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Prevalence and Factors Associated with Postpartum Urinary Symptoms among Women Attending Two Hospitals in Shendi, Sudan: A Hospital-Based Cross-Sectional Study

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Abstract

Background: Postpartum urinary symptoms are common and may adversely affect women's physical, psychological, and social well-being. This study assessed the prevalence and factors associated with postpartum urinary symptoms among women attending two hospitals in Shendi, Sudan. ***Methods:*** A hospital-based descriptive cross-sectional study was conducted at Al Mak Nemir University Hospital and Shendi Teaching Hospital from July 2024 to January 2025. The study included 98 women attending the hospitals within the first six weeks after childbirth who fulfilled the study inclusion criteria. Data were collected using an interviewer-administered questionnaire after obtaining informed consent and were analysed using SPSS version 26. ***Results***: Postpartum urinary symptoms were reported by 34 of 98 women (34.7%). Among the 34 symptomatic women, the most frequently reported symptoms were urgency (13/34, 38.2%), frequency (9/34, 26.5%), and nocturia (6/34, 17.6%). In the bivariate analysis, statistically significant associations were reported for age (p=0.029), educational level (p=0.027), occupation (p=0.024), residence (p=0.013), circumcision (p=0.001), body mass index (BMI; p=0.025), mode of delivery (p=0.028), duration of labour (p=0.018), episiotomy (p=0.014), early removal of urinary catheterisation (p=0.001), and postpartum complications (p=0.031). Parity was not significantly associated with symptoms (p=0.066). ***Conclusion***: Approximately one-third of the women in this hospital-based sample reported urinary symptoms during the first six weeks postpartum. Several sociodemographic and obstetric characteristics showed statistically significant associations. Larger studies using clearly defined urinary outcomes and adjusted analyses are needed to confirm these findings.

Keywords: Postpartum period; urinary symptoms; urinary incontinence; urinary retention; prevalence; Sudan.

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1. INTRODUCTION

Childbirth can affect the pelvic floor and lower urinary tract through mechanical, neurological, and connective-tissue changes. Vaginal birth may stretch or injure pelvic floor structures, including the pudendal nerve, levator ani muscles, and fascial supports. Factors such as operative vaginal delivery, a prolonged second stage of labour, and fetal macrosomia have been implicated in pelvic floor trauma. Such changes may compromise urethral support and the mechanisms that maintain urinary continence [1,2]. Postpartum urinary symptoms comprise a range of lower urinary tract complaints, including urinary urgency, frequency, nocturia, urinary retention, and urinary incontinence. These symptoms should not be treated as interchangeable outcomes because they may have different mechanisms and clinical implications. Postpartum urinary incontinence is associated with biomechanical and hormonal changes during pregnancy and childbirth and may be related to perineal trauma [3]. The International Continence Society defines urinary incontinence as the complaint of any involuntary leakage of urine. Stress urinary incontinence is one of its principal forms. Postpartum urinary incontinence can affect quality of life and psychological well-being, and

studies have reported an association between urinary incontinence and postpartum depression [4,5]. Its occurrence has been associated with obstetric factors, including mode of delivery, parity, age, and other maternal characteristics [6]. However, reported associations vary across populations and studies, including the roles of gestational age, BMI, and delivery-related factors [7]. The prevalence of postpartum urinary incontinence has varied widely across settings, reflecting differences in populations, outcome definitions, follow-up periods, and study methods [8,9]. Although pregnancy and childbirth are important contributors, non-obstetric characteristics may also be relevant. Evidence from local populations is needed to inform postpartum assessment and care. This study therefore aimed to determine the prevalence of postpartum urinary symptoms and assess their association with selected sociodemographic, obstetric, and clinical characteristics among women attending two hospitals in Shendi, Sudan.

MATERIALS AND METHODS

Study Design and Setting

A descriptive, hospital-based cross-sectional study was conducted at Al Mak Nemir University Hospital and Shendi Teaching Hospital in Shendi, Sudan, over seven months, from July 2024 to January 2025.

