ORIGINAL RESEARCH ARTICLE

Effectiveness of Sacral Massage on Labor Pain and Satisfaction Among Antenatal Mothers in Active Phase of Labor

Neha Patyal[1*], Santosh Kumari[2], Divya Verma[3], Harshita Yadav[4], Jasbir Kaur[5], Harpreet Kaur[6]

[1-6]Maharishi Markandeshwar College of Nursing, MMU-Solan (H.P), India

DOI: 10.55489/njcm.150420243670

ABSTRACT

Background: Massage is a powerful old technique & non pharmacological pain control during 1st stage. Satisfaction of mothers during birth is rather important in terms of women's health and positive family relations. Objective of the study is to assess the effectiveness of Sacral Massage on labour pain and satisfaction among antenatal mothers.

Methodology: A quantitative research approach and true experimental research design was adopted; 60 antenatal mothers were selected by simple random sampling. Sacral massage was administered for 3 cycles each for 30 minutes at 5-10cm using superficial massage, deep friction & effleurage during active phase of labor and routine care was given to the control group. After intervention post test was conducted.

Results: Study showed before Sacral massage the computed 't' value (-0.36) was found to be statistically non-significant at 0.05 level of significance and after Sacral massage it was (-24.7) was statistically significant at <0.01 level of significance, there were significant difference in mean post test score of labor pain in both groups. Majority (86.6%) mothers were moderately satisfied, followed (13.3%) were highly satisfied with Sacral massage.

Conclusion: Sacral massage was found effective to reduced pain and increase satisfaction.

Key words: Effectiveness, Sacral Massage, Antenatal Mother, Active Phase of Labor

ARTICLE INFO

Financial Support: None declared
Conflict of Interest: None declared
Received: 30-12-2023, **Accepted**: 16-03-2024, **Published**: 01-04-2024
***Correspondence:** Ms. Neha Patyal (Email: Nehapatial35@gmail.com)

How to cite this article: Patyal N, Kumari S, Verma D, Yadav H, Kaur J, Kaur H. Effectiveness of Sacral Massage on Labor Pain and Satisfaction Among Antenatal Mothers in Active Phase of Labor. Natl J Community Med 2024;15(4):299-306. DOI: 10.55489/njcm.150420243670

www.njcmindia.com | pISSN09763325 | eISSN22296816 | Published by Medsci Publications

INTRODUCTION

Pregnancy is a unique exciting time often in a women's life. It highlights the women's amazing, creative and nurturing power. When the women become pregnant most of them wonder about how to cope with the intensity of pain during labour and birth.[1] Pain in labour is nearly a universal experience for child bearing women. Child birth has been associated with pain and throughout history we find the measures to help to relieve it. Pain can vary during different times in the same labour and during different birth by the same woman.[2] Pain is a highly unfriendly and personal feeling that cannot share with others. Progress of labor increases the intensity of labor pain which becomes unbearable and it need prompt treatment which is pharmacological or non-pharmacological.[3] Massage is an old technique that is widely used during childbirth and can decrease the childbirth pain during labor. Massage is a cost-effective nursing intervention that can decrease pain and anxiety during labor. The study performed by **Semra Akkoz Cevik et. al. 2020** showed that sacral massage applied during labor reduced women's labor pain, lowered the levels of concern and anxiety. Massage also reduces the ischemia by amplification of local blood supply and stimulates the body to releases endorphins. This study showed that massage stimulates the body to releases endorphin when these endorphins attach to opiate receptor neurons, they reduce the intensity of pain in the human body and naturally block the pain signals which are produced by the nervous system.[4]

The wealth of the nation is its healthy population. The mother contribution in creating a healthy population is beyond explanation. So, mother should be kept physically, emotionally and socially healthy. Massage not only reduces pain and anxiety, but shortens labor and lowers new mothers' risk of experiencing postpartum depression. Scientific study conducted by Michel Tournaire et al. 2007 on complementary & alternative therapies to pain relief during labor showed that about 80 -90% of women who were massaged during labor pain have reduced or relieved their pain, made them feel psychologically supported and reduced their anxiety about labor and delivery.[5]

