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COMPARISON OF NORMAL VAGINAL DELIVERY WITH OR WITHOUT ANTENATAL EXERCISE IN PRIMIGRAVIDA PRESENTING IN A TERTIARY CARE HOSPITAL

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Abstract

Objectives: *To compare the frequency of normal vaginal delivery with or without structured antenatal exercise in primigravida presenting in a tertiary care hospital.*

Study design: *Comparative observational study.*

Place and Duration of the study: *Combined Military Hospital, Peshawar from August-2024 to March-2025.*

Methodology: *A total of 250 primigravida women were included. They were divided into Group-E (structured antenatal exercise group) and Group-NE (no structured antenatal exercise group). These were women were followed up till the delivery of baby based on antenatal visit schedule proposed by National Health Services UK and frequency of normal vaginal delivery was documented and compared between groups. Data was analyzed using SPSS version 22.*

Results: *In this study, 250 primigravida women were included divided into two groups. Median age was 24.50 (5.00) years. Median pre-pregnancy BMI was 21.10 (2.00) kg/m2. Median week of gestation was 8.00 (1.00) weeks. Overall frequency of normal vaginal delivery in present study was 168 (67.20%) while remaining 82 (32.80%) women had cesarean section. In Group-E (n = 125), normal vaginal delivery occurred in 92 (73.60%) women while in Group-NE (n = 125), it occurred in 76 (60.80%) women, (p = 0.031).*

Conclusion: *Structured antenatal exercise can significantly increase the chances of normal vaginal delivery.*

INTRODUCTION

Pregnancy is a critical phase of female life in which certain biophysiological changes occur in the body to compensate for the metabolic needs of the growing life in the womb of the pregnant women. [1, 2] In majority of the cases, the course of pregnancy is uncomplicated but pregnancy in primigravida women carries certain risk that are unique to these women. [3] In uncomplicated pregnancies, it is a general consideration that women should not only continue their regular physical activity but they should also have addition of some form of regulated exercise program. [4] However, in general it is observed that during pregnancy most women rest a lot and their physical activity tends to decline. [5] In fact, according to a meta-analysis, amongst all the women

who get pregnant, only 13% continue to engage in some form of exercise during their pregnancy. [5]

There are several reasons for this declining exercise trend in pregnant women including inability of sparing some time dedicated to perform exercise, fear of losing the baby, fear of exercise to cause onset of early contractions, fearful to cause malformations in the baby and fearing the risk of vaginal bleeding due to exercise. [6, 7] At the same time, there are factors that have been found that encourage women to engage in antenatal exercise like maintaining the weight gain that normally occurs during pregnancy, to avoid health problems related to sedentary life style, feeling of enjoyment related to exercise and maintaining their physical appearance. [7]

Just like the discrepancy in the reason that drive women to exercise or not exercise in the antenatal period, there is a high degree of variation in the evidence regarding the potential benefits of antenatal exercise and its impact on the mode of delivery. There are studies that show that structured antenatal exercise can significantly increase the probability of having normal vaginal delivery while at the same time there are studies that show that there is no potential effect of such structured exercise programs during the antenatal period on the increasing the chances of having the baby through vaginal delivery. [8, 9] To answer this discrepancy in the previous literature and an important research question that whether or not structured antenatal exercise can increase the propensity of having vaginal delivery, present study was conducted with the aim to compare the frequency of normal vaginal delivery with or without structured antenatal exercise in primigravida presenting in a tertiary care hospital.

METHODOLOGY

This comparative observational study was conducted at Combined Military Hospital, Peshawar from August-2024 to March-2025 after getting approval from institutional ethical committee (Ref No: 00299/24). Sample size was calculated through World Health Organization (WHO) calculator and sample size was obtained through following formula:

$$n = \frac{\left\{ z_{1-\alpha/2}\sqrt{2\bar{P}(1-\bar{P})} + z_{1-\beta}\sqrt{P_1(1-P_1)+P_2(1-P_2)} \right\}^2}{\left(P_1 - P_2\right)^2}$$

Sample size calculation was performed by using level of significance 5%, power of 95% and anticipated frequency of normal vaginal delivery with or without structured antenatal exercise of 90.4% and 77.4%, respectively. [10] This gave a sample size of 250 (125 in each group). Study sample was selected by using non-probability consecutive sampling technique.

Inclusion criteria:

Women who were aged more than 16 years who did not have a habit of regular exercise, were nulliparous and primigravida and had gestational age not more than 12 weeks were included.

Exclusion criteria:

Patients with history of comorbid conditions (diabetes, hypertension, respiratory, cardiovascular, neurological or renal disease), history of abortion or miscarriage, thyroid disease, autoimmune disease, morbid obesity or polycystic ovarian syndrome were excluded.

