

Analyze the Pelvic Floor Muscle Strength and Urinary Incontinence in the Postpartum Period

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ABSTRACT

Objective: To examine urine incontinence and pelvic floor muscle strength in the postpartum phase. **Method:** We conducted cross-sectional research with mothers during the initial 7 months following delivery. Interviewing, perineometer (Peritron™), and the International Consultation on Incontinence Questionnaire-Short Form were used to collect information (ICIQ-SF). **Results:** Participating in the research were 120 females. In the PFMS, the prevalence of UI and AI was 14.3% and 9.1%, correspondingly, with a mean of 35.2 (SD=19.8) cmH₂O. The parameters linked to PFMS in the multiple analyses have been the delivery type. Weight of the newborn, prior pregnancies, and UI throughout pregnancy all indicated a correlation with UI after delivery. Only AI before becoming pregnant was linked to AI after giving birth. **Conclusion:** Both vaginal birth and cesarean section have preventive effects that contribute to the lowering of PFMS. UI throughout pregnancy is predictive of UI after delivery, and females who have had previous pregnancies and babies that are heavier are more likely to experience UI after delivery. The sole potential risk for AI after delivery is AI before pregnancy. It is not reasonable to conclude that these factors are causally related based on connections between PFMS or between UI and sexual engagement.

Keywords: Pelvic floor muscle, pregnancy, post-partum, incontinence, delivery, strength.

1. Introduction

The fat increase during gestation and birth-related damages to the pelvic floor structures are frequently linked with a decrease in pelvic floor muscle strength (PFMS), which may lead to pelvic floor dysregulation including urine incontinence (UI) and anal incontinence (AI) [1,2].

The International Continence Society (ICS) defines UI as a problem of uncontrolled pee leaking of any quantity, and it is categorized based on the indications reported. The most prevalent forms of UI in women are stressed incontinence (urinary leaking with physical exertion, coughing, or sneezing); urge incontinence (urinary leaking accompanied by or even during desire to pee); and combined incontinence (combination of stress UI with mixed UI) [3].

The impact of gestation and birth mode on UI has been extensively researched, and it is well-known that symmetry and uterine or procedural birth are connected with this disorder. Nevertheless, there is little indication that a cesarean delivery lowers the chance of UI, particularly if it is followed by labor

[4,5]. In contrast to pregnancy and delivery, the relationship between UI and other aspects such as maternal age, neonate (NB) weight, and past UI is being studied [6,7].

AI is described as a symptom of the uncontrollable release of any quantity of feces or flatus, and it can be divided into two types: fecal incontinence (unconscious loss of feces) and flatus incontinence (unconscious loss of flatulent emissions) [3]. Although research on risk factors for AI is still contentious, the evidence has shown a link with mother aging, prior AI or AI during gestation-assisted childbirth, and anal sphincter injuries [8,9].

Regarding harming physical health, UI and AI have an impact on sexual and psychological health, as well as social life, reducing the female quality of existence [10-12]. Considering the existence of treatments for improving and curing these dysfunctions, few females seek specialist aid and take medication [17]. Functional evaluation of the pelvic floor musculature and evaluation of the influence of UI and AI on the performance of existence should be integrated into the primary care of public health care facilities, given the detrimental intervention of UI and AI in female lives and the accessibility of strategies for

avoiding and cure them.

While there is a lot of research on the topic covered in this research, there are still some questions that need to be answered, such as what causes UI and AI to emerge after pregnancy and how they are related to PFMS. Additional research on UI during the postpartum phase is also necessary considering Lahore hasn't done much research on the subject.

As a result, the current study's goal was to examine urine incontinence and pelvic floor muscle strength in the postpartum phase.

2. Methodology

A cross-sectional research was conducted in a healthcare center of an additional health service firm located in the region of Lahore on a cohort of women receiving PFMS, UI, and AI during the initial 7 months following pregnancy.

120 postpartum females who fulfilled the following requirements were included in the original study sample: age 20 decades; body mass index 35; one pregnancy; pregnant female age 12 weeks; no history of urogenital surgical procedure or disorder that could have affected PFMS; no objections to the implantation of the perineometer's probe in the vulva or the Valsalva maneuver for measuring PFMS; and no complexity comprehending the research's findings.

PFMS, UI, and AI have been the dependent factors in this research. The independent factors included socio-demographic attributes (mother's age, self-reported ethnic background, education level, profession, family status, and length of marriage), obstetric and medical background (childbirth, abortion, prior vaginal and c-section birth, UI, and AI just before to and during the current childbirth, overweight or obesity, and pelvic floor muscle exercise in this current research, the birth type. The trauma of the perineal is interfering with UI in female lives.

