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A Randomised Control Study on the Effect of Antenatal Pelvic Floor Muscle Exercises on Labour and Birth Outcome

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Abstract: ***Background**: Pregnancy is a physiological process that typically requires minimal medical intervention. However, pelvic floor muscle exercises (PFMEs) during pregnancy are believed to enhance muscle flexibility, strength, and coordination, potentially leading to improved labor and birth outcomes. PFMEs have been associated with benefits such as reduced labor duration, lower incidence of instrumental delivery, and decreased risk of postpartum urinary incontinence. This randomized controlled study aimed to assess the effects of antenatal PFMEs between 28 and 36 weeks of gestation on labor and birth outcomes. **Methods**: The study was conducted in the Department of Obstetrics and Gynecology at A.C.S. Medical College and Hospital. A total of 100 participants were randomly assigned into an intervention group (n=50), receiving standard antenatal care with PFME training, and a control group (n=50), receiving standard antenatal care alone. Participants in the intervention group performed three sets of eight exercises, sustained for 8–10 seconds, daily at home, with weekly follow-up. Data on maternal age, socio-economic status, weight, height, parity, mode of delivery, newborn weight, and neonatal intensive care unit (NICU) admission were collected and analyzed. **Results**: Antenatal PFMEs significantly improved birth outcomes, with 76% of the intervention group achieving vaginal delivery compared to 56% in the control group (p=0.001). The cesarean section rate was lower in the intervention group (24%) than in the control group (44%). While the mean newborn weight was slightly lower in the intervention group (2.76 ± 0.40 kg vs. 2.84 ± 0.35 kg, p=0.053), NICU admission rates were similar (32% vs. 30%, p=0.803). **Conclusion**: Antenatal PFMEs were associated with a significantly higher rate of normal vaginal delivery and a lower rate of cesarean section. These findings suggest that PFMEs may be a safe and effective method for improving labor outcomes. Future large-scale randomized controlled trials are needed to further validate these results.*

Keywords: Pelvic floor muscle exercises; antenatal exercise; labor outcomes; vaginal delivery; cesarean section; pregnancy; maternal health; randomized controlled study; birth outcomes; urinary incontinence prevention

1. Introduction

Pregnancy phase involves natural physiological processes attributing significant changes inside the maternal body to accommodate the growing fetus and ensure maternal well-being. While the majority of pregnancies progress without the need for medical or surgical interventions,[1] various physiological adaptations occur across multiple organ systems, including the musculoskeletal, cardiovascular, and endocrine systems, to support fetal development and prepare the mother for labor [2]. The primary focus of pregnancy care extends beyond just fetal growth; it also encompasses the holistic preparation of expectant mothers—both physically and emotionally—along with their families and the healthcare system that supports them throughout gestation and delivery [3]. One of the key aspects of optimizing pregnancy outcomes is ensuring a safe and effective mode of delivery. A normal vaginal delivery is widely recognized for its numerous benefits over caesarean sections, including reduced medical costs, shorter hospital stays, lower anaesthesia-related risks, decreased maternal morbidity, and lesser postpartum complications such as excessive bleeding and infection risk.

The body shows natural readiness for vaginal birth yet labor challenges sometimes require instrumental interventions or caesarean sections because of prolonged second-stage labor or weak maternal pushing abilities [4] [5]. Recent research focuses on antenatal exercises especially pelvic floor muscle exercises (PFMEs) to improve labor efficiency and birth outcomes. PFMEs target pelvic floor muscles to support the uterus and bladder and rectum so they help women deliver vaginally [6]. Strong pelvic floor muscles enhance motor control and flexibility which results in better labor pushing ability and decreases the need for medical assistance during delivery [7]. These exercises serve as a preventive measure and treatment method for urinary incontinence which affects many pregnant women.

The pelvic floor muscles experience dysfunction as a regular pregnancy complication which becomes more prevalent in the second and third trimesters. Research indicates that urinary incontinence affects more than one-third of pregnant women and approximately one-third of these women continue to leak urine during the first three months after giving birth [8]. The prevalence of anal incontinence or involuntary flatus symptoms among pregnant women reaches one-fourth during late pregnancy and continues to affect 20% of women a year after childbirth. Healthcare professionals often recommend

PFMEs for pregnant women and postpartum patients because they effectively reduce these pregnancy complications [9]. The strength and controlled nature of pelvic floor muscles creates two major benefits for new mothers including reduced perineal injuries and decreased postpartum pelvic organ prolapse and better sexual function.