Massage decreases the severity of pain; loosen the spasms and delivers general relief in labor. An ideal labor pain relief method should meet the subsequent criteria, having the least possible side effects for the mother and fetus, having everlasting effects.[6] Non pharmacological pain relief approaches have different compensations such as lack of side effects for mother and fetus and also being pleasing for both of them. Pain during labor include pressure on the bladder and bowel by the baby's head and enlarging of the birth canal and vagina so massage is a cost-effective nursing practice that can reduction pain and anxiety during labor and partner's contribution in the massage can also positively inspiration the quality of women's birth experience. In the literature massage was applied for 30 minutes, thus in this study the women in the experimental group were administered a sacral region under the supervision of a doctor for 30 min at every phase of labor.[7]

Another study showed that lower back massage was effective to reduce labour pain during strong contraction. Massage was given by using hand very firmly over the base of the spine and over surrounding muscles.[8] Since there were not much research studies on effect of sacral massage on reduction of labor pain and mother satisfaction in Himachal Pradesh. So, we decided to conduct this study to "assess the effectiveness of sacral massage on labor pain and satisfaction among antenatal mother in active phase of labor in Maharishi Markandeshwar Medical College and Hospital Solan, H.P.

The objectives of the study were to assess and evaluate pre-test and post test score of sacral massage on labour pain among antenatal mothers in both groups and satisfaction in experimental group, and also to find out association between post test score of labor pain among antenatal mothers with socio- demographic variables in both groups.

METHODOLOGY

Study Design and Setting: This was a randomized controlled experimental study. A quantitative research approach and true experimental research design was adopted. The study was conducted in the months of March, 2023 to May, 2023 at First stage and labour room situated in 6th floor at Maharishi Markandeshwar Medical College & Hospital Kumarhatti-Solan Himachal Pradesh. The study was performed in volunteer pregnant women.

Data Collection: A structured questionnaire was pilot tested. The population of the research consisted of antenatal women who were admitted to the delivery room. When the power analysis was performed, the sample size was calculated with a 5% error level, bidirectional significance level, 95% confidence interval, and 80% ability to represent the universe. It was found that at least 30 participants for each group and 60 antenatal mothers in total were needed (30 participants for the massage group and 30 participants for the control group). The following inclusion criteria were used to determine participation in the study: (1) 18-30 years old antenatal mothers (2) Singleton pregnancies between 37-40 weeks (3) Pregnant women whose labour began spontaneously (4) Pregnant women with a healthy foetus (5) Pregnant women without any complications that may cause dystocia during labour (6) Pregnant women for whom analgesia and anesthesia were not used during the first phase of labour (7) Pregnant women who volunteered to participate in the research and who could establish verbal communication. In addition, pregnant women with high-risk pregnancies,

with caesarean section indication, and pregnant women with a chronic illness were excluded.

Sample for the study was selected after sample size estimation using the formula that is:

$$n = (\sigma 1 + \sigma 2)2\frac{(Z1 - \alpha/2 + Z1 - \beta)^2}{(m1 - m2)^2}$$

Where, Z1-α/2: The level of significance for two trails, when researcher considers that intervention may have positive or negative effect on outcome variables. Otherwise, one tail effect is considered only in one direction (Z1-α); Z1-β: The power researcher considers for detecting the difference, which is generally considered 80% or 90%.; Z0.90 = 1.28 from Gaussian table; σ1 is SD of the outcome variable in group-1; σ2 is SD of the outcome variable in group-2; m1 is mean of the outcome variable in group-1; and m2 is mean of the outcome variable in group-2

The sample volume to represent the population was determined as minimum 30 people for each group. The women who participated in the study were randomized into either the control or the experimental group. Allocation to groups carried out by simple randomization method. Participants were chosen, one sealed envelope out of ten (5 Experimental group, 5 control group), offered by the researcher. This process was continued for all participants with inclusion criteria.

Enrolment: It is described in fig 1.

