Original Research Article

Women's knowledge about non-pharmacological methods of pain relief in labor: a cross-sectional study

A. Doris Lily[1], Soni Chauhan[2], Hema Joshi[1], Prahlad Khatik[1], Sushil Kumar Sharma[1], Sonia[1], Kaushal Nagar[1], Mamta Singh[1], Surya Kant Tiwari[1], Narendra Pal Singh Choudhary[1]*

[1]College of Nursing, All India Institute of Medical Sciences, Raebareli, Uttar Pradesh, India
[2]Yatharth Nursing College and Paramedical Institute, Chandauli, Uttar Pradesh, India

*Correspondence:
Dr. Narendra Pal Singh Choudhary,
E-mail: npchoudhary81@gmail.com

ABSTRACT

Background: Labor pain is a significant experience for primigravida women, and understanding nonpharmacological techniques for pain management is essential for enhancing their childbirth experience. This study aimed to assess the knowledge of primigravida women regarding non-pharmacological methods for managing labor pain.
Methods: A descriptive cross-sectional study was conducted at a tertiary care center from October to November 2023. Using a non-probability purposive sampling technique, 100 primigravida women were recruited based on the inclusion criteria, which included the ability to read and understand Hindi or English. Data were collected using a 30-item structured multiple-choice questionnaire that assessed the knowledge of non-pharmacological pain management techniques. Knowledge scores were categorized as adequate ($\geq$75% correct responses), moderate (50-74%), or inadequate (<50%).
Results: The findings revealed that 82% of respondents had inadequate knowledge, 18% had moderate knowledge, and none had adequate knowledge. The mean knowledge score was 39.53% (SD=2.75). Significant associations were found between knowledge levels and educational status (χ^2=11.05, p<0.05) and previous knowledge of non-pharmacological techniques (χ^2=18.74, p<0.01).
Conclusions: This study highlighted a substantial knowledge gap regarding non-pharmacological labor pain management among primigravida women. Educational interventions by healthcare providers, particularly nurses and midwives, are essential to improve awareness and understanding of these techniques, ultimately enhancing the childbirth experience for women.

Keywords: Analgesics, Educational status, Labor pain, Midwifery, Pain management, Pregnancy

INTRODUCTION

Labor and childbirth are significant milestones in a woman's life, often accompanied by intense emotions and physical challenges for both the woman and her family members.[1,2] A major aspect of the childbirth experience is labor pain, which is influenced by various factors, including individual assumptions, expectations, and cultural beliefs.[3,4] Although labor pain is a natural physiological process, its management is essential for ensuring a positive childbirth experience. Traditionally, pain management during labor has involved both pharmacological and nonpharmacological approaches. Pharmacological interventions, such as epidural analgesia, although effective, may carry risks and side effects.[5] Consequently, non-pharmacological methods have gained attention for their ability to relieve pain without these drawbacks.

Non-pharmacological techniques for managing labor pain include massage, breathing exercises, acupressure, hydrotherapy, and relaxation.[6,7] These methods not only

help reduce pain but also promote a sense of control and involvement in the childbirth process. Nurses, particularly midwives, play a pivotal role in providing supportive care during labor by incorporating these techniques into their clinical practice. The medical model of care focuses primarily on alleviating physical pain, whereas the midwifery model emphasizes reducing suffering, including addressing the emotional and psychological dimensions of labor.[8,9]

Despite advancements in medical science, many women, especially primigravida women, remain unaware of nonpharmacological options for labor pain management. This lack of knowledge can affect their ability to make informed decisions during childbirth and may result in the underutilization of beneficial, non-pharmacological interventions.[10] The existing literature suggests that various factors, such as education level, prior exposure to childbirth information, and cultural beliefs, influence a woman's understanding and use of non-pharmacological methods.[7,11]

Given the importance of informed decision-making in maternity care, it is critical to assess pregnant women's knowledge of non-pharmacological pain management techniques, particularly primigravida women. By identifying knowledge gaps, healthcare providers can develop targeted educational interventions to improve awareness and promote the use of safe, effective, and holistic approaches to pain relief during labor. Therefore, this study aimed to assess the knowledge of primigravida women regarding non-pharmacological techniques for managing labor pain, with the goal of identifying areas where education and support are needed to enhance maternal care outcomes.

METHODS

Study design and setting

A descriptive cross-sectional study was conducted at a tertiary-level facility in Western Rajasthan that provides maternal healthcare services to a diverse population, including urban and rural residents. The study was conducted between October and November 2023 using non-probability purposive sampling. We adhered to the strengthening the reporting of observational studies in epidemiology (STROBE) guidelines for this study.[12]

Study population

Primigravida women were selected as the target population because of their unique experience of labor pain, making them an important group for assessing knowledge related to non-pharmacological pain management techniques. The inclusion criteria for the study were primigravida women who could understand and read Hindi or English and who consented to participate in the study. These criteria ensured that participants could engage with the study materials and provide consent freely. Women with prior knowledge of or exposure to nonpharmacological labor pain management techniques were included to capture a range of baseline knowledge levels. The exclusion criteria included women with high-risk pregnancies or medical complications that might necessitate specific pharmacological interventions for pain relief, which could skew the data on non-pharmacological pain management knowledge.

