https://doi.org/10.65829/rvcn2022.1013

RV JOURNAL OF NURSING SCIENCES
VOLUME5|ISSUE 2|APRIL-JUNE 2026 E-ISSN No. 2583-472X
rvjns.rvcn@rvei.edu.in | Email: rvjns.rvcn@rvei.edu.in

THE ASSOCIATIONAL STUDY OF BIRTHINGBALLEXERCISEANDSACRALMASSAGEON MATERNAL AND FETAL WELL-BEING AMONG PRIMI PARTURIENT MOTHERS DURING LABOR

Dr.SundaramM[1], Dr.BhuvaneswariG[2], Dr. Chandrika Anand[3]
[1]Vice principal cum HOD of Obstetrics and Gynecology Nursing, Padmashree Institute of Nursing, Bangalore.
[2]Guide, Epidemiology and Public Health, Community Health Nursing, Saveetha College of Nursing, Chennai.
[3]Co guide, Department of Obstetrics and Gynecology, Padmashree Institute of Clinical Research, Bangalore.
Email: sreesrithina@gmail.com. Ph.No. 77955 97577

ARTICLEINFO

Article history:
Received 05 January 2025
Received in revised form 20 March 2025
Accepted 24 March 2025

Keywords: Parturition mothers, first stage of labor, birthing ball technique and sacral massage

ABSTRACT

Background: A variety of non-pharmacological methods are known to alleviate pain during labour. One among them is by improving the level of comfort, sense of control and overall well-being of the women[1]. During the crucial period in the first stage of labour, birthing ball exercise and sacral massage were administered to mothers[2]. The goal of these interventions is to benefit the primi parturient mother in coping with labour pain and improve the delivery process[3].

Aim: The aim of this study was to find association between the post test level of maternal and fetal wellbeing with their selected demographic variables among parturient women in control and experimental group.

Methods: An experimental study with a pre-test and post-test and a control group design was used. 300 primigravidae mothers were selected by purposive sampling method. 150 were assigned to control and 150 to experimental group after obtaining voluntary informed consent. This research was carried out at Shanthakumari Maternity Health Centre (Moodalapalya, Bengaluru, Karnataka) and Hoshahalli Maternity Health Centre (Vijayanagar, BBMP, Bengaluru, Karnataka). Birthing ball exercise and sacral massage were given to the first-time mothers in the experiment group during active phase of labour, while the control group was given routine care. Visual analogue scale for pain assessment and GAD-7 anxiety severity scale for anxiety measurement were used. Modified WHO partograph for primi parturient women was used to monitor cervical dilatation and uterine contraction. Chi-square test was used for statistical analysis.

Results: The comparison of control and experimental groups of demographic variables for homogeneity. Comparing the age, 86 (57.3%) were <25 years and 64(42.7%) were>26 years in experimental group, where as in control group 105(70%) were <25 years and 45(30%) were >26 years (P = 0.031) andthe obstetrical variables such as type of delivery, fetal complications, duration of 1st, 2nd stage of labour were statistically significant (p<0.05), while APGAR scoring and demographic variables such as age, education, residence and gestational age in week were not significant

Conclusion: The present study described that the association between the level of maternal and fetal wellbeing with their selected demographic variables and obstetrics variables among parturient women in the control and experimental groups. In the present study, the obstetrical variables such as type of delivery, fetal complications, duration of 1st, 2nd stage of labour were statistically significant (p<0.05), while APGAR scoring and demographic variables such as age, education, residence and gestational age in week were not significant.

