

Clinical Assessment and Risk Factors of Uremic Pruritus among Hemodialysis Patients

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Abstract

Background: Hemodialysis patients usually suffer from debilitating physical and psychological symptoms that negatively impact their life. Uremic pruritus is a frequent complaint of this group of patients. The pathophysiology of uremic pruritus is still not known and is supposed to be a multifactorial problem. **Aims:** To identify the clinical assessment and risk factors of uremic pruritus among hemodialysis patients. **Study Design:** A descriptive research design was utilized in current study. **Setting:** This study was carried out at the hemodialysis units of El Mowasah Hospital, Sharq El Madina Hospital, The Medical Research Institute Hospital, and El Shefaa Hospital in Alexandria Governorate, in addition to University Hospital in Beni Suf Governorate, in Egypt. **Subjects:** A convenience sample of 215 hemodialysis patients with uremic pruritus was recruited. **Tools:** Two tools were used for data collection. **Tool I: Uremic Pruritus Structured Interview Questionnaire**, it was composed of four parts. Part I: Patient's Socio-demographic Data; Part II: Patient's Clinical Data; Part III: Characteristics of Patient's Hygienic Pattern; and Part IV: Patient's Laboratory Investigations. **Tool II: 5-D Pruritus Scale** which included five domains namely duration, degree, direction, disability and distribution of pruritus. **Results:** There were significant relationships between socio-demographics and pruritus condition of the patients (where P for age = 0.002, level of education = 0.010 and place of residence = 0.001). Patterns of patients' hygiene had significant relationship with the degree of pruritus concerning use of emollients (P = 0.039), clothing materials (P = 0.004), and bedding materials (P= 0.045). **Conclusion:** The study findings emphasize the significance of conducting clinical assessments that reflect multiple dimensions to discover and identify risk factors of uremic pruritus among hemodialysis patients and advocate establishing standardized and patient-specific approaches for such symptom management. The identified risk factors of the present study are increased duration of the dialysis (more than five years), dryness of patients' skin, and increased concentration of blood urea & creatinine, as well as calcium levels. **Recommendations:** Plan and hold an educational program for both hemodialysis patients and nurses on risk factors and management of uremic pruritus.

Keywords: Hemodialysis patients, clinical assessment, risk factors, uremic pruritus, itching

Introduction

Chronic kidney disease (CKD) is more prevalent than other chronic diseases; as end-stage renal disease (ESRD) can develop from untreated CKD. The worldwide prevalence of CKD has projected to be 13.4 % and ESRD patients necessitating renal replacement therapy ranges from 4.902 to 7.083 million (Ahmed et al., 2021 & Rahman et al., 2022). In Egypt, the burden of CKD has grown by 35.7 %, placing it as the 5th leading cause of death from 2009 to 2019. This highlights its emergence as a significant public health issue (Abdelnabi et al., 2021, Farag, El- Sayed, 2022). In 2019, the estimated prevalence of dialysis in Egypt was 0.61 per 1000 individuals (Hassaballa et al., 2022).

Patients with ESRD undergoing maintenance hemodialysis (HD) often experience challenging

physical and psychological symptoms that significantly impact their quality of life (QOL). Uremic pruritus (UP) is a frequent complaint of this group of patients (Arzhan et al., 2020). It is a bilateral recurrent intermittent itch that intensifies at night and disturbs normal sleep patterns. The distribution pattern varies, but about half of UP patients experience generalized itching, while others may have localized areas of pruritus, particularly on the back or the fistula arm (Arzhan et al., 2020 & Kim & Pollock, 2021).

Uremic pruritus prevalence varies from 25 % to more than 50 % of patients undergoing HD. It is associated with declines in health related QOL, depression and increased risk of death (Min et al., 2016, Rayner et al., 2017, Elsenbsy et al., 2021). It also correlates with approximately 2-years of cardiovascular death in patients receiving maintenance HD (Weng et al., 2018). Unfortunately, UP is quite

often ignored in HD patients, so its true prevalence is underestimated in those patients leading to a worsening of symptoms over time (Daraghmeah et al., 2022).

Assessing uremic pruritus severity is complex, because it is a highly subjective symptom. The visual analog scale is the most used tool for assessment, but it evaluates only the intensity of itching (). Other tools assess the pruritus distribution and its effect on QOL and sleep as 5-D itching scale (Verduzco & Shirazian, 2020, Santos-Alonso et al., 2022).