Sample size

The sample size was calculated using the following formula for descriptive cross-sectional studies:

$$n=Z^2P(1-P)/d^2$$

where n = required sample size, Z = Z-score (1.96 for a 95% confidence level), P = expected prevalence (assumed to be 50%, or 0.5, as per our pilot study), and d = margin of error (set at 10%, or 0.1).

Thus, a sample size of 96 participants was determined. To account for potential dropouts or incomplete data, a final sample of 100 women was included in this study.

Data collection tools

Data were collected using two tools: the first gathered participants' sociodemographic characteristics, including age, religion, educational status, occupation, family type, monthly income, place of residence, and previous knowledge of non-pharmacological pain management techniques.

The second tool was a structured multiple-choice questionnaire comprising 30 items divided into two sections. The first section assessed knowledge of the concept of labor and labor pain, while the second section focused on knowledge of nonpharmacological pain management techniques. The questionnaire was developed by the researchers based on a literature review and validated by a panel of experts in obstetrics and gynecology. Content validity was ensured through expert recommendations, and necessary modifications were made prior to use.

Scoring and categorization

Each correct response was scored as '1' and incorrect responses as '0', resulting in a maximum possible score of 30. The total score was categorized into three levels of knowledge: i) adequate knowledge (≥75% correct responses), ii) moderate knowledge (50-74%), and iii) inadequate knowledge (<50%). The tool's reliability was confirmed using the split-half reliability method, applying Karl Pearson's correlation formula, with reliability coefficients of 0.89 and 0.85, indicating a high internal consistency.

Ethical considerations

Ethical approval was obtained from the institutional ethics committee. All participants were provided with detailed information about the study's objectives and procedures and were assured of the confidentiality of their responses. Written informed consent was obtained from all participants before data collection.

Statistical analysis

The collected data were reviewed for completeness and entered into a master sheet using Microsoft Excel. Data analysis was performed using SPSS software (version 20.0). Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize the participants' characteristics and knowledge levels. The Chi-square test was applied to assess the associations between knowledge levels and sociodemographic variables. Statistical significance was set at $p<0.05$.

RESULTS

Participant characteristics

The study included 100 primigravid women. The age of participants ranged between 18 and 35 years, with the majority in the age group of 24-29 years (58%). Of the total participants, approximately two-thirds were Hindu (68%) and belonged to nuclear families (68%). Regarding education, almost half had completed higher secondary education (49%) and were housewives (57%). A substantial proportion of respondents reported a monthly family income between ₹10,001 and ₹15,000 (42%). Most participants (56%) resided in urban areas (Table 1).

Table 1: Frequency and percentage distribution of primigravida mothers according to the demographic variables (n=100).

Demographic variables	Category	Frequency
Age (years)	18-25	15
	24-29	74
	30-35	8
	>35	3
Religion	Hindu	68
	Muslim	2
	Christian	30
Education status	Primary	7
	Secondary	29
	Higher secondary	49
	Graduation and above	15
Occupation	House Wife	57
	Private employee	25
	Government employee	13
	Business	5
Income of family (Rupees/month)	<5000	11
	5001-10,000	34
	10,001-15,000	42
	>15,000	13
Type of family	Nuclear	68
	Joint	32
Residence	Urban	56
	Rural	44
Source of knowledge	Neighbors/family members/friends	28
	Magazines/newspaper/journals and books	32
	Radio/internet/television	27
	Health personnel	13
Previous knowledge on non-pharmacological techniques	Yes	24
	No	76

Table 2: Level of mothers' knowledge scores regarding non-pharmacological techniques (n=100).

Knowledge aspects	Knowledge score	
	Mean (SD)	Mean percentage
Concept of non-pharmacological techniques	8.56 (2.6)	37.22
Importance of non-pharmacological techniques	3.3 (1.1)	47.14
Overall knowledge	11.86 (2.75)	39.53

Table 3: Association between knowledge score with selected demographic variables.

