ORIGINAL ARTICLE

Postpartum Urinary Retention after Vaginal Delivery: Frequency and Associated Factors from a Tertiary Care Hospital, Larkana, Pakistan

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ABSTRACT

Objective: To determine the frequency of postpartum urinary retention (PPUR) and its concomitant factors among women after vaginal delivery at a tertiary care hospital in Pakistan.

Study Design: A cross-sectional descriptive study.

Place and Duration of Study: The study was conducted at the Department of Obstetrics and Gynecology, Shaikh Zaid Women Hospital, Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana, Karachi, Pakistan, from January 2025 to June 2025.

Methods: 231 women were enrolled in this study, aged 18-45 years and at 32-37 weeks' gestation, who underwent vaginal delivery. Women with postpartum hemorrhage, renal disease, Urinary Tract Infections, and other chronic comorbidities were excluded. Postpartum urinary retention is the inability to void urine during the first 6 hours after delivery or post-void residual bladder volume ≥150 mL assessed by ultrasound. Data were analyzed using SPSS 20; Chi-Square tests were applied, with $P \leq 0.05$ considered statistically significant.

Results: The mean maternal age was 28.08 ± 5.68 years. Overall, 18.6% (43/231) of women developed postpartum urinary retention. Frequency was significantly higher among obese (*P*=0.0005), hypertensive (*P*=0.0005), anemic (*P*=0.0005), pre-eclamptic (*P*=0.0005), and smoking women (*P*=0.001). The study findings highlight that maternal comorbidities (obesity, hypertension, pre-eclampsia, anemia, and smoking) were the strongest predictors of PPUR, while sociodemographic variables did not significantly influence its occurrence.

Conclusion: Postpartum urinary retention is a clinically relevant problem following vaginal delivery, with obesity, hypertension, anemia, pre-eclampsia, and smoking as significant risk factors. Vigilant bladder care during labor, proactive postpartum monitoring, and early intervention when required can reduce complications and improve maternal outcomes.

Keywords: *Postpartum Period, Risk Factors, Urinary Bladder, Urinary Retention.*

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Introduction

Postpartum urinary retention (PPUR) is an under-recognized complication of vaginal delivery, with widely varying reported frequencies due to inconsistent definitions and study populations. Recent systematic reviews reported a prevalence between 6–19% worldwide.[1] Khan et al. reported a notable frequency of PPUR among women undergoing vaginal delivery and emphasized the contribution of maternal risk factors in a tertiary care setting. The frequency of postpartum urinary retention (PPUR) after vaginal delivery was observed in 6.14% (7/114).[1] Similarly, Saif et al. identified significant associations between obstetric and

maternal variables and the development of urinary retention postpartum concluded significant independent risk factors for PPUR including episiotomy (OR 3.90), epidural analgesia (OR 3.88), obesity (OR 2.54), gestational diabetes (OR 3.39), macrosomia (OR 4.75), and longer labor duration (P = 0.003).[2] Overt PPUR is the inability to void spontaneously within 6 hours after vaginal delivery or after catheter removal following cesarean section, while Covert PPUR is asymptomatic retention where a woman can void but has a post-void residual (PVR) urine volume ≥150–200 mL detected by ultrasound.[3,5] The condition results from a combination of mechanical, neurological, and physiological factors occurring during labor and delivery.[4,5] During childbirth, prolonged bladder over-distension, pudendal nerve neuropraxia, pelvic floor trauma, periurethral edema, and pain-induced reflex urethral spasm may ruin detrusor contractility.[6]

However, available local studies are limited in number and vary in methodology, making it difficult to generalize findings or develop standardized prevention strategies. Therefore, this study was conducted to determine the frequency of postpartum urinary retention and to identify associated maternal factors among women after vaginal delivery at a tertiary care hospital. Generating local evidence will help guide early risk stratification, postpartum bladder care practices, and protocol development to reduce preventable maternal morbidity.

Methods

A cross-sectional descriptive study was conducted at the Department of Obstetrics and Gynecology, Shaikh Zaid Women Hospital, Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana, Karachi, Pakistan, from January 2025 to June 2025. Sample size and sampling was based on an expected prevalence of 8% and a margin of error 3.5%, a sample of 231 postpartum women was included using non-probability consecutive sampling.[7]

Inclusion: Women aged 18–45 years, 32–37 weeks of gestation, undergoing vaginal delivery.

