

# Association of Obstetric Risk Factors with Postpartum Urine Retention after Vaginal Delivery

Risk Factors with Postpartum Urine Retention after Delivery

Amina Hanif, Memoona Hanif, Tahira Akhtar, Ayesha Arshad, Amina Waheed and Saher Arshad

## ABSTRACT

**Objective:** The basic aim of the study is to find the association of obstetric risk factors with postpartum urine retention after vaginal delivery.

**Study Design:** Case-control study

**Place and Duration of Study:** This study was conducted at the Gujranwala Medical College Teaching Hospital in Gujranwala from March–June 2024.

**Methods:** Our research included 300 females who had undergone vaginal delivery. Thirty-four of the women (11.3%) experienced postpartum urinary retention, while 266 (88.6%) did not. The rest of the women served as controls. Suppose a woman is unable to urinate within eight hours of giving birth and has a significant postpartum residual volume (PMRV) or a postvoid residual bladder volume of at least one hundred milliliters (mL). In that case, she is said to have postpartum urinary retention (PPUR). Through the use of logistic regression, risk factors were defined.

**Results:** The tendency to retain urine after giving birth was strongly linked to several factors, such as labor that lasted longer than six hours (Odds ratio = 0.46, 95% Confidence interval for OR = 0.06-3.67,  $p < 0.001$ ), perineal injuries (Odds ratio = 97.09, 95% Confidence interval for OR = 7.93-1188.93,  $p < 0.001$ ), an episiotomy (Odds ratio = 0.07, 95% Confidence interval for OR = 0.01-0.68,  $p = 0.022$ ), and a baby that weighed more than 4 kg (Odds ratio = 0.04, 95% Confidence interval for OR = 0.01-0.20,  $p < 0.001$ ).

**Conclusion:** Postpartum urine retention is a quite prevalent issue following vaginal delivery. Preventing this problem requires understanding the related risk factors, which include protracted labour, perineal lacerations, episiotomy, and macrosomic birth.

**Key Words:** Bladder, risk factors, urinary retention, delivery, postpartum

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## INTRODUCTION

Despite being common after both vaginal and caesarean births, postpartum urinary retention (PUR) is still an issue that needs more attention<sup>[1]</sup> The urine accumulation in the bladder of postpartum woman for a period of 6 hours following childbirth is referred to as postpartum urinary retention (PUR). This condition is marked by either the inability to remove the urine on one's own or the incapability to completely eliminate it.<sup>[2]</sup>

Department of Gynaecology, Gujranwala Medical College Teaching Hospital, Gujranwala.

Correspondence: Dr. Tahira Akhtar, Assistant Professor Department of Gynaecology, Gujranwala Medical College Teaching Hospital, Gujranwala  
Contact No: 03458404645  
Email: drtahira\_imran@yahoo.com

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The condition postpartum urinary retention (PPUR) is more likely to occur in women who have undergone intraspinal anaesthesia during the delivery of their babies. If it is not recognised and treated on time, it can give rise to long-term urinary dysfunction.<sup>[3]</sup> PUR takes place after 0.05%–45% of deliveries.<sup>[4]</sup> It is very important to get a correct diagnosis and start treatment right away to avoid problems like bladder injury, detrusor muscle and nerve damage, and kidney failure.<sup>[5]</sup>

One of the most prevalent complications that may arise following childbirth is postpartum urinary retention (PPUR), which can be classified into two categories: overt and covert. During the first six hours after a vaginal delivery, the inability to urinate on one's own is the defining characteristic of overt postpartum urine retention, (PUR). On the other hand, covert PUR is characterised by spontaneous urination within six hours of delivery, but urine volume that remains in urinary bladder after the initial urination is equal to or greater than 150 millilitres. Different elements are responsible for the aetiology. Owing to the physiological changes that take place during pregnancy, a greater post-void

residual volume is observed in the bladder, which also becomes hypotonic. Urinary retention can be the result of a perineal neuropathy that develops during the delivery process.<sup>[6]</sup>

