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Postpartum Urinary Retention Risk Factor Analysis

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Abstract

Urinary retention is one of the postpartum complications. Post Partum Urinary Retention (PPUR) problems can occur in vaginal births. This study contributed to identifying risk factors for postpartum urinary retention (PPUR) in vaginal and sectio caesarea (SC) postpartum mothers at RSUD Ciamis. A descriptive-analytic survey with a cross-sectional approach was conducted on 122 postpartum mothers (86 SC and 36 spontaneous) at RSUD Ciamis. Postpartum mothers at the age of 20-35 years were carried out by tracing the latest peripartum history regarding risk factors for PPUR, namely primipara, episiotomy, macrosomia, grade of perineal tear, use of birth aids (forceps and vacuum), use of labor anesthesia, no use of Catheterization during labor—the delivery of residual urine after the first voiding and the obesity status of the mother before delivery. Data are presented as percentages in spontaneous delivery and SC. The results showed that 36 primiparous respondents (42%), eight respondents experienced childbirth using tools (7%), 86 respondents (58%) used spinal anesthesia (regional) during SC delivery, 0% macrosomia, 29% obesity, 0% deliveries old, 24.6% did not do Catheterization during labor, 0.8% residual urine > 150 mL, 9% did episiotomy, 20% grade II perineal tear. This study concluded that there are risk factors for postpartum mothers for PPUR at Ciamis Hospital, including primipara, obesity, episiotomy, use of birth aids, and grade II perineal tears in postpartum mothers who give birth vaginally.

Keywords: *Postpartum; Risk Factor Urinary Retention*

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1. Introduction

Urinary retention is one of the postpartum complications. Post Partum Urinary Retention (PPUR) problems can occur in vaginal births as the results of another study in one hospital in Pakistan, there were 6.14% (7 out of 114) cases of PPUR from vaginal births (Khatoon et al., 2020). Meanwhile, the research results at RSCM showed that the incidence of urinary retention in postpartum mothers amounted to 26.7% (Djusad, 2020a). Furthermore, in a preliminary study conducted by researchers at Ciamis Hospital, it was reported that from January to June 2020 there were 25 out of 724 postpartum vaginal patients who were declared to have postpartum urinary retention (3.45%). The most significant risk factors for PPUR with vaginal birth include birth with the help of a device, such as a forceps or vacuum. Other studies have added that *prolonged labor* and the use of epidural analgesia are the factors that contribute most to the incidence of PPUR. Birth with the help of tools can cause hematoma and inflammation (edema) in the perineal area, urethra, and vagina due to excessive stretching trauma (Pifarotti et al., 2014). Inflammation of the perineal area (including the external urethral sphincter) can cause reflex inhibition of voiding, especially in the pudendal nerve pathway. This inhibition can cause distention in the urinary vesicles. Inhibition of this pathway provides information to the higher urinary regulation centers to induce relaxation of the external urethral sphincter (Yoshimura & Chancellor, 2012).

Both vaginal and sectio caesara (SC) deliveries can pose various risks to PPUR. Risk factors for postpartum urinary retention, both vaginally and SC, have been presented in other studies, namely: episiotomy, epidural analgesia, instrumental delivery, primiparity, when one and or two are elongated, Catheterization during the peripartum, high urine volume at the time of diagnosis of PPUR (>900mL), the SC procedure itself, tears in the perineal area, extra fluid administration during labor, perineal tearing in degree II or above, giving birth to a large pervaginal, primiparous and nullipara fetus (Djusad, 2020b; Humburg, Troeger, Holzgreve, & Hoesli, 2011; Lutfiyanti, 2020; Polat et al., 2018; Tiberon et al., 2018).

Postpartum urinary retention can become prolonged and cause complications in the urinary system if an immediate assessment of this diagnosis is not carried out. This condition can result from damage to the pudendal and perineal nerves and severe edema of the bladder wall (Singh, Pratibha; Gothwal, Meenakshi; Yadav, 2018). However, other factors may contribute to the lengthening of PPUR (Humburg et al., 2011).