The pathophysiology of UP is still not recognized and is supposed to be a multifactorial problem. Of these, inflammation is believed to have a significant role in the development of UP because of certain cytokines that are released during HD. UP may also be triggered by increased mast cell proliferation and calcium-phosphate complex deposits in the skin as a result of secondary hyperparathyroidism which is a significant complication of ESRD. In addition, disruptions in the interaction between dermal mast cells and the distal ends of nonmyelinated C fibers may contribute to UP by releasing numerous triggering substances such as histamine, interleukin-2, proteases, and tumor necrosis factor- α (Hsu et al., 2018, Asghar et al., 2021, Daraghmeah et al., 2022).

Other etiological factors of UP include dysregulation of the immune system, neural dysregulation and uremic toxin accumulation. Xerosis cutis, or excessively dry skin is also a potential risk factor for UP. UP has been associated also with hypermagnesemia, higher serum CRP level, low albumin level potentially reflecting chronic inflammatory state and malnutrition, elevated serum lead and aluminum concentrations, as well as hepatitis B or C antibodies. UP is also more prevalent in under-dialyzed patients (Kimata et al., 2014, Malekmakan et al., 2015, Mettang & Kremer, 2015, Zhang et al., 2016, Rayner et al., 2017, Weng et al., 2017, Agarwal et al., 2021, Asghar et al., 2021).

Uremic pruritus can result in several challenges, including sleep deprivation, depression, and an elevated risk of mortality. According to a study conducted in Egypt, it was shown that UP was the prevailing cutaneous abnormality among HD patients, accounting for 52.5% of the participants (Elsensy et al., 2021). Furthermore, a study conducted at HD facilities in Egypt revealed that HD patients experience UP, with a prevalence rate of 51.2% (Abdullah et al., 2023).

The initial step for management of UP is optimizing the dialysis efficacy. It is important to assess dialysis adequacy and the levels of related metabolic parameters. It was found that utilizing a

high-flux dialyzer, which is more effective at eliminating medium sized molecules including pruritogenic substances, has been linked to a decrease in the severity of pruritus (Westby et al., 2020).

Xerosis cutis can be treated by utilizing non-soap cleansers and applying emollients multiple times a day. Emollients can also contain menthol and camphor for cooling the skin and reducing pruritus. If tolerated, frequent topical capsaicin application may lessen localized itching. For severe UP, Ultraviolet B phototherapy is the preferred therapeutic option when systemic steroids and oral antihistamines are ineffective. Several treatments such as gabapentin, thalidomide, oral activated charcoal, ondansetron, and cholestyramine have been found to relieve itching (Singh & Vinayadev, 2021).

Finally, chronic UP is more than just an annoyance as it significantly affects all aspects of patients' life (Elman et al., 2010). This study aims to clinically assess and identify risk factors of UP among HD patients as a preparatory step to aid nurses and other health care providers in giving proper and individually-tailored interventions for such burdensome problem.

Aim of the study:

This study aimed to clinically assess uremic pruritus and identify risk factors among hemodialysis patients. **Research question:**

What are the items of clinical assessment and risk factors of uremic pruritus among hemodialysis patients? **Materials & Methods:**

Study design: A descriptive research design was utilized in current study.

Setting: This study was conducted at the HD units of El Mowasah Hospital, Sharq El Madina Hospital, The Medical Research Institute Hospital and El Shefaa Hospital in Alexandria Governorate, in addition to University Hospital in Beni Suef Governorate, in Egypt. **Subjects:** A convenience sample of 215 adult patients on maintenance HD, complaining of uremic pruritus and agreeing to participate in the present study were included. The recruitment of HD patients was conducted based on specified inclusion criteria: Their age ranging between 20-60 years, presence of associating UP, have the ability to communicate and on maintenance HD for at least 6 months. Exclusion criteria included patients with liver, hematological, and dermatological diseases as well as cognitive diseases.

Tools of Data Collection: two tools were used to fulfill the aim of the study.