Categories: Obstetrics/Gynecology, Pain Management, Therapeutics

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INTRODUCTION

Childbirth is a natural occurrence and a great gift. It is a unique feature of homeo sapiens[4]. Several physiological processes occur in a sequential manner combined with a happy feeling and at the same time pain, discomfort, anxiety and several other unexplainable feelings[5]. Labor is a complicated physiological occurrence resulting in the delivery of the baby along with umbilical cord, membranes and placenta[6]. This usually occurs between 37 to 42 weeks. For a women leading a normal health life the childbirth is considered as one of the most expected happening in a woman's life[7]. Though, the childbirth is a pleasant experience, it is accompanied by disturbing feelings to the pregnant women as well as the family [8]

Though, the birth of a child is a pleasant experience and joyful event to the mother, it is a little painful and causes stress[9]. Mechanical distension, position of the child and the mother, contractions and additionally the pain during labor and the anxiety[10]. Controlling the pain during labor for a mother is essential part of the obstetric and maternity care[11]. Usage of drugs if avoided is preferable due to side effects. Pain management by alternate and general methodologies practiced by people in many regions and races can be a suitable solution[12].

The labor pain has to be controlled appropriately and one of the reported methods are the birthing-ball technique[13]. It is an air-filled rubber ball providing adequate area for the pregnant women to sit on that and do the exercises. If offers a suitable environment and broadens the pelvic outlet resulting in suitable cervical dilatation[14].

MATERIALS AND METHODS

Participants

A total of 300 pregnant women were recruited for this study and the details on inclusion-exclusion criteria, setting of the study, experimental design, the usage of birthing-ball combined with sacral massage and the ethical concerns are given in earlier chapters.

METHODOLOGY

An experimental study with a pre-test and post-test and a control group design was used. 300 primigravidae mothers were selected by purposive sampling method. 150 were assigned to control and 150 to experimental group after obtaining voluntary informed consent. Birthing ball exercise and sacral massage were given to the first-time mothers in the experiment group during active phase of labour, while the control group was given routine care. Visual analogue scale for pain assessment and GAD-7 anxiety severity scale for anxiety measurement were used. Modified WHO partograph for primi parturient women was used to monitor cervical dilatation and uterine contraction. Variables such as age, education, residence and obstetrical variables viz., gestational age, antenatal visits, pain management during I-Stage of labor, type of delivery, fetal complications, duration of I and II-Stage of labour and APGAR score were noted.

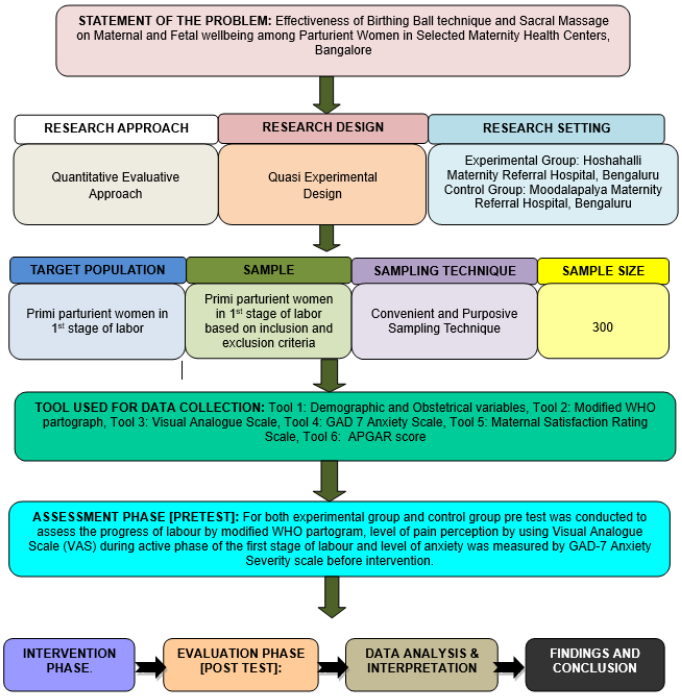

Figure 2.1: Schematic representation of the study

https://doi.org/10.65829/rvcn2022.1013

FIGURE1: CONSORT

Intervention protocol flow chat*Restrictions on eating and drinking ,intravenous lines, electronic fetal monitoring ,augmentation (speeding up labor), artificially breaking the waters , episiotomy , vaginal examinations , lying down during labor and coach pushing

Statistical Analysis

The data on socio-demographic and clinical variables were expressed as frequency table. The frequencies were analyzed by $\chi 2$-square test for goodness of fit (homogeneity) or independence. The selected probability for significance was set as <0.05. Sigma Plot 14,5 version was used for the statistical analysis (Systat Software Inc., San Jose, USA).