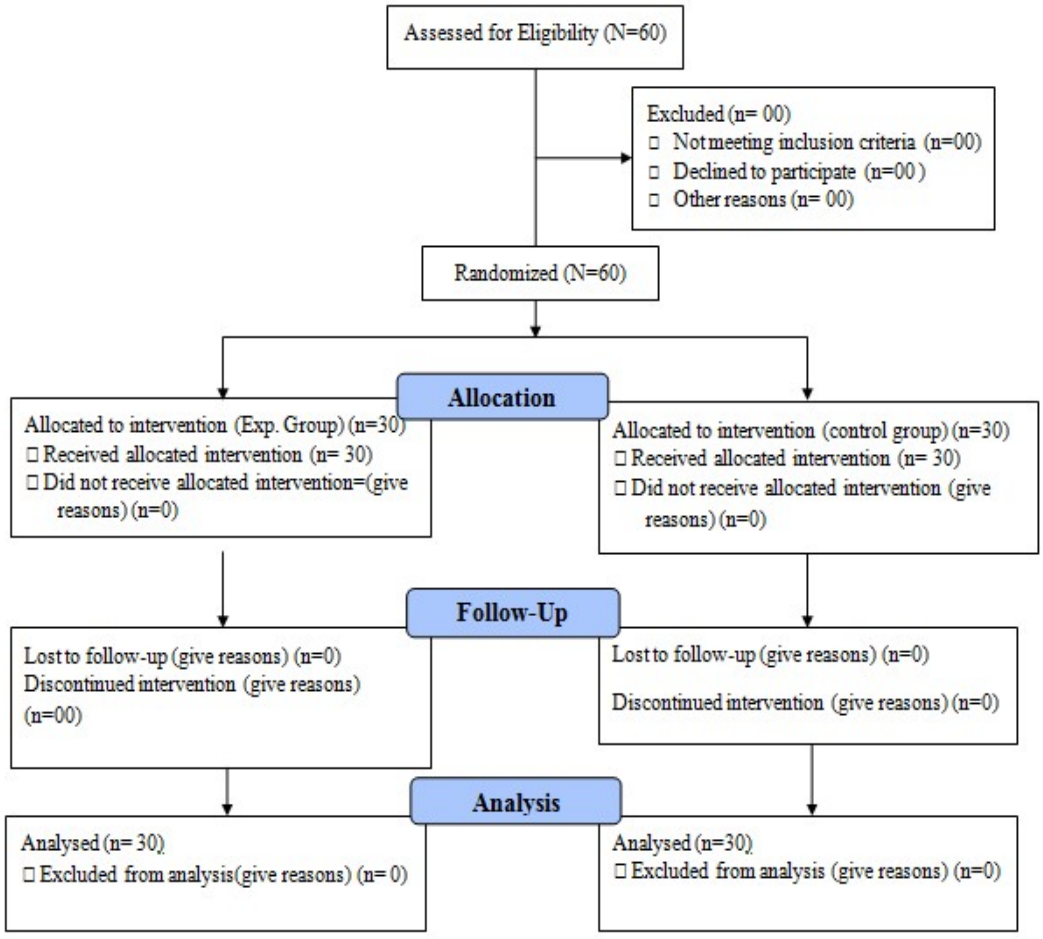

Figure 1: CONSORT study flow chart

Baseline Data Collection: After approval and permission to conduct the study were obtained from the Maharishi Markandeshwar university communication of decision of the ethics committee, approval letter no. MMMCH/IEC/23/759 on dated 27/09/2023 ethics committee, the hospital's head nurse, delivery room charge nurse/midwife and other midwives and nurses were informed about the purpose and scope of the study. Data were collected by one of the researchers. The researcher was aware of which patients were assigned to each group. However, the researchers did not interfere in any way with the study results. When they encountered women who met the inclusion criteria of the study, the purpose of the study was explained, and written consents were received from those who agreed to participate in the study. For the women who satisfied the criteria, participation in the study was voluntary. Additionally, during the study, no women requested to withdraw and no women were excluded from the study. Routine care and treatments for the women continued during data collection.

Data collection tools: Data of the study was collected using the prepared socio- demographic variables,

obstetrical variables, Visual analogue scale and self-structured satisfaction Likert scale.

Socio–Demographic Variables - It was self-structured tool to collect the socio-demographic of the mother. Socio-demographic data includes age, marital status, educational status of mother and father, area of residence, occupation of mother and father, religion, type of family, family income (monthly), family support, heard about sacral massage.

Visual Analog Scale (Wong & Waker Faces Pain Rating Scale)[10] - It was standardized tool to assess the pain level of the mother. This includes rating from (1– 10) (1-3) indicates mild pain, (4-6) indicates moderate pain and (7-10) indicates severe pain.

