



Long-Term Impact of Mode of Delivery on Stress Urinary Incontinence

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ABSTRACT:

Introduction: Stress urinary incontinence (SUI) poses a significant public health concern among women, impacting their quality of life physically, socially, and psychologically. This narrative review explores the relationship between birth method, sociodemographic factors, and postpartum SUI in primiparous women. Numerous studies have investigated the prevalence of SUI among primiparous women, with varying estimates reported. While the mode of delivery remains a subject of debate regarding its association with postpartum urinary incontinence, vaginal delivery is consistently identified as a risk factor for SUI compared to cesarean section. However, the severity of SUI and its impact on primiparous women's quality of life are influenced by factors such as age, parity, body weight, income, and neighborhood residence

Objectives:To explore the long-term impact of mode of delivery on stress urinary incontinence (SUI)

Methods: Using electronic databases like Research Gate, PubMed, Scopus, Google Scholar, and Allied Health Literature (CINHAL), the researchers thoroughly searched for pertinent studies to conduct narrative review.

Results:Findings from studies indicate a higher prevalence of SUI among women who delivered vaginally compared to those who underwent cesarean sections. The incidence of SUI tends to decrease over time postpartum, but certain risk factors such as age, birth weight, and mode of delivery remain significant predictors of SUI. While SUI is not life-threatening, its debilitating effects on physical activity, travel, social relationships, and emotional well-being underscore the importance of understanding its etiology and risk factors. Healthcare professionals must be vigilant in assessing and addressing SUI in primiparous women to improve their overall quality of life

Conclusions: Stress urinary incontinence (SUI) is the uncontrollably abrupt, uncomfortable leakage of urine resulting from elevated intra abdominal pressure, which thereby impacts the patient's quality of life. Laughing, sneezing, straining, coughing, or exercising are examples of physical activity that cause SUI. It is well established that SUI has an impact on how well women live their daily lives. This study highlights the fact that multiparous women had a higher prevalence of SUI than nulliparous women. Compared to cesarean deliveries, women who had repeated vaginal deliveries experience a higher frequency of urinary stress incontinence



Introduction

1. Stress urinary incontinence (SUI) is defined by the involuntary leakage of urine during activities that exert pressure on the bladder, such as physical exertion, sneezing, or coughing.¹ It remains unclear whether women who give birth via cesarean section are at a higher risk of experiencing urinary incontinence compared to women who have not given birth, and whether women who give birth naturally have an even greater risk of developing this condition.² About 49.0% of people have stress urinary incontinence, 22.0% have urge urinary incontinence, and 29.0% have mixed urinary incontinence. The urethral sphincter relaxes, leading to transient urine leakage due to its pathophysiology that is characterized by an elevation in bladder pressure surpassing the threshold needed for maintaining urethral closure.³ Stress incontinence happens when the bladder is impacted by stress or pressure.⁴

2. Stress urinary incontinence is the most prevalent type of incontinence, with a prevalence rate of 15% to 52%. Severe urine incontinence often stems from pelvic floor injury caused by vaginal delivery. The association between higher parity and incontinence still remains a topic of debate.⁵ Some individuals may experience damage to their pelvic floor muscles during childbirth. Additionally, childbirth can potentially harm the nerves responsible for bladder control, especially with vaginal delivery.⁴ While UI does not result in death, it does cause severe debility, social isolation, psychological anguish, and financial strain. Women who share the problem with medical professionals may feel ashamed and humiliated, and they may also experience despair.⁶ Age and parity are known risk factors for the illness, and they both accompany increases in occurrence and severity.⁷ According to a study conducted on February 16, 2016, the findings revealed that following a 6-month and 12-month period ($p < 0.001\%$), the overall postpartum incidence of SUI decreased to 27 (9.4%) and 19 (6.4%) from 32 (11.2%) observed at the 1-month follow-up.⁷ It has been determined that there are three primary forms of incontinence: stress, urge, and mixed.⁸ Risk factors listed for urinary tract injuries are newborn weight, mother age, smoking, obesity, forceps delivery, multiparity, episiotomy, length of the second phase of delivery, gravidity, and constipation.⁹ The risk of long-term incontinence increases if urinary or fecal incontinence develops during pregnancy or in the first