PFMEs have gained more attention in antenatal care because of their significant advantages. Regular practice of PFMEs demonstrates ability to improve labor results through shorter second stage labor duration and reduced requirement for instrumental delivery assistance based on research findings [10]. The exercises improve pelvic blood circulation while reducing venous congestion from uterine growth and improving tissue elasticity to decrease episiotomy risks and severe perineal tears [11]. PFMEs help mothers experience better psychological outcomes during pregnancy because they build childbirth confidence and minimize labor pain anxiety and potential complications [12]. The American College of Obstetrics and Gynecology (ACOG) supports the inclusion of pelvic floor training in standard antenatal care for low-risk pregnancies because it effectively lowers cesarean section rates and supports natural vaginal delivery [13].

The extensive research about PFMEs benefits has not yet fully explained their specific effects on labor progression and delivery outcomes and neonatal health across different population groups. PFME training demonstrates improved labor efficiency according to certain research [14] yet studies demand additional randomized controlled trials to establish its impact on delivery methods [15]. This research adds to existing knowledge by assessing how antenatal PFMEs administered between weeks 28 and 36 affect labor and birth results. Research confirms whether consistent PFME training enhances spontaneous vaginal delivery rates and decreases caesarean procedures and achieves better maternal and newborn results. A randomized controlled design in this study will generate strong evidence-based findings about PFME effectiveness during pregnancy. The research investigates antenatal care clinical recommendations while providing expectant mothers with practical knowledge to enhance their childbirth experience. This research demonstrated PFMEs as basic yet effective maternal healthcare interventions to guide future studies that will optimize exercise protocols and implementation strategies for better obstetric results.

2. Methodology

Study Setting and Design

The research took place at the Department of Obstetrics and Gynecology within A.C.S. Medical College and Hospital through a randomized controlled study. The research examined how antenatal pelvic floor muscle exercises (PFMEs) affect labor and birth outcomes. The research divided participants into two groups where the intervention group received standard antenatal care with PFMEs and the control group received standard antenatal care alone.

Sample Size and Participant Selection

The research included 100 eligible parturient women who were distributed into two groups containing 50 participants each. The researchers selected participants through established criteria for inclusion and exclusion.

The research included participants who were older than 18 years old and either expecting their first child or had delivered vaginally before. The study participants had gestational ages ranging from 28 to 36 weeks while presenting with a cephalic position and carrying one baby. The research included only low-risk pregnant women who gave their voluntary consent to join the study.

The study excluded participants who had undergone previous cesarean section or displayed placental abnormalities. The research excluded participants who had pregnancy-induced hypertension (PIH) or gestational diabetes mellitus (GDM) requiring insulin or oral hypoglycemic agents (OHA) or heart disease or renal diseases. The study excluded pregnant women who had more than one fetus or experienced previous adverse birth outcomes or fetal birth defects. The study excluded cases with cephalopelvic disproportion and incompetent cervix and any high-risk pregnancy indicators. The study excluded participants who refused to give their consent.

The researcher obtained consent before assigning participants randomly into intervention and control groups. The intervention group received PFME training through structured sessions along with their standard antenatal care. The exercise program started between weeks 28 to 36 of pregnancy and consisted of three sets of eight contractions that required holding each contraction for 8 to 10 seconds followed by a 10-second relaxation period. Each session lasted approximately 30 minutes. Participants administered the exercises every day at home where the principal investigator conducted regular weekly follow-up calls to check compliance and handle any arising issues. Participants maintained an exercise diary to track their adherence while digital monitoring occurred during their antenatal visits. Standard antenatal care was provided to the control group without PFME training. The study participants from both groups received standard obstetric care throughout their pregnancy and delivery period.

Data Collection and Analysis

The principal investigator distributed a structured questionnaire for data collection purposes. Demographic details, obstetric history, labor progression, and birth outcomes were recorded. The collected data were analyzed using appropriate statistical methods to assess differences between the intervention and control groups. The statistical significance of outcomes such as mode of delivery, duration of labor, and neonatal health parameters was determined using relevant analytical tools.