Study Population and Sample

The study population comprised women attending the participating hospitals during the postpartum period. A total of 98 women who attended either hospital within the first six weeks following childbirth and fulfilled the study eligibility criteria were included.

Data Collection

Data were collected using a pre-designed, structured, interviewer-administered questionnaire. Interviews were conducted by the principal researcher, registrars, and trained house officers in a private room provided by the hospitals to ensure participants' privacy and confidentiality.

Before data collection, the purpose of the study was explained to each participant, and informed consent was obtained from all women who agreed to participate. The questionnaire covered three main areas: sociodemographic characteristics, postpartum urinary symptoms, and selected obstetric and clinical factors.

Data Analysis

The collected data were coded, entered, and analyzed using the Statistical Package for the Social Sciences (SPSS), version 26. Descriptive statistics were used to summarize the study variables, with categorical data presented as frequencies and percentages. Associations between sociodemographic, obstetric, and clinical characteristics and the occurrence of postpartum urinary symptoms were assessed using appropriate statistical tests. *A p-value* of less than 0.05 was considered statistically significant.

RESULTS

A total of 98 women who attended the two hospitals during the first six weeks postpartum were included. Postpartum urinary symptoms were reported by 34 women (34.7%), while 64 (65.3%) did not report these symptoms (Table 1). Among the 34 symptomatic women, urgency was the most frequently reported symptom (13/34, 38.2%), followed by frequency (9/34, 26.5%) and nocturia (6/34, 17.6%). Urinary retention was reported by three women (8.8%), stress urinary incontinence by two (5.9%), and haematuria by one (2.9%). The distribution of sociodemographic characteristics by symptom status is presented in Table 2. Statistically significant associations were reported for age (p=0.029), educational level (p=0.027), occupation (p=0.024), residence (p=0.013), circumcision status (p=0.001), and BMI (p=0.025). The proportion of women reporting symptoms was higher in the categories of age below 20 years, illiteracy, worker occupation, rural residence, circumcision, and obesity. These findings describe the distribution in this sample and should not be interpreted as causal effects. Table 3 presents the obstetric and clinical characteristics according to postpartum urinary symptom status. Significant associations were reported for mode of delivery (p=0.028), prolonged labour (p=0.018), episiotomy (p=0.014), early removal of urinary catheterisation (p=0.001), and the complications variable (p=0.031). Parity was not significantly associated with symptom status (p=0.066). The table shows that 29 of 34 symptomatic women (85.3%) were recorded as having early catheter removal, compared with 28 of 64 women (43.8%) without symptoms.

Table 1: Prevalence and types of postpartum urinary symptoms among the study participants (N=98)

Variable	No	%
Occurrence of postpartum urinary symptoms		
Yes	34	34.7
No	64	65.3
Total	98	100.0
Type of symptom among symptomatic women (n=34)		
Urgency	13	38.2
Frequency	9	26.5
Nocturia	6	17.6

Variable	No	%
Urinary retention	3	8.8
Stress urinary incontinence	2	5.9
Haematuria	1	2.9
Total	**34**	**100.0**

Table 2: Sociodemographic characteristics by occurrence of postpartum urinary symptoms

Characteristic	Category	Yes n (%)	No n (%)	*P-value*
Age	<20 years	14 (41.2)	3 (4.7)	0.029
	20–29 years	12 (35.3)	15 (23.4)	
	30–39 years	5 (14.7)	29 (45.3)	
	>39 years	3 (8.8)	17 (26.6)	
Education	Illiterate	13 (38.2)	5 (7.8)	0.027
	Primary	9 (26.5)	11 (17.2)	
	Secondary	8 (23.5)	27 (42.2)	
	University	4 (11.8)	21 (32.8)	
Occupation	Housewife	11 (32.4)	38 (59.4)	0.024
	Worker	20 (58.8)	4 (6.3)	
	Employee	3 (8.8)	22 (34.3)	
Residence	Urban	10 (29.4)	45 (70.3)	0.013
	Rural	24 (70.6)	19 (29.7)	
Circumcision	Yes	30 (88.2)	30 (46.9)	0.001
	No	4 (11.8)	34 (53.1)	
BMI	Underweight (<18.5 kg/m²)	4 (11.8)	8 (12.5)	0.025
	Normal (18.5–24.9 kg/m²)	6 (17.6)	36 (56.3)	
	Overweight (25.0–29.9 kg/m²)	11 (32.4)	13 (20.3)	
	Obese (≥30.0 kg/m²)	13 (38.2)	7 (10.9)	