RESULT:

Association between the post test level of maternal and fetal wellbeing with their selected demographic variables among parturient women in control and experimental group.

Table1: Comparison of control and experimental groups of demographic variables for homogeneity by $\chi 2$ tests.

S.No	Variable	Categories	Con	Exp	Statistical analysis
1	Age	< 25 years	105	86	$\chi 2 = 4.669$ P = 0.031
		> 26 years	45	64	
2	Education	No formal education	23	39	$\chi 2 = 5.218$ P = 0.074
		School education	81	70	
		Graduate and above	46	41	
3	Residence	Urban	115	89	$\chi 2 = 9.574$ P = 0.002
		Rural	35	61	

Con = Control, Exp = Experimental, n = 150 each

The Table 1, details the comparison of control and experimental groups of demographic variables for homogeneity. Comparing the age, 86 (57.3%) were <25 years and 64(42.7%) were>26 years in experimental group, where as in control group 105(70%) were <25 years and 45(30%) were >26 years (P = 0.031). With regard to education, 39(26%) of them had no formal education,70 (46.7%) of them had school education and41(27.3%) of them were graduate in experimental group, where as in control group 23(15.3%) of them had no formal education,81(54%) of them had school education and 46(30.7%)of them were graduate (P= 0.074). With regard to residence, 89 (59.3%) of them belonged to urban community and 61(40.7%) of them belonged to rural community in experimental group, where as in control group 115(76.7%) of them belonged to rural community and 35 (23.3%)of them belonged to urban community (P = 0.002)

2 . Association between the post test level of maternal and fetal wellbeing with their selected obstetrical variables among parturient women in control and experimental group.

Table 2: Comparison of control and experimental groups on obstetrics variables.

S.No	Variable	Category	Con	Exp	Statistics
1	Gestational age (weeks)	37 – 38	-	-	$\chi 2 = 0.0$ P = 1.0
		39 – 40	150	150	
		41 – 42	-	-	
2	Antenatal visits (number)	< 4	11	0	$\chi 2 = 16.933$ P < 0.001
		4 – 8	88	114	
		> 8	51	36	
3	Pain management (analgesia) during first stage of labour	Systemic	-	-	$\chi 2 = 0.0$ P = 1.0
		Inhalation	-	-	
		Epidural	-	-	
		None	150	150	
4	Type of delivery	Normal vaginal	85	150	$\chi 2 = 82.979$ P < 0.001
		Forceps	51	0	
		Vacuum	14	0	
		CS	0	0	
5	Fetal complications	Prolapsed cord	6	0	$\chi 2 = 280.709$ P < 0.001
		Respiratory Distress	8	0	
		Meconium aspiration	136	5	
		None	0	145	
6	Duration of first stage of	8 – 9	16	11	$\chi 2 = 49.670$

	labour (hours)	9 – 10	38	81	P < 0.001
		10 – 12	63	58	
		> 12	33	0	
7	Duration of second stage of labour (minutes)	31 – 40	67	59	$\chi 2 = 90.152$ P < 0.001
		41 – 50	26	90	
		51 – 60	11	1	
		> 60	46	0	
8	APGAR score of new-born at 5 minutes of birth	0 – 3	-	-	$\chi 2 = 3.596$ P = 0.058
		4 – 6	14	5	
		7 – 10	136	145	
Con = Control, Exp = Experimental, n = 150 each, - Zero value and not taken for analysis.					

