

Impact of Early Versus Delayed Initiation of Kegel Exercises on Uterine Involution and Afterpains: A Quasi- Experimental Study Among Postnatal Mothers

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Abstract

Childbirth, while transformative, is frequently associated with discomfort like afterpains, resulting from uterine involution. These uterine cramps, which occur due to the uterus repeatedly contracting and relaxing, are commonly experienced by mothers after childbirth. Kegel exercises as repetitive contraction and relaxation of the pelvic floor muscles are a recognized non-pharmacological approach to strengthen pelvic muscles, alleviate discomfort, and potentially accelerate uterine recovery. This quasi-experimental study examined the effects of early versus delayed initiation of Kegel exercises on afterpains and uterine involution among 60 postnatal mothers at a tertiary hospital in Kolkata. Participants were assigned to early initiation (4 hours postpartum) or delayed initiation (24 hours postpartum) groups, performing exercises every 12 hours. Assessments of afterpains and symphysio-fundal height were conducted at baseline and 48 hours postpartum. Results showed greater uterine involution in the early initiation group, with a mean fundal height reduction of 2.30 cm versus 1.22 cm in the delayed group ($t=7.081$). While afterpains decreased in both groups, the difference was not fine significant ($p=0.328$). Early postpartum initiation of Kegel exercises significantly improves uterine involution and should be integrated into routine postnatal care to support faster recovery.

Keywords: Kegel exercise, Afterpains, Uterine involutio , Early initiation group, Delayed initiation group.

1. Introduction

The experience of childbirth is one of the most significant and emotional experiences in a woman's life. The unique transformation that begins after birth reflects the magical essence of motherhood. After giving birth, women feel several kinds of physical discomfort. One of these is afterpains, which is a result of uterine involution. Uterine cramping postpartum, commonly referred to as afterpains, It results from the continuous cycles of uterine contraction and relaxation. Painful cramping is more frequently

observed in multiparous women and is most common during breastfeeding in the initial days following childbirth [1]. After delivery, the fundus is located approximately 13.5 cm (5½ inches) above the symphysis pubis. During the first 24 hours postpartum, this level remains constant. Subsequently the fundal height decreases by approximately 1.25 cm (0.5 inches) every 24 hours. [2]. The pelvic floor muscle can stretch from 1.5 up to more than 3 times their normal length as the baby passes through [3]. In primipara, uterine tone is increased and the musculature remains in a state of tonic contraction and retraction. The sensation of afterpains can occur during active uterine contractions to expel blood clots from the uterine cavity [4]. Women experiencing afterpains could confuse it for flatus discomfort, particularly if they have had surgery or are constipated. Finding and addressing the source may cause the symptoms to return or raise the possibility of a more serious ailment that requires additional care [5]. In India, afterpains incidence fluctuates between 30% and 60%, depending on parity and breastfeeding habits. A study by the Indian Journal of Obstetrics and Gynaecology observed that 15–20% of women showed slowed uterine involution by the third day postpartum, particularly if they had not followed a postpartum exercise regimen [8]. Regionally, a clinical audit at SSKM Hospital in Kolkata revealed that 36% of women reported experiencing moderate afterpains during the first 48 hours after delivery, with breastfeeding mothers noting more intense cramping [9]. Additionally, a study conducted at in North Kolkata showed that by Day 5 postpartum, 68% of women had achieved the expected degree of uterine involution [10]. Those who began pelvic floor exercises early and were ambulatory within 24 hours showed a more rapid decrease in fundal height.

According to a 2010 WHO research, ninety-six percent of women experience at least one physical health issue during the postnatal period. During the puberty period, mothers have a relatively high morbidity rate & mild postpartum ailments such as afterpains as 67%, perineal discomfort is as 50%, the constipation levels are 43%, and exhaustion (67%) were the most prevalent mild illnesses [11]. Additionally, breastfeeding was identified as a factor that exacerbated afterpains intensity in both groups. [13]

One observational study done found that 47% of women experienced notable uterine contraction pain within 48 hours postpartum, with multiparous women more frequently affected than nulliparous women [14]. Evidence suggests that women with multiple births are at a higher risk of experiencing severe afterpains compared to first-time mothers. Strengthening the pelvic floor through Kegel exercises has been identified as a non-pharmacological approach to easing postpartum discomfort.