There is a lack of understanding regarding the illness known as PUR, which is supposed to be caused by a number of different variables. Anatomical changes that are generated by delivery, such as the loss of awareness of the bladder filling, the inhibition of micturition, the descent of the bladder with pushing, and hormonal changes that occur in the bladder throughout pregnancy, have been postulated as potential causes of postpartum urinary retention (PUR) by a number of studies.<sup>[7]</sup> Numerous factors have been associated with the neurological, physiological, and mechanical processes that arise during pregnancy and vaginal delivery. There is evidence that one of these features, painless delivery, influences the result on its own.<sup>[8]</sup> Periurethral blocking edema may be the result of trauma to the pelvic floor muscles, the detrusor muscle, and overdistention of nerve fibers, and bladder function may also be impacted by hormonal fluctuations. Bladder sensitivity may be compromised. Failure to promptly identify PPUR can result in detrusor muscles atony, denervation, and failure of urinary bladder.<sup>[9]</sup> Treatment of persistent urine retention is necessary in order to avoid micturition issues brought on by hydronephrosis, anuria, detrusor failure and kidney failure. This condition has the potential to be life-threatening for the patient and necessitates therapy.<sup>[4]</sup> Postpartum urinary retention (PUR) is more likely to happen if the second stage of labor lasts longer than expected, if you had an instrumental or vacuum-assisted delivery, if you had a perineal laceration, an episiotomy, epidural analgesia, or intermittent catheterization during labor, or if you don't go to the bathroom on your own soon after leaving the delivery room.<sup>[9]</sup> During the past several years, China has made significant strides in the implementation of labour analgesia techniques and concepts. As a result, labour epidural analgesia has been done extensively at a variety of midwifery institutes around the country. There has been a gradual increase in the rate of labour epidural analgesia, which has increased the incidence of postpartum urinary retention (PPUR), which has become more widespread and complicated. Epidural anesthesia may increase the chance of overt PUR, according to studies.<sup>[10]</sup>

Women who are in the immediate postpartum period frequently experience urinary retention, which can be a very irritating problem. The main short-term consequence is persistent urinary retention, which can be managed with clean intermittent self-catheterization. As part of the treatment, supporting measures are implemented to increase the possibility of micturition. These interventions include ambulation, privacy, and taking a warm bath. To prevent the need for prolonged

or recurrent catheterization, prophylactic antibiotics may be recommended in the event that the bladder holds more than 700 millilitres of urine.<sup>[6]</sup> In spite of the fact that catheterization is utilized in the treatment of PUR, there is no method or clinical guideline that has been developed regarding the type of catheterization or the duration of time that it should be carried out. While some groups employed a combination of continuous catheterization (CC) and intermittent catheterization (IC), others reported using an indwelling catheter for a period of twenty-four to seventy-two hours.<sup>[11]</sup>

## METHODS

March–June 2024 was the time frame for this case-control study at the Gujranwala Medical College Teaching Hospital in Gujranwala. With informed consent from all participants, the study included 300 consecutive women who gave birth to term singletons vaginally following uncomplicated pregnancies; the study was authorised by the institutional review board.

To determine the postvoid residual bladder volume (PVRBV), a transabdominal ultrasound was performed on each woman after giving birth. To get scans of the bladder both laterally and longitudinally, the transducer was placed over the symphysis pubis. PVRBV was determined by multiplying the widths of the transverse and longitudinal scans by 0.7, with D1 representing the broadest diameter, D2 the anteroposterior diameter, and D3 the cephalocaudal diameter.

The women who were classified as cases were those who had an estimated PVRBV of 100 milliliters or more, or who were unable to urinate with significant PMRV within eight hours after delivery. Those individuals who had an estimated PVRBV of less than 100 mL were designated as controls.

Each and every participant had a wide variety of maternal and neonatal demographic data taken from them simultaneously. Parity, BMI, age, birth weight, newborn head circumference, gestational age at labor start, analgesia, oxytocin use, labor duration, fundal pressure, macrosomic delivery, perineal lacerations, episiotomy, and postpartum urinary pain were collected.

Our statistical analysis was conducted using version 15.0 of SPSS. By using the Kolmogorov-Smirnov test, the normal distribution was evaluated. Mean  $\pm$  standard deviation is used to represent variables having a normal distribution, and median values are used to represent those without. The Mann-Whitney U test, the chi-square test, and the independent sample t-test were employed wherever it seemed suitable to do so in order to establish statistical comparisons. These tests were utilized for the aim of establishing statistical patterns. In order to analyze the risk factors associated with PPUR, logistic regression was employed. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

34 out of the 300 women enrolled in the research had PPUR, resulting in an incidence rate of 11.3%. Within this group, 28 individuals (9.33%) exhibited covert retention, while 6 individuals (2%) displayed overt retention.