year after giving birth.¹⁰ Urinary continence mechanisms involving the muscles, fascia, and brain can be hampered during pregnancy and delivery. Stress urinary incontinence (SUI) has been observed to have adverse effects on four dimensions of a pregnant woman's quality of life: physical activity, travel, social relationships, and emotional well-being, impacting approximately 54.3% of all pregnant women.⁵ Contrarily, assisted vaginal delivery using forceps or a vacuum is thought to carry higher risks of pelvic floor trauma. Cesarean delivery, especially pre labor cesarean, is thought to offer significant protection against such trauma.¹ A thorough history and physical examination, a urinalysis to rule out a UTI, a supine coughstress test (preferably with a full bladder), and a postvoid residual (PVR) volume can all be used to diagnose SUI.¹¹

Objectives

To explore the long-term impact of mode of delivery on stress urinary incontinence (SUI)

Methods

- Using electronic databases like Research Gate, PubMed, Scopus, Google Scholar, and Allied Health Literature (CINHAL), the researchers thoroughly searched for pertinent studies to conduct the narrative review. There were only original scientific publications in the review.
- The literature that already existed was carefully chosen to include in this narrative review.

INCLUSION CRITERIA

- Primiparous women
- Original research studies on the topic.
- The document, which is extensively available online and has full text accessibility.
- Papers for research projects presented in English

EXCLUSION CRITERIA

- Poor quality journal articles.
- A piece of research without an ISSN (International Standard Serial Number).
- Studies or researches that are not included in a journal database.



KNOWLEDGE REGARDING POSTPARTUM STRESS URINARY INCONTINENCY

NORMAL VAGINAL DELIVERY AND STRESS INCONTINENCE

3. In a study by Guri Rortveit in 2003, it was found that among nulliparous women, the age-standardized prevalence of any form of incontinence was 10.1%. For women who underwent a cesarean section, the prevalence was 15.9%, and for those who had a vaginal delivery, it was 21.0%.

4. The corresponding percentages for stress incontinence were 4.7%, 6.9%, and 12.2%, for urge incontinence they were 1.6%, 2.2%, and 1.8%, and for mixed-type incontinence they were 3.1%, 5.3%, and 6.1%, respectively. Corresponding percentages for moderate or severe incontinence were 3.7%, 6.2%, and 8.7%, respectively. Women who underwent cesarean sections had adjusted odds ratios for any incontinence of 1.5 (95 percent confidence range, 1.2 to 1.9) and moderate or severe incontinence of 1.5 (1.2 to 1.9) compared to nulliparous women. When comparing vaginal deliveries to cesarean sections, the adjusted odds ratio for any incontinence was 1.7 (with a 95% confidence interval of 1.3 to 2.1) and for moderate or severe incontinence, it was 2.2 (with a 95% confidence interval of 1.5 to 3.1). The only factor linked to the mode of delivery was stress incontinence (adjusted odds ratio, 2.4; 95 percent confidence interval, 1.7 to 3.2).²

5. Neelam Saba et al conducted a study in March 2022 involving 252 patients, with a mean age of 53.45 ± 13.24 years. Among the female participants, 52.8% (133) were in the 52–57 age group. Of the study sample 165 women (65.5%) underwent vaginal delivery, while 87 women (34.5%) underwent cesarean sections. Regarding stress urinary incontinence (SUI) frequency, 113 women (44.8%) reported never experiencing it, 63 women (25.0%) reported occasional occurrences, 47 women (18.7%) reported experiencing it sometimes with sneezing or coughing, and 29 individuals (11.5%) reported severe SUI with urine leaks during coughing and sneezing. The study found a higher prevalence of SUI in women who delivered vaginally compared to those who had cesarean sections, with severity increasing with parity. However, the mode of birth did not significantly affect stress urinary incontinence ($p > 0.05$).³

