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EFFECT OF KEGEL EXERCISES AND PRONE POSITION ON UTERINE INVOLUTION AMONG POSTNATAL MOTHERS: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Uterine involution is a crucial physiological process during the postpartum period, and delayed involution may lead to complications such as postpartum hemorrhage and infection. Non-pharmacological interventions that enhance uterine contraction and recovery are increasingly emphasized in postnatal care. This study aimed to evaluate the effectiveness of Kegel exercises combined with prone positioning on uterine involution among postnatal mothers. A quasi-experimental pre-test and post-test control group design was adopted. A total of 200 postnatal mothers who had undergone normal vaginal delivery were selected using purposive sampling and allocated into experimental (n = 100) and control (n = 100) groups. The experimental group received structured instruction on Kegel exercises and prone positioning for three consecutive days, while the control group received routine postnatal care. Uterine involution was assessed using fundal height measurement, uterine consistency, and lochia characteristics. Data were analyzed using descriptive and inferential statistics, including paired t-test. The experimental group demonstrated a significant reduction in uterine involution scores from pre-test (5.58 ± 1.21) to post-test (3.41 ± 1.01). The paired t-test revealed a highly statistically significant difference ($t = 17.62$, $df = 99$, $p < 0.001$), indicating enhanced uterine involution following the intervention. Kegel exercises combined with prone positioning are effective, safe, and low-cost interventions that significantly promote uterine involution among postnatal mothers and can be integrated into routine postnatal nursing care.

Keywords: Kegel exercises, prone position, uterine involution, postpartum mothers, quasi-experimental study

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INTRODUCTION

The postpartum period, also known as the puerperium, is a critical phase in a woman's reproductive life during which the body undergoes profound physiological and anatomical changes to return to its pre-pregnant state. One of the most significant processes during this period is uterine involution, which involves the gradual reduction in the size, weight, and tone of the uterus following childbirth [1]. Immediately after delivery, the uterus weighs approximately 1000 g and progressively decreases to nearly 60–80 g within six weeks postpartum through sustained myometrial contractions and tissue remodeling [1,2]. Effective uterine involution is essential for preventing postpartum complications such as hemorrhage, infection, subinvolution, and prolonged maternal morbidity.

Despite improvements in obstetric and postnatal care services, delayed or inadequate uterine involution continues to be a common clinical problem worldwide. Subinvolution of the uterus has been associated with postpartum hemorrhage, retained lochia, uterine infection, and delayed maternal recovery [3]. Several maternal and obstetric factors contribute to delayed involution, including multiparity, prolonged or obstructed labor, overdistension of the uterus, operative delivery, and reduced postpartum mobility [2,4]. Additionally, postpartum pain and fatigue often limit early ambulation and engagement in physical activity, thereby negatively affecting uterine contraction and physiological recovery.

Pharmacological agents such as oxytocin and ergometrine are routinely administered in the immediate postpartum period to promote uterine contraction and prevent hemorrhage. Although these medications are effective, their prolonged use is limited due to potential adverse effects and the need for close medical supervision [5]. Furthermore, reliance on pharmacological interventions alone does not address the broader aspects of maternal recovery. Consequently, there is an increasing emphasis on non-pharmacological, low-cost, and nurse-led interventions that can safely enhance uterine involution and promote maternal wellbeing during the postnatal period [3,5].

Kegel exercises, also known as pelvic floor muscle exercises, involve repeated voluntary contraction and relaxation of the pelvic floor muscles to improve muscle strength, endurance, and tone. Initially introduced for the management of urinary incontinence, pelvic floor muscle training has gained recognition as an essential component of postnatal rehabilitation [6]. Strengthened pelvic floor muscles provide mechanical support to the uterus and pelvic organs, facilitate effective uterine contraction, and enhance pelvic circulation, thereby promoting uterine involution [6,7]. Improved muscle tone also contributes to faster recovery of pelvic structures and reduces the risk of long-term complications such as pelvic organ prolapse.

In addition to pelvic floor strengthening, maternal positioning plays a crucial role in facilitating

postpartum physiological recovery. The prone position, in which the mother lies on her abdomen, has been reported to assist uterine involution by promoting gravity-assisted uterine drainage and enhancing uterine alignment [8]. This position supports the expulsion of lochia, reduces uterine congestion, and encourages sustained myometrial contraction. Prone positioning also aids early mobilization and may positively influence intra-abdominal pressure dynamics, thereby contributing to effective uterine shrinkage [8]. Despite these potential benefits, prone positioning is often underutilized in routine postnatal care, where supine positioning remains the most commonly practiced posture.

