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Original Research Article

Effectiveness of patterned breathing techniques on maternal and newborn outcome among intranatal primi women at Government Doon Medical College and Hospital Dehradun, Uttarakhand, India

Arti*, Bijaya Mohanta

Department of Obstetrics and Gynecology, State College of Nursing, Dehradun, Uttarakhand, India

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***Correspondence:**
Arti,
E-mail: negi4482@gmail.com

ABSTRACT

Background: Aim and the objectives of the study were to assess the maternal and newborn outcome, effectiveness of patterned breathing technique on maternal and newborn outcome among intranatal primi women at Government Doon Medical College and Hospital Dehradun, Uttarakhand.
Methods: This was a quasi-experimental research study conducted at the department of obstetrics and gynecology, Government Doon Medical College and Hospital Dehradun, Uttarakhand, India from June 1st to June 30th, 2023. The study comprised 60 samples selected through purposive sampling technique, adhering to specific inclusion and exclusion criteria. Microsoft office tools were employed for data processing and analysis. The analytical approach employed was descriptive and inferential in nature.
Results: There was significant difference ($p<0.001$) between mean maternal and newborn outcome among experimental and control group after performing patterned breathing exercise.
Conclusions: The patterned breathing technique is statistically significant. Thus, the investigator concluded that patterned breathing exercise helps in improving the maternal and newborn outcome among intranatal primi women.

Keywords: Effectiveness, Intranatal primi women, Maternal outcome, Newborn outcome, Patterned breathing techniques

INTRODUCTION

Childbirth is the most beautiful experience of the women's life and it is the starting of a new journey called "Motherhood".[1] Experience of the Childbirth process is totally a subjective feeling that depends on the interpretation and experience of the birthing process. Some women experience childbirth as beautiful while some experience it as stressful, exhausting, and hard work, which is unpredictable.[2]

Natural and non-pharmacological ways that are used traditionally for relieving pain during labour are breathing exercises, hypnosis, yoga meditation, changing positions, a warm bath and taking a shower, walking, listening to music, water immersion, acupuncture, massage, warm and cold compress, birthing ball, aromatherapy and continuous supportive care of the closed one.[3,4]

Based on a recent report from WHO (2021), the global rate of caesarean sections increased from 7% in 1990 to 21% currently (2023), with the trend predicted to continue throughout the current decade. India has also seen a surge in C-sections, rising from 8.5% to 17.9% in the past decade. The driving factor behind this trend is often the fear of pain associated with natural childbirth. The report predicts that by 2030, the highest C-section rates will be found in Eastern Asia (63%), Latin America and the Caribbean (54%), western Asia (50%), northern Africa (48%), southern Europe (47%) and Australia and New Zealand (45%).[5]

In India, from 2015 to 2020, there was a rise in C-section births. The number of C-section births is high in more than half of the states. In the first round of the NFHS-5 (National Family Health Survey-5), 2019-2020, Telangana had the greatest percentage (66.7%) of C-section births, while Nagaland had the lowest percentage (5.2%). Kerala (42.4%), Andhra Pradesh (42.4%), Lakshadweep (31.3%), Jammu and Kashmir (41.7%) and Goa (39.5%) were the top five states with the highest C-section rates in the NFHS-5. Meghalaya (8.2%), Bihar (9.7%), Mizoram (10.8%), Assam (18.1%), and Himachal Pradesh (21.0%) were the five states with less C-section deliveries.[6]

In India, there are several states with varying maternal mortality rates such as Bihar, Odisha, Rajasthan, Chhattisgarh, Madhya Pradesh, Uttar Pradesh and Assam have a 'very high' maternal mortality rate, with 130 or more maternal deaths per 100,000 live births. In Uttarakhand, West Bengal and Punjab have a 'high' maternal mortality rate, with 100-130 maternal deaths per 100,000 live births. On the other hand, Karnataka and Haryana have a 'low' maternal mortality rate, with 71-100 maternal deaths per 100,000 live births.[7]

