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RESEARCH ARTICLE

Differences in Pelvic Floor Muscle Strength Before and After Normal Delivery in Patients Who Give Birth in The Working Area of The Padang City Public Health Center

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Abstract

Objective: *To determine differences in pelvic floor muscle strength before and after vaginal delivery in patients who gave birth in the Padang City Community Health Center (Puskesmas) area.*

Methods: *This was a prospective cohort study with 30 primigravida respondents who met the inclusion criteria. Muscle strength was measured using perineometry in the final trimester and 3 months postpartum. Data were analyzed using a paired t-test (α = 5%).*

Results: *The average age of respondents was 28.27 years. Statistical tests showed no significant difference in pelvic floor muscle strength before and after delivery (p = 0.792), indicating that postpartum strength does not affect pre-delivery strength.*

Conclusion: *Uncomplicated vaginal delivery does not significantly affect pelvic floor muscle strength. Decreased strength may be influenced by other factors such as obstetric trauma, birth weight, and exercise during pregnancy. Longer-term follow-up studies are needed for a more comprehensive understanding.*

Keywords: *Pelvic floor muscles, vaginal delivery, perineometry, postpartum, primigravida*

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INTRODUCTION

Pelvic floor muscle weakness is a common condition among women of reproductive age and can significantly impair quality of life. This condition does not arise solely from anatomical changes during pregnancy but is also strongly associated with trauma sustained during vaginal delivery. Pelvic floor trauma during childbirth has been identified as a major etiological factor for pelvic floor dysfunction, including urinary incontinence, pelvic organ prolapse, and fecal incontinence.[1]

Globally, the prevalence of pelvic floor dysfunction after childbirth is considerable. A meta-analysis by Dai et al. (2023) reported a postpartum urinary incontinence prevalence of 26%.[2] Studies have consistently shown that women who undergo vaginal delivery have a higher risk of pelvic organ prolapse and urinary incontinence compared to nulliparous women and those delivered by cesarean section, with risks reported up to 7.8 times higher.[3] Similar findings have been reported in Indonesia, where postpartum urinary incontinence prevalence reaches 31%, and studies in Padang have shown high rates of urinary and defecation disorders among postpartum mothers.[4–5]

Vaginal delivery causes excessive stretching of pelvic floor muscles, bladder neck, and urethral sphincters, leading to reduced urethral closure pressure. Several risk factors have been associated with postpartum pelvic floor weakness, including maternal age, parity, mode of delivery, infant birth weight, episiotomy, and perineal rupture.[6–7] Although pelvic floor muscle strength is expected to recover within two to three months postpartum, significant reductions have been reported, especially among primiparous women.[8–9]

Despite the high number of vaginal deliveries in Padang, no prior studies have evaluated pelvic floor muscle strength before and after normal delivery in this region. Therefore, this study aimed to determine differences in pelvic floor muscle strength before and after uncomplicated vaginal delivery among patients delivering in the *Padang City Community Health Centers* (Puskesmas).

METHODS

This study was an analytical study with a prospective cohort design aimed at evaluating differences in pelvic floor muscle strength before and after normal vaginal delivery. The research was conducted in the working area of the *Padang City Community Health Centers* (Puskesmas) from September 2024 and was estimated to last approximately six months to accommodate sample recruitment and pre- and post-delivery observations.

The study population consisted of all pregnant women who underwent normal vaginal delivery between September 2024 and January 2025 in the Puskesmas Padang City area. Samples were selected using a consecutive sampling technique, in which all eligible subjects meeting the inclusion criteria were recruited until the required sample size was fulfilled. Inclusion criteria were primigravida women at term pregnancy who attended third-trimester antenatal care visits and had not yet entered labor, as well as women at three months postpartum with infant birth weight between 2500 and 4000 grams who agreed to participate and signed informed consent. Exclusion criteria included vacuum or forceps delivery, third- or fourth-degree perineal lacerations,

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postpartum wound infection, and refusal to continue participation.

Sample size calculation using the Lemeshow formula for paired mean comparison yielded a minimum of 27 subjects, which was increased to 30 to account for a 10% dropout rate.

Pelvic floor muscle strength was measured using perineometry during the third trimester (prepartum) and at three months postpartum through home visits. Data collected included maternal demographic characteristics and clinical variables. Data analysis was performed using SPSS, with a paired t-test applied to compare pelvic floor muscle strength before and after delivery. A p-value < 0.05 was considered statistically significant.

RESULT AND DISCUSSION

This study was conducted in Padang City in 2025 and included 30 primigravida women who met the inclusion criteria. Pelvic floor muscle strength was assessed using a perineometer before vaginal delivery (third trimester) and at three months postpartum.

Characteristics of Subjects

The mean maternal age was 25.93 ± 3.50 years, indicating that most participants were within the optimal reproductive age. The average height and weight were 153.77 ± 5.64 cm and 65.00 ± 9.69 kg, respectively, resulting in a mean body mass index (BMI) of 27.57 ± 4.36. The majority of respondents were classified as obese (77%), a condition known to increase intra-abdominal pressure and potentially affect pelvic floor function. The mean gestational age at assessment was 34.90 ± 2.68 weeks. Most participants had a high school education (43%) and were not employed (80%). The average birth weight was 2893.33 ± 204.83 grams. Regarding perineal trauma, 47% experienced first-degree lacerations, 27% second-degree lacerations, and 27% had no laceration.[6-12]

Pelvic Floor Muscle Strength Prepartum and Postpartum

Mean pelvic floor muscle contraction values showed a slight increase postpartum compared to prepartum. The average contraction increased from 7.47 ± 2.24 before delivery to 7.61 ± 2.33 after delivery. This mild improvement suggests that uncomplicated vaginal delivery does not necessarily impair pelvic floor muscle strength and may reflect neuromuscular adaptation or recovery after childbirth.[13-17]

Comparison of Prepartum and Postpartum Contraction

Paired t-test analysis demonstrated no statistically significant difference in pelvic floor muscle strength before and after delivery (p = 0.792; 95% CI: –1.25 to 0.96). This finding indicates that spontaneous vaginal delivery without major obstetric trauma does not significantly affect pelvic floor muscle strength in the short term.[18,20] These results are consistent with previous studies showing preserved pelvic floor function in women without instrumental delivery or severe perineal injury.[18-25]

Overall, the findings suggest that pelvic floor muscles have good resilience and recovery capacity following uncomplicated vaginal delivery. However, longer-term follow-up and

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consideration of additional factors such as duration of labor, physical activity, and pelvic floor exercise are recommended for future studies.

CONCLUSION

Based on this study, mothers who underwent normal vaginal delivery in the Padang City Community Health Center (Puskesmas) area were predominantly within the active reproductive age and were largely characterized by overweight to obese nutritional status. Pelvic floor muscle strength, as measured by perineometry, remained relatively stable before and after delivery, with only a slight, non-significant increase in postpartum contraction values. Statistical analysis confirmed that there was no significant difference in pelvic floor muscle strength between the prepartum and postpartum periods, indicating that uncomplicated spontaneous vaginal delivery does not cause a meaningful decline in pelvic floor muscle function in the short term. These findings suggest that, in the absence of major obstetric complications, the pelvic floor demonstrates adequate resilience and functional recovery following childbirth. This study provides initial evidence that normal vaginal delivery alone is not a primary determinant of pelvic floor muscle weakness, highlighting the importance of other contributing factors such as nutritional status, obstetric trauma, and maternal physical activity in influencing long-term pelvic floor health.

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