The combined application of Kegel exercises and prone positioning may provide synergistic benefits in enhancing uterine involution. While Kegel exercises improve pelvic floor muscle tone and support uterine contraction from below, prone positioning facilitates gravitational assistance and uterine drainage, optimizing involution through complementary physiological mechanisms [6–8]. Such combined interventions align with holistic and evidence-based postnatal care models that emphasize maternal participation, early mobilization, and non-invasive recovery strategies.

Nurses play a pivotal role in postnatal care and are uniquely positioned to implement and reinforce non-pharmacological interventions aimed at improving uterine involution. Nursing-led education, demonstration, and supervision of postnatal exercises and positioning techniques significantly influence maternal adherence and outcomes [9]. However, sociocultural beliefs, lack of awareness, and inadequate postnatal education often hinder the consistent practice of postnatal exercises among mothers, particularly in developing countries. This highlights the need for structured and evidence-based interventions that are simple, feasible, and culturally acceptable.

Previous studies have demonstrated the beneficial effects of individual interventions such as pelvic floor exercises, early ambulation, and postural changes on postpartum recovery [7,9]. However, limited research has systematically evaluated the combined effect of Kegel exercises and prone positioning on uterine involution using objective clinical parameters such as fundal height, uterine consistency, and lochia characteristics. Moreover, there is a paucity of evidence from the Indian context, where postpartum practices and maternal care needs may differ due to cultural and healthcare system variations.

In view of the above considerations, there is a clear need to generate empirical evidence on the effectiveness of combined Kegel exercises and prone positioning as non-pharmacological interventions for enhancing uterine involution among postnatal mothers. Such evidence can contribute to strengthening nursing practice, informing postnatal education programs, and developing standardized postnatal care protocols. Therefore, the present study was undertaken to evaluate the effectiveness of Kegel exercises and prone position on uterine involution among postnatal mothers using a quasi-experimental design.

MATERIALS AND METHODS

Study Design

A quantitative research approach with a quasi-experimental pre-test and post-test control group design was adopted to assess the effectiveness of Kegel exercises and prone positioning on uterine involution among postnatal mothers.

Study Setting

The study was conducted in selected maternity hospitals in Punjab, India.

Population and Sample

The study population comprised postnatal mothers who had undergone normal vaginal delivery. A total of 200 postnatal mothers were selected using purposive sampling technique and divided into experimental (n = 100) and control (n = 100) groups.

Inclusion Criteria

- Postnatal mothers within 48 hours of delivery
- Mothers who delivered by normal vaginal delivery
- Mothers willing to participate in the study

Exclusion Criteria

- Mothers with obstetric complications
- Mothers who underwent cesarean section
- Mothers with postpartum hemorrhage or infection

Intervention

The experimental group received structured teaching on Kegel exercises and prone positioning. Mothers were instructed to perform Kegel exercises three times a day and maintain prone position for 10-15 minutes twice daily for three consecutive days. The control group received routine postnatal care.

Data Collection Tools

Uterine involution was assessed using:

- Fundal height measurement (in centimeters)
- Assessment of uterine consistency
- Observation of lochia characteristics

Ethical Considerations

Ethical clearance was obtained from the institutional ethics committee. Written informed consent was obtained from all participants.

Statistical Analysis

Data were analyzed using descriptive statistics (mean, standard deviation, frequency, percentage) and inferential statistics (t-test and chi-square test). A p-value < 0.05 was considered statistically

significant.

RESULTS AND DISCUSSION

Table 1 represents the baseline demographic and obstetric characteristics of postnatal mothers in the experimental and control groups.

Table 1: Baseline characteristics of postnatal mothers (n = 200)

Variable	Category	Experimental n (%)	Control n (%)
Age (years)	21–25	30 (30.0)	30 (30.0)
	26–30	49 (49.0)	49 (49.0)
	>30	21 (21.0)	21 (21.0)
Height (cm)	140–145	30 (30.0)	31 (31.0)
	146–150	37 (37.0)	36 (36.0)
	151–155	18 (18.0)	15 (15.0)
	≥156	15 (15.0)	18 (18.0)
Weight (kg)	50–55	25 (25.0)	20 (20.0)
	56–60	30 (30.0)	29 (29.0)
	61–65	16 (16.0)	18 (18.0)
	≥66	29 (29.0)	33 (33.0)
Parity (living children)	One	54 (54.0)	48 (48.0)
	Two	45 (45.0)	50 (50.0)
	> Two	1 (1.0)	2 (2.0)
Time of first stage of labour	5–10 hours	34 (34.0)	42 (42.0)
	11–15 hours	51 (51.0)	47 (47.0)
	>16 hours	15 (15.0)	11 (11.0)
Episiotomy	Yes	61 (61.0)	52 (52.0)
	No	39 (39.0)	48 (48.0)
Duration of placental expulsion	5–10 min	31 (31.0)	36 (36.0)
	11–15 min	37 (37.0)	38 (38.0)
	15–20 min	18 (18.0)	16 (16.0)
	>21 min	14 (14.0)	10 (10.0)