6. Roya Kokabi et al conducted a prospective cohort study in June 2016 comprising of 286 healthy nulliparous women, with 148 undergoing vaginal delivery and 138 undergoing cesarean sections, initially exhibiting similar traits. Following a 1-month ($p < 0.001$), 6-month ($p < 0.001$), and 12-month ($p < 0.001$) period, the frequency of postpartum stress urinary incontinence (SUI) was notably higher in women who underwent vaginal delivery compared to those who had cesarean sections. In both the cesarean section ($p = 0.043$, $r = 0.125$) and vaginal delivery ($p = 0.021$, $r = 0.286$) groups, age was found to be positively correlated with a higher frequency of postpartum SUI. Tool-assisted vaginal birth ($p < 0.001$) and episiotomy ($p < 0.001$) were associated with SUI. Moreover, the higher frequency of postpartum SUI following vaginal delivery ($p = 0.011$, $r = 0.546$) and cesarean section ($p = 0.034$, $r = 0.311$) was significantly linked with birth weight. Furthermore, the body mass index of SUI patients was significantly higher compared to normal individuals ($p = 0.038$). SUI was also associated with lower neighborhood residence ($p = 0.033$) and lower income ($p = 0.028$).⁷

COMPARISON OF PREVALANCE OF STRESS INCONTINENCE IN MODE OF DELIVERY IN CESAREAN SECTION AND NORMAL VAGINAL DELIVERY

7. Riika M. Tahtinen et al conducted a study in January 2016 which results that an elevated risk of SUI following vaginal delivery compared to cesarean section was shown by pooled estimates from 15 relevant studies (adjusted odds ratio [aOR]: 1.85; 95% confidence interval [CI], 1.56–2.19; $I^2 = 57\%$; risk difference: 8.2%). A higher effect of vaginal birth was shown by meta regression in younger women ($p = 0.005$). There was no difference in the risk of SUI between instrumental and spontaneous vaginal delivery, according to four studies (aOR: 1.11; 95% CI, 0.84–1.45; $I^2 = 50\%$). Compared to cesarean sections, eight studies indicated a higher risk of SUI following vaginal delivery (aOR: 1.30; 95% CI, 1.02–1.65; $I^2 = 37\%$; risk difference: 2.6%). This study demonstrated that as compared to cesarean sections, vaginal delivery is linked to about twice the odds of long-term SUI, an absolute increase of about 8%.¹

8. Boyles et al conducted a study in January 2009 in which a total of 15,787 women responded to the study,



representing a 39% response rate. All Oregon mothers who gave birth to a live newborn within a year received a population-based survey through mail. At three to six months postpartum, information was gathered on urinary incontinence, past birthing experiences, and additional risk factors for incontinence. For continuous variables, univariate analyses were performed with *t* tests and Wilcoxon rank-sum tests; for categorical variables, χ^2 tests were used. For the clinical and demographic risk factors, 95% confidence intervals and odds ratios were estimated using logistic regression analysis. 5,599 of these women were primiparous, gave their information on urinary continence, finished the survey within the allotted time, and had never experienced incontinence before becoming pregnant. 955 people (17.1%) in all reported leaking urine. Urinary incontinence was more common in women who delivered babies vaginally than in those who delivered babies via cesarean (odds ratio 4.96 [95% confidence interval 3.82–6.44], $P < .001$). Perineal laceration and assisted birth both raised this risk. Women who had elective cesarean deliveries (6.1%), women who had cesarean deliveries after laboring (5.7%), and women who had cesarean deliveries after pushing (6.4%) did not vary statistically in the incidence of urine incontinence.¹²