Mother's Satisfaction Likert Scale: It was a self-structured 3 Point Likert scale; it includes 15 statements used to assess the satisfaction of the antenatal mothers in labour pain. This includes scores for Highly Satisfied (≥35), moderately satisfied (23-34) and less satisfied (≤22).

Intervention: Sacral Massage: Massage was administered to antenatal mothers to the sacral region under the supervision of midwife and obstetrician for 3 cycles each for 30 minutes at cervical dilatation 5-6cm, 7-8cm, 9-10cm using superficial massage (5 minutes), deep friction (5 minutes) and effleurage (5minutes) on each buttock during active phase (5-10cm) of labor. To attain this, patient was placed in left lateral position or position desired by mother in active phase (5-10cm) of labor. This technique was applied between T10 and S4 according to Fig. 2. For the correct application of the massage, we were trained by a certified Physiotherapist at MMMC& Hospital.

Procedure: The data was collected by the researchers through face-to-face interviews. Before data collection, an informative meeting regarding the purpose and scope of study was held for the members of healthcare team who worked in the unit, where study would be conducted. In addition, cooperation was provided by the members of the healthcare team. For the correct application of massage, the researcher was trained by the physiotherapist who worked at MMMC& Hospital. The massage was applied only to the pregnant women in the intervention group at every phase of labor. There was no intervention in the control group except for routine care.

Steps for data collection, in the experimental & Control group were as follows:

In Experimental Group:

Face to face interview was conducted with the antenatal mothers. The prepared socio- demographic variables, Visual analog scale (Wong & Waker Faces Pain Rating Scale) was applied. In addition to providing them with routine midwifery care the antenatal mother in the experimental group has been administered a massage to the sacral region under the supervision of midwife and obstetrician for 3 cycles. The Visual Analog Scale was applied and evaluated after the massage in the active phase. The Self Structured Satisfaction Likert Scale was applied and evaluated after delivery.

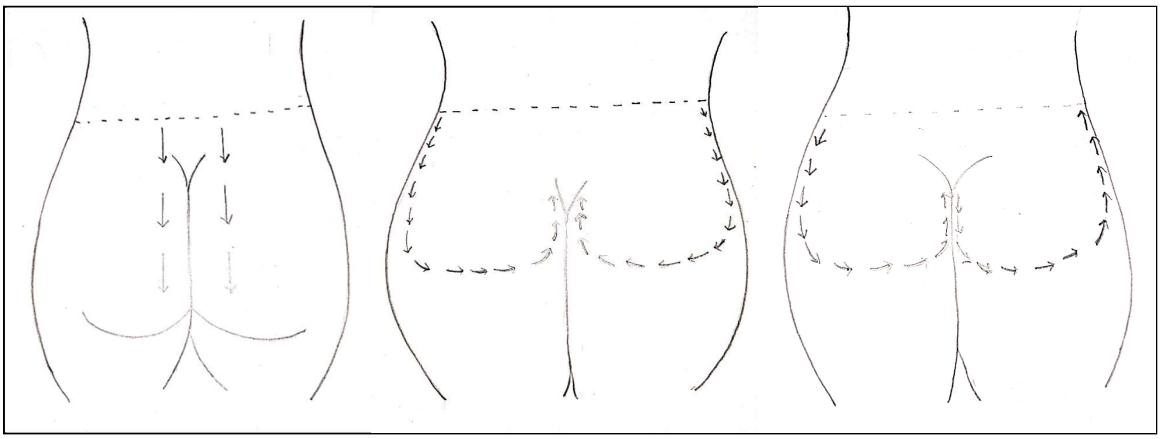

Figure 2: Steps of Sacral Massage

Control Group

Face to face interview was conducted with the antenatal mothers. The prepared socio- demographic variables, obstetrical variables, Visual analogue Scale was applied and routine midwifery care was given. The self-structured satisfaction Likert scale was applied and evaluated after delivery.

Data Analysis: Data were analysed on the basis of objectives of the study. Descriptive and inferential characteristics were used for analysis purpose. Calculation was carried out manually with the calculator and with help of MS EXCEL and also SPSS Version 22.

RESULTS

Frequency and Percentage Distribution of Selected Demographic Variables of Antenatal Mothers in Active Phase of Labour in Experimental and Control Group were shown in table 1.

