



Original Article

Effects of delivery mode and sociodemographic factors on postpartum stress urinary incontinency in primipara women: A prospective cohort study

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Abstract

Background: To determine the frequency of postpartum stress urinary incontinence (SUI) in women undergoing vaginal delivery or elective cesarean section and to investigate the sociodemographic determinants of SUI in a sample of Iranian patients.

Methods: This prospective cohort study was performed during a 1-year period from 2014 to 2015 including 286 healthy nulliparous women in the third trimester of pregnancy without prepregnancy urinary incontinence. Participants were categorized based on the mode of delivery, i.e., vaginal delivery ($n = 148$) and elective cesarean section ($n = 138$). SUI was evaluated in all the participants before delivery and at 1 month, 6 months, and 12 months after delivery using a previously validated Persian questionnaire. The frequency of postpartum SUI was recorded in both study groups and was compared between them. We also determined the sociodemographic determinants of SUI.

Results: Baseline characteristics were comparable. The frequency of postpartum SUI was significantly higher in vaginal delivery than in cesarean section after a 1-month ($p < 0.001$), 6-month ($p < 0.001$), and 12-month ($p < 0.001$) period. Age was found to be associated with increased frequency of postpartum SUI in both vaginal delivery ($p = 0.021$, $r = 0.286$) and cesarean section groups ($p = 0.043$, $r = 0.125$). SUI was associated with tool-assisted vaginal delivery ($p < 0.001$) and episiotomy ($p < 0.001$). The birth weight was positively correlated with increased frequency of postpartum SUI in both vaginal delivery ($p = 0.011$, $r = 0.546$) and cesarean section ($p = 0.034$, $r = 0.311$). Patients with SUI had a significantly higher body mass index than the normal individuals ($p = 0.038$). SUI was associated with lower income ($p = 0.028$) and lower neighborhood residence ($p = 0.033$).

Conclusion: Vaginal delivery is associated with a twofold increased risk of postpartum SUI in primipara women compared with elective cesarean section. Age and birth weight are the main risk factors of postpartum SUI in both modes of delivery. Tool-assisted delivery and episiotomy were determined as the risk factors of postpartum SUI in vaginal delivery.

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Keywords: cesarean section; frequency; sociodemographic determinants; stress urinary incontinence; vaginal delivery

1. Introduction

Urinary incontinence (UI) is among the highly prevalent and global health problems associated with high social and

economic burden, affecting quality of life in a negative fashion. The prevalence of the condition is about 31–60% during pregnancy, which decreases to 9% shortly after delivery.^{1,2} Stress urinary incontinence (SUI) is one of the subtypes of UI which is defined as the involuntary loss of urine on effort or physical exertion, or on sneezing, or coughing.³ It is rare in men but common in women. The prevalence and severity increases with age and parity and both are established risk factors of the condition.^{4,5} The etiology is believed to be multifactorial. It is postulated that traumatic injuries to fascial and muscular supports of the bladder neck and urinary

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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sphincter during delivery is the main pathomechanism of SUI. However, pregnancy itself may cause mechanical changes, hormonal changes, or both, that can lead to UI.⁶

There are increasing evidences supporting the concept of permanent pelvic floor damage after vaginal delivery. Cesarean delivery, particularly prelabor cesarean, is believed to offer substantial protection against such pelvic floor trauma; in contrast, tool-assisted vaginal delivery, with vacuum or forceps, is believed to carry increased risks of trauma. An extensive body of evidence from the 1st year after delivery demonstrates that in this initial postpartum period, rates of SUI are higher in women undergoing vaginal delivery than in those undergoing cesarean delivery.^{7,8} However, the long-term effects of the delivery mode are more important to patients than transient postpartum incontinence. The results of the current literature demonstrate that the mode of delivery is associated with rate of postpartum SUI.^{9–11} In addition, there are many sociodemographic factors (cultural background) that are associated with postpartum SUI. Although previous studies have addressed this issue in different patient populations, data from Iran is scarce.^{12,13} Thus, we performed the current study to determine the association between the delivery mode and the incidence of postpartum SUI in a series of Iranian women. We also investigated the role of sociodemographic factors or postpartum SUI in this population.

