
	c) Fatigue	98	59.39

Table 2: Distribution of Fatigue Severit

Sl.no	Level of fatigue	Frequency	Percentage	Mean	Sd
1.	No/mild fatigue (<4)	18	10.91%	3.73	0.191083
2.	Clinically significant fatigue (4–5)	16	9.70%	4.7	0.205756
3.	Severe fatigue (>5)	131	79.39%	5.84	0.248749

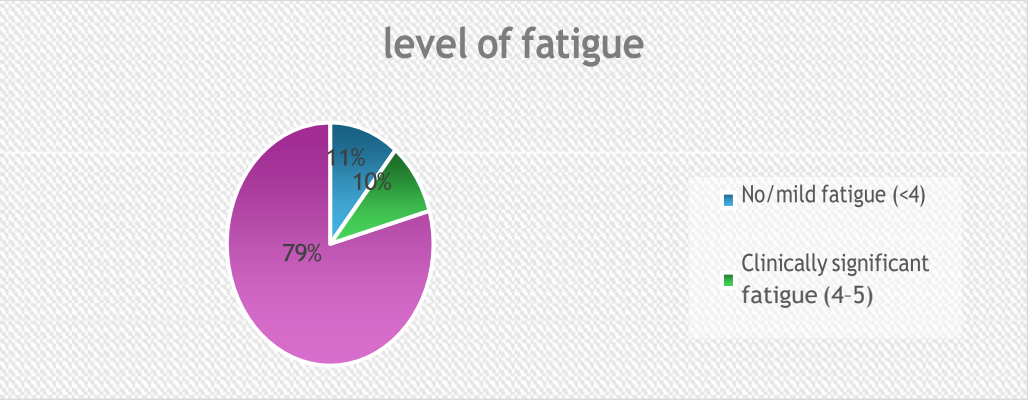

Figure 1: presenting the data on prevalence of level of fatigue among Hemodialysis Patients

Table 2, data demonstrates the scores of Fatigue Assessment Scale offered by 165 hemodialysis patients, it was observed that 79.39 % (131) of them were severely fatigued with the mean score of (5.84 ±0.25), which means that hemodialysis patients had high scores of fatigue burden. A smaller percentage, 9.70% (n = 16), was categorized as clinically significant fatigue mean (4.70 ±0.21), which were moderate levels of symptoms but impactful. Just 10.91% (n = 18) had reported mild fatigue, with a mean of (3.73 ±0.19), which is less than the clinical level. These results demonstrate that practically nine out of every ten patients have clinically significant fatigue, and most of those patients have it in the severe intensity, which proves the necessity of targeted assessment and management of fatigue among this population.

Table 3: Domain-wise Quality of Life Scores among Hemodialysis Patients (SF-36) (n = 165)

SL.No	Domain wise	Mean	Standard Deviation
1.	Physical Functioning	48.29201102	13.5820914
2.	Role Limitations Physical	52.72878788	36.57765304
3.	Role Limitations Emotional	73.13131313	33.00790023
4.	Energy/Fatigue	38.39393939	7.156007834
5.	Emotional Wellbeing	50.61818182	9.843916889
6.	Social Functioning	56.43939394	16.83284919
7.	Pain	47.3030303	12.33984639
8.	General Health	43.48484848	7.536260676

Table 3, describes the scoring of patients under hemodialysis in the eight SF-36 subscales and it provides a view of their quality of life. The Role Limitation had the highest score (Mean = 73.13 ±33) which indicates that the vast majority of respondents remained at the minimal of physical ability to conduct everyday tasks. Conversely, the lowest score was in the Energy/Fatigue (Mean = 38.39 ± 7.15) which showed that the study population experienced frequent fatigue and lack of vitality. Role Limitations due to Physical Health (Mean = 46.21 ± 36.57) and Role Limitations due to Emotional Problems (Mean = 43.03 ± 43.11) were variably different, which indicates that a percentage of the participants were severely disturbed in their daily roles by physical health issues. Close to the mid-point was the Emotional Well- being, Social Functioning, and the perception of the general health which displayed moderate mental health and fair understanding of the overall health status. The pain scores (Mean = 43.48±12.33) showed moderate levels of interference with pain. Altogether, these results emphasize that fatigue, pain, and activity limitations have a strong influence on the quality of life of patients under hemodialysis highlighting the need of holistic management options that focus symptom control and functional development.