Table 1: Frequency and Percentage Distribution of Selected Demographic Variables of Antenatal Mothers in Active Phase of Labour in Experimental and Control Group (N=60)

Socio -Demographic Variables	Experimental group (n=30) (%)	Control group (n=30) (%)	Chi square	df	p value
Age in years					
18-22	7 (23.3)	6 (20)	2.99	3	0.39^{NS}
23-27	13 (43.3)	8 (26.6)			
28-32	9 (30)	13 (43.3)			
≥33	1 (3.3)	3 (10)			
Marital status			NA		
Married	30 (100)	30 (100)			
Education status of mother					
Elementary	4 (13.3)	0(0)	5.03	3	0.16^{NS}
Secondary	11 (36.6)	13(43.3)			
Graduation	11(36.6)	10 (33.3)			
Above graduation	4 (13.3)s	7 (23.3			
Education status of father					
Elementary	4(13.3)	2 (6.6)	1.1	3	0.77^{NS}
Secondary	7 (23.3)	8 (26.6)			
Graduation	14 (46.6)	13(43.3)			
Above graduation	5 (16.6)	7 (23.3)			
Area of Residence					
Urban	9 (30)	10 (33.3)	1.1	3	0.77^{NS}
Rural	21 (70)	20 (66.6)			
Occupation of husband					
Private job	20 (66.6)	15 (50)	2.38	2	0.30^{NS}
Govt. Job	5 (16.6)	10(33.3)			
Health worker	0 (0)	0 (0)			
Others	5 (16.6)	5(16.6)			
Occupation of mother					
Private job	4 (13.3)	4 (13.3)	7.47	3	0.05*
Govt. Job	0 (0)	6 (20)			
Health worker	1 (3.3)	2(6.6)			
Others	25 (83.3)	18 (60)			
Religion					
Hindu	29 (96.6)	28(93.3)	42.5	3	0.00*
Muslim	1 (3.3)	2 (6.6)			
Type of family					
Joint	14 (46.6)	13 (43.3)	0.007	2	0.96^{NS}
Nuclear	12 (40)	13(43.3)			
Extended	4 (13.3)	4 (13.3)			
Family income (monthly)					
Rs ≤5000	1 (3.3)	0	5.6	3	0.133^{NS}
Rs 5001-10,000	8 (26.6)	2 (6.6)			
Rs 10,001-15,000	9 (30)	12(40)			
Rs ≥15,000	12 (40)	16 (53.3)			
Family support					
Adequate family support	29 (96.6)	28 (93.3)	1.01	2	0.60^{NS}
No family supports	0 (0)	1(3.3)			
Less support	1 (3.3)	1(3.3)			
Heard about sacral massage					
Yes	4 (13.3)	8 (26.6)	1.66	1	0.19^{NS}
No	26 (86.6)	22 (73.3)			

*Significant (p≤0.05), NS= Not Significant (p≥0.05); Age $Mean_1 \pm SD_1 = 25 \pm 4.29$; $Mean_2 \pm SD_2 = 27.7 \pm 4.37$

Table 2: Mean, Mean Difference, Standard Deviation Difference, Standard Error of Mean Difference and 't' Value of Pre-Test and post-test Highest Pain Scores of Antenatal Mothers during Active Phase of Labor in Experimental Group and Control Group (N=60)

Group	Mean± SD_D	$Mean_D$	SE_{MD}	t value	p value
Pre-test					
Experimental Group (n=30)	8.56±0.18	0.66	0.103	-0.36	0.71^{NS}
Control Group (n=30)	8.63±0.18				
Post-test					
Experimental (n=30)	4.86±0.81	-4.66	0.14	-24.7	0.00*
Control Group (n=30)	9.53±0.62				

*Significant(p≤0.05); NS= Not Significant (p≥0.05)

Table 2 revels that mean pretest pain score of antenatal mothers during active phase of labor in experimental group was 8.56 and in control group was 8.63. Mean difference 0.66, however the difference was non-significant at 0.05 level of significance.

Mean post-test pain score of antenatal mothers during active phase of labor in experimental group was 4.87 and in control group was 9.53. Mean difference was -4.66 which was statistically significant at 0.00 level of significance.