Exclusion: Women with postpartum hemorrhage, Disseminated Intravascular coagulation, chronic renal disease, Urinary Tract Infection, bleeding disorders, multiple transfusions, hepatic or cardiopulmonary dysfunction, or who declined consent.

After obtaining informed written consent and approval from the hospital's Ethical Review Committee vide IRB no: A/30/55/25A, dated: 13 November 2024. participants were evaluated. PPUR was diagnosed if women were unable to void within 6 hours of delivery or had post-void residual bladder volume (PVRBV) ≥150 mL on ultrasound. Demographics and comorbidities (obesity, diabetes, hypertension, pre-eclampsia, anemia, smoking, parity, and residence) were recorded.

Statistical Analysis: Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Mean and Standard deviation were calculated for continuous variables. The Chi-Square test was applied; $P \leq 0.05$ was considered statistically significant.

Results

A total of 231 subjects were incorporated in this study. The mean maternal age was 28.08 ± 5.68 years, and the mean gestational age was 35.67 ± 1.40 weeks. Most participants were primiparous (60.1%) and from urban areas (66.6%) (Table 1).

Table 1: Demographic statistics of the study patients

Variables	Mean	95% Confidence Interval	
		Lower Bound	Upper Bound
Age (Years)	28.08±5.68	27.34	28.82
BMI (kg/m^2)	24.15±1.95	23.89	24.40
Gestational Age (Weeks)	35.67±1.40	35.49	35.85
Parity	1.48±0.67	1.39	1.57

Table 2: Associated factors

Variables	Count	Percent
Obesity	51	22.1%
Smoking	16	6.9%
Hypertension	32	13.9%
Diabetes mellitus	65	28.1%
Preeclampsia	11	4.8%
Anemia	32	13.9%

Table 3: Frequency of postpartum urinary retention in women after vaginal delivery by demographic characteristics (N=231)

Variables	Categories	Postpartum Urinary Retention		Total	*Chi-Square* test (χ^2)	*P*-value
		Yes Count (%)	No Count (%)			
Age Groups	<=25	22 (22.2%)	77 (77.8%)	99	2.65 (3)	0.449
	26 to 30	14 (19.2%)	59 (80.8%)	73		
	31 to 40	5 (11.6%)	38 (88.4%)	43		
	>40	2 (12.5%)	14 (87.5%)	16		
Gestational age (Weeks)	<35	13 (15.9%)	69 (84.1%)	82	0.64 (1)	0.424
	36-37	30 (25.2%)	119 (74.8%)	119		
Parity	Primiparous	27 (19.3%)	113 (80.7%)	140	0.11 (1)	0.745
	Multiparous	16 (17.6%)	75 (82.4%)	91		
Address	Urban	34 (23.1%)	113 (76.9%)	147	-	0.424
	Rural	9 (10.7%)	75 (89.3%)	84		
Total	-	43 (18.6)	188 (81.4)	231	-	-

Table 4: Frequency of postpartum urinary retention in women after vaginal delivery by other modifiers (N=231)

Variables		Postpartum Urinary Retention		Total	(χ^2)	*P*-value
		Yes Count (%)	No Count (%)			
Obesity	Yes	23 (53.5%)	28 (14.9%)	51	28.10 (1)	0.0005
	No	20 (46.5%)	160 (85.1%)	180		
Smoking	Yes	8 (18.6%)	8 (4.3%)	16	9.06 (1)	0.001
	No	35 (81.4%)	180 (95.7%)	215		
Hypertension	Yes	20 (46.5%)	12 (6.4%)	32	43.92 (1)	0.0005
	No	23 (53.5%)	176 (93.6%)	199		
Diabetes mellitus	Yes	16 (37.2%)	49 (26.1%)	65	1.63 (1)	0.143
	No	27 (62.8%)	139 (73.9%)	166		
Preeclampsia	Yes	10 (23.3%)	1 (.5%)	11	34.99 (1)	0.0005
	No	33 (76.7%)	187 (99.5%)	220		
Anemia	Yes	21 (48.8%)	11 (5.9%)	32	66.25 (1)	0.0005
	No	22 (51.2%)	177 (94.1%)	199		

The overall frequency of postpartum urinary retention (PPUR) was 18.6% (43/231) (Table 2).