Tool I: Uremic Pruritus Structured Interview Questionnaire, this tool was developed by the researchers following a review of recent related literatures (Ozen et al., 2018, & Murtaqib et al., 2022, &). It consisted of four parts as follow:

Part I: Patient's socio-demographic data: This part was used to collect baseline socio-demographic data such as age, sex, level of education, marital status, place of residence, and economic status.

Part II: Patient's clinical data: this part included causes of kidney failure, duration of hemodialysis, and treatment for pruritus, skin condition before and after the disease (as determined by the patients themselves as "normal or dry").

Part III: Patient's laboratory investigations: These investigations included hemoglobin, hematocrit, blood urea, serum creatinine, calcium, phosphorus, albumin, uric acid, and parathyroid hormone.

Part IV: Characteristics of patient's hygienic pattern: It included items related to patient's hygienic pattern such as frequency of bathing/showering, use of soap, use of emollients, clothing materials, and bedding materials.

Tool II: 5-D Pruritus Scale (5-D PS)

The scale was developed by Elman et al., 2010 to assess pruritus in an objective way. The validation and translation of this instrument into the Arabic language were conducted by (Khan et al., 2013) and its Cronbach's Alpha value was 0.83. The scale was adopted by the researchers. It contains five domains that assess the duration, degree, direction, disability and distribution of pruritus. Each of the initial three domains, namely duration, degree, and direction, consisted of a single item. Nevertheless, the disability portion consisted of many items that assessed the impact of pruritus on various aspects of daily living, including sleep, leisure and social activities, household chores and errands, as well as work and school. The final segment of 5-D PS focused on the dispersion of pruritus throughout various body regions. A total of sixteen anatomical regions were encompassed, and each participant was provided with an open-ended choice to ascertain the specific body parts that were impacted by pruritus.

Scoring system of 5-D Pruritus scale (5-D PS):

Scores of 5-D PS are ranging from 5 (no pruritus) to 25 (unbearable pruritus). Duration, degree and direction of pruritus are quantified from 1 to 5. The domain of disability consisted of four sub-items, and its score was determined by selecting the highest score among the four items. The distribution score was determined by analyzing 16 body areas based on the percentage of affected body parts, with a maximum score of 5 points, 0–2: 1 point (no pruritus), 3–5: 2 points (mild pruritus), 6–10: 3 points (moderate

pruritus), 11–13: 4 points (severe pruritus), and 14–16: 5 points (unbearable pruritus) (Elman et al., 2010).

Validity: Content validity was established for tool I by a panel of five academic nursing professors. They reviewed the tool's feasibility, clarity, relevance, comprehensiveness and applicability, and accordingly some modifications were introduced.

A Pilot Study was carried out before starting the data collection on 10 % of study subjects (22 patients) to test the clarity, applicability and feasibility of the tool. Those subjects were excluded from the total study sample, thereafter.

Ethical Considerations: Official consent was obtained from the research ethics committee of the Faculty of Nursing, Alexandria University, as well as the responsible administrative authorities of the study settings. Informed consent was obtained from subjects after explaining the study's aim. Anonymity, privacy, safety and confidentiality were absolutely assured. Each participant had the right to withdraw from the study at any time.

Data collection and actual study: Each HD patient was interviewed for 20 - 30 minutes using tool I to collect socio-demographic and clinical data and identify risk factors of UP, as well as tool II to assess the degree of UP. The data were collected over a span of five months from November 1, 2022 to March 30, 2023.

Statistical analysis: data were collected and transferred into specially planned formats, to be suitable for computer feeding. Data were analyzed using computer with statistical package for social sciences (SPSS) version 20. Complete confidentiality was maintained while the data were being processed. **Data analysis:** the following statistical measures were used:

- Descriptive statistics were used to describe different characteristics.
- Kolmogorov – Smirnov test was used to examine the normality of data distribution.
- Univariate/Multivariate analyses were used to test the significance of results of quantitative variables.
- Chi-Square test was used to test the significance of results of qualitative variables.

Results:

Table (1) found that 61.9 % of the patients in current study were in age group between 50-60 years. Around three quarters (74%) of the study subjects were married & 74.9% were from urban settings. Slightly more than half (50.7%) of the study subjects were females. As regards level of education, 22.8% were illiterate. Higher education was among 30.2% of the study subjects.