3. Results

The study comprised 100 participants, evenly distributed between the intervention and control groups. The mean age of participants in the intervention group was 25.85 ± 3.44 years, while in the control group, it was 26.09 ± 3.54 years. The majority of participants fell within the 25 to 40-year age category, comprising 62% of the intervention group and 60% of the control group, with a minimum age of 19 years and a maximum of 34 years in both groups. There was no statistically significant difference in age distribution between the two groups (Table 1, Fig.)

Table 1: Age distribution of study participants between intervention and control group

Age	Intervention Group		Control Group	
	No. of Patients	Percentage (%)	No. of Patients	Percentage (%)
18 to 25 years	19	38	20	40
>25 to 40 years	31	62	30	60
Total	50	100	50	100
Min. Age (in years)	19		19	
Max. Age in years	34		34	
Mean age in years ± SD	25.85 ± 3.44		26.09 ± 3.54	
t Value	0.660			
p value	0.552			

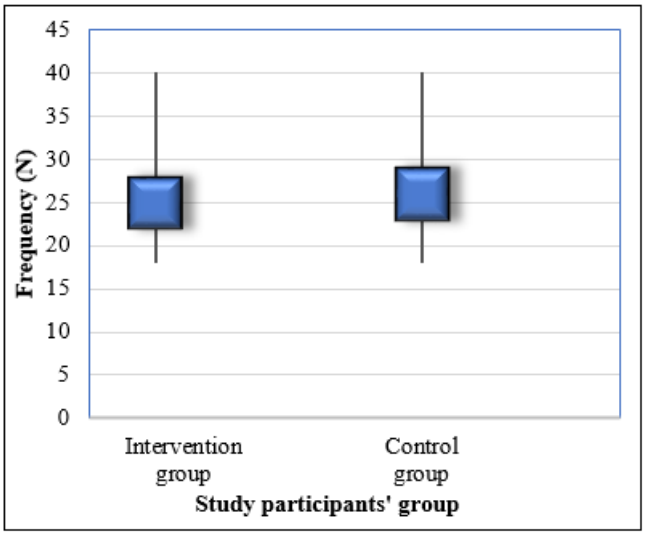

Figure 1: Graph showing Age distribution among study participants

Socioeconomic status distribution revealed that in the intervention group, 12% belonged to the lower middle class, 76% to the middle class, and 12% to the upper class. In the control group, 6% were from the lower middle class, 78% from the middle class, and 16% from the upper class. The distribution was similar between the groups with no significant differences (Table 2, Fig. 2).

Table 2: Socio Economic Status Distribution Among Study Participants

Socioeconomic status	Intervention group		Control group		Chi square value, p value
	No of patients	Percentage	No of patients	Percentage	
Lower middle class	6	12	3	6	3.66, 0.160
Middle class	38	76	39	78	
Upper class	6	12	8	16	
Total	50	100	50	100	

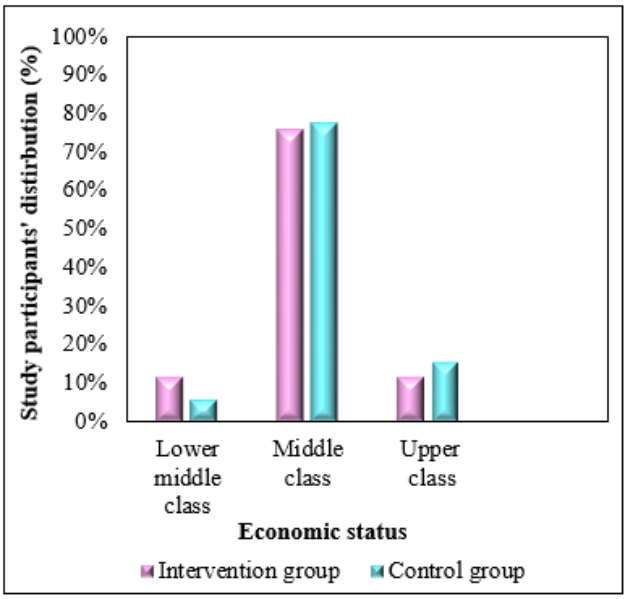

Figure 2: Cluster bar Graph Shows Socio Economic Status Distribution among Study Participants

The mean weight of participants in the intervention group was 67.89 ± 7.45 kg, while in the control group, it was 68.03 ± 9.13 kg. Though slightly higher in the control group, the difference was not statistically significant (Table 3). Similarly, the mean

height in the intervention group was 155.49 ± 2.98 cm, whereas in the control group, it was 156.03 ± 3.82 cm, also showing no significant difference (Table 3).