REVIEW OF LITERATURE

Saxena et al. (2023) conducted a study among postnatal mothers who practiced Kegel exercises and experienced a significant reduction in afterpains and a more rapid uterine involution compared to those who did not. Furthermore, the timing of initiating Kegel exercises postpartum may influence their effectiveness. While early initiation could potentially expedite recovery, delayed commencement might diminish the benefits [17]. Namboothiri and Viswanath (2016) conducted a prospective survey to assess afterpains among postnatal mothers over the first three postpartum days using a numerical pain rating scale. The study found that afterpains were highest on the first day and decreased over time. While no association was observed with age or mode of delivery, a significant association was found between afterpains and parity on the first and third postpartum days. This highlights the need for targeted postpartum pain management based on parity [19].

Lufianti T, Fatimah M, Agustiana M. (2025) conducted a quasi-experimental study at Permata Bunda Hospital, Indonesia, involving 10 postpartum women and result shows that, 80% of participants reported a drop from moderate to mild pain and 20% from severe to moderate pain, indicating that postpartum exercises considerably decreased afterpains levels. The results demonstrated a statistically significant effect of postpartum activities on afterpains levels (p -value < 0.05)[20]. Duya S (2024) performed a study with 60 postnatal mothers to assess the effectiveness of postnatal exercises on afterpains. Participants performed postnatal exercises three times daily for three days, starting six hours post-delivery. Pain levels, measured using a 0–10 Numeric Rating Scale, showed a significant reduction post-intervention, indicating the efficacy of postnatal exercises in alleviating afterpains [21]. Namboothiri SP (2017) found a trend in afterpains among postpartum mothers at a tertiary care hospital in South India and found the most common types of pain experienced. During the first three postpartum days, the reported pain included abdominal incisional pain, perineal pain, abdominal afterpains and back pains were observed. Dash M (2016) A quantitative study was performed to find Effectiveness of selected 50 postnatal mothers for nursing interventions on afterpains. The results express the statistically significant ($p < 0.05$) difference in the pain level. Priyakumari M (2012) executed a quasi-experimental study at the upgraded Primary Health Centre, Kundrathur, and Chennai, to evaluate the effectiveness of selected nursing interventions on afterpains among multipara mothers. The thirty multipara mothers were selected using purposive sampling and concluded highly significant reduction in afterpains ($t = 22.78, p < 0.001$), suggesting that the applied nursing interventions are effective in managing postpartum afterpains [23].

MATERIALS AND METHODS

A time-series, non-equivalent two group pretest-posttest design was employed. Participants were allocated into two experimental groups; however, due to the quasi-experimental nature of the study, random assignment was not utilised. Baseline measurements were taken at 4 hours postpartum, followed by post-test measurements at 48 hours postpartum. This design facilitated the comparison of the effects of Kegel exercises initiated at different times postpartum on maternal health outcomes. The time-series, non-equivalent two-group pretest-posttest design is particularly useful in real-world settings where randomisation is not feasible. It allows researchers to observe changes over time within and between groups, providing valuable insights into the effectiveness of interventions such as Kegel exercises on postpartum recovery.