Data were gathered using a survey designed for the research, interviewing, and the International Consultation on Incontinence Questionnaire-Short Version (ICIQ-SF), which was also self-reported. We assessed the PFMS and body weight of the females. Before labor, socioeconomic variables, medical, and obstetrics data were taken from the health records.

The ICIQ-SF, which consists of 3 inquiries about the occurrence, quantity, and interruption of UI in everyday life, was completed by women who had reported experiencing UI in the 4 weeks before the interviewing. The total score ranges from 0 to 21. A final query concerns the occurrence of pee leaks.

The digital force perineometer Peritron™, which comprises a transportable microcomputer coupled to a sensing situated in a vaginal silicon probing of 7 cm in length and 2 cm in diameter, was used to perform the PFMS assessment. The PFMS is entered in the microcontroller on a range from 0.1 to 250 whenever the pelvic floor muscles constrict and push on the probing, and the inaccuracy does not surpass 1 cmH₂O. The perineometer was performed utilizing

a method from a prior study [19]. The female "was in the gynecological posture and was told to tighten the pelvic floor muscle even during PFMS assessment.

The probing was inserted 5 to 7 cm through into the vaginal, wrapped with a temporary contraceptive, and outwardly moistened with water-based lubricant. The perineometer was validated by putting the probing into the vaginal and inflating it to 120 cmH₂O; according to the manufacturer's instructions, the gauge was then returned to zero. The pelvic floor muscles of the ladies were instructed to tighten as forcefully as they could and hold the contraction for five seconds. With a pause of thirty seconds somewhere between, this contraction was performed thrice times. There were three reported PFMS values, however, only the greatest one was used for analysis [19]. Each woman acquired a leaflet about pelvic floor exercises from the research group, and they were all orally instructed and urged to perform the workouts.

Well with help of the SPSS 25.0 edition system, information was entered, and analyses were performed. The statistics were analyzed using both descriptive and inferential methods. The Kruskal-Wallis, Wilcoxon-Mann-Whitney, Wilcoxon signed-ranked, and Pearson's correlation analyses, as well as the inferential evaluation of continuous factors (bivariate interpretation), were utilized. Fisher's exact and McNemar's tests were implemented in the categorical data assessment (bivariate assessment). In the various analyses, logistic regression was utilized to identify factors related to UI and AI, whereas linear regression identified components related to the PFMS. Both analyses used the reverse method with all factors that had a p-value of less than 0.20 in the bivariate test.

All analyses were run using a two-tailed design, adopting a 5% ($p=0.05$) type 1 error likelihood and a 95% (95% CI) confidence level. The researchers carried out in conformity with the legal guidelines for experimental studies after receiving approval from the research ethics board. All the females signed written permission forms and willingly accepted to take part in the research.

3. Results

Eighty out of one-hundred study participants were assessed up to 2 months (60 days) after giving delivery, thirty-seven between 2-4 months (61 to 120 days), and three between 4-7 months (121 to 208 days) following giving birth.

The majority of females ($n=105$; 80.5%) were between the ages of 20 and 34 years old, with a mother age range of twenty to forty-four years. A large percentage claimed to have a high school degree ($n=102$; 79.9%), possessing paid employment ($n=95$; 74.5%), and cohabiting with a spouse ($n=112$; 87.6%), which then in 84.7% of the cases lasted for more over 12 months. Upwards of 50 percent ($n=74$; 57.2%) self-identified as having dark skin color.

Before the current pregnancy, 63.5% (n=80) of the women were primigravidae, 12.8% (n=15) had previously had an abortion, 18.4% (n=23) had previously given birth vaginally, and 16.7% (n=21) had previously undergone cesarean delivery.

Concerning incontinence, the female reported UI and AI before childbirth, correspondingly, at rates of 36.7% (n=47) and 25.8% (n=33). It is important to note that just flatus incontinence occurred in the AI-affected female

Concerning the current delivery method, the majority of females (n=95; 75.4%) received C-sections, while of those who gave birth vaginally (n=31; 24.6%), 90.3% performed episiotomies. During the first 6 months following delivery, 79.7% (102 women) had restarted sexual intercourse, 73.2% (93 women) were using some kind of contraception, and 91.4% (117 women) were nursing.

The mean weights of the current NB and the NB that was previously the largest were comparable. In terms of dietary health, half of the pregnant females (n=60; 50%) were overweight. The percentage of obese

females decreased slightly (n=57; 44.6%) throughout the postoperative phase. 45.5% of women (n=52) who were pregnant engaged in pelvic floor practices at a minimum of two times per week. Nevertheless, this percentage dropped to 23.4% (n=29) in the postpartum phase.