Table 3: Weight & Height Distribution among Study Participants:

Weight distribution among study participants			
Group	**No of patients**	**Mean weight in kg ± SD**	**p value**
Intervention group	50	67.89 ± 7.45	0.884
Control group	50	68.03 ± 9.13	
Height Distribution among study participants			
Group	**No of patients**	**Mean height in cm ± SD**	**p value**
Intervention group	50	155.49 ± 2.98	0.168
Control group	50	±3.82	

Parity distribution analysis indicated that in the intervention group, 64% were primigravida, 30% were gravida 2, 4% were gravida 3, and 2% were gravida 4. In the control group, 62% were primigravida, 36% were gravida 2, and 2% were gravida 3. No significant difference in parity status was observed between the two groups (Table 4, Fig. 3).

Table 4: Parity Status among study participants:

Parity	Intervention group		Control group		Chi square value, df, p value
	No of patients	Percentage	No of patients	Percentage	
Primi	32	64	31	62	4.15 3, 0.246
G2	15	30	18	36	
G3	2	4	1	2	
G4	1	2	0	0	
Total	50	100	50	100	

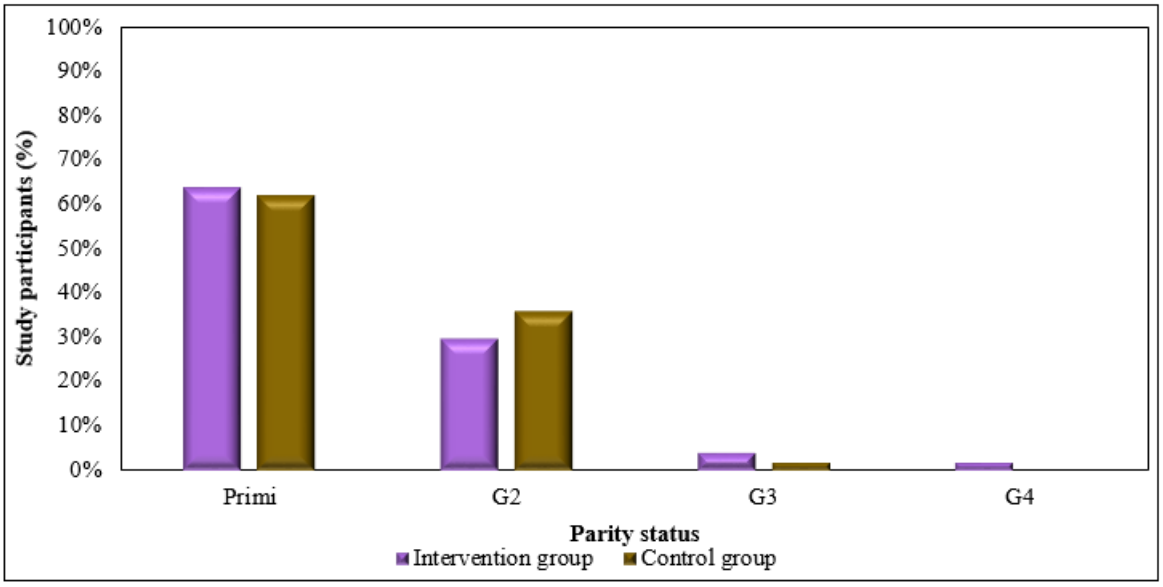

Figure 3: Cluster Bar graph shows Parity status among study participants.

A notable finding was the mode of delivery, where 76% of the intervention group had a normal vaginal delivery, compared to 56% in the control group. Conversely, the rate of cesarean sections was higher in the control group (44%) than in the intervention group (24%). This difference was statistically significant, indicating a positive effect of pelvic floor muscle (PFM) exercises on facilitating vaginal delivery (Table 5, Figure 4).

