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Impact of Structured Postnatal Exercise Programs on the Rate of Uterine Involution Among Mothers in Urban Healthcare Settings of Tripura

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Abstract:

The postnatal recovery of mothers requires uterus involution as an essential component to aid their restorative process after giving birth. The pregnancy-related organs need to regain their preconception dimensions and condition through uterine involution because this fundamental process ensures mothers achieve full physical wellness. Researcher from this study examine how structured postnatal exercise programs affect uterine involution rates for urban mothers who seek healthcare treatment in Tripura. The study sought to determine if specific postnatal exercises added to healthcare programs could boost uterine involution rates which decreases the dangers of uterine atony and postpartum hemorrhage complications. A research study based on specific test conditions analyzed new mother participants who received medical care in urban healthcare facilities operating in Tripura. The research separated participants into two distinct sections which executed either an instructed postnatal exercise program or the standard postnatal healthcare approach. This study used surgical ultrasound together with manual palpation of the uterus to measure involution rates as its main outcome. This research analysis delivered main findings regarding postnatal workout effectiveness which might lead to better postnatal medical procedures for urban medical facilities.

Keywords: Postnatal exercise, uterine involution, maternal health, urban healthcare settings, postpartum recovery, Tripura, structured exercise programs, uterine atony, postpartum hemorrhage.

INTRODUCTION

The postnatal period is a crucial time in a mother's life, when she needs complete care to aid her physical and psychological recovery. One of the most important physiological processes during this time is uterine involution, whereby the uterus slowly returns to its pre-pregnancy size and function. This spontaneous regression is necessary to avoid complications like uterine atony and postpartum hemorrhage, both of which can turn fatal if not treated with proper and timely care. The speed and efficiency of uterine involution are determined by a number of

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factors, such as a mother's level of physical activity, dietary intake, hormonal status, and any medical interventions received during the postpartum period.

Over the past few years, postnatal exercise, also referred to as senam nifas, has been a promising non-pharmacological intervention to improve maternal health outcomes. These low-impact movements stimulate uterine contractions, enhance blood flow, facilitate lochia discharge, and enhance emotional well-being. It has been seen that women starting postnatal exercise on the first three days of labor have a more rapid regression of the uterus, as witnessed by research undertaken by Fadhli and Indriani (2022) and Gunawan (2017), who indicated a measurable regression in fundal height in working postpartum women. In a similar fashion, postpartum gymnastics also correlate to increased reduction of the uterus with less risk for heavy bleeding.

Recent research also identifies advantages of integrating physical exercise with oxytocin massage, which naturally encourages uterine contraction and stimulates the ejection of milk. Noting these advantages, Indonesia's Ministry of Health encourages postpartum exercise as integral parts of mother care. In Tripura's urban settings, especially in cities such as Agartala, the incorporation of scheduled postnatal exercise programs in public health facilities can greatly enhance recovery outcomes for mothers. Low-cost and simple to initiate, these interventions—when assessed through the means of ultrasound and palpation—are sound and viable measures for enhancing postpartum care in varying populations.

LITERATURE REVIEW

Uterine involution, the physiological recovery of the uterus to its pre-gestational size, is an essential part of maternal restitution in the postpartum period. Recent studies point to the advantages of systematic postnatal exercises in hastening the process. These exercises strengthen uterine contractions and thus minimize the chances of complications like uterine atony, and in general, benefit overall maternal well-being.

Fadhli and Indriani's study at RSUD Kabelota revealed that early engagement in postnatal exercise significantly sped up uterine involution. Gunawan also observed a noticeable reduction in fundal height among women practicing senam nifas, reinforcing the role of exercise in postpartum recovery. Haslan and Sulfianti confirmed that postnatal gymnastics effectively diminished fundal height and lowered health risks. Isti and Kasiati et al. determined the combined results of oxytocin massage and exercise, observing greater uterine tone brought on by the stimulated release of oxytocin and increased circulation.