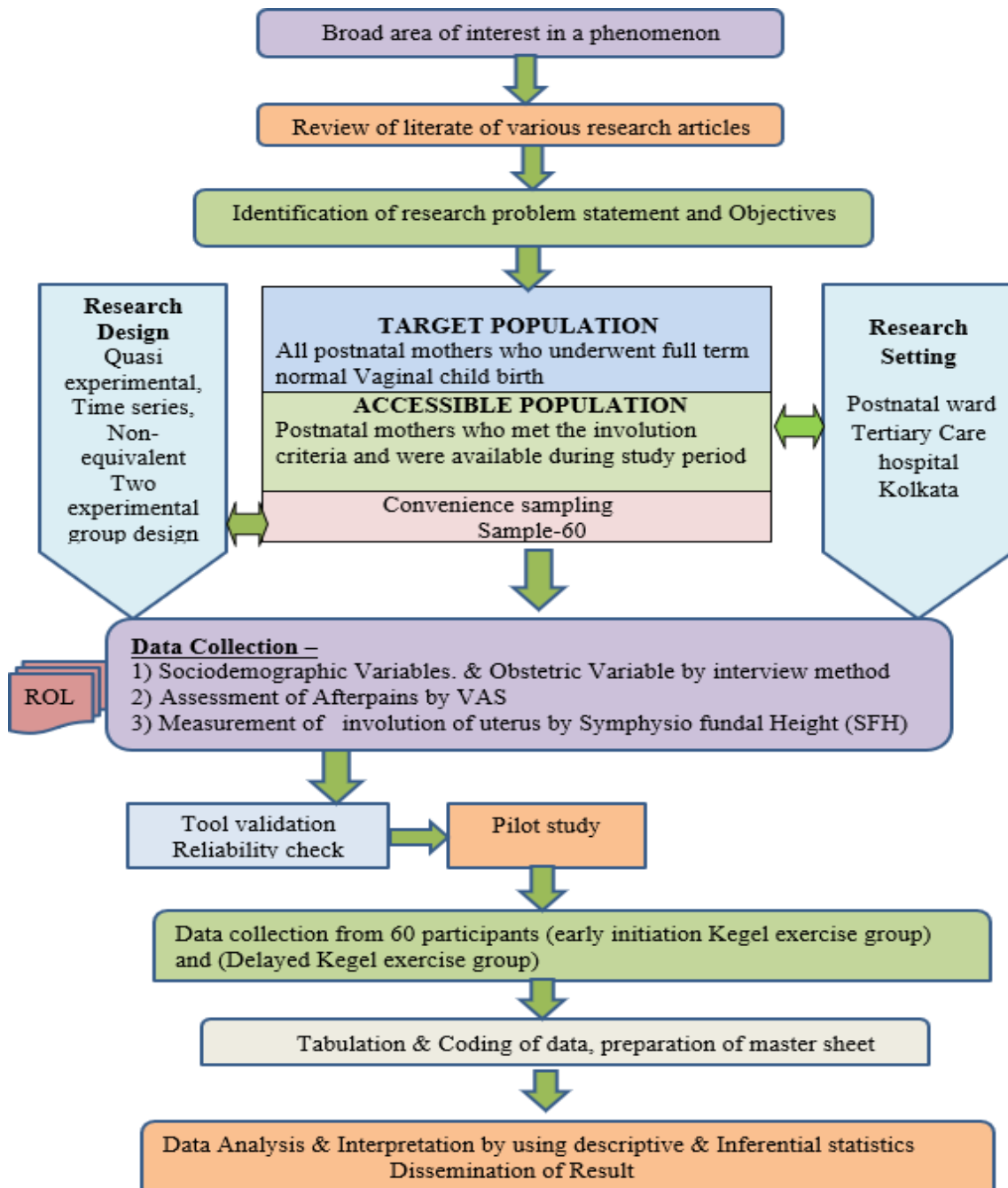


Figure 1: Schematic Preparation of Research Methodology

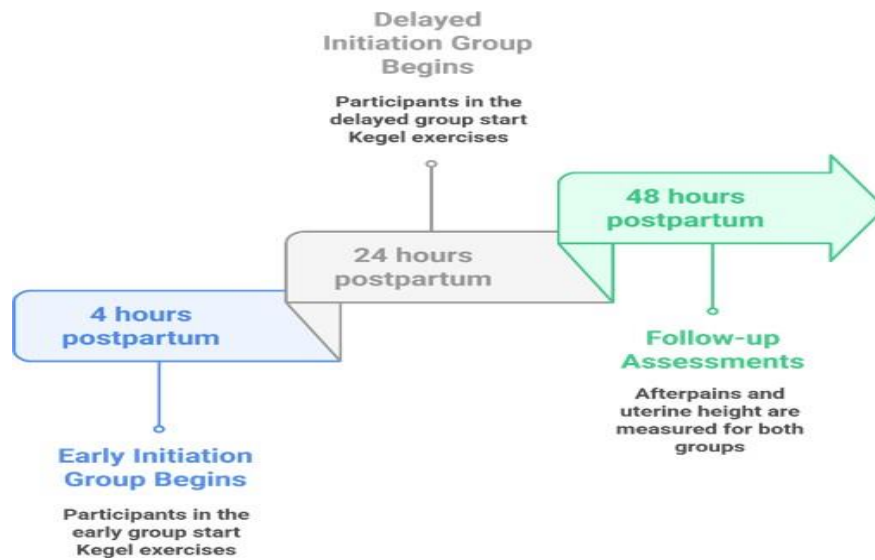


Figure 2: Schematic representation of the study population

This study used a non-- probability-based convenience sampling, in which participants are chosen based on ease of access and willingness to participate. Because the study focused on mothers who had undergone normal vaginal birth with or without episiotomy, two groups of 30 women each were formed: one for early initiation of Kegel exercises and the other for delayed initiation. Given the short data collection timeframe and hospital bed constraints, convenience sampling was adopted. Participants were briefed about the study and recruited based on their availability and informed consent. Sample size is the count of units from which data are gathered to determine whether the study's results are statistically meaningful. The required number depends on several factors, such as the chosen measurement indicators, their baseline levels within the population, and the minimum change the study aims to detect accurately. Based on the above calculation, the required sample size was determined to be 56 postnatal mothers. Therefore, A minimum of 56 were required, and the sample was rounded up to 60 divided into two groups of 30. This allocation ensures sufficient power to detect the intended effect.

The Postnatal mothers who underwent full term normal vaginal birth includes episiotomy and Mothers who are able to speak and understand Hindi or English were considered as Inclusion Criteria. The exclusion criteria are the Postnatal mothers who underwent operative and instrumental child birth, Mothers with Obstetric emergencies and pregnancy related complications during the intrapartum and postpartum phase and Mothers whose new-borns are low birth weight or large for gestational age babies. The new-born's birth weight. Visual Analogue Scale (VAS) to estimate the level of after-pains experienced by post-delivery mothers. The VAS is a reliable and widely accepted pain assessment tool. It consists of a 100 mm straight line, with one end representing "no pain" and the other end representing the "worst possible pain." Participants mark their pain intensity along the line, allowing a quantifiable measure of discomfort.