Table5: Relationship between Quality of Life and the Selected Demographic/Clinical Variables of Patients Undergoing Hemodialysis. (n = 165)

Sl.No	Demographic Characteristics	Quality of Life (QoL)		Chi-square	df	p-value	Significance
		High QoL	Low QoL				
1.	**Age**						
	1.30– 45 years	17	14				
	2.45– 60 years	9	56	23.14	2	**<0.00001***	**significant**
	3.60 years and above	11	58				
2.	**Gender**						
	1. Male	2	25	4.1849	1	**.040786***	**significant**
	2. Female	35	103				
3.	**Marital status**						
	1. Single	2	4				
	2. Married	30	112	1.8909	3		Not significant
	3.Divorced/ Separated	1	5				
	4. Widowed	4	7				

4.	**Educational status** 1. No formal education	9	16				
	2. Primary	6	16	8.2149	4	.084016	Not significant
	3. Secondary	1	12				
	4. Higher secondary	18	81				
	5. Graduate and above	3	3				
5.	**Occupation** 1. Unemployed	23	73				
	2. Daily wage earner	5	20				
	3. Homemaker	1	13	2.574	4	.631431.	Not significant
	4. Government job	5	10				
	5. Retired	3	10				
6.	**Residential type** 1. Rural	1	16	2.9812	1	.084234.	Not significant
	2. Urban	37	112				
7.	**Duration of diagnosis of disease** 1. Less than 1 year	1	13				
	2. 1 year -3 year	1	18	6.36	2	**.041464***	**Significant**
8.	3. 3 years and above	36	97				
9.	**Length of Hemodialysis** 1. <6 months	1	3				
	2. 6 months–1 year	1	18	9.2298.	3	**.026387***	**Significant**
	3. 1–2 years	25	94				
	4. >2 years	10	13				
10.	**Number of Hemodialysis per week** 1. Once in a week						
	2. Thrice in a week	1	20	4.315 1.	1	**.037775***	**Significant**
	3. Twice in a week	36	108				
11.	**Physical complaints during dialysis** 1.Absent	1					

Table 4, presents the relationship between the quality of life (QoL) of hemodialysis patients and their demographic and clinical factors. QoL was significantly associated with age (χ^2=23.14, p<0.00001), with older patients (above 45 years) reporting poorer QoL. There was also significance in gender (χ^2=4.18, p=0.040786), with males reporting lower QoL in comparison with females. QoL was strongly associated with clinical factors, including duration of diagnosis (χ^2=6.36, p=0.0464), length of hemodialysis (χ^2=9.23, p=0.026), and frequency of dialysis per week (χ^2=4.31, p=0.038). In addition, physical complaints during dialysis, especially hypotension and fatigue, were closely correlated with low QoL (χ^2=12.19, p=0.006) However, marital status, education, occupation and type of residence did not show any significant relationships. These findings suggest that age and clinical profile are the determining factors of QoL in dialysis patients.

Table 5: Relationship between level of fatigue and the Selected Demographic/Clinical Variables of Patients Undergoing Hemodialysis.(n = 165)

Sl. No	Demographic Characteristics	Level of fatigue			Chi-square	df	p-value
		No/mild fatigue	Clinically significant fatigue	Severe fatigue			
1)	**Age**						
	1) 30– 45 years	5	1	25			
	2) 45– 60 years	8	10	47	6.4159	2	17017.
	3) 60 years and above	5	5	59			
2)	**Gender**						
	1) Male	15	14	22	0.1934.	1	.907808
	2) Female	3	2	22			
3)	**Marital status**						
	1) Single	1	1	4			
	2) Married	4	1	118	97.1308.	3	**<0.00001***
	3) Divorced/ Separated	10	14	4			
	4) Widowed	1	2	5			
4)	**Educational status**						
	1) No formal education	2	3	20			
	2) Primary	4	5	12	13.6596	4	.091081
	3) Secondary	1	1	12			
	4) Higher secondary	6	8	81			