Table 5: Delivery Details Among Study Participants:

Delivery details	Intervention group		Control group		Chi square value, df, p value
	No of patients	Percentage	No of patients	Percentage	
Vaginal delivery	38	76	28	56	11.65, 1, 0.001
LSCS	12	24	22	44	
Total	50	100	50	100	

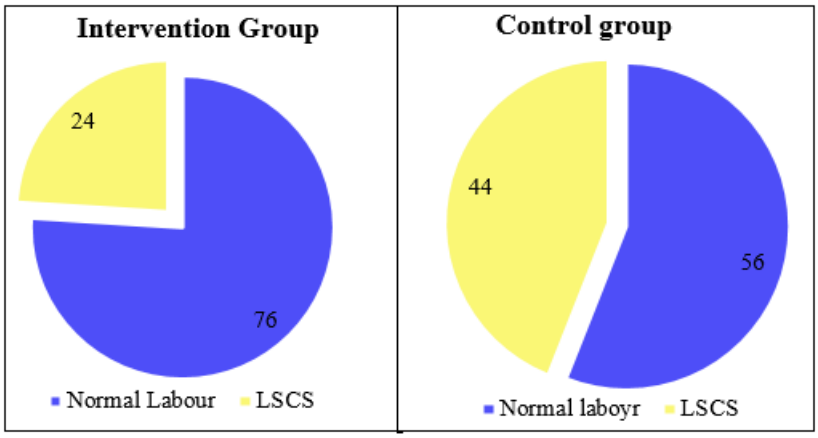

Figure 4: Pie chart shows mode of delivery among study participants

The mean birth weight of neonates in the intervention group was 2.76 ± 0.40 kg, while in the control group, it was 2.84 ± 0.35 kg. Although slightly higher in the control group, the difference was not statistically significant (Table 6, Fig. 5). NICU admission rates among neonates were comparable between groups, with 32% of newborns in the intervention group requiring NICU care, compared to 30% in the control group. The slight increase in NICU admissions in the intervention group was not statistically significant (Table 7, Fig. 6).

Table 6: Weight Distribution of the new born baby

Group	N	Mean weight in Kgs + Standard Deviation	P value
Intervention Group	50	2.76 + 0.40	0.053
Control Group	50	2.84 + 0.35	

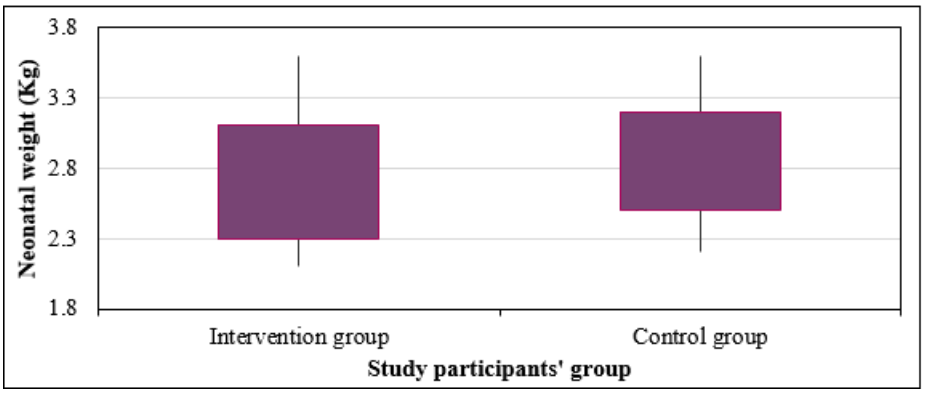

Figure 5: Error bar graph shows mean weight distribution of the new born baby of study participants

Table 7: NICU Admission of Baby of Study Participants

NICU Admission	Intervention Group		Control Group		Chi square value, df, p value
	No. of Patients	Percentage (%)	No. of Patients	Percentage (%)	
YES	16	32	15	30	0.06, 1, 0.803
NO	34	68	35	70	