Table 3: Frequency and Percentage Distribution of Antenatal Mothers in terms of Level of Satisfaction regarding Selected Stages of Post Interventions in experimental group (N=30)

Level of satisfaction	Score of stages	Frequency (%)
Highly satisfied	≥35	4 (13.3)
Moderately satisfied	23 – 34	26 (86.6)
Less satisfied	≤22	0 (0)

Maximum score – 45; Minimum score – 15

Table 4: Chi square showing association of posttest of higher pain score with selected demographic variables of experimental group (N=30)

Variables	Level of pain			Association with level of Pain		
	Mild	Moderate	Severe	Chi-square value	df	p value
Age						
18 – 22	0	7	0	2.41	3	0.49^{NS}
23- 27	0	13	0			
28- 32	1	8	0			
≥33	0	1	0			
Marital Status						
Never Married	0	0	0	Not applicable		
Married	1	29	0			
Educational Status of Antenatal Mother						
Elementary	0	4	0	1.78	3	0.61^{NS}
Secondary education	0	11	0			
Graduation	1	10	0			
Above Graduation	0	4	0			
Educational Status of Father						
Elementary	0	4	0	1.18	3	0.75^{NS}
Secondary education	0	7	0			
Graduation	1	13	0			
Above Graduation	0	5	0			
Area of Residence						
Urban	1	8	0	2.41	1	0.12^{NS}
Rural	0	21	0			
Occupation of Husband						
Private job	1	19	0	0.51	2	0.772^{NS}
Govt. job	0	5	0			
Others	0	5	0			
Occupation of Antenatal mother						
Private job	0	4	0	0.2	2	0.90^{NS}
Health Worker	0	1	0			
Others	1	24	0			
Religion						
Hinduism	1	28	0	0.36	1	0.85^{NS}
Muslim	0	1	0			
Joint	1	13	0	1.18	2	0.55^{NS}
Type of Family						
Nuclear	0	12	0			
Extended	0	4	0			
Family In- come (Monthly in Rs.)						
≤Rs5000	0	1	0	1.55	3	0.67^{NS}
Rs 5001 – Rs10,000	0	8	0			
Rs 10,001 – Rs 15,000	0	9	0			
≥15,000	1	11	0			
Family Support						
Adequate family support	1	28	0	0.03	1	0.85^{NS}
Less support	0	1	0			
Heard about Sacral massage						
Yes	0	4	0	0.15	1	0.69^{NS}
No	1	25	0			

*Significant(p≤0.05); NS= Not Significant (p≥0.05)

This showed that there will be significant difference in mean post test score of labor pain in antenatal mothers of experimental group and control group. Hence H_1 hypothesis is accepted.

Data in table 3 revels that majority (86.6%) of mothers were moderately satisfied with the sacral massage followed (13.3%) mothers are highly satisfied with sacral massage and (0%) mothers are less satisfied with sacral massage.

Table 4 depict that calculated chi square and 't' value post test scores of experimental groups regarding sacral massage was not associated with socio - demographic variables. There was no significant association of age (p= 0.49) , all mothers are married chi- square is not applicable , educational status of mother (p=0.61), educational status of father (p=0.75) , area of residence (p=80.12), occupation of husband (p=0.77) , occupation of mother (p=0.90), religion (p= 0.85), type of family (p= 0.55), family income (p=0.67), family support (p=0.85), type of lifestyle (p=0.04), heard about sacral massage (p=0.69).Therefore research hypothesis H_2 hypothesis rejected , it is showing highest pain score is not associated with socio demographic variables such as age , marital status , educational status of mother , educational status of father, area of residence, occupation of husband , occupation of antenatal mothers, religion ,type of family , family income, family support, and heard about sacral massage.

Discussion

Labor pain is a public experience for all women during the delivery time. Therefore, a pain relief measure for mother during labor is vital. Massage is an old practice that is widely used in childbirth and can decline the childbirth pain during 1st stage. Massage is a cost-effective nursing intervention that can reduction of pain and anxiety during labor. Sacral massage refers to the massage given to antenatal mothers at sacral region to reduce the labor pain.