Before being included in the current research, a written consent form was signed by the patients for their inclusion in the study and they were told about the purpose of study. After that baseline characteristics including age, pre-pregnancy body mass index (BMI), week of gestation, education status and occupation status were documented. After this, patients were educated regarding the two choices of exercise during the antenatal period from which they were requested to choose. One mode of exercise was the structured antenatal exercise program. In this program, women had to complete a structured exercise routine of sixty minutes daily with two sessions to be performed under the supervision of research team by visiting the institution. In this sixty minutes sessions, first five minutes were for warm up. This was followed up by forty minutes aerobic exercise and then 13 minutes of weight bearing exercise focusing mainly on the muscles of the pelvic floor. Last 2 minutes were kept for stretching exercise to cool down the body. Women who chose this mode of antenatal exercise were placed in Group-E. Second mode of exercise was not the structured antenatal exercise instead women were offered to continue with their routine physical activity during the day and were advised to walk on a flat surface for at least thirty minutes each

day. Women who chose this mode of antenatal exercise were placed in Group-NE. Allocation of patients in groups is demonstrated below in CONSORT patient flow diagram (Figure-1):

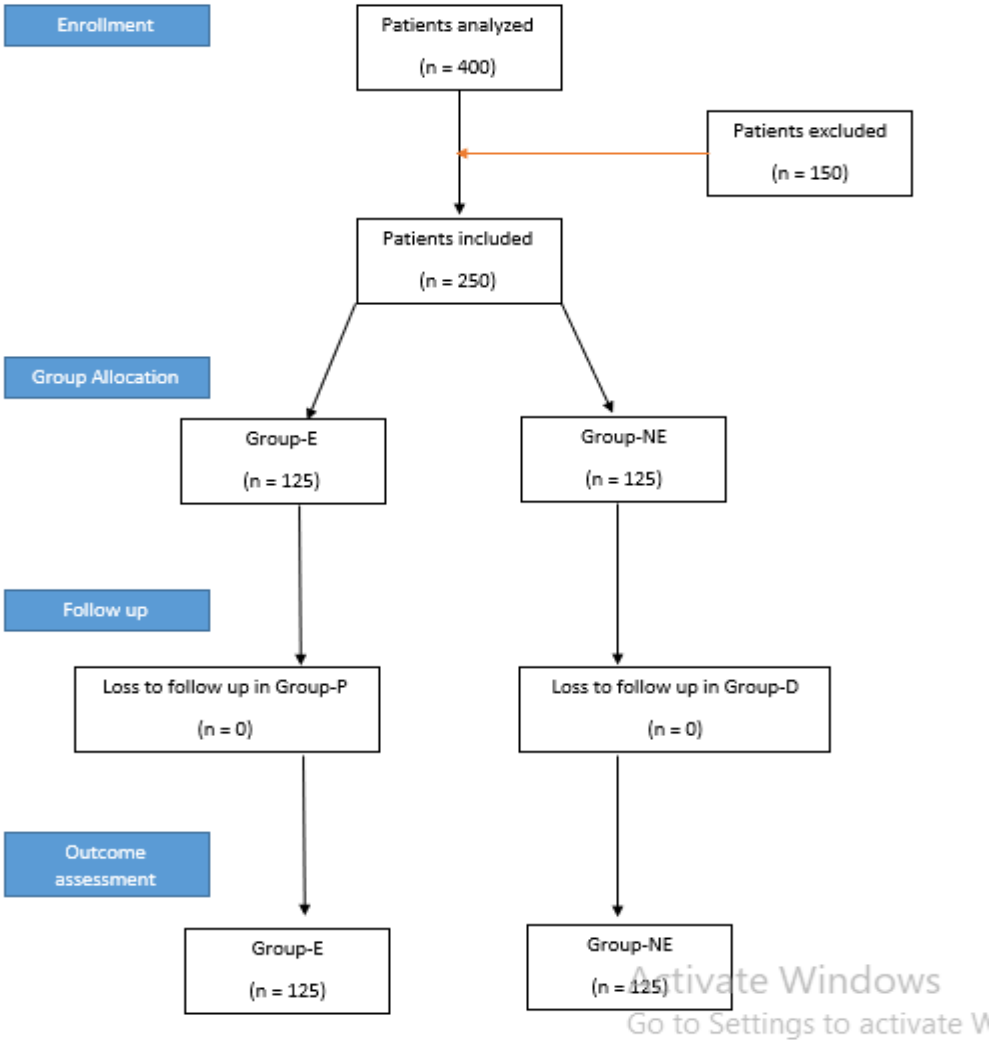

Figure-1: CONSORT patient flow diagram

All the women were followed up till the delivery of the baby through regular antenatal follow up visits as per National Health Services (NHS) antenatal visits schedule of United Kingdom (UK) and the mode of delivery either normal vaginal delivery of cesarean section was documented.

To statistically analyze the collected data, Statistical Package for Social Sciences (SPSS) software version 22 was used. Normality of quantitative data was checked by Kolmogorov-Smirnov test which showed that age, pre-pregnancy BMI and week of gestation were not distributed normally and were thus represented as median interquartile range (IQR). Qualitative variables (education status, occupation status and normal vaginal delivery) were presented as frequency and percentages. To compare age, pre-pregnancy BMI and week of gestation between groups, Mann Whittney U-test was used. To compare qualitative variables (education status, occupation status and mode of delivery) between groups, Chi-square test was used. A p-value of ≤ 0.05 was considered as statistically significant.