In Uttarakhand, the direct causes which contribute in maternal mortality are hemorrhage 22.9%; eclampsia 14.6%, ectopic pregnancy 2.1%, and amniotic fluid embolism 2.1% and indirect causes are anemia 16.6%, jaundice 12.5%, heart diseases 6.2% and other communicable diseases 6.3%. The causes of infant death are preterm with birth asphyxia 13.9%, septicemia 16.8%, and perinatal asphyxia 13.9%.[8]

Breathing properly reduces the risk of assisted vaginal birth and trouble during labour. Shallow and uncoordinated breathing can lead to maternal exhaustion which ultimately results in fetal distress and long-term maternal postnatal complications.[9] However, breathing co-ordinately and rhythmically during the active phase of labour can help in increased oxygen flow to the body which reduces the risk of fetal distress as well as the chances of fetal death.[10,11]

Objectives of the study

To assess the maternal and newborn outcomes among intranatal primi women in both experimental and control group. To evaluate the effectiveness of patterned breathing techniques on maternal and newborn outcomes among intranatal primi women in both experimental and control group.

METHODS

Research approach and design

It was a quantitative research approach which employed quasi-experimental (non-equivalent control group post-test only) research design.

Setting of the study

Study took place at Government Doon Medical College and hospital Dehradun, Uttarakhand.

Study time

The duration of the study was 4 weeks (1 June 2023 to 30 June 2023).

Target population

The target population of the study consisted of intranatal primi women who had completed 37 weeks of gestation.

Accessible population

The accessible population of the study included all the intranatal primi women who were admitted in Government Doon Medical College and hospital Dehradun, Uttarakhand.

Sample

The samples for the study were intranatal primi women who fulfilled the inclusion criteria of the study.

Sampling technique

Non probability purposive sampling technique was used for the selection of samples in experimental and control group.

Data collection tool

The tool consists of three sections: section A- demographic variables. It consisted of 7 variables which include age of women, body mass index, gestational age, educational status, type of family, dietary pattern and physical activity during pregnancy. Section B- observational checklist to evaluate maternal outcome. It is a self structured observational checklist, which consists of 15 variables-conducted normal vaginal delivery, consciousness, fatigue, vitals after delivery, oxygen saturation, episiotomy, perineal tear, duration of third stage of labour, separation of placenta, signs of PPH, overall duration of labour, performed delayed cord clamping, overall duration of labour, maintained immediate skin to skin contact with baby and time of initiation of breast feeding. Section C: checklist to assess newborn outcome. APGAR score is used to assess newborn outcome. It is the standard tool. Newborn apgar score had 5 components- activity, pulse rate, grimace, appearance and respiration.

Ethical approval

The permission was taken from appropriate authority conducted in Government Doon Medical College and hospital Dehradun, Uttarakhand.

Data collection procedure

Data collection process started after obtaining administrative and ethical permission from concerned authorities in nursing college and hospital. Investigator explained about the study and its purposes and requested to each participant to sign the written consent those who fulfilled the inclusion criteria. The first 30 participants were taken as experimental and then other 30 taken as control group in order to prevent the biasness.

In experimental group, patterned breathing techniques along with routine treatment was given to the participants during 1st, 2nd and 3rd stage of labour. After the delivery of the baby the maternal and newborn outcome was assessed. In control group, only routine treatment is provided to the participants during the labour process. After the delivery of the baby the maternal and newborn outcome was assessed. The data were collected as per protocols with maintaining the strictest confidentiality.

Data analysis

The data analysis was planned on the basis of objectives of the study and its hypothesis. The frequency, percentage and mean were computed to describe the sample characteristics. Unpaired t-test was used to find the effectiveness of patterned breathing techniques on maternal and newborn outcome.

RESULTS

Table 1 suggests that majority 19 (63.3%) of women were in age group of 18-23 years in experimental group and 16 (53.3%) were in control group. It was observed that majority 20 (66.7%) of women had BMI 18.5-24.9 (normal) in experimental group and 17 (56.7%) had BMI≥25 (overweight) in control group. In this study, majority 17 (56.7%) of women had gestational age between 39-40 weeks in experimental group and 37-38weeks in control group. As per the educational status of women, majority 17 (56.7%) of women were fall between graduate and above category in both experimental and control group respectively. In this series, majority 17 (56.7%) belongs to the nuclear family in experimental group and 25 (83.3%) in control group. As per the dietary pattern, majority 17 (56.7%) had non vegetarian dietary habits in experimental and 18 (60%) in control group. With regards to the physical activity, majority 17 (56.7%) of women were not performing any physical activity during pregnancy in experimental group whereas 19 (63.3%) performing physical activity during pregnancy in control group.