The Table 2- details the comparison of control and experimental groups on obstetrics variables. With regard to gestation age in week all, 300(100%) of parturient mothers in the control-experimental groups belonged to 39 to 40 weeks of gestational age (P = 1.0). With regard to number of antenatal visits, the majority of 114(76%) parturient mothers in the experimental and 88(58%)in the control group had 4 to 8 times visit during antenatal period. In regard to pain management during I-Stage of labour, 300 (100%) of parturient mothers in the control-experimental groups, not had any sort of pain management during I-Stage of labour (P = 1.0). In regard to type of delivery all, 150 (100%) of parturient mothers in the experimental had normal vaginal delivery whereas, in control 85(56.7%) of parturient mothers had normal vaginal delivery, 51(34%) of parturient mothers had forceps delivery and 14(9.3%) of parturient mothers had vacuum delivery (P < 0.001). In regard to fetal complications, only 5(3.3%) of the parturient mother's fetus had meconium aspiration in experimental group where as in control group, majority, 136 (90.6%) of the parturient mother's fetus had meconium aspiration (P < 0.001). In regard to duration of I-Stage of labour, in experimental group majority, 81(54%) of parturient mothers had 9 to 10 hour duration, whereas 63(42%) of parturient mothers had 10-12 hours duration in control group (P < 0.001). With regard to duration of II-Stage labour, in experimental group majority, 90 (60%) of parturient mothers had 41 to 50 min duration, whereas 46(30.6%) of parturient mothers had more than 60 min duration in control group (P < 0.001).

With regard to APGAR score majority, 145(96.6%) of the parturient mother's child had score between 7 to 10 at 5 min of birth in experimental group where as 136(90.6%)of the parturient mother's child had score between 7 to 10 at 5 min minutes of birth in control group (P = 1.0).

Discussion

The present study (n = 300) describes the specific and relevant extraneous or confounding (background) variables of parturient mothers. Table 1 shows demographic variables of parturient mothers such as age, education and residence. Table 2 shows obstetrical variables of parturient mothers such as gestational age, antenatal visits, pain management during I-Stage of labor, type of delivery, fetal complications, serration of I and II-Stages of labor and APGAR score of new born. This study showed significance in variables viz., gestational age, number of antenatal visits, pain management during first stage of labor, type of delivery, fetal complications, serration of I and II-Stage of labor, while APGAR scoring and demographic variables such as age, education, residence were not significant.

A study conducted hashed et tal (2022) with an intervention for pregnant women showed similarity in the age of the control and experimental groups (n = 160), around 25to 30 years. The education and occupation of the two groups were also of similar proportion and also showed similar age group (n = 200). Majorities were from rural areas and were living in nuclear family[15].

A study was carried out in Hongkong by Lai and coworkers (2021) on an intervention program (massage-therapy) for the pregnant women (n = 600). They also reported no significant differences among the groups in terms of maternal age and other demographic characteristics[16].Pinar et al (2021) also carried out an intervention study (RCT) for pain, anxiety and other related symptoms of pregnant women (n = 40 + 40) showed a similarity in age. The education (graduates) and type of family (nuclear) also showed equal[17].The study with birthing-ball intervention by Abo-Hatab TAet tal(2020) at I-Stage of labor in pregnant women (n = 120), selected an age group between 20 to 30. Majority of them completed the schooling and did not get any health education.. These publications reveal that selecting a homogenous group for the control and experimental groups would bring the unbiased result of the selected intervention.

CONCLUSION

In the present study, the obstetrical variables such as type of delivery, fetal complications, duration of 1st, 2nd stage of labour were statistically significant ($p<0.05$), while APGAR scoring and demographic variables such as age, education, residence and gestational age in week were not significant. **Antenatal education programs should include** sessions on birthing ball exercises and sacral massage to increase awareness and acceptance among expectant mothers

ETHICAL APPROVAL

Ethical clearance was obtained from the institutional ethics committee of Saveetha Institute of Medical and Technical Sciences, Chennai, India (Approval no 006/02/2022/IEC/SMCH Date: 14/02/2022).The participants gave their consent and were provided with both written and verbal information about the study

Participant Consent for Publication: A written informed consent was obtained from the patients.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contribution: All the authors have made substantial contributions to conception and design, acquisition of data, analysis and interpretation of data, involved in drafting he manuscript and revising it critically for important intellectual content and have given final approval of the version to be published.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The authors received no financial support for the research and/or authorship of this article

REFERENCES

1. Nori W, Kassim MA, Helmi ZR, Pantazi AC, Brezeanu D, Brezeanu AM, Penciu RC, Serbanescu L. Non-pharmacological pain management in labor: a systematic review. Journal of Clinical Medicine. 2023 Nov 21;12(23):7203.