Mother age, gravidity, parity, BMI, duration from birth to first void, gestational period, postpartum urine signs, and neonate head circumference did not exhibit any significant differences between cases and controls. In comparison to controls, cases had a significantly higher mean birth weight (3745.79±432.18 g vs. 3493.63±492.68 g, p<0.032). A significantly higher mean PVRBV was observed in cases (202.11±60.15 mL vs. 57.84±26.63 mL, p<0.001).

Patients and controls exhibited similar obstetric characteristics in the first and third periods. Patients experienced a substantially longer 2nd stage of labor than controls (38.42±9.44 minutes vs. 23.00±11.72 minutes, p<0.001). The number of cases that had fundal pressure, macrosomic infants, episiotomy, and perineal laceration was significantly greater than the average. According to logistic regression analysis, PPUR was not associated with parity, analgesic use during labor, first-stage labor length, oxytocin labor induction, fundal pressure, or birth-to-first-void time. Postpartum ureteral retention (PPUR) was had a number of risk factors, including episiotomy (odds ratio = 0.07, 95% confidence interval = 0.06–0.68, p = 0.022), prolonged second-stage labour (odds ratio = 0.46, 95% confidence interval = 0.06–0.67, p < 0.001), perineal lacerations (odds ratio = 97.09, 95% confidence interval = 7.93-1188.93, p < 0.001), and a newborn birth weight that was greater than 4000 grams (odds ratio = 0.04, 95% CI for OR = 0.01-0.20, p < 0.001).

**Table No. 1: Evaluation of PUR risk factors using logistic regression analysis**

	Odds Ratio (OR)	95% CI for OR	P value
Second stage duration	0.46	0.06-3.67	< 0.001
Perineal lacerations	97.09	7.93-1188.93	< 0.001
Fetal macrosomia	0.04	0.01-0.20	< 0.001
Episiotomy	0.07	0.01-0.68	0.022

To be statistically significant, a p-value of less than 0.05 was evaluated.

## DISCUSSION

Our investigations show that 11.3% of women experience postpartum urine retention following a vaginal delivery. While the incidence of postpartum urinary retention varies widely in the literature, many

cases go undetected, particularly covert cases identified only through ultrasound or catheterization. For example, according to a research conducted by Polat et al,<sup>[12]</sup> the incidence rate of about 22.1% which is roughly thr double of our results.

The specific cause of PPUR is still unknown, despite the fact that several obstetric risk factors have been proposed as potential causes. The risk factors for postpartum urine retention (PUR) identified in our study include episiotomy, prolonged second-stage labor, perineal lacerations, and fetal macrosomia. The results of our study are backed up by another study Cavkaytar S et al<sup>[13]</sup>. That study identified episiotomy, perineal laceration, and protracted second stage of labor as the primary risk factors for postpartum urine retention (PUR).

Primiparity has been recognized as a risk factor in a number of studies; however, our research did not provide evidence to support this hypothesis. None of our subjects received regional anesthesia or instrumental delivery, which have been linked to PPUR risk. On the other hand, fundal pressure during labour, which was shown to be more prevalent among patients, was not found to be a critical element in our regression model. We found that prolonged second-stage labour and macrosomic newborns enhanced the incidence of PPUR due to pelvic floor mechanical stress and abdominal strain. Pain and reflex urethral spasm may have increased the risk of PPUR after perineal lacerations and episiotomy.

## CONCLUSION

A woman's immediate and long-term well-being can be significantly impacted by postpartum urinary retention (PUR), a significant yet frequently overlooked complication. The condition is quite prevalent, and if it is not controlled properly, it can have severe repercussions. To avoid this problem, it's important to think about factors like episiotomy, perineal lacerations, prolonged labour, and the delivery of a macrosomic newborn. Additional research is required to investigate the effectiveness of postpartum bladder scanning as well as factors leading to postpartum urinary retention (PPUR).

### Author's Contribution:

Concept & Design of Study: Amina Hanif  
 Drafting: Memoona Hanif, Tahira Akhtar  
 Data Analysis: Amina Waheed, Ayesha Arshad, Saher Arshad  
 Revisiting Critically: Amina Hanif, Memoona Hanif  
 Final Approval of version: By all above authors

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