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Lower Urinary Tract Symptoms and Quality of Life Among Female Hemodialysis Patients in Palestine: Prevalence and Risk Factors

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Abstract: Introduction: Lower urinary tract symptoms (LUTS) are prevalent globally. Limited research has explored LUTS in hemodialysis (HD) patients, who often experience diminished quality of life (QoL). This study aims to evaluate LUTS among female HD patients, with assessment of the symptom, risk factors, and impact on QoL. **Methods:** A prospective, cross-sectional study was conducted among 94 female HD patients, assessing demographics, clinical data, and LUTS using the Bristol Female Lower Urinary Tract Symptoms (BFLUTS) questionnaire. Statistical analysis examined correlations between BFLUTS, demographics, and QoL. **Results:** Among the study population, 91.5% of female HD patients experienced at least one filling symptom, with the most common being nocturia (65%, n = 61). Voiding symptoms were observed in 63% of participants, with hesitancy (49%, n = 46), straining (33%, n = 31), and intermittency (45%, n = 42) being notable. Incontinence symptoms were prevalent, with urgency incontinence reported by 23% of participants (n = 22). Statistically significant correlations were found between the duration of dialysis and voiding symptoms ($r = 0.240$, $p = 0.021$), as well as between poor QoL and storage symptoms ($r = 0.212$, $p = 0.040$) and incontinence symptoms ($r = 0.439$, $p < 0.001$). Additionally, significant associations were found between the presence of incontinence symptoms and diabetes mellitus ($p = 0.002$) and smoking ($p = 0.042$). **Conclusion:** The impact of LUTS on females undergoing HD is prevalent and should be considered as disabling syndrome. The QoL in such cohort of patients is also affected. Thus, screening protocols should be put in place to address such problem.

Keywords: Lower Urinary Tract Symptoms (LUT), Hemodialysis, Quality of Life, Risk Factors, Female Patients.

Introduction

Lower urinary tract symptoms (LUTS) is a broad category of symptoms that include storage, voiding and incontinence symptoms [1]. LUTS is prevalent in our community, and several articles have been published to characterize this clinical syndrome [2-8]. In addition to having a major negative impact on quality of life, it also poses a substantial social and financial burden [1-3]. The management of LUTS is based on etiology and symptomatology [9]. Lifestyle changes, medication, and surgical intervention are all options available to treat LUTS and its underlying cause [1, 2, 10, 11]. A comprehensive understanding of the intricate etiology of LUTS is required for the most effective clinical evaluation and treatment strategy.

In the same field, only a few studies have shown that the predisposition to LUTS in hemodialysis (HD) patients is significant, with about one-fourth of dialysis patients suffering from various grades of LUTS, and this predisposition is independent of the modality of dialysis [12, 13]. On the other hand, LUTS has been regularly associated with a decrease in QoL in dialysis patients, related to the documented impact on the quality of sleep because of the presence of various storage symptoms [12, 14, 15]. Bladder dysfunction, commonly associated with most dialysis patients, is linked with hypersensitivity, poor compliance, and detrusor sphincter dyssynergia [16]. This paves the way for a proposal that urodynamic assessment should be indicated before transplantation in a patient presenting with LUTS [16]. In addition, several risk factors raise the pathogenesis of LUTS, including aging, obesity, smoking, and diabetes mellitus (DM). This further complicates the diagnosis and management of LUTS in such patients with multiple comorbidities [2, 3, 9, 10].

The main objective of this study is to provide a comprehensive assessment of LUTS among female HD patients. This includes an analysis of the symptoms, types, and severity of LUTS, as well as the impact on QoL. Furthermore, this study seeks to identify and evaluate possible risk factors associated with LUTS in this group of patients. By focusing on female HD patients, this research aims to fill the existing knowledge gap and provide valuable insights for the diagnosis and management of LUTS in this specific population.

Material and Methods

Study design: A prospective, cross-sectional study was used to investigate LUTS and its impact on the QoL among HD female patients.

Study Setting: This study was conducted at three dialysis centers located throughout the West Bank of Palestine,

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specifically in Nablus, Jenin, and Tulkarem. The data collection period was from October 2021 until January 2022.

Study population and sampling: All female patients who were undergoing HD were asked to fill out the questionnaire. Based on the expected population during the research period and a 50% response distribution, the required sample size was approximately 90, ensuring a 95% confidence level with a 5% margin of error.

Inclusion and exclusion criteria: Inclusion criteria comprised female patients undergoing HD aged over 18 years with a minimum duration of dialysis exceeding 12 months. Exclusion criteria encompassed individuals with symptomatic urinary tract infection (UTI), pre-existing urinary tract abnormalities, and those presenting with zero urine output.

