



Original Research Article

UREMIC PRURITUS: ITS PREVALENCE AND PSYCHOLOGICAL IMPACT ON QUALITY OF LIFE AMONG HEMODIALYSIS PATIENTS

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ABSTRACT

Background: Chronic Kidney Disease (CKD) entails a gradual decline in kidney function over time. Pruritus, or uremic pruritus, is common in advanced CKD patients on dialysis, severely affecting their quality of life. It impacts around 20% of CKD patients and 40% of those with end-stage renal disease, varying in distribution and severity. Uremic pruritus is linked to depressive symptoms and reduced quality of life (QoL). Despite its high prevalence and significant impact, pruritus effects are not well understood, particularly in our local context. This study estimated the prevalence of uremic pruritus in CKD patients undergoing hemodialysis and evaluated its impact on their quality of life.

Materials and Methods: Conducted at two nephrology units in Amritsar, India, this multicenter cross-sectional study included 200 CKD patients on hemodialysis. The 5-D itch scale, Patient Health Questionnaire-9 (PHQ-9), and Dermatology Life Quality Index (DLQI) were used to assess pruritus, depressive symptoms, and quality of life, respectively. Data analysis involved independent samples t-test, ANOVA, and Spearman's rank-order correlation.

Results & Conclusion: The prevalence of uremic pruritus was 63%. CKD duration exceeded 2 years in 51% of cases, significantly correlating with itch scores. According to the DLQI, itching affected 60% of patients' lives, and the PHQ-9 indicated that about 90% of patients experienced depression. The study found a significant association between CKD duration, impaired QoL, depression, and pruritus intensity and severity. Therefore, to enhance quality of life and reduce depressive symptoms, physicians must properly manage uremic pruritus.

Keywords: Chronic Kidney Disease, uremic pruritus, hemodialysis, depression, quality of life.

INTRODUCTION

Chronic Kidney Disease (CKD) is a progressive form of renal illness characterized by a gradual decline in kidney function over an extended period of time, typically exceeding three months. While pruritus or itching is typically a transient sensation in the general population, it becomes more prevalent and troublesome among individuals with advanced CKD undergoing dialysis. CKD-associated pruritus

(CKD-aP) or uremic pruritus tend to recur and persist in these cases, significantly affecting the patients' quality of life. Nevertheless, the underlying mechanisms causing uremic pruritus are not well understood, and available treatment options for patients undergoing dialysis are scarce and often fail to provide satisfactory relief.^[1]

Pruritus is present in about 20% of patients with CKD and 40% of patients with end-stage renal disease with variation in its distribution and

severity.^[1] It mainly affects the face, chest, and limbs, and may be generalized in up to 50% of patients. Pruritus is less common in less advanced stages of kidney disease. There can be superimposed complications of excoriation including impetigo, linear crusts, papules, ulcerations, and prurigo nodularis.^[2] All these possible effects of this pruritus have been linked to depressive symptoms in many studies.^[3]

Pruritus is observed in approximately 20% of patients diagnosed with CKD, and its prevalence increases to 40% among individuals with end-stage renal disease, with variations in its severity and distribution.^[1] Primarily affecting the face, chest, and limbs, pruritus may also become generalized in up to 50% of patients and primarily affects the face, chest, and limbs. However, pruritus is less commonly reported during the early stages of kidney disease. Furthermore, pruritus can lead to additional complications such as excoriation, including impetigo, linear crusts, papules, ulcerations, and prurigo nodularis.^[2] Numerous studies have reported a correlation between the potential effects of pruritus and the development of depressive symptoms.^[3]

According to the guidelines of the World Health Organization (WHO), “depression is a common mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness and poor concentration”.^[4] Depression is a psychiatric disorder prevalent among individuals with end-stage renal disease (ESRD). Haemodialysis patients, in particular, experience a significantly higher prevalence of depression compared to the general population.^[3]

Health-related quality of life (QoL) assesses a patient's overall well-being, functioning, and perception of general health across three key domains: physical, psychological, and social.^[5] Though enhanced survival rates are associated with hemodialysis, multiple studies have raised concerns about the decline in the quality of life caused by CKD. These findings are worrisome and highlight the importance of addressing QoL issues in CKD patients.^[5,6]

Despite the significant prevalence and profound impact of pruritus on individuals undergoing hemodialysis, there is a lack of comprehensive understanding of its effects on patients' lives, particularly in the local context. Therefore, the objective of this study was to determine the prevalence and influence of uremic pruritus on the quality of life of patients and examine its potential association with depressive symptoms in this population. Additionally, we will assess various patient-related factors to explore their potential correlations with uremic pruritus. The findings of this study can assist local physicians in effectively addressing and treating pruritus in these patients, thereby enhancing their overall QoL.