Table (2) presented that hypertension (HT) was reported by 34.4% of subjects, glomerulonephritis by 22.8%, diabetes mellitus (DM) by 11.2%, and DM + HT by 12.6%, polycystic kidney disease (PKD) by 15.3% and systemic lupus erythematosus (SLE) by 3.7% as the causes of ESRD in these patients. Duration of dialysis ranged from 6 months to more than 10 years with 41.9% of patients had dialysis duration from 1 to less than 5 years. Dry skin was suffered by 63.3% and approximately 61.9% of patients were found to receive systemic treatment (antihistamines) against pruritus.

Table (3) showed that some laboratory parameters (urea, creatinine, and phosphorus) were abnormally high in 79.5 %, 79.5 %, & 58.6 % of subjects, respectively. Hemoglobin & hematocrit recorded abnormally low values (69.8%, 68.8 %) respectively.

Table (4) displayed that daily showering was taken by less than half of the study subjects (47.0 %). Around 95 % of the current study subjects were using soap for their body hygienic practices. Only 26 % used emollient after showering. Less than one third (32.1 %) of the current study subjects' materials of clothing were made of cotton. Cotton bedding's materials were used by many study subjects (68.8 %)

Table (5) demonstrated that a large percentage (67.0 %) of study subjects experienced pruritus for duration of less than 6 hours every day, 14 % suffer pruritus from 6-12 hours daily, while 11.6 % suffer from pruritus all the day. As regards severity of the pruritus, it was detected that 29.3 %, 31.2 %, 24.6 %, 14.9 % complained of mild, moderate, severe & unbearable pruritus respectively. In relation to the direction of the pruritus, around one third (34.4 %) of the study subjects labeled pruritus as improved but

still present, while 23.7 % described it as unchanging. This table also clarifies that 27.9 % of the study subjects described that pruritus as never affects their sleep, while 14.9 % described pruritus as a reason that frequently delays falling asleep

With reference to the effects of pruritus on some of subjects daily living activities (leisure/social, housework, work/school), it was noticed that the largest percentages (49.3 %, 56.3 %, and 45.1 %) respectively, regarded them as never affects these activities. Pertaining to the distribution of pruritus throughout various body areas of the subjects, it was noticed that pruritus affects almost all of the body parts of 40.9 % of the study subjects.

Table (6) identified that significant relations were found among patients' some socio- demographic data and pruritus condition as higher age ($P = 0.002$), level of education ($P = 0.010$) and place of residence ($P = 0.001$).

Table (7) demonstrated that no significant relation could be identified between all studied patients' clinical characteristics and their degree of pruritus including etiology of ESRD, dialysis duration, treatment of itching and skin condition.

Table (8) showed that characteristics of patients' hygiene had significant relation with the degree of pruritus concerning use of emollients ($P = 0.039$), clothing materials ($P = 0.004$), and beddingmaterials ($P = 0.045$).

Table (9) shed the light on the risk factors affecting pruritus in the present study as increased duration of the dialysis (more than five years), dryness of patients' skin, and increased concentration of blood urea, creatinine, and calcium levels.

Table (1): Distribution of the studied subjects according to their socio-demographic characteristics (n = 215)

	Patients' Sociodemographic Characteristics	No.	%
1	Age (years)		
	20-<30	5	2.3
	30-<40	27	12.6
	40-<50	50	23.3
	50-60	133	61.9
2	Sex		
	Male	106	49.3
	Female	109	50.7
3	Marital status		
	Single	18	8.4
	Married	159	74.0
	Divorced	10	4.6
	Widow	28	13.0
4	Level of education		
	Illiterate	49	22.8
	Primary	34	15.8
	Secondary	67	31.2
	Higher education	65	30.2
5	Place of residence		
	Rural	54	25.1
	Urban	161	74.9
6	Economic status from patients points of views		
	Sufficient	60	27.9
	Insufficient	155	72.1

Table (2): Distribution of the studied subjects according to their clinical characteristics (n = 215)

Patients Clinical Characteristics	No.	%
Etiology of ESRD		
HT	74	34.4
DM	24	11.2
DM + HT	27	12.6
GN	49	22.8
PKD	33	15.3
SLE	8	3.7
Dialysis duration		
6 months: ≤ 1 year	35	16.3
1: ≤ 5 years	90	41.9
5: ≤ 10 years	39	18.1
> 10 years	51	23.7
Treatment for pruritus		
Systemic treatment	133	61.9
Local treatment	28	13.0
Self-care remedy	1	0.5
None	53	24.6
Skin condition (determined by the patients themselves):		
Normal	79	36.7
Dry	136	63.3