Table 3: Obstetric and clinical characteristics by occurrence of postpartum urinary symptoms

Characteristic	Category	Yes n (%)	No n (%)	P-value
Parity	Para 0	6 (17.6)	1 (1.6)	0.066
	Para I	8 (23.5)	11 (17.2)	
	Para II–IV	13 (38.2)	39 (60.9)	
	Para V or more	7 (20.7)	13 (20.3)	
Mode of delivery	Spontaneous vaginal delivery	13 (38.2)	28 (43.8)	0.028
	Emergency caesarean section	13 (38.2)	8 (12.5)	
	Elective caesarean section	2 (5.9)	26 (40.6)	
	Assisted vaginal delivery	6 (17.7)	2 (3.1)	
Duration of labour	Short	4 (11.8)	10 (15.6)	0.018
	Average	7 (20.6)	46 (71.9)	
	Prolonged	23 (67.6)	8 (12.5)	
Episiotomy	Performed	23 (67.6)	24 (37.5)	0.014
	Not performed	11 (32.4)	40 (62.5)	
Early removal of urinary catheter	Yes	29 (85.3)	28 (43.8)	0.001
	No	5 (14.7)	36 (56.2)	
Postpartum complications	No complications	14 (41.2)	55 (85.9)	0.031
	Perineal tears	12 (35.3)	3 (4.7)	
	Bladder injury	3 (8.8)	0 (0.0)	
	Postpartum haemorrhage	5 (14.7)	6 (9.4)	

DISCUSSION

In this study, 34.7% of women attending two hospitals in Shendi during the first six weeks after childbirth reported at least one urinary symptom. This finding indicates that postpartum urinary complaints were relatively common in the study population. However, direct comparison with studies of postpartum urinary incontinence should be made cautiously because the present study included a broader group of symptoms, including urgency, frequency, nocturia, urinary retention, stress urinary incontinence, and haematuria. Urgency was the most frequently reported symptom (38.2% of symptomatic participants), followed by frequency (26.5%) and nocturia (17.6%). Stress urinary incontinence accounted for only 5.9% of the reported symptoms. This distribution differs from reviews