Aims & Objectives

This study aimed to assess the prevalence of uremic pruritus among patients with Chronic Kidney Disease (CKD). Additionally, this study aimed to evaluate the influence of uremic pruritus on the quality of life of hemodialysis patients.

MATERIALS AND METHODS

This multicenter cross-sectional study was conducted at the nephrology unit of Guru Nanak Dev Hospital, Amritsar and Dr. Virinder Singh's Kidney Clinic & Dialysis Centre, Amritsar from March 2021 to July 2021 (five months). CKD patients on hemodialysis for at least three months were included in the study. Patients with altered mental sensorium and those who were unwilling to provide consent were excluded.

Sample size calculation: To calculate the sample size, the following formula (Daniel, 1999) was used:

$$n = Z^2 * P(1-P) / d^2$$

Where n = sample size,

Z = Z statistic for a level of confidence,

P = expected prevalence or proportion (in proportion of one; if 50%, P = 0.5)

d = precision (in proportion of one; if 10%, d = 0.10).

Z statistic (Z): For the level of confidence of 95%, which is conventional, the Z value is 1.96.

The prevalence of Uremic Pruritus in CKD patients was reported to be around 50% in previous studies.^[7,8] With an allowable error of 10%, the minimum calculated sample size was 100. A total of 200 patients (100 from each center) were included in the study.

Data Analysis: Data were entered into Microsoft Excel sheets, and statistical analysis was performed using the 'IBM SPSS' statistical package for Windows. Categorical data are presented as percentages. The normality of the numerical data distribution was tested using the Kolmogorov-Smirnov test. Normally distributed numerical data were presented as mean (standard deviation), and between-group differences were compared using the independent-samples Student's t-test and ANOVA test. For non-normally distributed continuous variables, a correlation matrix was drawn using Spearman's rank-order correlation to observe the correlation. Statistical significance was set at P < 0.05.

Study Tool

Part 1: Semi-structured questionnaire This section covers the sociodemographic profile, comorbidities, and treatment details. Estimated ten-year survival was calculated using the Charlson Comorbidity Index (CCI).^[9-11]

Part 2: 5-D Itch Scale,^[12]

To assess pruritus in the population, the 5-D itch scale was used, which includes five dimensions related to pruritus: duration, degree, direction, associated disability, and pruritus distribution. The

categories of the 5-D itch scale have been equivalated with the numeric rating scale (NRS) by a study that concludes that for the 5-D scale, scores of less than 9 mean no pruritus, 9-11 indicate mild, 12-17 indicate moderate, and 18-21 indicate severe pruritus.^[3]

Part 3: Patient Health Questionnaire-9,^[13]

To assess depression, the Patient Health Questionnaire-9 (PHQ-9) was used, which is a nine-item scale with a scoring range of 0-27. Scores from 0-4 correspond to no depression, 5-9 show mild, 10-14 moderate, 15-19 to moderately severe depression, while scores above 20 are consistent with severe depression.^[3]

Part 4: Dermatology Life Quality Index (DLQI)^[14]

The DLQI questionnaire was used to observe the effects of pruritus on patients' quality of life. Its reliability for the purpose is also well-established by many studies.^[3] A score of 0-1 means there is no effect on the patient's life, 2-5 indicates small, 6-10 indicates moderate, 11-20 indicates large, and 21-30 means very large and severe limiting effects on the patient's life due to associated pruritus.

It was ensured that the itching reported by the patients was due to uremic pruritus and not related skin conditions, such as psoriasis, eczema, or dermatitis, by excluding them one by one.

Ethical considerations: Written consent was obtained from all participants stating that they are volunteering to participate in the study. Participants were assured of data confidentiality and all questionnaires were kept anonymous. The study was conducted in accordance with the ethical standards of the Institutional Ethics Committee.

RESULTS

A total of 200 patients (100 from the government and 100 from a private facility) were recruited, of which the majority were male (76.0 %). Approximately three-fourths of the participants fell within the 40-70-year age group, with a mean age of 54.44 ± 13.3 . The most prevalent family size was between three and five members, with a mean of 4.0 ± 1.8 . Among the participants, 35.0% had a per capita income ranging from ₹5000 to ₹10000, with

an average income of ₹8298. [Table 1] There was no significant correlation between age, sex, and itching severity and intensity.