In the present quasi-experimental study, the baseline demographic and obstetric characteristics of postnatal mothers in the experimental and control groups were found to be comparable, indicating appropriate group allocation and minimizing the influence of confounding variables on the study outcomes. The majority of mothers in both groups belonged to the age group of 26–30 years, which represents the common reproductive age group and aligns with previously reported obstetric population profiles. Similar age distribution between groups ensures that age-related physiological differences did not influence uterine involution outcomes.

Anthropometric variables such as height and weight were also similarly distributed between the two groups. Most mothers had a height between 146–150 cm and a weight ranging from 56–60 kg. Since maternal body composition may influence uterine tone and postpartum recovery, the comparable distribution of these variables strengthens the internal validity of the study and supports that observed differences in uterine involution were attributable to the intervention rather than physical differences between participants.

Parity is an important determinant of uterine involution, as multiparity is often associated with delayed uterine contraction. In the present study, the majority of mothers in both groups had one or two living children, with very few having more than two children. The similar parity distribution further confirms that parity did not act as a confounding factor influencing uterine involution or postnatal pain outcomes.

Obstetric factors such as the duration of the first stage of labour, episiotomy, and duration of placental expulsion were also comparable between the experimental and control groups. Prolonged labour and episiotomy are known to contribute to increased postpartum discomfort and delayed uterine recovery. The majority of mothers experienced a first stage of labour lasting 11–15 hours, and a substantial proportion in both groups underwent episiotomy. Additionally, placental expulsion time was largely within 5–15 minutes for most participants. The similarity of these obstetric variables indicates that both groups had comparable delivery-related stress and trauma.

Overall, the homogeneity observed in baseline demographic and obstetric characteristics suggests that the experimental and control groups were well matched. This strengthens the credibility of the study findings and supports the conclusion that the observed improvement in uterine involution and reduction in postnatal pain in the experimental group can be attributed to the effect of Kegel exercises combined with prone positioning rather than baseline differences.

Table 2: Comparison of pre-test and post-test uterine involution within experimental group (n = 100)

Assessment	Mean ± SD	t value	df	p value
Pre-test	5.58 ± 1.21			

Post-test	3.41 ± 1.01	17.623	99	<0.001***

Table 2 shows the comparison of pre-test and post-test uterine involution scores within the experimental group. The mean uterine involution score significantly reduced from 5.58 ± 1.21 in the pre-test to 3.41 ± 1.01 in the post-test. The paired t-test revealed a highly statistically significant difference ($t = 17.62$, $df = 99$, $p < 0.001$).

The significant reduction in uterine involution scores in the experimental group indicates that Kegel exercises combined with prone positioning effectively enhance uterine contraction and tone during the postnatal period. Strengthening of pelvic floor muscles improves uterine support, while prone positioning aids gravitational drainage, collectively accelerating uterine involution. These findings are consistent with earlier studies reporting improved postpartum uterine recovery following structured postnatal exercise interventions.

CONCLUSION

The present quasi-experimental study concludes that Kegel exercises combined with prone positioning significantly enhance uterine involution among postnatal mothers. Mothers who practiced these interventions demonstrated a marked improvement in uterine recovery compared to routine postnatal care. Strengthening of pelvic floor muscles through Kegel exercises improves uterine support and tone, while prone positioning facilitates gravity-assisted uterine drainage and sustained myometrial contraction. The intervention is simple, non-invasive, cost-effective, and can be easily implemented by nursing professionals in clinical settings. Incorporating Kegel exercises and prone positioning into routine postnatal care protocols may accelerate maternal recovery, reduce postpartum complications, and improve overall maternal wellbeing. Further studies with longer follow-up periods and randomized designs are recommended to strengthen evidence and explore long-term maternal outcomes.

Authors contribution

The authors confirm contribution to the paper as follows: writing original and editing: KG; writing original and editing: CKG and LK: Supervision. All authors reviewed the results and approved the final version of the manuscript.

Ethical Statement

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