ESRD= End stage renal disease HT= Hypertension DM= Diabetes mellitus
GN= Glomerulonephritis PKD= Polycystic kidney disease SLE= Systemic lupus erythematosus

Table (3): Distribution of the studied subjects according to patients' laboratory parameters (n = 215)

Patients' laboratory parameters	Normal		Abnormal	
	No.	%	No.	%
Urea (mg/dL)	44	20.5	171	79.5
Creatinine (mg/dL)	44	20.5	171	79.5
Hemoglobin (g/dL)	65	30.2	150	69.8
Hematocrit (%)	67	31.2	148	68.8
Calcium (mg/dL)	122	56.7	93	43.3
Phosphorus (mg/dL)	89	41.4	126	58.6
Albumin (g/dL)	214	99.5	1	0.5
Uric acid (mg/dL)	207	96.3	8	3.7
Parathyroid hormone (pg/mL)	149	69.3	66	30.7

Table (4): Distribution of the studied subjects according to characteristics of their hygienic patterns (n = 215)

Characteristics of Patients' Hygienic Patterns	No.	%
Frequency of bathing/showering		
Daily	101	47.0
Two times per week	43	20.0
Three Times per week	65	30.2
Others (several times per day)	6	2.8
Use of soap		
Yes	204	94.9
No	11	5.1
Use of emollients		
Yes	56	26.0
No	159	74.0
Clothing materials		
Cotton	69	32.1
Synthetics	42	19.5
Others (Mixed)	104	48.4
Bedding materials		
Cotton	148	68.8
Synthetics	11	5.1
Others (Mixed)	56	26.1

Table (5): Distribution of the studied subjects according to Pruritus Scale (n = 215)

	5-D Pruritus Scale	No.	%
1	Duration		
	< 6hrs/day	144	67.0
	6-12 hrs/day	30	14.0
	12-18 hrs/day	16	7.4
	18-23 hrs/day	0	0.0
	All Day	25	11.6
2	Degree		
	Mild	63	29.3
	Moderate	67	31.2
	Severe	53	24.6
	Unbearable	32	14.9
3	Direction		
	Completely resolved	28	13.0
	Much better, but still present	74	34.4
	Little bit better, but still present	47	21.9
	Unchanged	51	23.7
	Getting worse	15	7.0
4	Disability		
	a. Sleep		
	Never affect sleep	60	27.9
	Occasionally delays falling asleep	41	19.0
	Frequently delays falling asleep	32	14.9
	Delays falling asleep, and occasionally wakes me up at night	47	21.9
	Delays falling asleep, and frequently wakes me up at night	35	16.3
	b. Leisure/Social activities		
	Not applicable	26	12.1
	Never affects this activity	106	49.3
	Rarely affects this activity	43	20.0
	Occasionally Affects this activity	23	10.7
	Frequently Affects this activity	11	5.1
	Always Affects this activity	6	2.8
	c. Housework		
	Not applicable	29	13.5
	Never affects this activity	121	56.3
	Rarely affects this activity	39	18.1
Occasionally Affects this activity	16	7.4	
Frequently Affects this activity	7	3.3	
Always Affects this activity	3	1.4	
d. Work/School			
Not applicable	67	31.2	
Never affects this activity	97	45.1	
Rarely affects this activity	27	12.5	
	Occasionally Affects this activity	15	7.0
	Frequently Affects this activity	6	2.8
	Always Affects this activity	3	1.4
5	Distribution		
	0 – 2 regions	39	18.1
	3 – 5 regions	66	30.7
	6 – 10 regions	20	9.3
	11 – 13 regions	2	1.0
	14 – 16 regions	88	40.9

Table (6): Relations between degree of pruritus and patients' Sociodemographic characteristics