The duration of chronic kidney disease was 2-5 years and > 5 years in most cases. The duration of CKD was found to be significantly associated with 5-D itch scores (P = 0.012). The duration of haemodialysis was 3-6 months in 38% of patients and 2-5 years in 27%. The estimated 10-year survival rate (according to CCI) was less than 20% in 34% of patients and 20-50% in 30% of cases. There was no significant correlation between haemodialysis duration and itching severity. [Table 2]

Heparin was administered in 98% of cases, EPO in 94% of cases, fistula creation in 79% of patients, and puncture site infection was found in 95% of cases. The majority (64%) of patients had Diabetes Mellitus as a comorbid condition, while other diseases such as CAD, liver disease, CHF, CVA/TIA, and hemiplegia were found in fewer patients. [Table 3]

According to the 5-D itch scale scores, 37% of the patients did not experience pruritus, 31% had moderate pruritus, 21% had mild pruritus, and 11% had severe pruritus. [Table 4] The mean itch score was 11.62 ± 3.29 .

Of the participants, 40% reported that itching had no noticeable impact on their lives based on Dermatology Life Quality Index (DLQI) grades. Meanwhile, 25% experienced a minor effect, 24% experienced a moderate effect, 6% experienced a significant effect, and 4% experienced an extremely significant effect on their lives due to itching. The mean DLQI score was 4.86, with an SD of 6.193. The DLQI grade was significantly associated with the mean 5-D itch score (P value less than 0.001). Fifteen percent of patients were found to have moderately severe depression, 13% had moderate depression, 10% had mild depression, and 10% had no depression according to PHQ9 grades, which was found to be significantly associated with mean 5-D itch scores (P value less than 0.001). The mean PHQ9 score was 8.91 with an SD of 5.928. [Table 5] The correlation between DLQI, PHQ-9, and 5-D itch scores was statistically significant. [Table 6]

Table 1: Sociodemographic profile of the participants

Gender	Frequency	Percentage	Mean 5-D itch score	Test of significance with 5-D itch scores	p-Values
Female	48	24	11.36 ± 4.0	Independent samples t-test	0.089
Male	152	76	12.46 ± 3.5		
Institution					
Government	100	50	10.76 ± 3.7	Independent samples t-test	0.002
Private	100	50	12.48 ± 4.0		
Residence					
Rural	104	52	11.41 ± 4.0	Independent samples t-test	0.439
Urban/ Peri-urban	96	48	11.84 ± 3.8		
Age Group (in years)				Spearman's correlation r=0.059	0.408
21-30	14	7			
31-40	20	10			
41-50	40	20			
51-60	56	28			
61-70	50	25			

>70	20	10			
Family Size					
2	28	14	-	Spearman's correlation r=0.41	0.564
3 to 5	150	75			
>5	22	11			
Per Capita Family Income					
<5000	50	25	-	Spearman's correlation r= -0.005	0.948
5000- 10000	70	35			
10000 – 15000	52	26			
>15000	28	14			

Table 2: Disease profile of the participants

		Frequency	Percent	Test of significance with 5-D itch scores	p-Values
CKD years	3m - 6m	32	16.0	Spearman's correlation r=0.177	.012
	6m - 12m	30	15.0		
	1y - 2 y	36	18.0		
	2-5 y	60	30.0		
	>5 y	42	21.0		
Haemodialysis Years	3m - 6m	76	38.0	Spearman's correlation r=0.48	.504
	6m - 12m	32	16.0		
	1y - 2 y	26	13.0		
	2-5 y	54	27.0		
	>5 y	12	6.0		
Estimated 10 year survival (according to Charlson Comorbidity Index)	<20 %	68	34.0	Spearman's correlation r= -0.079	.268
	20-50 %	60	30.0		
	50-80 %	26	13.0		
	>80 %	46	23.0		

Table 3: Comorbidity profile of the participants

Comorbidity	Frequency	Percent
Diabetes Mellitus	128	64.0
Coronary Artery Disease (CAD)	34	17.0
Liver disease	26	13.0
Congestive Heart Failure (CHF)	20	10.0
Cerebro-Vascular Accident (CVA) / Transient Ischemic Attack (TIA)	14	7.0
Hemiplegia	12	6.0
Dementia	8	4.0
Peptic Ulcer Disease (PUD)	6	3.0
Chronic Obstructive Pulmonary Disease (COPD)	2	1.0
Connective tissue Disorder	2	1.0
Lymphoma	2	1.0

Table 4: Grade of pruritus according to 5-D itch scale

Itch_Grade (Score)	Frequency	Percent
No pruritus (less than 9)	62	37.0
Mild pruritus (9-11)	49	21.0
Moderate pruritus (12-17)	67	31.0
Severe pruritus (18-21)	22	11.0
Total	200	100.0