Data collection: The first part of the questionnaire elicited information on patients' demographics and clinical data. This included age, body mass index (BMI), smoking, the presence of DM and duration of dialysis in months, which was divided into <24 months and ≥24 months. The amount of urine was also measured. We categorized the patients into two age groups: <60 and ≥60.

In the second part, we used Bristol Female Lower Urinary Tract Symptoms (BFLUTS) questionnaire which is an instrument created by Jackson et al in 1996 and used to assess a wide range of urinary symptoms [17, 18]. The Arabic version of the questionnaire was prepared and evaluated by a group of experts in the fields of urology and biostatisticians, the clarity of the questionnaire was pre-tested in a pilot study of 15 patients. This questionnaire was chosen because it is one of the most practical ways to assess the impact of LUTS on the QoL in female patients. The questions asked participants to rate how strongly they agreed with each statement using a score from "0" to "3" or "0" to "4". BFLUTS questionnaire assesses five domains as follows: filling domain (4 questions, score range 0–15), voiding domain (3 questions, score range 0–12), incontinence domain (5 questions, score range 0– 20), sexual function (2 questions, score range 0–6), and QoL (5 questions, score range 0–18). In total, there are nineteen questions, with a total score ranging from 0 to 71. The higher the score, the more severe the symptoms. The primary outcome was LUTS and QoL. The questionnaire was interview-based, and researches recorded participants responses.

Ethical considerations: Prior to commencing the study, ethical clearance was sought from An-Najah National University's Institutional Review Board (IRB) and NNUH to access the necessary data. The study adhered to the principles outlined in the Helsinki Declaration. A verbal informed consent was obtained from the patients. Participants were informed that their data will be encrypted and anonymized.

Statistical Analysis: Statistical analysis was performed using IBM Statistical Package for Social Sciences program (SPSS) (version 21). Categorical variables were expressed as absolute frequency (percentage), and continuous variables were described as medians and interquartile ranges. The data were normalised using the Kolmogorove test. A Pearson correlation analysis was conducted in order to measure the correlation between BFLUTS, demographics and QoL. Mann Whitney U-test test was used to evaluate the differences between continuous variables. P values < 0.05 were considered statistically significant.

Results

Patients' Demographics and Clinical Characteristics: Of the study population, 94 HD patients completed and returned the questionnaire. Patients more than 60 years of age made up the highest proportion of participants (53%). Forty-two patients (45%) were classified as having an obesity range BMI. Fifty-one patients (54%) were on dialysis for more than 24 months. Fifty-eight patients reported having type 2 diabetes (62%), and only 11 patients (12%) were smokers. The median amount of urine output was 120 ml (5-500). (Table 1) shows the demographic and clinical characteristics of the participants.

Table (1): Demographic and clinical characteristics of study participants (n=94).

Background and clinical characteristics	Frequency (%)	Median (Q1-Q3)
Age in years		
<60	44 (46.8%)	60 (18-83)
≥60	50 (53.2%)	
Body mass index		
Underweight (<18.5)	5 (5.3%)	
Normal (18.5–24.9)	28 (30.4%)	28.667 (15.31-47.75)
Overweight (25–29.9)	17 (18.5%)	
Obese (>30)	42 (44.7%)	
Duration of Dialysis in months		
<24	43(45.7%)	24 (0.5-144)
≥24	51(54.3%)	
Smoking		
Yes	11 (11.7%)	
No	83 (88.3%)	
Diabetes mellitus type 2		
Yes	58 (61.7%)	
No	36 (38.3%)	
Amount of urine in ml		120 (5-500)

BFLUTS subdomains: Storage, Voiding, Incontinence, and QoL domains: Tables 2,3,4 and 5 show the frequency of each symptom in the BFLUTS subdomain among female HD patients. Over half of surveyed HD patients reported having nocturia and urgency (n = 61; 65%, n=49; 52%, respectively). In addition, 31 (33%) patients mentioned experiencing bladder pain, and 27 (29%) mentioned frequency. Moreover, 91.5% of HD patients had at least one filling symptom. (Table 2).

The voiding symptoms were observed to be as follows: hesitancy: 46 (49%), straining: 31 (33%), and intermittency 42 (45%). At least one voiding symptom was present in 63% of people with HD. (Table 3).

In terms of incontinence, urgency incontinence affected 22 (23%), stress incontinence 38 (40%), overflow incontinence 4 (4%) and nocturnal enuresis 9 (10%). Incontinence symptoms had a median score of 3 [1-16]. (Table 4).

Regarding QoL, 26 (28%) of patients reported changing outer clothing during the day due to urinary symptoms, while 27 (29%) demonstrated an overall impact of urinary symptoms on their life quality. The median QoL score was 1.00 [0-15]. (Table 5)

Table (2): Frequency of filling symptoms among HD female patients (n=94).