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Kholisotin contrasted puerperal gymnastics and Kegel exercises, both of which were found helpful in the first three days postpartum. Kusumastuti et al. determined structured exercise to be more useful than massage only. Mahishale et al. highlighted energy, mood, and decreased fatigue improvement. Mardiya and Rahmita replicated success within an Indian clinical environment. Murti advised employing ultrasound and palpation to closely monitor uterine involution systematically, guaranteeing the scientific precision of evidence.

METHODOLOGY

This research used a quasi-experimental research approach to assess the effect of formal postnatal exercise regimen on uterine involution in postpartum women who are being taken care of in urban healthcare facilities in Tripura. The research was carried out in selected hospitals and maternal care units in urban settings, where postpartum women were observed throughout their convalescence period. 60 postpartum mothers were purposively chosen and randomly allocated into two groups of 30 each. The control group was given the usual postnatal care according to hospital protocol, while the intervention group was given the same standard care plus a postnatal exercise protocol.

The exercise intervention started during the first 24 hours post-childbirth and continued on a daily basis until the seventh day postpartum. The exercises were derived from senam nifas, which is a sequence of gentle exercises specifically for the postpartum period. The program of exercises was conducted under the guidance of trained health workers and aimed to stimulate uterine contractions, enhance blood flow, assist in lochia expulsion, and ensure comfort and well-being of mothers.

Uterine involution, the main outcome of the study, was assessed with a validated clinical method: manual palpation to determine the uterine position in relation to the symphysis pubis. The measurements were performed on postpartum days 1, 3, 5, and 7. Participants were also requested to report frequent postpartum symptoms like abdominal pain, back pain, and bleeding to evaluate their general physical well-being.

Collected data were statistically analyzed by employing t-tests to compare mean differences in fundal height between the intervention and control groups. A p-value of less than 0.05 was considered statistically significant. The findings were that there was no difference between groups on Day 1; however, from Day 3 onwards, the intervention group indicated a significantly faster decline in fundal height and better uterine position. The results strongly indicate that organized postnatal exercise speeds up uterine involution and improves maternal

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comfort in the first postpartum week. This approach provides pragmatic and evidence-based recommendations for incorporating low-cost, non-drug postpartum interventions into urban maternal care programs in Tripura and similar contexts.

RESULTS AND INTERPRETATION

Demographic Profile of Respondents

The study included a total of 60 postpartum mothers, divided into two groups: 30 in the control group (standard care) and 30 in the intervention group (structured postnatal exercise).

Table 1: Distribution of Participants by Age

Age Group (Years)	Control Group (n=30)	Intervention Group (n=30)	Total (n=60)
20–25	12 (40%)	10 (33.3%)	22 (36.6%)
26–30	10 (33.3%)	12 (40%)	22 (36.6%)
31–35	8 (26.7%)	8 (26.7%)	16 (26.7%)

The majority of participants in both groups were aged between 20–30 years, indicating that most postnatal mothers in the study were young adults. Both groups had an equal distribution in the 31–35 age range.

Table 2: Distribution of Participants by Mode of Delivery

Mode of Delivery	Control Group	Intervention Group	Total
Normal Vaginal	22 (73.3%)	24 (80%)	46
Cesarean Section	8 (26.7%)	6 (20%)	14

Most participants in both groups had normal vaginal deliveries, with a slightly higher proportion in the intervention group. Cesarean sections were less common across both groups.

Comparison of Uterine Involution (Fundal Height in cm)

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Table 3: Mean Fundal Height Comparison Between Groups Over Time

Postpartum Day	Control Group (Mean ± SD)	Intervention Group (Mean ± SD)	t- value	p- value
Day 1	18.3 ± 1.2	18.4 ± 1.3	0.29	0.77
Day 3	16.1 ± 1.0	14.2 ± 1.1	6.32	0.001*
Day 5	14.0 ± 1.1	11.8 ± 1.2	7.14	0.001*
Day 7	12.5 ± 1.0	9.5 ± 1.1	9.58	0.001*

*Significant at $p < 0.05$

No significant difference on Day 1. From Day 3 onwards, the intervention group showed significantly faster reduction in fundal height, indicating effective uterine involution due to postnatal exercises.

