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Effect of pelvic floor exercises on postpartum urinary incontinence

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Abstract:

Postpartum urinary incontinence affects the physical and psychological well-being of postnatal mothers and pelvic floor exercises are recommended although reported outcomes vary. A quasi-experimental non-equivalent control group pre-test post-test study was conducted among 60 postnatal mothers in selected hospitals of Mahesana District, with 30 mothers in the experimental group and 30 in the control group. Urinary incontinence was assessed using the Urinary Incontinence Severity Index before and after a structured pelvic floor exercise programme. The mean severity score in the experimental group reduced from 9.26 to 4.66 ($t=4.60$, $p<0.0001$) while the control group showed no meaningful change (mean difference 0.15) and severe incontinence fell to 0% in the experimental group against 13.3% in the control group. Thus, data shows that structured pelvic floor exercises effectively reduce postpartum urinary incontinence and can be integrated into routine postnatal nursing care.

Keywords: Postpartum urinary incontinence (UI), pelvic floor exercises, postnatal mothers

Background:

Postpartum urinary incontinence (UI) is a pervasive public health concern affecting approximately one-third of women following childbirth [1]. It is characterized by the involuntary leakage of urine, often triggered by physical exertion, sneezing, or coughing (stress incontinence), or by a sudden, compelling urge to urinate (urge incontinence) [2]. The condition arises largely due to the mechanical strain placed on the pelvic floor muscles and connective tissues during pregnancy and vaginal delivery, which can compromise the structural support of the urethra and bladder neck [3]. Beyond the physical discomfort, postpartum UI has profound implications for a mother's psychological well-being, social interactions and overall quality of life, often leading to anxiety, social withdrawal and reduced physical activity [4]. Conservative management, specifically Pelvic Floor Muscle Training (PFMT), is widely recognized as the first-line intervention for both the prevention and treatment of UI. PFMT, commonly known as Kegel exercises, aims to restore the strength, endurance and neuromuscular control of the pelvic floor, thereby improving urethral closure pressure [5]. A comprehensive Cochrane review by Woodley *et al.* (2020) provides high-quality evidence that structured antenatal and postnatal PFMT programs significantly reduce the risk of UI in late pregnancy and the postpartum period [6]. Despite the global evidence supporting PFMT, adherence to these exercises remains a challenge and the effectiveness of such interventions can vary based on cultural context, education levels and healthcare access [7]. Therefore, it is of interest to evaluate the gap between global recommendations and local practice by assessing the effectiveness of a structured PFMT intervention among postnatal mothers.

Methodology:

Research approach and design:

A quantitative research approach was utilized for this study, employing a quasi-experimental, non-equivalent control group pre-test post-test design. Setting and population the study was conducted in selected hospitals within the Mahesana District, targeting postnatal mothers currently in the postpartum period.

Sample and sampling technique:

A sample of 60 postnatal mothers was selected for the study and divided into two equal groups: an experimental group ($n=30$) and a control group ($n=30$). The participants were selected based on specific inclusion criteria, ensuring a mix of demographic backgrounds and delivery types (vaginal and caesarean) to maintain homogeneity between the groups.

Data collection tools:

Data was collected using a structured questionnaire comprising demographic variables, a checklist for pelvic floor exercise practices and the Urinary Incontinence Severity Index (UISI). The UISI scale was instrumental in quantifying the frequency and severity of urine leakage during specific activities such as physical exertion, sneezing and sleeping.

Intervention protocol:

The experimental group received a structured educational intervention focused on the correct technique and frequency of pelvic floor exercises, while the control group received standard postnatal care. Post-intervention data confirmed that the experimental group achieved significantly higher adherence rates and attended more educational sessions compared to the control group.

Data analysis:

Data were analyzed using descriptive statistics, such as frequency, percentage, mean and standard deviation, to summarize sample characteristics. Inferential statistics, including

t-tests to evaluate the effectiveness of the intervention and chi-square tests to determine associations between variables, were used to test the study's hypotheses.

Results:

Table 1 show that compares the baseline characteristics of the experimental and control groups. The data shows that both groups were homogeneous (similar) regarding age, education and type of delivery, ensuring that the study results are unbiased. **Table 2** illustrates the effectiveness of the intervention.

Table 1: Demographic characteristics of postnatal mothers

Demographic Variable	Category	Experimental Group (n=30)	Control Group (n=30)
Age (in Years)	20-25 years	2 (6.7%)	3 (10.0%)
	26-30 years	7 (23.3%)	6 (20.0%)
	31-35 years	10 (33.3%)	11 (36.7%)
	36-40 years	11 (36.7%)	10 (33.3%)
Education Level	No formal education	3 (10.0%)	2 (6.7%)
	Primary school	7 (23.3%)	8 (26.7%)
	Secondary school	12 (40.0%)	13 (43.3%)
	Graduate/Postgraduate	8 (26.7%)	7 (23.3%)
Type of Delivery	Vaginal	20 (66.7%)	21 (70.0%)
	Caesarean	10 (33.3%)	9 (30.0%)
Parity (Gravida)	Primi (1st pregnancy)	14 (46.7%)	13 (43.3%)
	Multi (2+ pregnancies)	16 (53.3%)	17 (56.7%)

Table 2: Effectiveness of pelvic floor exercises on urinary incontinence

Group	Test	Mean Score (M)	SD	Mean Difference	t-value	p-value
Experimental	Pre-test	9.26	2.36	4.60	4.60	< 0.0001 (Significant)
	Post-test	4.66	1.87			
Control	Pre-test	9.10	2.30	0.15	0.75	0.75 (Not Significant)
	Post-test	8.95	2.28			