Present study showed that majority (43.3%) antenatal mothers in experimental were in age group of 23-27 years and (43.3%) mothers in control group were in the age group of 28-32 years. Alike findings were reported by **Pwale (2020)** who did study on effectiveness of back massage on pain relief during first stage of labor in primi mothers admitted at a tertiary care center which revealed that in experimental group majority (45%) mothers were in age group of 22-25 years and in control group majority (35%) were in age group of 26-29 years.[11] Another study done by **Janssen (2012)** on Massage therapy and labor outcomes: a randomized controlled trial showed that in experimental group majority (38.9%) and in control group majority (55.9%) mothers were in the age group of (30-34 years).[12]

Present study revealed that the posttest mean pain score was in experimental group 4.86±0.81 and in control group 9.53±0.62 which was found statically highly significant at p ≤ o.o5 level, which means sacral massage, is effective to reduce labor pain. Similar findings were reported by Devi et.al who did study on effectiveness of Back Massage in First stage labour pain among pregnant women (2020) showed that post test score regarding back massage posttest mean pain score was in experimental group 14.63 and in control group 14.7 which was found statically highly significant at p ≤ o.o5 level, which means sacral massage is effective to reduce labor pain.[13] Further studies also revealed that sacral massage is effective to reduce labour pain Sethi (2017)[14], Purwandari (2022)[15], Rosmiarti (2020)[16], Iskandar (2018)[17], Shahbazzadegan (2022)[18].

Present study revealed that majority (87%) mothers were moderately satisfied with sacral massage, & few (13%) mothers were highly satisfied with sacral massage. Similar studies were reported by Illknur (2020) who did study on effects of massage and acupressure on relieving labor pain, reducing labor time and increasing delivery satisfaction, which showed that in massage only group majority (96.8%) mothers are satisfied with sacral massage[19], similarly by Maghalian (2022)[20], Sundaram (2023)[21].

Present study revealed that highest pain score of labor pain is not associated with socio demographic variables such as age ($p=0.49^{NS}$) , marital status , educational status of mother ($p=0.61^{NS}$) , educational status of father ($p=0.75^{NS}$), area of residence ($p=0.12^{NS}$), occupation of husband ($p=0.77^{NS}$), occupation of antenatal mothers (0.90^{NS}), religion($p=0.85^{NS}$) ,type of family($p= 0.55^{NS}$) ,family income ($p=0.67^{NS}$), family support (0.85^{NS}), type of lifestyle ($p=0.40^{NS}$) and heard about sacral massage ($p=0.69^{NS}$). Chi square was not found statistically significant at 0.05 level of significance. Similar study was reported by Devi et.al who did study on effectiveness of Back Massage in First stage labour pain among pregnant women (2020) who did that post test score regarding back massage was not associated with demographic variables such as age, family income, education, occupation, religion, type of family, gravida, period of gestation, any history of abortion, chi square was not found statistically significant at 0.05 level of significance. Mwakawanga (2022) find effectiveness of Back Massage in First stage labour pain among pregnant women showed that no association with the demographic variables such as age, family income, education, occupation, religion, type of family.[22] Chaillet (2014) uses non-pharmacologic approaches based on continuous support with sacral massage, were the most effective for reducing obstetric interventions during labor.[23]

Limitations

One of the limitations of the current study is the small sample size. Thus, studies with larger sample size are recommended.

Conclusion

Sacral massage applied during labor was found effective to reduced pain and also positively affected the satisfaction. So, it should be recommended as a routine care in parturient women.

Recommendations

A study can be conducted to assess the knowledge and practice of sacral Massage for labour pain management among nurse midwives. Effect of back massage and relaxation training on the act of labor: RCT.