Table 5: D scores in different categories of PHQ-9 and DLQI scores

DLQI Grade (Score)	Frequency	Percent	Mean 5-D Itch Score	Test of significance with 5-D itch scores	p-Value
No effect on life (0-1)	80	40.0	8.61 ± 1.8	One-Way ANOVA F = 67.52	< .0001
Small effect on life (2-5)	51	25.5	11.68 ± 2.9		
Moderate effect on life (6-10)	49	24.5	13.89 ± 3.1		
Very large effect on life (11-20)	12	6.0	17.33 ± 2.9		
Extremely large effect on life	8	4.0	18.75 ± 1.1		

(21-30)					
PHQ9 Grade (Score)					
Minimal / No Depression (0-4)	58	29.0	9.56	One-Way ANOVA F = 28.84	< .0001
Mild Depression (5-9)	48	24.0	9.83		
Moderate Depression (10-14)	45	22.5	12.75		
Moderately severe depression (15-19)	49	24.5	14.75		
Severe depression (>20)	0	0	-		
Total	200	100.0	11.62 ± 3.29		

Table 6: Correlation matrix by Spearman's correlation (Correlation of DLQI and PHQ-9 scores with 5-D itch scores)

Spearman's coefficient (r) and p-values			
	5-D itch score	DLQI scores	PHQ-9 scores
5-D itch score	1	r = 0.784 p< .0001	r = 0.505 p< .0001
DLQI scores	r = 0.784 p< .0001	1	r = 0.469 p< .0001
PHQ-9 scores	r = 0.505 p< .0001	r = 0.469 p< .0001	1

DISCUSSION

This study aimed to determine the impact of uremic pruritus on the quality of life of hemodialysis patients and to identify an association between depressive symptoms and pruritus in hemodialysis patients.

The prevalence of uremic pruritus varies between 30% and 64% in the literature.^[15-19] We found that 63% of the patients had uremic pruritus. In our study, 21% of the patients had mild pruritus, and 42% had moderate to severe pruritus (31% moderate, 11% severe) according to the 5-D itch scale scores. Similarly, the mean pruritus score was 11.62 ± 3.29 (0–21) in this study, and the severity of uremic pruritus was 7/10 in more than half of the studies that evaluated its severity. An international study reported moderate to extreme pruritus in 36–50% of hemodialysis patients.^[15] Pruritus prevalence of 67% was reported by a study from Saudi Arabia, where it was mild in 50.8%, moderate in 32.8% and severe in 16.4% of patients.^[20]

The duration of chronic kidney disease was 2-5 years and > 5 years in 51% of cases. The itch scores were directly proportional to the duration of CKD, which was found to be significantly associated with 5-D itch scores (P = 0.012), calculated using Spearman's correlation rank test. A study in Pakistan revealed a statistically significant association between CKD-associated pruritus with age of patients, duration of CKD and quality of life.^[21]

We found that the DLQI grades were 2-30 in 60% of patients, which means that 60% of patients had an effect on their lives due to itching. One-Way ANOVA conducted with 5-D itch scores showed a value of F = 67.52 and a P value less than 0.001. DLQI scores increase with an increase in itch scores; therefore, the quality of life is directly affected by itching. According to our assessment using the PHQ-9 scale, approximately 90% of the patients had depression. Moderate-to-severe depression was observed in 47% patients. The

scores increased with increasing itching severity. One-way ANOVA conducted with 5-D itch scores gave an F value of 28.84 and a P value of less than 0.001.

Similar results have also been reported in other studies. Mohamed K. Ibrahim conducted a study on 100 patients with ESRD which showed that the QoL of haemodialysis patients with pruritus was found to be significantly impaired in comparison to those on haemodialysis with no pruritus.^[22] Patients with uremic pruritus had significantly lower quality of life according to the SF-36 questionnaire in a study conducted by Susel et al,^[23] The same study showed impaired skin-related quality of life among patients with uremic pruritus, as evaluated using the Dermatology Life Quality Index. There was a significant correlation between QoL score and pruritus intensity in another study.^[24]

Depression was reported to develop 1.3 to 1.7 times more commonly in uremic pruritus patients in some studies.^[15,25] A study by Araujo et al reported a significant relationship between depressive symptoms and uremic pruritus.^[26] Depression level significantly correlated with quality of life and severity of depressive symptoms was significantly associated with uremic pruritus intensity in a study by Susel et al.^[23] Other studies report that uremic pruritus frequently causes significant mood impairment, including depression and anxiety and patients with depressive symptoms have significantly higher odds of developing severe pruritus.^[26,27]

CONCLUSION

Pruritus was common among CKD subjects, and there was a significant association between CKD duration, impaired QoL, and depression and pruritus intensity and severity. Thus, physicians must recognize the impact of uremic pruritus and appropriately address it to enhance patients' quality of life and alleviate depressive symptoms. Urgent attention is required to develop effective treatment

modalities for managing uremic pruritus in hemodialysis patients with the aim of improving their overall well-being.

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