2. Method

This study used an analytical descriptive design. This research was conducted during June-October 2022 at Ciamis Hospital, West Java Province. The study population was all postpartum vaginal and SC mothers who gave birth from June to October 2022. The sample of this study was taken using a purposive sampling method and by the exclusion criteria: postpartum mothers with severe organ system disorders. The sample size was 122 respondents (aged 18-40 years), with 86 giving birth to SC and 36 giving birth vaginally. Data collection was carried out by interviews, documentation studies on patient medical records, and direct physical examination on PPUR risk factor variables, namely obstetric status, use of assistive devices in labor (vacuum and forceps), type of anesthesia, baby's birth weight, body mass index (BMI) before delivery, length of time I and II, catheterization procedures during labor, urine residues after the first urination, Episiotomy, degree of perineal tear, external tear of vulva, and history of extra fundal push during labor. Data analysis uses frequency distribution and central tendency (mean and standard deviation). This research has received ethical clearance from the KEPK Poltekkes Kemenkes Tasikmalaya with the number KP-KEPK/0083/2022.

3. Results and Discussion

One of the risk factors for PPUR is the age over 30 years. At this age, there is a risk of PPUR associated with decreased muscle motility under the pelvis. Variations can occur under several conditions (Khatoon et al., 2020). The average age of respondents with SC and vaginal copying types was almost the same, which was nearly 30 years in Table 1.

Table 1. Age Characteristics of Respondents (n=122)

Type of Labor	Age (years)	
	Average ±SD	Min-Max
Pervaginam (36)	29.65±5.51	18-42
SC (86)	$29.98±5.98	19-43

Table 2 is the majority of respondents' obstetric status in SC and vaginal delivery was multiparous (n = 122). There is a history of the use of birth aids (forceps) in respondents who gave birth to SC.

Table 2. Respondent Characteristics by Obstetric Status and Use of Tool Assistance (n=122)

Types of Childbirth	Obstetrics status		
	Primiparous	Multiparous	Total
vaginal	8	28	36
SC	20	66	86
Types of Childbirth	Childbirth Equipment Assistance		Total
	exist	none	
vaginal	0	36	36
SC	8	78	86

Table 3. showed only respondents with SC delivery used anaesthesia, which is the type of epidural anaesthesia (spinal)

Table 3. Characteristics of Respondents based on the type of labour anaesthesia (n = 122)

Types of Childbirth	Types of Anaesthesia		
	Spinal/ epidural	totally	Total
vaginal	0	0	36
SC	86	0	86

From Table 4. There appears to be childbirth with a maximum total birth weight of >4000 gr. Table 4 shows there is a maximum time of 24 hours for vaginal delivery. There is an average of two lengthening times in vaginal birth to a maximum of 120 minutes, including in SC delivery (long history of time II).

Table 4. Characteristics of Respondents based on Birth Weight, length or duration of labour in Stage I and delivery in stage II (n = 122)

Types of Childbirth	Birth weight (gram)	
	mean ±SD	Min-Max
vaginal (36)	2970,29±681	1050-4600
SC (86)	2986±689	1147-4900
Types of Childbirth (n)	Duration of stage 1 (hour)	
	mean ±SD	Min-Max
vaginal (36)	6,31± 2,1	4-24
SC (86)	8,07 ±3,9	6-12
Types of Childbirth (n)	Duration of stage II (minutes)	
	mean ±SD	Min-Max
vaginal (36)	50±50	1-120
SC (86)	30±14,9	2-120

Table 5 showed all SC labour respondents were catheterised. The table showed that There was

a history of episiotomy in vaginal delivery in as many as eleven respondents.