References

1. Beigi NM, Broumandfar K, Bahadoran P, Abedi HA. Women's experience of pain during childbirth. Iranian Journal of Nursing & Midwifery Research. 2010; 15(2):77-82.
2. Jagdish G S, Abirami P. Effectiveness of circular hip massage on first stage labour pain among primi gravida mothers. International Journal of Pharmacy and Biological Sciences. 2016; 6(2): 17-22.
3. Beigi NM, Broumandfar K, Bahadoran P, Abedi HA. Women's experience of pain during childbirth. Iran J Nurs Midwifery Res. 2010; 15(2):77-82.
4. Akköz Çevik S, Karaduman S. The effect of sacral massage on labor pain and anxiety: A randomized controlled trial. Jpn J Nurs Sci. 2020 Jan; 17(1):e12272.
5. Tournaire M, Theau-Yonneau A. Complementary and alternative approaches to pain relief during labor. Evid Based Complement Alternat Med. 2007 Dec; 4(4):409-17.
6. Ranjbaran M, Khorsandi M, Matourypour P, Shamsi M. Effect of Massage Therapy on Labor Pain Reduction in Primiparous Women: A Systematic Review and Meta-analysis of Randomized Controlled Clinical Trials in Iran. Iranian Journal of Nursing & Midwifery Research. 2017 Jul-Aug; 22(4):257-261.
7. Bolbol-Haghighi N, Masoumi SZ, Kazemi F. Effect of Massage Therapy on Duration of Labour: A Randomized Controlled Trial. Journal of Clinical & Diagnostic Research. 2016 April; 10(4):12-5.
8. American SPA Staff, Massage and Endorphins American Spa [Internet]. 2004 April. [cited 2024 Feb 17]. Available from: https://www.americanspa.com/business/massage-and-endorphins.
9. Sharma SK. Nursing Research & statistics. 2nd edition. New Delhi: Elsevier; 2014;p-282
10. Wong-Baker Faces Pain Scale: [cited 2024 Feb 17]. Available from: https://www.sciencedirect.com/topics/medicine-and-dentistry/faces-pain-scale
11. Pawale MP, Salunkhe JA. Effectiveness of back massage on pain relief during first stage of labor in primi mothers admitted at a Tertiary care center. J Family Med Prim Care. 2020 Dec 31;9 (12):5933-5938.
12. Janssen P, Shroff F, Jaspar P. Massage therapy and labor outcomes: a randomized controlled trial. Int J Ther Massage Bodywork. 2012;5(4):15-20.
13. Devi Mamta Akoijam, Sharma Shalu, Sharma Deepak. Effectiveness of Back Massage in First stage labour pain among pregnant women. European Journal of Translational and Clinical Medicine. 2020 January 7(11):6644-6652.
14. Sethi Deepika, Barnabas Seema. A pre-experimental study to evaluate the effectiveness of back massage among pregnant women in first stage of labour pains admitted in labour room of a selected hospital. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. *2017 Jan;6(1):76-83.*
15. Purwandari Atik, Tuju O Sjenny et. al. Effleurage Massage by Husband on the Level of Pain in Maternal When the 1 Phase is Active. Journal of Positive School Psychology. 2022; 6 (5): 5527–5540.
16. Rosmiarti, Marlin Riska, Murbiah. Reduction of labour pain with back massage. Enferm Clin. 2020;30(S5):209---212.
17. Iskandar Siraj Rawah et. al. The Effectiveness of Lower Back Massage on Reducing Labor Pain for Primiparous at Maternity and Children's Hospital. Nursing & Primary Care. 2018 May; 2(3): 1-4.
18. Shahbazzadegan Samira, Nikjou Roya. The most appropriate cervical dilatation for massage to reduce labor pain and anxiety: a randomized clinical trial. BMC Women's Health, 2022; 22:282.
19. Gönenç, I. M., & Terzioğlu, F. Effects of Massage and Acupressure on Relieving Labor Pain, Reducing Labor Time, and Increasing Delivery Satisfaction. The Journal of Nursing Research : JNR, 2020 Feb 28(1);e68
20. Maghalian Mahsa, Kamalifard Mahin, Hasanzadeh Robab, Mirghafourvand Mojgan. The effect of massage on childbirth satisfaction: A systematic review and meta-analysis. Advances in Integrative Medicine. 2022September; 9(3) 151–158.
21. Sundaram M, Bhuvaneswari G, Anand Chandrika. A Study to Assess the Level of Satisfaction of Birthing Ball Technique and Sacral Massage on Maternal and Fetal Outcome among Primi Parturition Mothers. Journal of Nursing. 2023 November;70(11):1 -13
22. Mwakawanga DL, Mselle LT, Chikwala VZ, Sirili N. Use of non-pharmacological methods in managing labour pain: experiences of nurse-midwives in two selected district hospitals in eastern Tanzania. BMC Pregnancy and Childbirth. 2022 Dec; 22(1):1-9.
23. Chaillet N, Belaid L, Crochetière C, Roy L, Gagné GP, Moutquin JM, et al. Nonpharmacologic approaches for pain management during labor compared with usual care: A meta-analysis. Birth. 2014; 41: 122–37.