9. Kathleen C. Kobashi MD etl conducted a study in 2016 whose findings were contrasting, portraying cesarean section to vaginal delivery had an adjusted odds ratio (aOR) of 1.85, a 95% confidence interval (CI) of 1.56-2.19, an I(2) of 57%, and a risk difference of 8.2%. Vaginal delivery is linked, in comparison to cesarean section, to an approximately twofold increase in the chance of long-term SUI, with an absolute increase of 8%; this impact is more pronounced in younger women. Additionally, there is a roughly 3% absolute increase in the risk of SUI.¹³

10. M Gyhagen etl conducted a study in 2013 on 6148 women. While comparing Vaginal delivery to Cesarean Section, prevalences were greater in the overall population, and the rise for SUI was noted to be 4.4%. After both ways of delivery, the percentage of severe SUI was 19% (CS 67/348; NVD 300/1551).¹⁴

11. Yi-Hao Lin etl conducted a study in March 2018, in which 446 (51.5%) of the studied pregnant women self-reported as having SUI. Of the 560 women who gave birth vaginally, 70 (12.5%) had SUI 12 months after the birth, and 22 (7.2%) of the 306 women who had

a cesarean delivery had SUI 12 months after the birth. At the initial visit, body weight and body mass index were risk factors for SUI throughout pregnancy. Parity was the only risk factor for persisting SUI in the vaginal delivery group at 12 months postpartum; no other significant risk factor was identified in the cesarean delivery group.¹⁵

12. Elsevier etl conducted a study in June 2003 on 15,307 women in Norway which showed that 10.1% of the nulliparous group, 15.9% of the cesarean-only group, and 21.0% of the vaginal-only group were incontinent. 3.7%, 6.2%, and 8.7% of women had incontinence ranging from moderate-to-severe in severity. Incontinence due to stress was 4.7%, 6.9%, and 12.2% ranging from moderate-to-severe in severity. The cesarean only group's adjusted odds ratio for any incontinence was 1.5 (96CI 1.2 to 1.9) and the vaginal birth alone groups was 1.7 (95CI 1.3 to 2.1) when compared to the nulliparous group. It was noted that only the mode of birth was linked to stress incontinence.¹⁶

13. Wing Lam Tsui etl conducted a study by using a retrospective cohort design on population in a specific time period. For this study, women who gave birth between January 1, 2000, and December 31, 2018, were chosen. Following propensity score matching, 51,587 women had vaginal deliveries (VD) and 51,587 women had cesarean sections (C/S). Compared to the C/S group (0.8 and 0.6 in 1000 person-years), the VD group had a greater incidence of SUI (1.6/1000 person-years). An elevated risk of SUI was linked to VD. The VD group had a greater cumulative incidence of SUI than the C/S group (log-rank test, $P < 0.05$).¹⁷

Discussion

The majority of the studies on SUI of primipara during pregnancy that are now available are sample studies, and the risk factors for this condition are not widely understood.¹⁸ Stress urinary incontinence represents a significant public health concern impacting numerous women. While not life-threatening, it substantially diminishes quality of life and gives rise to physical, social, and psychological challenges. Prevalence estimates of this common and distressing condition among women vary across studies. It is widely acknowledged that urinary incontinence (UI) significantly affects women's ability to lead their daily lives.³ Many studies have identified vaginal delivery as a risk factor for urine incontinence. It is currently believed



that the mode of delivery during childbirth is associated to post-partum urine incontinence in women. Urinary incontinence after childbirth has garnered attention from the public and medical community recently, and it is occasionally used as justification for an elective caesarean section. The current study demonstrated a substantial correlation between the mode of birth and the incidence of urine incontinence, with vaginal delivery having the highest correlation¹². Compared to primiparous women, multiparous women exhibited a higher incidence of urinary incontinence. According to our research, women who have given birth via caesarean section are more likely to experience urinary incontinence than women who have given birth naturally, and this risk is much higher for those who have given birth vaginally. More research has been done on the relationship between incontinence and the mode of delivery. There is a higher risk following vaginal delivery than following caesarean section, according to a few studies. Few of these investigations were carried out in the aftermath of childbirth.

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