Table 5. Respondent Characteristics based on the history of Catheterization and Episiotomy (n=122)

Types of Childbirth	Catheterisation during stage I-IV		
	yes	no	Total
vaginal	6	30	36
SC	86	0	86
Types of Childbirth	Efficient Procedure		
	yes	no	Total
vaginal	11	24	36
SC	0	36	86

Table 6. Respondent Characteristics by Perineal Tear Degree/Grade (n=122)

Types of Childbirth	Perineal Tear Grade			
	Grade I	Grade II	Grade III	Total
vaginal	10	25	1	36
SC	0	0	0	86
Total	10	25	1	86

Based on Table 6. in vaginal delivery, the majority of ≥ II-degree perineal tears occur. Based on Table 7. there is an external tear in a small percentage of vaginal deliveries. Based on Table 7. One respondent had a history of external fundal pressure.

Table 7. Respondent Characteristics based on External Tear (vulva tear, not episiotomy) and History of External Fundal Pressure (n=122)

Types of Childbirth	External tear		
	yes	no	Total
vaginal	9	27	36
SC	0	36	86
Types of Childbirth	External Fundal Pressure		
	yes	no	Total
vaginal	36	1	36
SC	86	0	86

Another risk factor is primiparous obstetric status. Primiparous has a greater risk of changes and damage to the internal pelvis than multipara. Changes can occur in the anatomical structure of the pelvis, urethra, and lower pelvic muscles. In addition, in primiparous, there is a risk of pudendal nerve damage during vaginal delivery compared to SC. In primiparous, it was found that more people received labor equipment assistance (forceps and vacuum) and episiotomy during vaginal delivery, increasing the risk of inflammation in the birth canal and urethra area (Ain, Shetty, & K, 2021; Khatoon et al., 2020; Li, Zhu, & Xiao, 2020; Polat et al., 2018).

Episiotomy causes pain that will create spasms in the urethral muscles, causing PPUR (Ain et al., 2021). Pain in an episiotomy causes postpartum mothers to hold back often urination, which will eventually increase bladder volume and increase uterine involution, resulting in uterine subinvolution and postpartum hemorrhage (Anne. Phillips, 1998). Sutures in episiotomy wounds can cause pain and reduced bladder sensitivity in voiding (Khatoon et al., 2020). Tears in the perineum in this study showed that there were respondents who experienced grade II tear depth from the skin of the birth canal to the muscles from the perineum to the vagina. This tear requires a suture procedure for healing (Zhang, Sun, Li, & Tao, 2016). This tearing most often occurs in the process of vaginal delivery.

Furthermore, II lengthening is one of the independent factors that can cause PPUR. Stretching and excessive pressure by the fetus on the pelvic muscle area can cause injury to the muscles and nerves in the pelvic region, including the pudendal nerve and bladder muscle. Excessive and prolonged stretching of the perineal area can cause edema and spasms of the urethral speaker (Li et al., 2020).

Peripartum Catheterization has been proposed as a potential strategy to prevent or manage PPUR, but its efficacy and safety remain controversial (Lamblin et al., 2019). A systematic review and meta-analysis found that the overall prevalence of PPUR was 12.7% among women who underwent peripartum catheterization, compared to 14.3% in those who did not. The study also identified several risk factors for PPUR, including primiparity, the prolonged second stage of labor, and instrumental delivery. Similarly, a prospective cohort study by Nurul et al. (2020) reported that women who received peripartum catheterization had a 1.8-fold increased risk of developing PPUR compared to those who did not. Other studies have shown that Catheterization at the peripartum can reduce the incidence of PPUR (Mulder et al., 2018). In this study, a small percentage of respondents who gave birth vaginally and all postpartum SC respondents were catheterized during the peripartum period.

The use of epidural anatomy can reduce pain in labor while inhibiting nerve impulses in the bladder area. This anesthesia inhibits the voiding reflex because reflex impulses from the pons area to the bladder are interrupted. This condition can cause bladder overdistension and injury (Ain et al., 2021). In addition, another study (Li et al., 2020) states that using regional anesthesia can extend the duration of kala II, which poses a risk of using the help of tools such as forceps and vacuums. Using

forceps and vacuum labor aids can cause injury to the urethral area, causing inflammation and spasms of the urethral sphincter. Device assistance in the vaginal delivery process can also cause injury to the detrusor muscle and voiding dysfunction after labor. Ultimately, the use of epidural anesthesia can risk PPUR through mechanical (obstructive) and neurological mechanisms. Despite this, these occurrences vary considerably (Khatoon et al., 2020).