	5) Graduate and above	3	1	6			
5)	**Occupation**						
	1) Unemployed	5	8	77			
	2) Daily wage earner	6	2	17			
	3) Homemaker	2	1	13	9.1907	4	.326466
	4) Government job	3	3	15			
	5) Retired	2	2	9			
6)	**Residential type**						
	1) Rural	6	2	10			
	2) Urban	14	14	121	4.0053.	1	.134975
7)	**Duration of diagnosis of disease**						
	1) Less than 1 year	1	1	9			
	2) 1 year -3 year	1	1	105	4.0949.	2	.393314.
	3) 3 years and above	16	12	17			
8)	**Length of Hemodialysis**						
	1) <6 months	3	1	8	**26.1814.***	3	**000206***
	2) 6 months–1 year	9	9	111			
	3) 1–2 years	2	3	10			
	4) >2 years	4	3	2			
9)	**Number of Hemodialysis per week**						
	1) Twice in a week	12	13	120	**9.9692***		**006842***
	1) Thrice in a week	6	3	11			
12	**Physical complaints during dialysis**						
	`1. Absent	8	1	6			
	2.Present 2.a.Hypotension	11	4	27	**52.681***	1	**0.00001***
	2.b.Shortness of breath	2	2	19			
	2.c.Fatigue	2	4	79			

The data in the **Table 4,** shows a relationship between the level of fatigue and Demographic/clinical factors among hemodialysis patients. The chi-square test showed that it had significant association with certain demographic variables. Significant association

was identified with marital status (χ^2=97.13, p<0.00001) in which married patients were disproportionately finding severe fatigue. Factors related to treatment indicated high strengths of correlation: dialysis duration (χ^2=26.18, p=0.0002) had higher prevalence of severe fatigue among patients receiving treatment of 6-12 months, whereas dialysis frequency (χ^2=9.97, p=0.007) indicated the lowest prevalence of severe fatigue among patients treated thrice a week. The highest clinical association was intradialytic physical complaints (χ^2=52.68, p<0.00001), especially in cases where reported fatigue was an issue related to hemodialysis. It is important to note that the fatigue severity was not significantly found with age, gender, education, occupation, residence, or duration of diagnosis of disease (p > 0.05). These results indicate that the severity of fatigue is largely dependent on treatment regimen and marital status, which may imply the importance of targeted intervention focus on these domains rather than general demographics.

Table 6: Correlation Between Fatigue and Quality of Life among the patient undergoing hemodialysis.

variables	Mean	Standard Deviation	r-value	df	t-statistic	p-value
Fatigue	48.58	8.66	-0.47	163	-6.86	< 0.001
Quality of Life (QoL)	50.88	12.64				

As shown in the **table 6,** the Pearson correlation analysis indicates that fatigue (M=48.58, SD=8.66) is significantly correlated with quality of life (QoL) (M=50.88, SD=12.64). The value of r = -0.47 indicates that the relationship between fatigue levels and the scores of QoL is moderate-strongly negative, meaning that the higher the level of fatigue the lower the QoL scores. This correlation has a significant level of statistical significance (p < 0.001) These findings demonstrate that fatigue management should be included in the regular care regimen to have a meaningful impact on patient outcomes and quality of life in the population of hemodialysis patients.