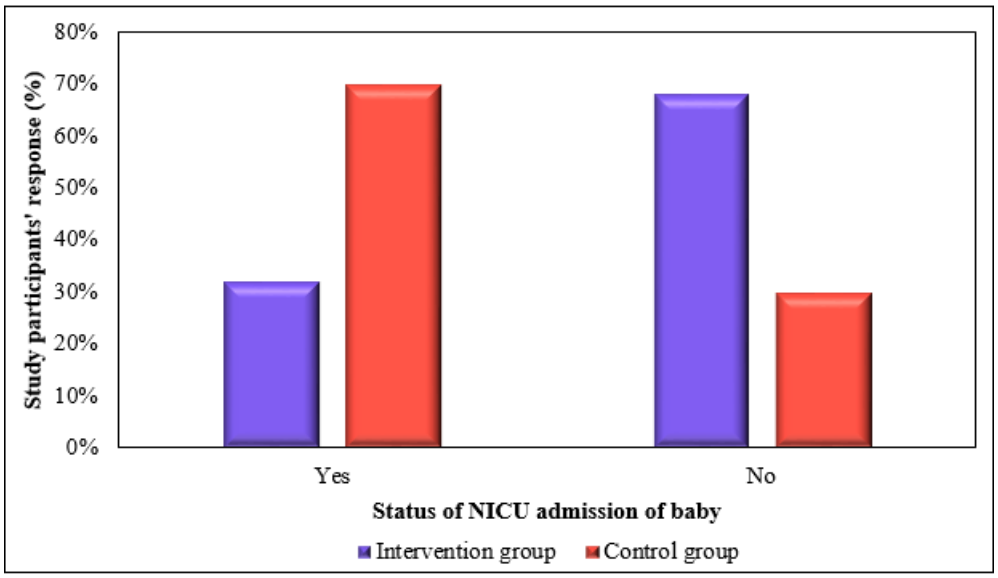

Figure 6: Cluster Bar graph shows NICU admission of the baby among Study participants

These findings indicate a significant association between antenatal PFM exercises and the mode of delivery, suggesting that structured training during pregnancy may facilitate normal vaginal delivery while reducing the likelihood of cesarean sections. Other parameters, including age, socioeconomic status, weight, height, parity, neonatal weight, and NICU admissions, showed no statistically significant differences between the groups, supporting the homogeneity of the sample and reinforcing the reliability of the observed effects on delivery outcomes.

4. Discussion

The current research demonstrates strong evidence that antenatal pelvic floor muscle exercises (PFME) lead to beneficial outcomes during labor and birth. The mean ages of participants in both intervention and control groups matched closely without showing any significant statistical differences in age distribution. The research by El-Shamy et al. [1] along with Zhao et al. [10] reported findings that matched the present study regarding equally distributed mean ages between intervention and control groups. The study results demonstrate that age-related differences do not affect PFME effectiveness in labor outcomes thus validating the reliability of the research findings. The majority of participants in both groups belonged to the middle socioeconomic class without any notable differences between them. The study's results remained unaffected by socioeconomic factors because the demographic characteristics were consistent between groups. Research conducted previously demonstrated middle-class women tend to participate in structured antenatal exercise programs which suggests these groups exhibit similar levels of accessibility and compliance. The mean weight and height measurements between groups showed no significant differences thus eliminating any impact of maternal anthropometric characteristics on labor outcomes. The research findings from Dias et al. [12] support the present study's conclusions because they showed no significant differences in weight and height measurements between training and control groups.

This study revealed an essential result demonstrating intervention group participants achieved normal vaginal deliveries at a rate of 76% while control group participants only experienced normal vaginal delivery at 56%. The research outcome matches previous findings by El-Shamy et al., [1] who discovered that PFME led to spontaneous vaginal delivery in 90% of participants.

Dias et al. [12] discovered that most women in their training cohort delivered vaginally which substantiates PFME as a tool to avoid instrumental or cesarean deliveries. The American College of Obstetrics and Gynecology supports routine PFM training during pregnancy because it improves maternal health and enables natural childbirth [16].

PFME proved to reduce the intervention rate of caesarean section (LSCS) among participants in this study suggesting its effectiveness for minimizing surgery during childbirth. The results support earlier research which demonstrates that stronger pelvic floor muscles lead to better second-stage labor efficiency thus decreasing the requirement for operative delivery. The enhanced motor coordination and flexibility from antenatal PFME has led to lower labor dystocia rates according to research on exercise-based interventions [1] [17]. The research data revealed that newborns in the control group weighed slightly heavier at 2.84 kg compared to 2.76 kg in the intervention group. The weight distribution of newborns born to mothers who performed structured PFME matched those of infants born to mothers who did not exercise according to previous research [18] [19]. The safety of PFME as an antenatal recommendation is supported by research which shows that this exercise does not affect fetal growth negatively [20].