2. Methods

2.1. Study population

This prospective cohort study was conducted during a 1-year period from September 2014 to September 2015 in Zeinabieh Hospital, a tertiary obstetrics referral center in Southern Iran affiliated with Shiraz University of Medical Sciences. The study protocol was approved by the Institutional Review Board and Medical Ethics Committee of Shiraz University of Medical Sciences. All the participants provided their informed written consent before inclusion in the study. We included 288 healthy pregnant women who were nulliparous, Iranian, during the third trimester of pregnancy, and had willingness to participate. Exclusion criteria were multiparity and multifetal, chronic or systemic illnesses, such as diabetes, hypertension, urinary tract infection, and use of medications other than routine prenatal supplements. We also excluded those who had SUI or any subgroup of UI before delivery.

2.2. Study protocol

All the participants were recruited during the prenatal visits of the third trimester. All the participants were visited and a complete history and physical exam was performed, and the data was recorded in a data gathering form. The sociodemographic factors included education, comorbidities (diabetes mellitus, hypertension), religion (Shia or Sunni Islam), ethnicity, income, and neighborhood residence. We also recorded the baseline body mass index (BMI). We used a simple questionnaire to detect SUI. This questionnaire has

been previously described and validated in Persian for the evaluation of SUI in women.¹⁴ It includes questions about UI, and the analysis of the answers indicates that women who experience daily episodes of UI precipitated by physical activity or exercise have clinical SUI. The questionnaire was first administered between the 24th week and 28th week of pregnancy. Data from the labor and delivery of each participant were recorded prospectively. The mode of delivery in the current study included vaginal delivery and elective cesarean section (performed before the active phase of labor). Each participant was given the same questionnaire 1 month, 6 months, and 12 months postpartum. Episiotomy was performed in patients with imminent severe perineal rupture, instrumental delivery, shoulder dystocia, prolonged second stage of labor, and nonreassuring fetal heart rate. Participants who did not respond were excluded from the study. Independent variables included nominal and interval variables. Nominal variables included mode of delivery and episiotomy. Interval variables consisted of birth weight, head circumference, maternal age at the time of delivery, maternal BMI, gestational age at the time of delivery, and duration of the second stage of labor. The results were compared between the two study groups.

2.3. Statistical analysis

Based on 80% power to detect 5% difference between the postpartum frequencies of SUI between the two study groups with α error equal to 0.05, we needed 140 participants in each study group. In order to compensate for nonevaluable patients, we included 286 women (148 in vaginal delivery group and 138 in elective cesarean section group). All the statistical analyses were performed using SPSS software (Version 16.0; SPSS Inc., Chicago, Illinois, USA). Data are presented as mean \pm SD and proportions as appropriate. Nonparametric data were compared using chi-square test, whereas the parametric data were compared using the independent *t* test. For assessment of linear correlation between parametric variables, we used Pearson correlation analysis for which correlation coefficient (*r* value) was reported. A two-sided *p* value $<$ 0.05 was considered statistically significant.

3. Results

Overall we included 286 healthy nulliparous pregnant women during the third trimester in two study groups based on the mode of delivery (148 in vaginal delivery group and 138 in elective cesarean section group). All the patients followed the study and thus were included in the final analysis. The mean age of the participants was 29.1 ± 7.2 years. There was no significant difference between the two study groups regarding the baseline characteristics (Table 1). The overall postpartum frequency of SUI in 1-month follow-up was 32 (11.2%), which decreased to 27 (9.4%) and 19 (6.4%) after a 6-month and 12-month period ($p <$ 0.001%). The frequency of postpartum SUI was significantly higher in vaginal delivery than in cesarean section after 1 month [14.2% vs. 7.9%; $p <$ 0.001; odd ratio

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