Patients' Sociodemographic Characteristics	Degree of Pruritus						χ^2	p
	Mild (n = 63)		Moderate (n = 67)		Severe/Unbearable (n=85)			
	No.	%	No.	%	No.	%		
Age (years)							18.960*	MC _p = 0.002*
20-<30	1	1.6	2	3.0	2	2.3		
30-<40	2	3.2	6	9.0	19	22.4		
40-<50	19	30.1	20	29.8	11	12.9		
50-60	41	65.1	39	58.2	53	62.4		
Sex							2.471	0.291
Male	26	41.3	34	50.7	46	54.1		
Female	37	58.7	33	49.3	39	45.9		
Marital status							7.406	MC _p = 0.273
Single	5	7.9	4	6.0	9	10.6		
Married	41	65.1	53	79.1	65	76.5		
Divorced	3	4.8	3	4.5	4	4.7		
Widow	14	22.2	7	10.4	7	8.2		
Level of education							16.821*	0.010*
Illiterate	24	38.1	7	10.5	18	21.2		
Primary	11	17.5	13	19.4	10	11.8		
Secondary	14	22.2	24	35.8	29	34.1		
Higher education	14	22.2	23	34.3	28	32.9		
Place of residence							27.988*	<0.001*
Rural	31	49.2	12	17.9	11	12.9		
Urban	32	50.8	55	82.1	74	87.1		
Economic status							1.006	0.605
Sufficient	20	31.7	16	23.9	24	28.2		
Insufficient	43	68.3	51	76.1	61	71.8		

 χ^2 : Chi square test MC: Monte Carlo,*: Statistically significant at $p \leq 0.05$

Table (7): Relation between patient's clinical characteristics and degree of

Patient's Clinical Characteristics	Degree of Pruritus						χ^2	p
	Mild (n = 63)		Moderate (n = 67)		Severe/Unbearable (n=85)			
	No.	%	No.	%	No.	%		
Etiology of ESRD							8.167	0.613
HT	26	41.3	21	31.3	27	31.8		
DM	5	7.9	8	11.9	11	12.9		
DM + HT	8	12.7	9	13.4	10	11.7		
GN	14	22.2	17	25.4	18	21.2		
PKD	7	11.1	8	11.9	18	21.2		
SLE	3	4.8	4	6.0	1	1.2		
Dialysis duration							11.718	0.069
6 months to ≤ 1 year	16	25.4	13	19.4	6	7.1		
$1 \leq 5$ years	23	36.5	27	40.3	40	47.1		
$5 \leq 10$ years	8	12.7	11	16.4	20	23.5		
> 10 years	16	25.4	16	23.9	19	22.3		
Treatment for itching							10.693	MC _p = 0.062
Systemic treatment	36	57.1	41	61.2	56	65.9		
Local treatment	4	6.4	12	17.9	12	14.1		
Self-care remedy	0	0.0	1	1.5	0	0.0		
None	23	36.5	13	19.4	17	20.0		
Skin Condition							0.496	0.780
Normal	25	39.7	25	37.3	29	34.1		
Dry	38	60.3	42	62.7	56	65.9		

ESRD= End stage renal disease HT= Hypertension DM= Diabetes mellitus GN= Glomerulonephritis

PKD= polycystic kidney disease SLE= Systemic lupus erythematosus χ^2 : Chi square test MC: Monte Carlo

Table (8): Relation between Characteristics of Patients' Hygienic Patterns and Degree of Pruritus

Characteristics of Patients' Hygienic Patterns	Degree of Pruritus						χ^2	P
	Mild (n = 63)		Moderate (n = 67)		Severe/Unbearable (n=85)			
	No.	%	No.	%	No.	%		
Frequency of bathing / showering								
Daily	32	50.8	31	46.3	38	44.7	1.894	MC _p =0.948
Two times per week	13	20.6	12	17.9	18	21.2		
Three times per week	17	27.0	21	31.3	27	31.8		
Several times per day	1	1.6	3	4.5	2	2.3		
Use of soap								
Yes	59	93.7	64	95.5	81	95.3	0.393	MC _p =0.862
No	4	6.3	3	4.5	4	4.7		
Use of emollients								
Yes	9	14.3	20	29.9	27	31.8	6.470*	0.039*
No	54	85.7	47	70.1	58	68.2		
Clothing materials								
Cotton	24	38.1	23	34.3	22	25.9	15.197*	0.004*
Synthetics	19	30.2	13	19.4	10	11.8		
Others (Mixed)	20	31.7	31	46.2	53	62.3		
Bedding materials								
Cotton	46	73.0	46	68.7	56	65.9	9.371*	MC _p =0.045*
Synthetics	7	11.1	2	3.0	2	2.3		
Others (Mixed)	10	15.9	19	28.3	27	31.8		