RESULTS

In this study, 250 primigravida women were included. Median age was 24.50 (5.00) years. Median

pre-pregnancy BMI was 21.10 (2.00) kg/m2. Median week of gestation was 8.00 (1.00) weeks. Amongst included women, 132 (52.80%) were illiterate and 118 (47.20%) were literate. Regarding occupational status, 130 (52.00%) women were house wives and 120 (48.00%) were employed. Baseline demographics of patients are compared between groups in Table-I:

Table-I: Comparison of baseline demographics of patients in two groups (n = 250)

Parameter	Group-E (n = 125)	Group-NE (n = 125)	p-value
Median age	24.00 (5.50) years	26.00 (5.00) years	0.183
Median BMI	21.20 (1.70) kg/m2	21.10 (2.00) kg/m2	0.319
Median week of gestation	8.00 (1.00) weeks	8.00 (1.00) weeks	0.621
Education status			
Illiterate	67 (53.60%)	65 (52.00%)	0.800
Literate	58 (46.40%)	60 (48.00%)	
Occupation			
House wife	62 (49.60%)	68 (54.40%)	0.448
Employed	63 (50.40%)	57 (45.60%)	

Overall frequency of normal vaginal delivery in present study was 168 (67.20%) while remaining 82 (32.80%) women had cesarean section. In Group-E (n = 125), normal vaginal delivery occurred in 92 (73.60%) women while in Group-NE (n = 125), it occurred in 76 (60.80%) women, (p = 0.031). Comparison of mode of delivery between groups is given in Table-II:

Table-II: Comparison of mode of delivery between groups (n = 250)

Mode of delivery	Group-E (n = 125)	Group-NE (n = 125)	p-value
Normal vaginal delivery	92 (73.60%)	76 (60.80%)	0.031
Cesarean section	33 (26.40%)	49 (39.20%)	

DISCUSSION

Pelvic floor muscles play a crucial role in childbirth and the maintenance of the function of pelvic organs after the childbirth since after normal vaginal childbirth there are certain changes in the physiological function and strength of muscles of this region. [11, 12] Antenatal exercise has been considered to play a major role in improving the strength of these muscles in pregnant women, reducing the pain in pelvis after delivery and preventing the disorders of pelvic floor post-partum. [13, 14] Present study thus focused on determining the impact of structured exercise programs during the antenatal period on the mode of delivery.

In present study, there was no difference of statistical significance between study groups based on age (p = 0.183), BMI (p = 0.319), week of gestation (p = 0.621), education status (p = 0.800) and occupation status (p = 0.448). Interestingly, the composite frequency of primigravida women who had their baby delivered through normal vaginal delivery was 67.20% while those who underwent cesarean section made up 32.80% of the women. This rate of cesarean section was alarmingly high and the exact reason for this in present study is unknown. One possible reason can be the inclusion of primigravida women only in present study and primigravidity has been found to increase the chances of having cesarean delivery. [15, 16] Additionally, the rate of cesarean delivery in present study was also much higher than the general acceptable rate of this mode of delivery which ranges between 10% and 15%. [17] In Pakistan, however, a study was conducted by Jadoon et al. [18] in which this rate of cesarean delivery was 44% which was even higher compared to current

study while normal vaginal delivery occurred in only 56% of the women.

Upon comparative analysis of the mode of delivery being vaginal delivery among primigravida women with or without structured antenatal exercise it was found that those primigravida women who followed a structured antenatal exercise regimen throughout there antenatal period had significantly higher proportion to have successful normal vaginal delivery ($p = 0.031$). Compared to this, Chauhan et al. [19] reported similar results with higher frequency of pregnant women to deliver the baby vaginally who continued to have exercise regularly during their antenatal period. Similarly, Wadhwa et al. [20] also found that those women who went through a structured antenatal exercise program were significantly more likely to have normal vaginal delivery ($p < 0.05$). The main reason behind this is hypothesized to be the beneficial effect of these exercise programs to strengthen the core of pregnant women as well as their pelvic floor muscles that help in delivering the baby vaginally. On the contrary, Sobhgol et al. [21] found that engaging in a specified antenatal program of exercising did neither had any impact on the labor nor on the mode and outcome of birth. Similarly, Watkins et al. [8] and Carrascosa et al. [9] reported that such structured regimens of exercises in pregnancy does not have any significant impact on the frequency of women to have vaginal childbirth. This difference, however, is likely due to the differences in the type of exercise regimens being used in these studies compared to the current study which may not be adequate enough to have a significant impact on the mode of delivery.

Results of present study clearly reflect the advantages of having structured antenatal exercise program in place for primigravida women in terms of increased chances to have normal vaginal delivery. Therefore, inclusion of this exercise protocol in the usual antenatal care is strongly recommended to reduce the rising rates of CS delivery in Pakistan.

LIMITATIONS

There we no limitations of present study.

CONCLUSION

In conclusion, structured antenatal exercise can significantly increase the chances of normal vaginal delivery.

CONFLICT OF INTEREST

None.

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