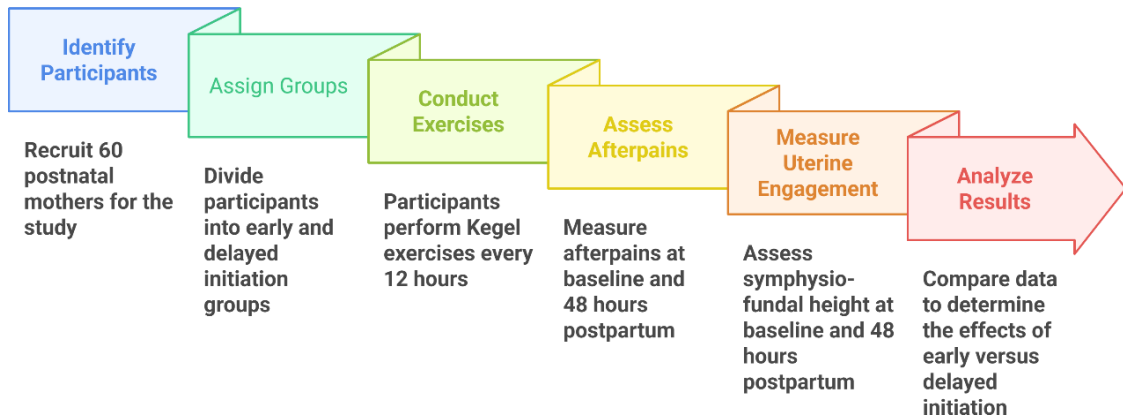


Figure 3: Representation of the sampling process carried out for study

ANALYSIS AND INTERPRETATION OF RESULT

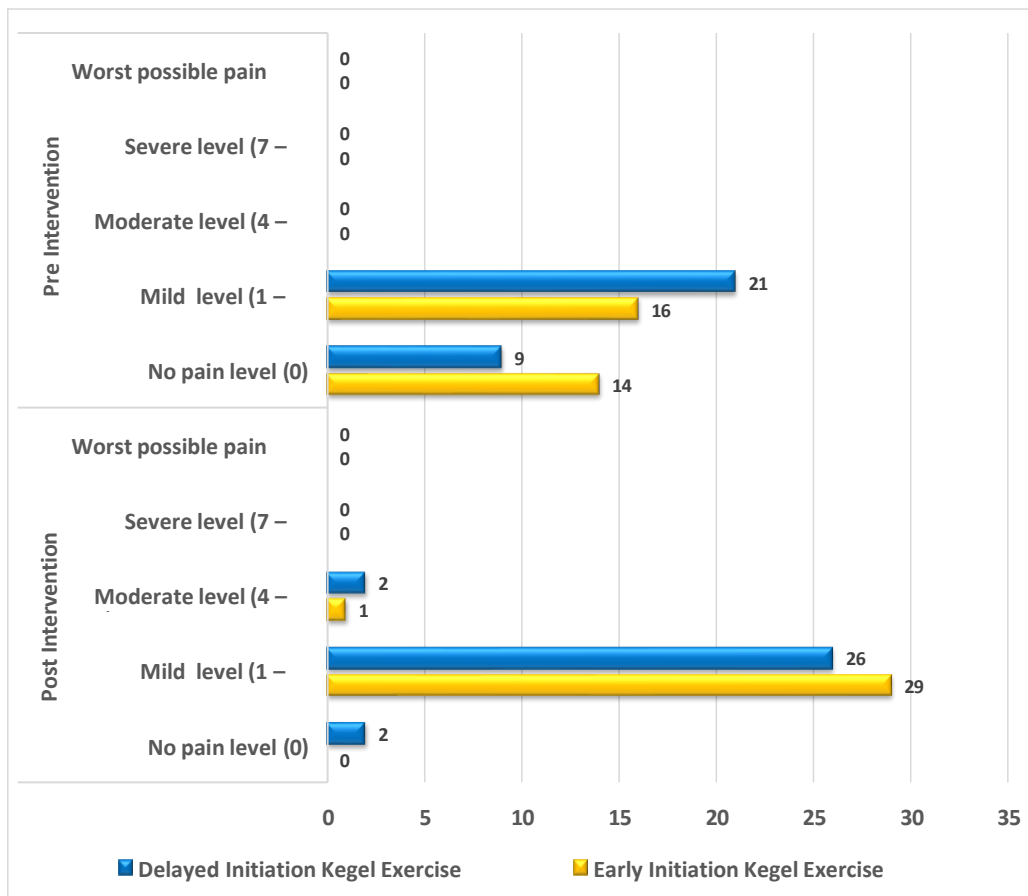


Figure 4: Frequency distribution afterpains level among postnatal mothers in early and delayed initiation Kegel exercise group. (n=60)