Each one of the females who experienced UI after giving birth reported experiencing it either before becoming pregnant or throughout the current childbirth, as seen in Table 1. In particular, 25 (30.0%) of the 69 females with prior UI who remained on the continent after giving delivery also had prior UI, as did 38 (55.0%) of them. Of them, 33 indicated having the issue from the start of the pregnancy, and seven said the UI had happened during a prior pregnancy and had gone into treatment preceding this one. 19 (57.6%) of the 33 postpartum women who already had UI at the onset of the gestation continued to perform pelvic floor exercises on a routine basis (at least 2 times a week).

Table 1

Variable	UI after pregnancy					
	Yes		No		Total	
	N	%	N	%	N	%
UI before gestation	1	1.2	16	10.5	17	12.8
UI in gestation	4	4.8	25	30.0	29	25.0
UI before and during gestation	7	8.4	24	18.6	31	23.1
UI without before and during gestation	-	-	43	37.1	43	39.1
Total	12	14.3	108	85.1	120	100

The mean ICIQ-SF score during gestation was 7.5 (SD=3.9), with a minimum score of 1 and the highest score of 18, and the mean score following childbirth was 9.54 (SD=5.0), with the lowest score of 2 and a maximum score of 18. The mean ICIQ-SF score was greater among females who gave birth naturally (12.1; SD=6.5 and 5.7; SD=2.4, correspondingly) than it was among those who underwent cesarean sections.

Regarding AI, Table 2 demonstrates that of the eight females who reported this complaint following delivery, six had previously experienced AI either before becoming pregnant or during their previous delivery, and three had never experienced AI. It is important to note that the single complaint in every instance of AI was flatus.

Table 2

Variable	AI after pregnancy					
	Yes		No		Total	
	N	%	N	%	N	%
AI before gestation	2	2.4	14	13.8	16	16.2
AI in gestation	2	2.4	3	3.5	5	3.1
AI before and during gestation	2	2.4	12	12.3	14	12.5
AI without before and during gestation	2	2.4	83	60.1	85	67.3
Total	8	9.1	112	91.0	120	100

The minimum and maximum strengths reported were 5.2 and 102.0 cmH2 O, correspondingly, and the PFMS mean was 35.2 (SD=19.8) cmH2O during the most recent pregnancy. In comparison to postpartum results, there weren't statistically meaningful differences between gestation and postpartum PFMS scores (p=0.077). The bivariate evaluation of the PFMS with other factors reveals the existence of a marginally negative connection between the mother age (r=0.012), the weight of a prior NB (r=0.23), and the weight of the current NB (r=0.103) in the PFMS.

Relating to the current, the women who received cesarean delivery reported PFMS greater compared to those who had a vaginal delivery, with mean of 36.5 and 26.7 cmH2 O, correspondingly (p=0.002). The PFMS mean for the female who experienced a perineal injury during delivery was 25.4 versus 34.3 cmH2 O for the female who did not (p=0.013). Females with previous pregnancies (p=0.006), vaginal births (p=0.003), UI before pregnancy (p=0.001), and UI throughout pregnancy (p=0.002) had greater rates of UI.

Age and AI before childbirth were the only factors associated with AI that were statistically meaningful (p=0.013 and p=0.001, respectively). AI before

pregnancy was indeed a significant predictor for AI after delivery, and the occurrence of AI increased with age. The overall result retained a statistically significant relationship between prior cesarean section and the current mode of delivery. Comparing these females to nulliparous or those that had previously given birth vaginally, the FMAP was, on mean, 10.37 cmH2O greater in those who had previously undergone cesarean delivery. Concerning the most recent form of birth, it was discovered that women who gave birth vaginally experienced PFMS that has been, on average, 8.82 cmH2O smaller.

Table 3

Variable	Final model		
	Coefficient	95% CI	p-value
Prior C- section Yes No	10.37 0	1.43 to 18.25	0.023
Current birth mode C-section Vaginal birth	-8.82 0	-16.16 to - 1.13	0.024

Table 4

Variable	Final model		
	Coefficient	95% CI	p-value
Prior pregnancy Yes No	13.12 1	1.61 to 105.25	0.015
UI during pregnancy Yes No	2.41 1	160 to 240.1	0.016

Despite having a statistically significant correlation, the mother's age and educational qualification were excluded from the multiple assessments of AI after delivery since there were subcategories with a probability of 0. As a result, the initial sample would include the parameters AI before gestation, AI throughout pregnancy, and contraceptives after childbirth. Only AI before pregnancy preserved a statistically significant connection in the final model ($p=0.042$), demonstrating that AI before gestation raises the risk of females developing AI after giving birth by 6 times (OR=6.25; 95% CI 1.07-35.43).