Filling symptoms	Frequency (%)	Median (Q1-Q3)
Nocturia		
Yes	61 (64.9%)	
No	33 (35.1%)	
Urgency		
Yes	49 (52.1%)	
No	45 (47.9%)	
Bladder Pain		
Yes	31 (33.0%)	
No	63 (67.0%)	
Daytime frequency		
Yes	27 (28.7%)	
No	67 (71.3%)	
Filling symptoms score		3 (1-11)
At least one filling symptom	86 (91.5%)	

Table (3): Frequency of voiding symptoms among HD female patients (n=94).

Voiding symptoms	Frequency (%)	Median (Q1-Q3)
Hesitancy		
Yes	46 (48.9%)	
No	48 (51.1%)	
Straining		
Yes	31 (33.0%)	
No	63 (67.0%)	
Intermittency		
Yes	42 (44.7%)	
No	52 (55.3%)	
Voiding symptoms score		4 (1-12)
At least one voiding symptom	59 (62.8%)	

Table (4): Frequency of incontinence symptoms among HD female patients (n=94).

Incontinence symptoms	Frequency (%)	Median (Q1-Q3)
Urgency Incontinence		
Yes	22 (23.4%)	
No	72 (76.6%)	
Urine Leakage frequency		
Yes	23 (24.5%)	
No	71 (75.5%)	
Stress Incontinence		
Yes	38 (40.4%)	
No	56 (59.6%)	
Overflow Incontinence		
Yes	4 (4.3%)	
No	90 (95.7%)	
Nocturnal Enuresis		
Yes	9 (9.6%)	
No	85 (90.4%)	
Incontinence symptoms score		3 (1-16)
At least one incontinence symptom	46 (51.1%)	

Table (5): Quality of life among HD female patients (n=94).

Quality of life	Frequency (%)	Median (Q1-Q3)
Changing outer clothing during the day due to urine leakage		
Yes	26 (27.7%)	
No	68 (72.3%)	
Reducing the amount of drunken fluid to improve urinary symptoms		
Yes	14 (14.9%)	
No	80 (85.1%)	
Effect of urinary symptoms on daily performance		
Yes	19 (20.2%)	
No	75 (79.8%)	
Avoidance of places and situations where a toilet is not nearby		
Yes	24 (25.5%)	
No	70 (74.5%)	
Overall effect of urinary symptoms on life quality		
Yes	27 (28.7%)	
No	67 (71.3%)	
Quality of life score		1.00 (0-15)

Correlation Between BFLUTS Subdomains and Patients' Demographics: Duration of dialysis was positively and significantly correlated with voiding symptoms (r = 0.240, p = 0.021). There was positive and significant correlation between poor QoL and the presence of storage and incontinence symptoms (r = 0.212; p = 0.040, r = 0.439; p < 0.001, respectively). Age and BMI had no correlation with any of the BFLUTS subdomains. Further analysis showed statistical significance between the presence of incontinence symptoms and DM type 2 or being a smoker (p-value = .002; 0.042, respectively). The results of the correlational analysis are shown in (Tables 6 and 7).

Table (6): Correlations Between BFLUTS, Demographics, and QoL.

		BFLUTS-FS (Storage)	BFLUTS-VS (Voiding)	BFLUTS-IS (Incontinence)
Age	Pearson Correlation	-0.072	0.010	0.050
	p-value	0.490	0.925	0.630
BMI	Pearson Correlation	-0.099	0.030	-0.017
	p-value	0.346	0.780	0.869
Duration of dialysis	Pearson Correlation	-0.097	0.240	-0.181
	p-value	0.356	0.021	0.082
BFLUTS-QoL	Pearson Correlation	0.212	0.026	0.439
	p-value	0.040	0.807	<0.001

The bold values indicate p-value < 0.05
Abbreviations: FS, Filling symptoms; VS, Voiding symptoms; IS, Incontinence symptoms; QoL, Quality of life.

Table (7): Correlations Between BFLUTS and Demographics.

	BFLUTS-FS (Storage) Median (Q1-Q3)	BFLUTS-VS (Voiding) Median (Q1-Q3)	BFLUTS-IS (Incontinence) Median (Q1-Q3)
Smoking			
Yes	2 (1-3)	3 (0-4)	0 (0-0)
No	3 (1-5)	2 (0-5)	1 (0-3)
p-value a	0.336	0.904	0.042
Marital status			
Married	3 (2-4.75)	2.5 (0-4)	0 (0-3)
Single b	3 (1-5.25)	2 (0-6.25)	1 (0-3.25)
p-value a	0.906	0.809	0.735
Diabetes mellitus type 2			
Yes	3 (1.75-5)	3 (0-5)	2 (0-4)
No	3 (1-4)	1 (0-4.75)	0 (0-1.75)
p-value a	0.364	0.689	0.002

The bold values indicate p-value < 0.05
a Statistical significance values calculated using Mann–Whitney U-test.
b Single include widowed, divorced and unmarried patients.