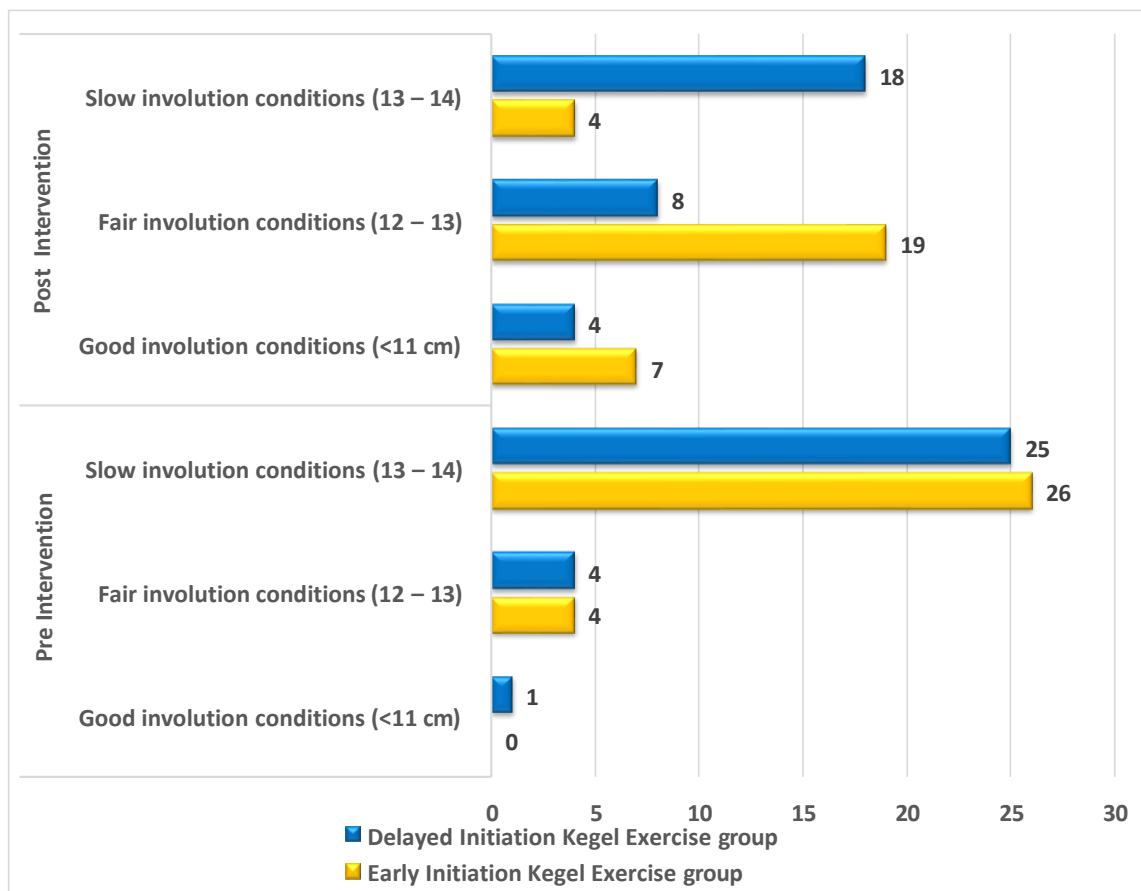


Figure 5: Frequency distribution of uterine involution among postnatal mothers in the early and delayed initiation Kegel Exercise group. (n=60)

Table 1: Comparison of pre and post intervention afterpains level in both early & delayed initiation Kegel exercise group (n=60)

Afterpains	Early Initiation Kegel exercise group		Delayed initiation Kegel exercise group		Mean Difference Score	Student Independent 't'	p-Value
	Mean	S.D	Mean	S.D			
	Pre Intervention	1.80	0.80	1.97			
Post Intervention	0.73	0.83	0.93	0.74	0.20	0.987	0.328

Table 2: Comparison of pre/post intervention of uterine involution in both early and delayed initiation Kegel exercise group (n=60)

Involution of Uterus	Early Initiation Kegel exercise group		Delayed initiation Kegel exercise group		Mean Difference Score	Student Independent 't'	p-Value
	Mean	S.D	Mean	S.D			
		14.58	1.61	15.25			