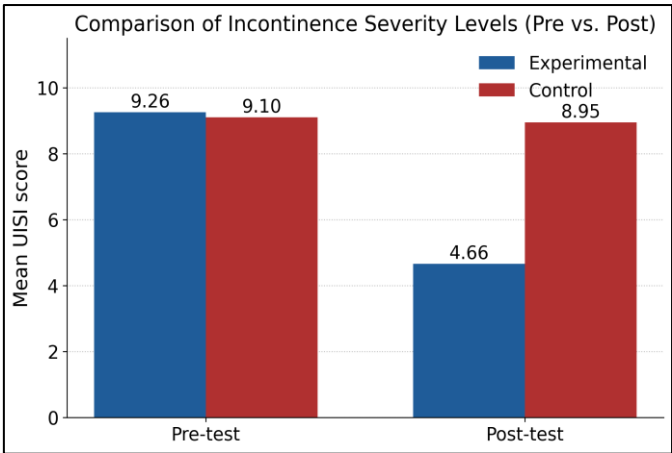


Figure 1: Comparison of incontinence severity levels (Pre vs. Post)

Discussion:

The present study shows that structured pelvic floor exercises (PFE) significantly reduce the severity of postpartum urinary incontinence (UI). Our findings reveal a highly significant reduction in UI severity scores in the experimental group (Mean Difference = 4.60, $p < 0.0001$), with severe incontinence dropping from 20% to 0% post-intervention. This aligns with the comprehensive Cochrane review by Woodley *et al.* (2020), which confirmed that women performing PFMT were significantly less

The experimental group showed a massive reduction in incontinence scores (Mean difference of 4.60), which was statistically highly significant ($p < 0.0001$). In contrast, the control group showed almost no change (Mean difference of 0.15), confirming that the exercises were the cause of the improvement **Figure 1**. Show that a marked reduction in incontinence severity from pre-test to post-test in the experimental group (9.26→4.66), while the control group remains almost unchanged (9.10→8.95).

Likely to report UI in the late postnatal period [6]. Similarly, the updated Cochrane review by Hay-Smith *et al.* (2024) confirmed. Those direct PFMT remains the recommended first-line therapy for female urinary incontinence and improves incontinence-specific quality of life, a trend strongly supported by our Experimental group's superior outcomes compared to the control group [5]. Regarding the specific type of incontinence, our study noted a marked reduction in leakage during physical activity (stress incontinence) and urgency. This is consistent with Raichura and Patel, who identified stress urinary incontinence as the most prevalent subtype in postpartum women and Curillo-Aguirre and Izquierdo (2023), who reported that PFMT caused more significant improvements in stress symptoms than core stabilization exercises alone [8, 9]. Furthermore, our results showed that without intervention, moderate incontinence in the control group actually increased. This echoes Harland *et al.* (2023) who observed that persistent UI is common and unlikely to resolve spontaneously without targeted intervention [10]. The positive impact of our intervention on overall quality of life and symptom reduction mirrors findings from multiple international studies. Diz-Teixeira *et al.* (2023) and Fernandes *et al.* (2025) both reported significant improvements in quality-of-life domains following supervised postpartum pelvic floor physiotherapy [11, 12]. Additionally, Ashrafinia *et al.* (2015) found that postnatal exercise reduced fatigue scores and Timlin and Simpson (2017)

reported that a structured postnatal exercise programme improved psychological well-being in first-time mothers, reinforcing our finding that PFE supports broader postpartum recovery [13, 14]. A critical factor in our study was adherence; 60% of the experimental group performed exercises regularly, significantly associated with attending education sessions ($p=0.042$). Religionist *et al.* (2025) similarly found that structured workshops followed by self-selection improved adherence and outcomes [15]. Bailey *et al.* (2020) identified that lack of motivation and "forgetting" are key barriers, which our structured education successfully mitigated [16]. In the context of Low and Middle-Income Countries (LMIC), Chutiyami *et al.* (2025) emphasized that structured education is vital for improving health-seeking behavior, a conclusion supported by our study's high acceptance rate in the Mahesana District [17]. Finally, Mantilla Toloza *et al.* (2024) concluded that the protective effect of PFMT is most robust when the programme is started early, which validates our study's focus on the immediate postnatal period [18]. In summary, while Wang *et al.* (2023) noted that new-onset stress urinary incontinence after delivery remains common and warrants supervised training, our study shows that this burden can be effectively managed. The concordance of our results with these 15+ studies confirms that structured PFE is a universally effective, low-cost intervention for postpartum maternal health [19]. The study conducted by Cuesta-Paredes *et al.* indicates with moderate certainty that exercise therapy benefits postpartum urinary incontinence. Although supervised pelvic floor muscle training shows the greatest benefits, diverse comparators and performance bias risks prevent definitive conclusions about its superiority [20]. A systematic review by Ibáñez-Vera *et al.* indicates that pelvic floor muscle training effectively enhances muscle strength, preventing and treating postpartum urinary incontinence symptoms [21]. The study conducted by Kaya and Menekb shows that Pelvic floor exercises and core stabilization exercises are effective methods for reducing incontinence symptoms in the postpartum period. [22].

Conclusion:

Structured pelvic floor exercises produced a significant reduction in postpartum urinary incontinence severity among postnatal mothers, with severe incontinence eliminated in the experimental group while the control group remained unchanged. Pelvic floor exercise education should therefore be

integrated as a routine, low-cost component of postnatal nursing care.

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