The baby's weight is also described as a risk factor for PPUR. An infant body weight of more than 3500 grams can be a risk factor for the incidence of PPUR (Polat et al., 2018).

In addition to the weight of the baby born, the body mass index of pregnant women is explained to be a risk of PPUR, namely in obese pregnancies with a body mass index (BMI) of ≥ 30 (Lamblin et al., 2019; Polat et al., 2018). This study shows that most respondents have overweight and obese status. Maternal obesity has become a growing concern worldwide, with its prevalence increasing in recent years (Nurul-Farehah & Rohana, 2020). Obesity during pregnancy is associated with various complications, including gestational diabetes, preeclampsia, and cesarean delivery (C. C. Lim & Mahmood, 2015). Recent studies have also investigated the relationship between maternal obesity and postpartum urinary retention (PPUR). This condition can lead to significant discomfort and potential long-term complications for new mothers (Dai et al., 2023).
A systematic review and meta-analysis (Dai et al., 2023) found that the overall prevalence of PPUR was 14.3% among obese women, compared to 7.2% in non-obese women. The study also identified several risk factors for PPUR, including primiparity, the prolonged second stage of labor, and instrumental delivery. Similarly, a prospective cohort study by Lee et al. (2024) reported that obese women had a 2.1-fold increased risk of developing PPUR compared to women with normal body mass index (BMI).

However, several theories have been proposed. A study by Mohr et al. (2022) suggested that increased intra-abdominal pressure due to excess fatty tissue may lead to compression of the bladder and urethra, resulting in urinary retention. Additionally, hormonal changes associated with obesity, such as increased levels of estrogen and progesterone, may contribute to urethral sphincter dysfunction (Kizilkaya Beji, Satir, & Çayir, 2020).
Early identification and management of PPUR are crucial to prevent complications such as urinary tract infections and bladder dysfunction (Gupta et al., 2021). A randomized controlled trial by (Dai et al., 2023; Mohr et al., 2022) found that early catheterization and bladder training effectively reduced the duration of PPUR and improved patient satisfaction among obese women. Furthermore, lifestyle interventions promoting healthy weight gain during pregnancy and postpartum weight loss may help reduce the risk of PPUR (S. Lim, Hill, Teede, Moran, & O'Reilly, 2020).

External pressure on the fundus (Kris teller's manoeuvre) is applied as labor enters stage II (complete cervical opening) lengthwise and the mother is exhausted and even uterine contractions are weak. However, some studies do not recommend this maneuver because it is considered unfavorable for both mother and baby. In addition, this maneuver can injure the pelvic floor muscle and risk causing problems in the urinary system (urinary incontinence). Kristeller's maneuver showed complications to an external tear in the vulva. Injury to the vulvar area is one of the risk factors for postpartum urinary retention (Papadakis, 2019; Youssef, Brunelli, Bianchini, & Pilu, 2021).

4. Conclusions and Suggestions

In general, it can be concluded that the most risk factors for postpartum urinary retention are primipara, obesity, episiotomy, use of birth aids, and grade II perineal tears in postpartum mothers who give birth vaginally. This condition may be different in other health facilities, especially maternity special referral hospitals. By identifying the most significant risk factors, this study will contribute to the development of targeted prevention and management strategies for PPUR, ultimately improving maternal outcomes and quality of life in the postpartum period. The suggestions for future research provide a comprehensive framework for exploring the complexities of postpartum urinary retention (PPUR) risk factors, enabling the development of more effective prevention and management strategies. By addressing these research gaps, healthcare providers can improve maternal outcomes and enhance the quality of life for postpartum mothers.

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