The NICU admission rate between intervention and control groups showed a minor difference with 32% in the intervention group and 30% in the control group yet no statistical significance emerged. The research findings match Sultan and Stanton's [11] conclusion that vaginal delivery leads to reduced maternal complications without affecting the need for neonatal intensive care. The marginally elevated NICU admission rate among infants born to participants with PFME may stem from reasons both apart from PFME and due

to gestational complications or neonatal conditions unrelated to delivery method.

The strong relationship between PFME and better labour outcomes supports previous research which promotes pelvic floor exercise as a safe and effective method to enhance maternal health [21] [22]. Recent research builds on existing evidence which demonstrates PFME as a method to strengthen pelvic muscles while improving pelvic flexibility and enhancing labor progression. The research findings support previous evidence which demonstrates that antenatal exercise programs help mothers maintain better health by decreasing perineal injuries and bleeding complications and shortening labor duration [23] [24].

The promising findings must be viewed in relation to study restrictions regarding sample size along with outside elements that could impact labor outcomes. Future research needs to expand its study population size and investigate the sustained postpartum advantages of PFME. Future investigations should use pelvic floor strength measurement techniques such as electromyography or ultrasonographic evaluations to validate the research findings.

The research demonstrates that antenatal PFME provides significant advantages for labor outcomes by decreasing the need for operative deliveries. The simple implementation and non-invasive nature of PFM training requires healthcare providers to strongly advocate for structured exercise regimens in routine antenatal care. Future research needs to develop improved exercise methods and adherence programs while evaluating additional maternal health improvements to make PFME a fundamental obstetric care practice.

5. Conclusion

The research demonstrates that antenatal pelvic floor muscle exercises (PFMEs) play a crucial part in enhancing labor and birth results. Pregnant women who performed PFMEs regularly demonstrated increased chances for vaginal delivery while experiencing decreased rates of cesarean section procedures. Additionally, while the differences in neonatal weight and NICU admissions were not statistically significant, the overall maternal benefits reinforce the importance of PFMEs as a non-invasive, low-risk intervention during pregnancy. Strengthening the pelvic floor muscles not only aids in facilitating the second stage of labour but may also contribute to long-term maternal health by reducing the risk of pelvic organ prolapse and urinary incontinence.

Given the observed benefits, integrating PFMEs into routine antenatal care could be an effective strategy to optimize maternal and neonatal outcomes. However, further large-scale randomized controlled trials with standardized exercise protocols are essential to establish more definitive evidence regarding the long-term impact of PFMEs on labour progression and postpartum recovery. Future research should also explore the influence of adherence levels, different training intensities, and the role of professional supervision in enhancing the effectiveness of PFMEs. By reinforcing the adoption of PFMEs in obstetric practice, this study contributes to the growing body of evidence supporting non-pharmacological interventions for improving childbirth experiences and maternal well-being.