focusing specifically on urinary incontinence, in which stress urinary incontinence is commonly identified as the predominant subtype [17,18]. The difference may reflect the broader outcome definition used in the present study rather than a true difference in the pattern of postpartum incontinence. Several sociodemographic characteristics were statistically associated with symptom status, including age, education, occupation, residence, circumcision status, and BMI. The higher proportion of symptoms among women younger than 20 years, women who were illiterate, rural residents, and women classified as obese should be interpreted in the context of the small sample and the bivariate nature of the reported analysis. Livinus *et al.,* reported associations between postpartum urinary incontinence and age, educational status, and occupation in a study in Nigeria [10]. Hersh *et al.,* identified maternal BMI and urinary incontinence during the last pregnancy as relevant factors among Palestinian postpartum women [11]. A systematic review by Dai *et al.,* also identified maternal BMI and several obstetric and pelvic-floor-related variables among factors associated with postpartum urinary incontinence [12]. Differences in outcome definitions and population characteristics may explain variation between studies. Circumcision status was associated with postpartum urinary symptoms in the present study (p=0.001). This finding warrants careful interpretation. The current data do not establish a causal relationship, and the manuscript does not provide details on the type or extent of circumcision or the mechanisms through which it might relate to the different urinary symptoms. Further studies using clearly defined exposure categories and adjusted analyses are required. Regarding obstetric characteristics, mode of delivery, prolonged labour, episiotomy, early removal of urinary catheterisation, and the recorded postpartum complications variable were statistically associated with symptom status. These findings are broadly consistent with literature describing relationships between childbirth-related pelvic floor trauma and postpartum urinary problems. Abdallah *et al.,* reported associations between mode of delivery and different postpartum urinary symptoms in Sudan [13]. Al-Dujaili *et al.,* identified later gestational age, a longer second stage of labour, induction of labour, and episiotomy as predictors of postpartum urinary retention [14]. Kayondo *et al.,* reported early urinary catheter removal and repeat surgery for perineal tears as factors associated with postoperative urinary retention among Ugandan women [15]. Other studies have also reported associations between perineal trauma and postpartum urinary retention. Cao *et al.,*, in a large study of primiparous women after vaginal delivery, identified several obstetric factors associated with overt postpartum urinary retention, including episiotomy and perineal tears [16]. Reviews have similarly highlighted delivery mode, parity, maternal BMI, perineal laceration, instrumental delivery, and prolonged second stage of labour as potential factors associated with postpartum urinary incontinence [12,17,18]. Nevertheless, urinary retention and urinary incontinence are distinct outcomes, and these studies should be compared with the present findings in light of that distinction. Parity was not significantly associated with postpartum urinary symptoms in this study (p=0.066). This contrasts with some reviews identifying multiparity as a factor associated with postpartum urinary incontinence [12]. The small sample size and the inclusion of several different urinary symptoms may have limited the ability to detect an association. In addition, the reported analysis appears to be unadjusted; therefore, confounding between age, parity, mode of delivery, and other obstetric characteristics cannot be excluded. Overall, the findings suggest that postpartum urinary symptoms deserve attention during postnatal assessment. However, the results should be considered exploratory. The study design does not establish temporality or causality, and the relatively small hospital-based sample limits generalisability. In addition, the reported p-values and some variable labels require confirmation from the original dataset and statistical output before publication.

LIMITATIONS

This study has several limitations. First, the relatively small sample size (98 women) and recruitment from only two hospitals may limit the generalisability of the findings to the wider population of postpartum women in Shendi or Sudan. Second, the cross-sectional design does not establish temporal or causal relationships between the identified characteristics and urinary symptoms. Third, data were collected through an interviewer-administered questionnaire, which may be affected by recall, reporting, or interviewer bias. Fourth, the study assessed a broad range of urinary complaints, which are clinically distinct; combining them into a single outcome may obscure symptom-specific patterns. Fifth, the manuscript reports bivariate associations but does not describe adjusted multivariable analysis; potential confounding therefore remains. Finally, detailed information on the sampling procedure, operational definitions of urinary symptoms and prolonged labour, ethical approval, and the statistical tests used was not included in the submitted version. These details should be clarified, and all reported p-values should be verified against the original dataset.

CONCLUSION

Postpartum urinary symptoms were reported by 34.7% of women attending the two study hospitals in Shendi. Urgency, frequency, and nocturia were the most commonly reported complaints. Several sociodemographic and obstetric characteristics were statistically associated with symptom status, whereas parity was not. These findings highlight the importance of recognising and assessing urinary complaints during the postpartum period. Because of the small sample and cross-sectional design, the reported associations should be interpreted cautiously and confirmed in larger studies with standardised outcome definitions and adjusted analyses.

Ethical Considerations

We obtained written informed consent from all participants before data collection. We clearly explained the study's purpose and objectives to each participant and informed them of their right to participate voluntarily and withdraw at any time without consequence. Confidentiality and privacy were strictly maintained throughout the study. All collected data were securely handled and used exclusively for research purposes. Participants' identities were kept anonymous, and no personally identifiable information was disclosed.

Consent: The patient's written consent has been collected.

Competing Interests: Authors have declared that no competing interests exist.

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