Analysis of maternal comorbidities showed that PPUR was significantly more common among obese women (41.9% vs. 13.3%, *P*<0.001), those with hypertension (25.6% vs. 5.3%, *P*<0.001), pre-eclampsia (14.0% vs. 2.7%, *P*<0.001), anemia (44.2% vs. 11.7%, *P*<0.001), and smokers (18.6% vs. 3.7%, *P*<0.001) compared to their counterparts (Table 3).

Sociodemographic factors, including maternal age, parity, and place of residence, were not statistically significantly associated with Post-Partum Urinary

Retention (Table 4). For instance, PPUR occurred in 26 (60.5%) of women aged ≤30 years versus 17 (39.5%) in women >30 years (*P*=0.87). Similarly, the frequency was comparable between primiparous and multiparous women (58.1% vs. 41.9%, *P*=0.77) and between urban and rural residents (67.4% vs. 32.6%, *P*=0.92).

Thus, the study findings highlight that maternal comorbidities (obesity, hypertension, pre-eclampsia, anemia, and smoking) were the strongest predictors of PPUR, while sociodemographic variables did not significantly influence its occurrence.

Discussion

Khan et al. reported frequency of postpartum urinary retention (PPUR) after vaginal delivery was observed in 6.14% (7/114). Significant risk Factors contributing to post-partum urinary retention (PPUR) were prolonged labor and epidural analgesia.[1] Various risk factors were significantly associated with PPUR in this study. Obesity remained a significant factor. Similar findings have been reported in international studies, where maternal obesity has been linked to impaired bladder emptying due to increased intra-abdominal pressure, altered pelvic floor function, and metabolic factors.[2-4] This highlights the need for pre-emptive bladder care and early mobilization in obese women after parturition. The frequency of PPUR in our study was 18.6%, which is at the upper end of the reported range (6–19%).[4] This signifies the importance of recognizing postpartum urinary retention as a common and clinically important complication of vaginal delivery.

Hypertension, along with preeclampsia, was also strongly related to PPUR. Preeclampsia is known to cause endothelial dysfunction and microvascular compromise, which may impair detrusor muscle function. Moreover, hypertensive women often require induction, prolonged monitoring, and at times instrumental deliveries, all of which may increase the risk of urinary retention.[4,7-9]

Anemia was an additional substantial risk factor. Although not widely reported in the literature, anemia may contribute indirectly by impairing tissue oxygenation and muscle recovery at the molecular level, delaying restoration of bladder function. This finding augments the regional evidence and suggests that improving maternal nutritional status may have additional benefits in reducing postpartum morbidity.[2,10,11] Smoking was strongly associated with PPUR in this study. Cigarette smoke contains nicotine and other vasoactive substances that affect bladder contractility and vascular supply. While not widely studied in postpartum women, our results are in line with urological and obstetric literature linking smoking to bladder dysfunction.[12-15]

In contrast, maternal age, parity, and gestational age were not significantly associated with PPUR, differing from some earlier studies.[4,6,16-19] These variations may reflect differences in study design, population characteristics, and diagnostic criteria.

From a clinical perspective, undiagnosed PPUR can lead to serious consequences such as bladder over-distension, infection, hydronephrosis, and even long-term voiding dysfunction. Early recognition and time management are therefore crucial. Simple measures such as ensuring bladder emptying within 6 hours postpartum, using bladder scans to assess residual urine volume, and educating staff to recognize risk factors can significantly improve outcomes.[8,13,16,17,20]

This study contributes to the limited local single-center data on PPUR in Pakistan, emphasizing the need for routine postpartum bladder monitoring, particularly in high-risk women (obese, hypertensive, anemic, smokers). It also underscores the need to develop standardized postpartum bladder care protocols in tertiary hospitals.[10,11,18]

Conclusion

Postpartum urinary retention is a common complication, observed in nearly one in five women after vaginal delivery in this study. Obesity, smoking, hypertension, pre-eclampsia, and anemia were significant risk factors. Vigilant bladder monitoring and early intervention are essential to prevent complications.

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Author Contributions

KS: Conception and design of the work
NA: Manuscript writing for methodology design and investigation
SJ: Data acquisition, curation, and statistical analysis
Y: Revising, editing, and supervising for intellectual content
AP: Validation of data, interpretation, and write-up of results
SHA: Writing the original draft, proofreading, and approval for final submission