References

[1] El-Shamy FF, Abd El Fatah E. Effect of Antenatal Pelvic Floor Muscle Exercise on Mode of Delivery: A Randomized Controlled Trial. Integr Med Int 2017;4(3– 4):187–97.
[2] Wolfe LA, Brenner IK, Mottola MF. Maternal exercise, fetal well-being and pregnancy outcome. Exerc Sport Sci Rev 1994; 22: 145–94.
[3] Ace's Guide to Exercise Testing and Program Design: A Fitness Professional's Handbook : Bryant, Cedric X., Franklin, Barry A., Newton-merrill, Sabrena: Amazon.in: Books [Internet]. [cited 2022 Sep 8];Available from: https://www.amazon.in/Guide-Exercise-Testing-ProgramDesign/dp/1585180122.
[4] Does antenatal pelvic floor muscle training affect the outcome of labour? A randomised controlled trial - PubMed [Internet]. [cited 2022 Sep 8];Available from: https://pubmed.ncbi.nlm.nih.gov/17530154/.
[5] Effect of antenatal pelvic floor muscle training on labor and birth - PubMed [Internet]. [cited 2022 Sep 8];Available from: https://pubmed.ncbi.nlm.nih.gov/19461423/
[6] Reilly ETC, Freeman RM, Waterfield MR, Waterfield AE, Steggles P, Pedlar F. Prevention of postpartum stress incontinence in primigravidae with increased bladder neck mobility: a randomised controlled trial of antenatal pelvic floor exercises. BJOG Int J Obstet Gynaecol 2002;109(1):68–76
[7] Your pelvic floor in pregnancy - BabyCentre UK [Internet]. [cited 2022 Sep 8];Available from: https://www.babycentre.co.uk/a536339/your-pelvic-floor-inpregnancy.
[8] Woodley SJ, Lawrenson P, Boyle R, Cody JD, Mørkved S, Kernohan A, et al. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. Cochrane Database Syst Rev 2020;2020(5):CD007471.
[9] El-Shamy FF, Abd El Fatah E. Effect of Antenatal Pelvic Floor Muscle Exercise on Mode of Delivery: A Randomized Controlled Trial. Integr Med Int 2017;4(3– 4):187–97.
[10] Zhao Y, Zou L, Xiao M, Tang W, Niu H yi, Qiao F yuan. Effect of different delivery modes on the short-term strength of the pelvic floor muscle in Chinese primipara. BMC Pregnancy Childbirth 2018;18(1):275-282.
[11] Sultan AH, Stanton SL. Preserving the pelvic floor and perineum during childbirth--elective caesarean section? Br J Obstet Gynaecol 1996;103(8):731–4.
[12] Dias LAR, Driusso P, Aita DLCC, Quintana SM, Bø K, Ferreira CHJ. Effect of pelvic floor muscle training on labour and newborn outcomes: a randomized controlled trial. Braz J Phys Ther 2011;15(6):487–93.
[13] Patients' knowledge of potential pelvic floor changes associated with pregnancy and delivery - PubMed [Internet]. [cited 2022 Sep 27];Available from: https://pubmed.ncbi.nlm.nih.gov/16003482/

[14] Effects of aerobic and strength conditioning on pregnancy outcomes - PubMed [Internet]. [cited 2022 Sep 27];Available from: https://pubmed.ncbi.nlm.nih.gov/3688075
[15] Du Y, Xu L, Lilu D, Wang Y, Wang Z. The effect of antenatal pelvic floor muscle training on labor and delivery outcomes: a systematic review with meta-analysis. Int Urogynecology J 2015;26-35.
[16] Critchley, C.J., 2022. Physical therapy is an important component of postpartum care in the fourth trimester. *Physical therapy*, *102*(5), p.pzac021.
[17] Ren S, Gao Y, Yang Z, Li J, Xuan R, Liu J, Chen X, Thirupathi A. The effect of pelvic floor muscle training on pelvic floor dysfunction in pregnant and postpartum women. Physical Activity and Health. 2020 Oct 29;4(1).
[18] Haakstad LA, Bø K. Exercise in pregnant women and birth weight: a randomized controlled trial. BMC pregnancy and childbirth. 2011 Dec; 11:1-7.
[19] Barakat R, Lucia A, Ruiz JR. Resistance exercise training during pregnancy and newborn's birth size: a randomised controlled trial. International journal of obesity. 2009 Sep;33(9):1048-57.
[20] Szumilewicz A, Santos-Rocha R. Exercise selection and adaptations during pregnancy. InExercise and Physical Activity During Pregnancy and Postpartum: Evidence-Based Guidelines 2022 Oct 27 (pp. 275-361). Cham: Springer International Publishing.
[21] Van Hauwaert R, Tomé A, de Almeida RP, Vilela F, Coutinho AL, Alpoim D, de Jesus RS, Virga E. Physical Exercise and Pelvic Floor Muscle Training: A Vital Tool in Mitigating Pelvic Floor Dysfunction During Pregnancy and Postpartum. Global Innovations in Physical Education and Health. 2025:169-202.
[22] Awal R, Sharma R. Role of a Physiotherapist in Women's Health. Journal of Scientific & Technical Research. 2024 Jul 1;14(2).
[23] Crump, C. and Freeman, B., 2021. Benefits and Risk Associated With Physical Exercise During the Antenatal Period.
[24] Zhang D, Bo K, Montejo R, Sánchez-Polán M, Silva-José C, Palacio M, Barakat R. Influence of pelvic floor muscle training alone or as part of a general physical activity program during pregnancy on urinary incontinence, episiotomy and third-or fourth-degree perineal tear: systematic review and meta-analysis of randomized clinical trials. Acta Obstetricia et Gynecologica Scandinavica. 2024 Jun;103(6):1015-27.