2.Sheishaa DM, El-Mashad HA, Khedr NF. Effect of birthing ball exercises during pregnancy on the first stage progress of labor. International Journal of Nursing. 2019 Dec;7(2):47-67.

3. Escott D, Slade P, Spiby H. Preparation for pain management during childbirth: the psychological aspects of coping strategy development in antenatal education. Clinical psychology review. 2009 Nov 1;29(7):617-22.

4. Rosenberg K, Trevathan W. Birth, obstetrics and human evolution. BJOG: an international journal of obstetrics and gynaecology. 2002 Nov 1;109(11):1199-206.

5.Vallath N, Salins N, Kumar M. Unpleasant subjective emotional experiencing of pain. Indian journal of palliative care. 2013 Jan;19(1):12.

6.Melaku L. Physiological changes in the pregnancy and anesthetic implication during labor, delivery, and postpartum. The Open Anesthesia Journal. 2022 Sep 19;16(1).

7. Othman A. The effects of pregnancy and childbirth on women's health-related quality of life: A scoping review. Evidence-Based Nursing Research. 2024 Jan 1;6(1):39-52.

8.Hosseini Tabaghdehi M, Keramat A, Kolahdozan S, Shahhosseini Z, Moosazadeh M, Motaghi Z. Positive childbirth experience: A qualitative study. Nursing Open. 2020 Jul;7(4):1233-8.

9. de Carvalho Coutinho E, da Silva AL, Pereira CM, Rouxinol DF, Parreira VB, Nelas PA, Chaves CM, do Rosário Cabral L. Experiences of being a mother: meanings of childbirth, pain and birth. Fronteira: Journal of Social, Technological and Environmental Science. 2014 Nov 27;3(3):259-74..

10.Komariah N, Wahyuni S. The Relation Between Labor Pain with Maternal Anxiety. InFirst International Conference on Health, Social Sciences and Technology (ICOHSST 2020) 2021 Apr 19 (pp. 201-206). Atlantis Press.

11. Hensley JG, Collins MR, Leezer CL. Pain management in obstetrics. Critical Care Nursing Clinics. 2017 Dec 1;29(4):471-85.

12.Manjiani D, Paul DB, Kunnumpurath S, Kaye AD, Vadivelu N. Availability and utilization of opioids for pain management: global issues. Ochsner Journal. 2014 Jun 20;14(2):208-15.13. Dixon LJ. A brief introduction to modern amplitude methods. Proceedings, Theoretical Advanced Study Institute in Elementary Particle Physics: Journeys Through the Precision Frontier: Amplitudes for Colliders (TASI 2014): Boulder, Colorado. 2014 Jun 2;2015:39-97.

14.Farrag RE, Omar AM. Using of birthing ball during the first stage of labor: Its effect on the progress of labor and outcome among nulliparous women. International Journal of Nursing Didactics. 2018 Sep 14;8(09):01-10.

15. Sobhy Saber Hashad N, Ahmed Elsheikh M, Abd ELhaliem Said S, Abo zaid Ramadan E. An evidence-based guideline of birth ball exercise during the first stage of labor on the outcome of birthing criteria. Journal of Nursing Science Benha University. 2022 Jul 1;3(2):903-18.

16. Lai CY. *Perinatal Massage Programme for Labour Pain Relief* (Doctoral dissertation, The Chinese University of Hong Kong (Hong Kong)).

17. Pinar SE, Demirel G. The effect of therapeutic touch on labour pain, anxiety and childbirth attitude: A randomized controlled trial. European Journal of Integrative Medicine. 2021 Jan 1;41:101255.

18. Abo-Hatab TA, Ahmed MH, Abozeid E, Gaheen MA, El-adham A. Effect of Various Maternal Positions on Labor Pain and Fetal Heart Rate duringthe First Stage of Labor. positions.;11:12.