Pre Intervention							
Post Intervention	12.28	1.57	14.03	2.61	1.75	3.142	0.003

ASSOCIATION OF SELECTED PARAMETERS WITH LEVEL OF ATERPAINS AND INVOLUTION OF UTERUS

The association of afterpains level with sociodemographic variables in early initiation kegel exercise group the Fisher's Exact Test p-values for all demographic variables (Age, Educational Status, Age at Menarche, and BMI) are reported as 1.000. This indicates that there is no statistically significant association between these demographic factors and the severity of afterpain (mild vs. moderate) in this study population. the association of afterpains and obstetrical variables in Early Initiation Kegel Exercise group .Fisher's Exact Test was used to evaluate whether any obstetrical variables were associated with the severity of afterpains. The results revealed no statistically significant associations across all factors—including parity, mode of birth, episiotomy experience, uterotonic use, analgesic requirements, labor duration, early ambulation No statistically significant associations were found between pre-intervention uterine involution and the demographic variables analysed in which all p-values exceed the conventional threshold ($p > 0.05$), indicating independence between these variables The associations between obstetrical variables (including obstetrical score, mode of birth, pain at episiotomy, uterotonic use, analgesic requirement, duration of labor stages, early ambulation, and birth weight) and uterine involution were tested using Fisher's Exact Test. No statistic significant associations were found (all two-tailed $p > 0.05$), indicating that none of these variables were linked to involution status.

RESULTS AND DISCUSSIONS

Overall, none of the selected demographic variables showed a statistically significant association with the afterpains level, suggesting that these characteristics did not influence the pain experienced by participants in this study.

H01: There is no significant difference in afterpains among postnatal mothers in both early and delayed initiation of Kegel exercises group at 0.05 level of significance. The mean pre intervention afterpains score for the early initiation Kegel exercise group was 1.80 ± 0.80 , while in the delayed initiation group, it was 1.97 ± 0.99 . The mean difference values of scores between the two groups was 0.17, and t-value of 0.711 and a p-value of 0.480, which is not statistically significant (N.S). In Post-intervention, the early initiation group reported a mean afterpains score of 0.73 ± 0.83 , while the delayed initiation group had a mean of 0.93 ± 0.74 . The calculated mean difference was 0.20, with a t-value of 0.987 and a p-value of 0.328, again indicating no statistically significant difference between the groups (N.S). There is no significant difference in mean post intervention afterpains level between early and delayed initiation of Kegel exercise group. Since calculated p value is more than 0.05 we failed to reject the null hypothesis

Ha1: There is a significant difference in afterpains among postnatal mother in both with early and delayed initiation of Kegel exercises group at 0.05 level of significance.

H02: There is no significant difference in involution of uterus among postnatal mothers in both early and delayed initiation of Kegel exercises group at 0.05 level of significance

Ha2: There is a significant difference in involution of uterus among postnatal mothers in both early and delayed initiation of Kegel exercises at 0.05 level of significance

The mean fundal height in the early initiation group was 14.58 ± 1.61 cm, whereas in the delayed initiation group, it was 15.25 ± 2.53 cm. The mean difference was 0.67 cm and the independent 't' value was 1.215, with a p-value of 0.230 .This indicates no significant difference in uterine involution before the intervention but after the intervention, the mean fundal height in the early initiation group reduced

to 12.28 ± 1.57 cm, while the delayed initiation group had a mean of 14.03 ± 2.61 cm. The mean difference was 1.75 cm, with 't' value of 3.142 and a p-value of 0.003, which is statistically significant. This suggests that early initiation of Kegel exercises results in significantly better uterine involution compared to late initiation. Effectiveness observed in early initiation group compared to the delayed initiation group. There is a significant difference in mean post intervention involution of uterus between early and delayed initiation of Kegel exercise group. Since calculated p value is less than 0.05, we reject the null hypothesis and accept research Hypothesis

CONCLUSION

Data collection instruments were a socio-demographic questionnaire, standardized visual pain scale such as pain assessment, and fundal height for uterine involution. The inferential and descriptive tests were incorporated in the statistical analysis. Within the early initiation group, the average afterpain decreased during the post-intervention period (1.80 ± 0.80) to 0.73 ± 0.83 ($t = 5.406$, $p = 0.001$). Equally, in the delayed initiation group, the scores decreased to $0.93, \pm 0.74$ to $0.93, \pm 0.74$ ($t = 6.100$, $p = 0.001$). Though both groups

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