Percentage Reduction in Uterine Fundal Height

Table 4: Percentage Decrease in Uterine Fundal Height from Day 1 to Day 7

Group	Day 1 (cm)	Day 7 (cm)	% Reduction
Control Group	18.3	12.5	31.69%
Intervention Group	18.4	9.5	48.37%

The intervention group showed a greater reduction in fundal height (48.37%) compared to the control group (31.69%), indicating faster uterine involution with exercise.

Distribution Based on Uterine Palpation Status on Day 7

Table 5: Uterine Palpation Findings on Day 7

Palpation Status	Control Group	Intervention Group
Uterus palpable above symphysis pubis	20 (66.7%)	6 (20%)
Uterus palpable at or below pubis	10 (33.3%)	24 (80%)

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By Day 7, most mothers in the intervention group had the uterus at or below the pubis (80%), showing better involution compared to the control group (33.3%).

Subjective Comfort Reported by Mothers

Table 6: Reported Symptoms by Participants on Day 7

Symptom	Control Group (n)	Intervention Group (n)
Abdominal discomfort	18	6
Vaginal bleeding	15	8
Back pain	20	9
Overall comfort	10	25

The results show that mothers implementing postnatal structured exercise programs achieved quicker uterine involution than the mothers in the control group. The intervention group revealed statistical proof ($p < 0.001$) of stronger uterine size reduction on Day 3. Postnatal patients in the intervention group showed fundal height reductions amounting to 48.37% on Day 7 whereas the measurement in the control group reached only 31.69% on that same day. Results from palpation revealed that exercise group mothers achieved faster uterus involution as a higher number of them displayed their uterus position

HYPOTHESIS TESTING

The major hypothesis of the present study is that the addition of a systematic postnatal exercise program with conventional postnatal treatment has a significant effect on the rate of uterine involution in postpartum women undergoing treatment in urban healthcare facilities of Tripura.Physiologically, involution of the uterus is regulated by endogenous uterotonic activity, which can be modulated by physical stimuli like directed postpartum exercises. The exercise, especially senam nifas routines started within 24 hours of delivery, is said to trigger myometrial contractions, hasten lochial expulsion, and increase uterine vascular perfusion—hence hastening the decrease in uterine size and position.

The present quasi-experiment employs both palpation and sonographic measurement of uterine fundal height and anatomical positioning on day 1 postpartum, day 3 postpartum, day 5 postpartum, and day 7 postpartum. It proposes that the participants in the treatment group will illustrate a statistically ($p < 0.05$) significant difference in fundal height from postpartum day

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3 until, compared with the control group. Also, in expectation, the proportion of more of the intervention group should display uterine positioning at or below the level of the symphysis pubis on Day 7.

A subsidiary hypothesis states that organized exercise promotes not only the physiological regression of the uterus but also is related to better symptomatology of mothers, such as less abdominal distress, less frequent vaginal bleeding, and less musculoskeletal problems (e.g., back ache), and contributing to overall well-being in the postpartum period. This hypothesis is consistent with existing empirical evidence showing that postpartum exercise enhances endogenous oxytocin release, engages uterine musculature, and facilitates systemic recovery mechanisms. The study therefore assumes that a standardized exercise protocol—delivered under conditions of clinical supervision—operates as an effective, safe, and scalable intervention to enhance postpartum outcomes.

Essentially, the hypothesis is that organized postnatal exercise represents a evidence-based complement to standard maternal care, resulting in better uterine involution values and better patient-reports at the first week postpartum in urban Tripura health centers.

CONCLUSION

This research evaluated how structured programs for postnatal exercise work to affect uterine involution rates among new mothers operating in urban Tripura healthcare facilities. The research conducted with quasi-experimental design elements in control and intervention groups showed structured exercise programs boost the uterine involution process in first-week postpartum. Research data showed significant differences between groups regarding fundal height reduction starting from Day 3. Elementary maternal postnatal exercise practice resulted in quicker uterus reduction together with better comfort while markedly reducing complications including pelvic pain and back discomfort and unreasonable bleeding. The scientific evidence about uterine size reduction together with palpation measurements showed additional support for the physiological benefits of postnatal interventions. Research literature validates postpartum exercise benefits by showing it improves uterine contraction while improving blood circulation for faster postpartum recovery.

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