Table 1: Frequency and percentage distribution of socio-demographic variables of participants in experimental and control group (N=60).

Variables	Sub variables	Experimental group frequency (%)	Control group frequency (%)
Age in years	18-23	19 (63.3)	16 (53.4)
	24-29	8 (26.7)	13 (43.3)
	30-35	3 (10)	1 (3.3)
Body mass index	18.5-24.9 (normal)	20 (66.7%)	13 (43.3)
	≥25 (overweight)	10 (33.7)	17 (56.7)
Gestational age of mother	37-38 weeks	13 (43.3)	17 (56.7)
	39-40 weeks	17 (56.7)	13 (43.3)
	>40 weeks	0	0
Educational status of women	No formal	1 (3.3)	1 (3.3)
	Primary	4 (13.3)	4 (13.3)
	Secondary	8 (26.7)	8 (26.7)
	Graduate and above	17 (56.7)	17 (56.7)
Type of family	Nuclear	17 (6.7)	25 (83.3)
	Joint	13 (43.3)	5 (16.7)
Dietary pattern	Vegetarian	13 (43.3)	12 (40)
	Non vegetarian	17 (56.7)	18 (60)
Perform any physical activity during pregnancy	Yes	13 (43.3)	19 (63.3)
	No	17 (56.7)	11 (36.7)
If yes, specify	Walking	10 (33.3)	12 (40)
	Exercise	1 (3.3)	3 (10)
	Yoga	2 (6.7)	4 (13.3)

Table 2: Findings related to maternal outcome among experimental and control group.

Maternal outcome	Experimental group frequency (%)	Control group frequency (%)
Poor maternal outcome (0-5)	0	2 (6.7)
Average maternal outcome (6-10)	3 (10)	18 (60)
Good maternal outcome (11-15)	27 (90)	10 (33.3)

Table 2 outlines the maternal outcome in experimental and control group. Findings suggested that, majority of women 27 (90%) had good maternal outcome in experimental group while in control group, majority 18 (60%) of women had average maternal outcome.

Table 3 shows distribution of newborn outcome among experimental and control group on 1 minute Apgar score assessment. Majority 27 (90%) of newborn were in excellent condition in experimental and 22 (73.3%) were in control group.

Regarding 5 minutes Apgar score assessment, majority 29 (96.7%) and 27 (90%) of newborn were in excellent condition in both experimental and control group respectively.

Table 3: Distribution of maternal outcome among experimental and control group.

Newborn outcome	Experimental group frequency (%)	Control group frequency (%)
APGAR score at 1 minute		
Severely depressed (0-3)	0	0
Moderately depressed (4-6)	3 (10)	8 (26.7)
Excellent condition (7-10)	27 (90)	22 (73.3)
APGAR score at 5 minutes		
Severely depressed (0-3)	0	0
Moderately depressed (4-6)	1 (3.3)	3 (10)
Excellent condition (7-10)	29 (96.7)	27 (90)

Table 4: Findings related to effectiveness of patterned breathing techniques on maternal outcome among experimental and control group.

Maternal outcome	Experimental group (N=30)	Control group (N=30)	Mean difference	't'-value	P value
	Mean±SD	Mean±SD			
Good outcome	13.33±1.21	12.5±1.35	1.05	3.17	0.002**
Average outcome	9.67±0.58	8.89±1.02	0.78	3.69	0.0006***
Poor outcome	-	4.5±0.7	4.5	34.71	0.0001***

*Significant at p<0.01

Table 5: Findings related to effectiveness of patterned breathing techniques on newborn outcome among experimental and control group.