Table (9): Univariate and Multivariate Linear Regression Analysis for Patients' Parameters Affecting Pruritus Scale (n = 215)

Patients' Parameters Affecting Pruritus Scale	Univariate		Multivariate	
	p	B (LL – UL 95% C.I)	p	B (LL – UL 95% C.I)
Patients' Sociodemographic				
Age (≥ 50 years)	0.650	-0.271 (-1.444 – 0.903)		
Female	0.900	0.073 (-1.068 – 1.213)		
Married	0.254	0.752 (-0.543 – 2.048)		
High education	0.644	0.275 (-0.896 – 1.446)		
Urban	0.070	1.204 (-0.101 – 2.509)		
Insufficient Economic status	0.350	-0.603 (-1.872 – 0.666)		
Patients Clinical Data				
Etiology of ESRD				
HT	0.304	-0.626 (-1.824 – 0.571)		
GN	0.619	0.343 (-1.015 – 1.702)		
Dialysis duration (>5 years)	0.010*	1.507 (0.369 – 2.645)		
Treatment for itching	0.079	1.176 (-0.138 – 2.489)		
Dry Skin	0.017*	1.422 (0.255 – 2.589)		
Patients' laboratory				
Urea	0.001*	2.410 (1.034 – 3.786)		
Creatinine	0.001*	2.410 (1.034 – 3.786)		
Hemoglobin (%)	0.186	0.833 (-0.404 – 2.070)		
Hematocrit (%)	0.142	0.916 (-0.309 – 2.141)		
Calcium (mg/dL)	0.021*	1.339 (0.202 – 2.476)		
Phosphorus (mg/dL)	0.639	0.276 (-0.881 – 1.434)		
Parathyroid hormone (pg/mL)	0.112	0.995 (-0.235 – 2.224)		
Hygienic Patterns				
Frequency of bathing/showering/week (≥ 2 times)	0.483	-0.407 (-1.548 – 0.735)		
Use of soap	0.271	1.445 (-1.136 – 4.026)		
Use of emollients	0.165	0.914 (-0.380 – 2.207)		
Clothing materials (synthetics)	0.305	-0.420 (-1.224 – 0.385)		
Bedding materials (synthetics)	0.896	0.065 (-0.922 – 1.053)		

ESRD= End stage renal disease

HT= Hypertension

GN= Glomerulonephritis

Discussion

The current research outcomes exhibited that the majority of the studied patients were females, aged between 50-60 years, from urban areas with inadequate economic status from patients' points of views. Regarding patients' level of education, the highest percent had secondary education. As regards marital status, most of them were married. These findings corroborated by (Zahran et al., 2020) who found that the highest proportion of the study patients was between 50 and 59 years but uncorroborated regarding place of residence, as they concluded that most of them were from rural areas. On the other hand; these findings disagree with (Sarhan et al., 2020) who found that the majority of HD patients with UP were males with age ranged between 23-86 years; which came in line with (Ozen et al., 2018) who concluded that the mean age of the HD patients with UP was 62.54 ± 12.77 years and the majority of the patients were males.

Patients' clinical characteristics in the current study results exhibited that, the etiology of ESRD was hypertension as cited by the highest percent of the study subjects, followed by glomerulonephritis, whereas the etiology in the lowest percent was the systemic lupus erythematosus (SLE). This finding coincides with (Zahran et al., 2020) study in a central governmental hospital of El-Sharkia Governorate, Egypt and asserted that the most frequent etiology as revealed by the studied ESRD patients was hypertension, while SLE had small percent, whereas, chronic glomerulonephritis represented one cause of ESRD. (Seetan et al., 2023) in Jordan also reported that the leading cause of ESRD was hypertension in most participants.

The findings of current research revealed that the majority of patients reported dialysis duration ranging between 1 to ≤ 5 years. This finding is in line with (Barzegar et al., 2017) who showed that the average duration of hemodialysis in subjects was 34.03 months which mean about three years. Most of the current study patients' treatment for pruritus was systemic treatment followed with none, then local treatment while only one patient had self-care remedy and the majority of the patients' skin condition was dry. This finding agrees with (Kalra et al., 2022) study in India which assured systemic treatment and asserted that the majority of the patients' skin condition was dry.