4. Discussion

There appears to be general agreement that PFMS readings decline after pregnancy [1,2]. The difference in PFMS between pregnancy and delivery was not statistically meaningful in the present research. This result is consistent with cohort research that applied the same PFMS evaluation technique. The researchers concluded that PFMS is not considerably altered by childbirth or during pregnancy [13-15].

Numerous research has examined the relationship between PFMS and birth mode, and they have found that vaginal birth is associated with reduced PFMS

[16,17]. This link was confirmed by numerous analyses in the sample of the present research, with a greater mean of PFMS among women who underwent cesarean sections and a smaller mean among those who gave birth vaginally. Contrarily, no statistically meaningful distinctions were discovered between PFMS and birth mode in 2 recent research [18].

The majority of women who gave birth vaginally had episiotomies, which is a significant finding of this study. This suggests that the pelvic floor damage brought on by perineal injury may have contributed to the decreased PFMS among vaginal-birthing women compared to cesarean-birthing female trauma.

In the studies, there are prevalence estimates of UI after delivery that vary from 2% to 45%. [19]. The wide range could be explained in part by the medical and obstetrical features of the study samples as well as methodological variations across the groups analyzed. This research (14.3%) frequency of UI across women is comparable to a previous study's (6.74% UI prevalence across puerperium females) [5]. According to other research, UI during gestation was a predictor of UI following delivery [6,20]. All postpartum UI patients disclosed prior UI either before or throughout pregnancy. Females who had UI throughout pregnancy were 20 times more likely to have it after giving delivery. The high proportion of women with prior UI who turned continent after giving delivery should be mentioned.

The research highlights UI's ephemeral nature, not just in the postpartum stage but throughout all stages of female lives. Obesity is included as a sporadic lifestyle factor, in addition to maternity and delivery [21, 22].

Consequently, these are the possible causes of UI clearance in women who have already had UI. Additionally, over 50% of the female participants in the present study engaged in pelvic floor exercises, which could have also assisted in the reduction of UI complaints.

There is a lot of research on the relationship between these factors and UI during pregnancy. Pregnancy is well-acknowledged as a significant potential cause of UI [5,7]. Regarding the mode of delivering, numerous researchers discovered a higher risk of UI in women who gave birth vaginally [7,8]; however, additional research examining potential complicating variables is necessary since it is not feasible to conclude from the existing literature that cesarean sections have a preventive role on UI [4]. While previous pregnancies and vaginal deliveries were associated with increased UI occurrence in the given research, there was no statistically meaningful association between the mode of childbirth and UI for the present childbirth. All of the females that experienced UI after delivery most likely had UI in the past or throughout pregnancy, which may have impacted this finding.

The ICIQ-SF score allows for the classification of UI influence in females' lives as minor (1–5),

intermediate (6–12), extreme (13–18), and extremely severe (19–21) [24]. This disruption in the current investigation may be regarded as modest. Women who had cesarean deliveries were thought to have minor interference, whereas those who had vaginal deliveries were seen to have a serious interruption. In contrast to these findings, a continuous prospective study [23] found no relationship between the interference with everyday life even during 6 postoperative weeks, and the mode of delivery, even though the frequency of UI 1 year after pregnancy was greater in females no had vaginal deliveries.

In comparison to UI, there is less research on AI, particularly during the postpartum period. Although it is uncertain how often this disorder is, it is recognized that it occurs less frequently than UI [24]. The occurrence of AI in the current study was 9.1%. Only 2 of the 7 postpartum women who developed AI were AI-free before or during pregnancy.

In line with earlier studies [12-15], the given results of this analysis revealed that maternal age, AI before pregnancy, and AI throughout pregnant women all raised the risk of AI after childbearing. Nevertheless, in the multiple evaluations, only AI before pregnancy retained a statistically substantial relationship, raising the risk of AI after giving birth by 6 times.

Relating to the current study's restrictions, the primary biases were choice, and data. For patient care, the present research may enhance the understanding of specialists in female reproductive health, thus inspiring a strategy for this topic throughout the prenatal stage. At a proper moment, recognizing females who were in danger of UI or AI.

5. Conclusion

Although females who gave birth vaginally during prior pregnancies or the current gestation investigated had reduced occurrences of PFMS compared to those who gave birth through a cesarean birth, PFMS is strongly related to the method of birth. Pregnancy-related UI is predictive of postpartum UI.

Additionally, postpartum UI is more likely to occur in women who have previously given birth. The sole health risk for AI after delivery is AI before pregnancy. The research's findings regarding relationships between PFMS and UI need not allow us to conclude that these factors are causally linked.

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