Newborn outcome	Experimental group (N=30)	Control group (N=30)	Mean difference	't'-value	P value
	Mean±SD	Mean±SD			
1 minute APGAR score					
Excellent condition	8.29±0.47	7.5±0.6	0.79	5.68	0.0001***
Moderately depressed	6±0	5.63±0.52	0.37	3.89	0.0003***
Severely depressed	-	-	-	-	-
5 minutes APGAR score					
Excellent condition	9.34±0.72	8.37±0.93	0.97	4.51	0.001***
Moderately depressed	6±0	5.67±0.33	0.33	5.5	0.0001***
Severely depressed	-	-	-	-	-

*Significant at p<0.01

Tables 4 and 5 illustrate the comparison of post-test mean score of maternal and newborn outcome in experimental and control group. This shows there was significant difference in the scores of maternal and newborn outcomes in experimental and control group, which was highly significant at the level p<0.001.

DISCUSSION

In this series, the majority of women (63.3%, 53.4%) belong to age group of 18-23 years among experimental and control group respectively. Regarding body mass index, majority (66.7%) had normal BMI in experimental and (56.7%) had BMI more than normal in control group. Highest (56%) of women had gestational age between 39-40 weeks in experimental and 37-38 weeks in control group. As per their educational status, majority (56.7%) were fall between graduate and above category in both experimental and control group respectively. Regarding their dietary pattern majority (56.7%) had non-vegetarian dietary habit in experimental whereas (60%) in control group. With the regard to physical activity, majority (56.7%) were not performed any physical activity in experimental group while in control group majority (63.3%) performed physical activity during pregnancy. These findings were comparable to the study done by Meenakshi, where out of 30 samples 25 (83.33) in experimental group and 24 (80%) in control group belongs to age group of 20-30 years. Majority 30 (100%) samples were having term pregnancy (37-42 weeks). Educational status majority of women 11 (36.67%) were had primary education in experimental group and 11 (36.67%) had secondary education. Previous information about exercise, yoga, changing position and massage majority 29 (96.67%) had no knowledge about it.[12]

In this study, the result related to maternal outcome revealed that, majority of women (90%) had good maternal outcome in experimental group while in control group, majority (60%) of women had average maternal outcome. Related to the newborn outcome, 1 minute Apgar score assessment suggested, highest (90%) of newborn were in excellent condition in experimental and (73.3%) were in control group. Regarding 5 minutes Apgar score assessment, majority (96.7%) and (90%) of newborn were in excellent condition in both experimental and control group respectively. The similar findings were found in the study conducted by Padmaja et al, the result showed that among 60 samples (63.3% and 30%) had satisfied outcome in experimental group and control group respectively. In relation to the newborn outcome majority 63% had normal APGAR score in experimental group and 33.3% control group.[1]

The comparison of newborn outcome suggested the mean of 1 minute APGAR score among experimental group was (8.29±0.47) and in control group (7.5±0.79) with the mean difference of 0.79 (t=5.68, p=0.0001) which is significant at the level p<0.001. The comparison of the mean of post-test outcome suggested that there is significant difference between the mean of maternal and newborn outcome among experimental and control group. The mean of maternal outcome between experimental (13.55±1.21) and control group (12.5±1.35) with mean difference 1.05 (t=3.17, p=0.002) which is significant at the level p<0.001. The findings were supported by the study conducted by Anjum, the result revealed that the mean of experimental group was 22 which was higher than the mean value of control group 20.27. The t-value of maternal outcome was t=1.567 (p=0.126) which is significant at p<0.05 level.[13]

The duration of the study is limited to the 4 weeks. The samples were limited to intranatal primi women in Government Doon Medical College and Hospital Dehradun, Uttarakhand. Very few studies had been done on this topic, the researcher had difficulty to find out the reviews.

CONCLUSION

Mean post test score of maternal and newborn outcome among experimental group (13.55±1.21) and (8.29±0.47). In control group mean post test score of maternal and newborn outcome (12.5±1.35) and (7.5±0.79). The comparison of means suggested that there is statistically significant difference between the outcome of two groups. It means there was significant improvement in maternal and newborn outcome among intranatal primi women after performing patterned breathing techniques.

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