Discussion

Storage symptoms were notably prevalent among female HD patients in our study, with 91.5% of the cohort experiencing at least one filling symptom, with the most common symptom being nocturia (65%). According to earlier research, nocturia is common in people with chronic kidney disease (CKD), and the severity of the condition worsens as it advances in stage [19]. Beyond merely creating discomfort, its effects might adversely affect sleep patterns and quality of life, exacerbating the already difficult circumstances that this susceptible patient group faces [20-22]. Notably, anxiety and depression are common in people with HD, and they have been linked to nocturia [22-24]. In addition, persons with reduced renal function frequently experience nocturnal polyuria, a disorder characterized by increased urine production at night [25, 26]. It's important to distinguish between nocturia and nocturnal polyuria since they have distinct pathophysiological mechanisms and treatment modalities [27].

There was at least one voiding symptom reported by 63% of our cohort. This percentage is significantly lower than in males having HD because males typically present with additional risk factors for bladder outlet obstruction, which exacerbates voiding symptoms [28]. Patients on regular HD frequently experience bladder dysfunction [16], which is why some experts advise urodynamics and voiding-cystography for eligible patients before renal transplantation [29, 30]. This could be useful in identifying frequent problems that people on HD have, such as poor bladder compliance, underactive bladder, and increased voiding pressure [29, 31]. Additionally, it has been suggested that uroflowmetry is a useful tool for evaluating patients who have voiding symptoms [32].

Over 50% of adult females experience urinary incontinence at some point in their lives [8, 33]. Moreover, research indicates that persons with CKD frequently experience urgency incontinence [34]. In our study, urgency incontinence was identified in 23% of study participants. There are a number of risk factors associated with the high frequency of urinary incontinence in females, including medication use, childbearing, chronic medical disorders, hormonal fluctuations, and other pelvic conditions [35]. This has an additional detrimental effect on QoL by posing financial, psychological, and physical challenges [33].

The current study highlights the negative effects of LUTS on quality of life by demonstrating its frequency among female patients undergoing HD. There is a noticeable relationship between this effect and diabetes mellitus, incontinence, smoking behaviors, and the duration of dialysis. Previous studies have already demonstrated that patients with HD frequently have lower quality of life, sleep difficulties, a higher incidence of depression, and a high frequency of frailty among these patient groups [24, 36, 37]. The development of LUTS intensifies these difficulties and jeopardizes the quality of life of those suffering HD even more.

Strengths and Limitations: The study strengths lie in its prospective design, using a validated questionnaire, and inclusion of various demographic and clinical variables. Furthermore, inclusion of multiple dialysis centres across the West Bank enhances the study's generalizability, while its focus

on female HD patients fills a notable gap in the literature. Furthermore, the statistical analysis conducted to explore correlations between LUTS, demographic factors, and QoL strengthens the validity of the findings. However, limitations such as the cross-sectional design's limits the ability to establish a causality relationship, and potential bias from self-reported data. The small sample size, and the absence of a control group are additional limitations. Other confounding variables not addressed in this study could have an influence on study results.

Conclusion

This study highlights the significant prevalence of LUTS among female HD patients and their detrimental impact on QoL. The correlation between LUTS, duration of dialysis, comorbidities like DM, and lifestyle factors highlights the multifactorial nature of LUTS in this population. Addressing LUTS in female HD patients through tailored interventions, including targeted medical management and lifestyle modifications, is essential for improving their QoL and overall health outcomes. Future research is needed for further assessment of LUTS in HD patients and assess interventional strategies which would help QoL.

Recommendations

Future research should focus on longitudinal studies to understand the long-term impact of LUTS on the quality of life of female HD patients. Additionally, comparative studies evaluating different management approaches are needed to optimize care delivery. Collaborative efforts between researchers and healthcare providers are essential for developing evidence-based strategies to improve the quality of life and overall health outcomes of female HD patients with LUTS.

Disclosure Statement

- **Availability of data and materials:** The data and materials used in this research are available upon request from the corresponding author. Detailed methodologies and supplementary materials can also be provided as needed.
- **Author contributions:** All authors made significant contributions to the conception and design of the study. They have approved the final version for publication, agreed to submit to this journal, and accepted responsibility for all aspects of the work.
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