In relation to patients' laboratory parameters, the present study confirmed abnormal increase in urea, creatinine, and phosphorus while hemoglobin & hematocrit recorded abnormally low values. This finding is in agreement with (Hassen et al., 2018) who found a significant increase in serum urea and creatinine in patients undergoing hemodialysis. The

current finding is also in line with (Gautam, 2018) who revealed hematological alterations in hemoglobin, hematocrit and platelet levels related to hemodialysis.

The results of present research declared that most of study subjects were experiencing pruritus for duration of less than 6 hours/daily with moderate severity while the lowest percentage of the patients suffered from pruritus all the day. Most of patient's labeled pruritus as improved but still present and pruritus affect almost all of the body parts. This finding is congruent with (Ersoy & Akyar, 2019) study in Ankara, Turkey which revealed that about half of patients had pruritus with moderate severity. But they disagreed in the daily duration as it was 6-12 hours daily in most patients with track "a little bit better but still present"

As regards the effects of pruritus on study subjects daily living activities as sleep, leisure/social, housework, and work/school, the results showed that, these activities were never affected in the largest percentages of patients. This finding is not consistent with (Ersoy & Akyar, 2019) who indicated that those patients were experiencing disruptions in their sleep patterns, social interactions, household chores, and errands, which came in agree with (Daraghmeah et al., 2022) who concluded that pruritus has major association with poor sleep.

The present study results also revealed significant relationships between pruritus and socio-demographic data of the patients as higher age, level of education and place of residence; however sex has no significant relationship. Elderly individuals are commonly seen as being prone to diminished immune system and organ functionality. It is postulated that this particular condition may contribute to the development of pruritus among those undergoing hemodialysis. These findings are matched with (Rroji et al., 2016), who postulated that the elderly complained more about pruritus. These results are not in accordance with (Vrucinic et al., 2015), who asserted a notable correlation observed between male gender and the manifestation of pruritus, but no significant association was found between pruritus and age. A study conducted in Indonesia by (Sembiring et al., 2020) found that sex has a significant role in the development of pruritus, with males being particularly susceptible.

The present study findings clarified norelationships between all studied patients' clinical characteristics and degree of pruritus as etiology of ESRD, dialysis duration, treatment for itching and skin condition. These findings agree with (Yang et al., 2022) who concluded the same result. However, the present study findings showed significant relationships

between patients' hygiene: use of emollients, clothing and bedding materials, and the degree of pruritus. These findings agree with (Lavery et al., 2016) who found a relationship between patients' poor hygiene and increase the degree of pruritus. It is also in line with (Rupert & Honeycutt, 2022) who recommended that liberal use of emollients was helpful,

particularly following showering and bathing.

It could be declared from the current study findings that the majority of patients were older adults with dry skin as well as low socioeconomic status. This age group may face a lack of resources, impaired cognition, depression or physical disabilities; making them more likely to neglect regular hygiene and grooming practices especially the use of detergents and emollients. This, in turn, can make them more susceptible to developing pruritus. Moreover, the study results revealed that most patients were having daily baths, using soap; there is a fact that prolonged water exposure aggravates pruritus. Water exposure should not exceed a maximum of 20 minutes with lukewarm water, and use of mild, perfume-free soaps and other hygiene products is recommended (Weisshaar et al., 2019). So, patient education is necessitated to promote awareness of contact irritants and triggers.

Conclusion

Meticulous assessment and management of pruritus in individuals with ESRD undergoing maintenance HD are of utmost importance in clinical practice, for the well-being of patients, and has a priority for both nurses and other healthcare professionals. The findings of the current study highlight the need of employing multidimensional assessment methods and provide evidence for the necessity of creating standardized and patient-specific symptom treatment strategies. The identified risk factors of the present study are increased duration of the dialysis (more than five years), dryness of patients' skin, and increased concentration of blood urea & creatinine, and calcium levels.

Recommendations

Regular assessment of UP and identification of its risk factors among HD patients are crucial for developing individualized care plans to effectively address this complex symptom. Plan and hold educational program for both patients and nurses on risk factors and management of uremic pruritus with larger sample and more settings is recommended.

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