Discussion:

The results of the current research demonstrates the quality of life (QoL) in hemodialysis patients as dependent on a variety of demographic and clinical factors. Study by Kimmel et al. (2006), found that poorer QoL is strongly correlated with older age, probably because of the cumulative burden of comorbidities and physical limitations. The age, marital status and total time spent period on hemodialysis sessions all had a significant effect on QoL in our multivariate analysis (p < 0.05) [11]. Li et al. (2017), who discovered that the longer the treatment schedule, the more straining is the physical and psychological load [12]. Similarly, research by Shankar et al. (2024) identified hypotension and fatigue in dialysis as important predictors of lower QoL, as well as that emphasizes symptom burden as a significant factor in patient-reported outcomes,

concurs that symptom burden is a critical determinant of patient-reported outcomes [13].

Indicatively, treatment-related variables showed a high prevalence of fatigue as reported by Burdelis et al. (2023) [14]. Study by Biniaz et al. (2013) and Figueiredo et al. (2022) discovered that fatigue is influenced by hemodialysis time and shift schedules [15,16]. Alshammari et al. (2024) concluded, fatigue is a major determinant of the quality of life of hemodialysis patients [17]. According to Tsirigotis et al. (2022), there were strong correlations between fatigue and clinical (comorbidities) and psychosocial (marital status and health literacy) variables, which indicated that comprehensive strategies are essential in managing fatigue [18]. Faioli et al. (2024) examined predictors of fatigue in hemodialysis with dialysis-related changes in physiological states and treatment regimens being the main determinants [19]. The psychosocial factors, including marital status, and treatment-specific attributes such as dialysis duration and physical complications have been found to be critical in the management of fatigue and thus interventions must be targeted in these areas to reduce the fatigue burden in this group of patients.

Most of the studies have always shown that high fatigue levels have a strong association with low quality of life among hemodialysis patients. Our results ($r = -0.42$, $p<0.001$) are consistent with the literature reflecting that fatigue severity has moderate to strong negative correlations with QoL measures. The authors by Bossola et al. (2011) also found the same correlation coefficients ($r = -0.38$ to -0.45), and the systematic review by Almutary et al. (2013) confirmed the same trend in multiple studies (pooled $r = -0.39$) [20,21]. According to Liu et al. (2019), the level of fatigue showed a strong negative connection with the overall rating of QoL in 312 patients undergoing hemodialysis ($r = -0.45$, $p<0.001$) [22]. A prospective study by Abdel-Kader et al. (2018), which found that the severity of fatigue at baseline was a strong predictor of poorer QoL at 12-month follow-up ($b = -0.39$, $p<0.001$), with fatigue being a highly significant determinant of poorer outcomes in dialysis populations, and there should be specific measures taken to address fatigue in clinical practice to improve patient outcomes and general well-being [23].

Conclusion:

This research shows that fatigue is very common amongst patients in hemodialysis in North Bengal and a huge proportion of patients face severe fatigue. Fatigue was identified to be moderately to strongly related with poor quality of life, especially on the energy/fatigue domain. The most important variables that can be related to the increased fatigue are marital status, time and frequency of dialysis, and intradialytic physical complaints. These results highlight the necessity to establish systematic fatigue measurement and management into the regular hemodialysis practice. The combination of clinical and psychosocial factors in fatigue can be improved to improve overall quality of life and health outcomes in long-term dialysis patients.

Limitations of the Study :

The cross-sectional nature of the study limits the possibility of developing causal relationships between fatigue and quality of life. A non-probability convenience sampling method was used to select the sample in one center, which did not allow generalizing the results to other regions or populations. There could be the social desirability and recall bias in self-reported data. Furthermore, no measurement was done on possible confounding factors like nutritional status, depression and sleep quality, which could have affected fatigue and quality of life outcomes. It is suggested that future longitudinal and multicentric studies can be implemented to achieve a better understanding of these associations.

Acknowledgment :

We would like to convey our sincere thankfulness to our research guide and co-guide whose guidance and support were invaluable during this study. We are grateful to all our co-authors and their cooperation. We also appreciate the cooperation of Dr. Chhang of Super-specialty Hospital, Siliguri and people who participated without which this research would be impossible.

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