Variables	Good knowledge	Poor knowledge	χ^2 (df)
	N (%)	N (%)	
Age group (years)			
18-23	11 (73.3)	4 (26.67)	
24-29	40 (54.05)	34 (45.95)	
30-35	4 (50.0)	4 (50.0)	2.7 (3)
Above 35	1 (33.33)	2 (66.67)	
Religion			
Hindu	39 (57.35)	29 (42.65)	
Muslim	1 (50.0)	1 (50.0)	0.48 (3)
Christian	15 (50.0)	15 (30.0)	
Education status			
Primary	5 (71.43)	2 (28.57)	
Secondary	22 (75.48)	7 (24.14)	
Higher secondary	24 (48.98)	25 (51.02)	11.05 (3)*
Graduation and above	4 (26.67)	11 (73.33)	
Occupation			
House wife	32 (56.14)	25 (43.86)	
Private employee	15 (60.0)	10 (40.0)	
Government employee	6 (46.15)	7 (53.85)	1.14 (3)
Business	2 (40.0)	3 (60.0)	
Family income			
<5000	7 (63.64)	4 (36.36)	
5001-10,000	17 (50.0)	17 (50.0)	
10,001-15,000	23 (54.76)	19 (45.24)	1.32 (3)
>15,000	8 (61.54)	5 (38.46)	
Type of family			
Nuclear	35 (51.47)	33 (48.53)	
Joint	20 (62.5)	12 (37.5)	1.07 (1)
Residence			
Urban	27 (48.21)	29 (51.79)	
Rural	28 (63.64)	16 (36.36)	2.37 (1)
Source of knowledge			
Neighbors/family members/friends	18 (64.29)	10 (35.71)	
Magazines/newspaper/journals and books	18 (56.25)	14 (43.75)	
Radio/internet/television	14 (51.85)	13 (48.150	2.55 (3)
Health personnel	5 (38.46)	8 (61.54)	
Previous knowledge on non-pharmacological techniques			
Yes	4 (45.83)	13 (54.17)	18.74 (1)**
No	51 (59.21)	31 (40.79)	

* p<0.05; ** p<0.001.

Knowledge of non-pharmacological techniques

The majority of participants had inadequate knowledge of non-pharmacological techniques for managing labor pain (82% of participants). Approximately one-fifth of the participants demonstrated moderate knowledge (18%), and none had adequate knowledge (Table 2). The overall mean knowledge percentage was 39.53% (SD±2.75), indicating a low level of awareness of non-

pharmacological pain management methods among the study population.

Association between knowledge and socio-demographic variables

Table 3 presents the association between sociodemographic variables and knowledge of non-pharmacological techniques. Knowledge scores were significantly associated with educational status (χ^2=11.05, p<0.05) and prior knowledge of non-pharmacological techniques (χ^2=18.74, p<0.01). However, no significant association was observed between knowledge levels and other variables, including age group (χ^2=2.7, p>0.05), occupation (χ^2=1.14, p>0.05), family income (χ^2=1.32, p>0.05), religion (χ^2=0.48, p>0.05), type of family (χ^2=1.07, p>0.05), place of residence (χ^2=2.37, p>0.05), or source of information (χ^2=2.55, p>0.05).

DISCUSSION

This study aimed to assess the knowledge of primigravida women regarding non-pharmacological techniques for managing labor pain. The findings revealed that a substantial majority of the participants had inadequate knowledge of these methods, while only a small number of participants had moderate knowledge, and none displayed adequate knowledge. These results are consistent with those of prior studies conducted in similar settings. For instance, studies from India and South Africa found that most pregnant women were aware of non-pharmacological techniques for labor pain management.[13,14] In contrast, few studies have reported good knowledge of non-pharmacological techniques among pregnant women.[11,15,16]

The low knowledge levels observed in this study are concerning, as an inadequate understanding of pain management options can limit women's ability to make informed decisions during labor. Non-pharmacological techniques have been shown to be effective in managing labor pain without the side effects associated with pharmacological interventions, making them essential components of holistic maternity care. However, the study's findings suggest a significant gap in the dissemination of this information to first-time mothers.

The findings of this study indicate a significant association between educational status and knowledge of non-pharmacological labor pain management techniques among primigravida women. This aligns with previous research that has shown that higher educational attainment often correlates with increased health literacy and knowledge of childbirth practices.[17,18] For instance, a study conducted in Poland reported that educated women were more likely to be aware of and utilize non-pharmacological pain management strategies, underscoring the importance of education in empowering women to make informed choices during labor.[11] Additionally, our results highlighted a significant

association between previous knowledge of non-pharmacological techniques and current knowledge levels, suggesting that exposure to information through antenatal classes or healthcare provider consultations can enhance understanding and acceptance of these methods.

In contrast, the study revealed no significant associations between knowledge levels and demographic factors such as age, occupation, family income, and type of family, which is inconsistent with some international studies that have identified these variables as influencing factors in women's knowledge and attitudes toward labor pain management.[19,20] For example, research from Nigeria indicated that women from higher socioeconomic backgrounds tended to have better knowledge and awareness of non-pharmacological pain relief options.[21] These discrepancies may be attributed to cultural differences, variations in healthcare access, and the availability of educational resources in different settings.

One of the key strengths of this study lies in its focus on primigravida women, a vulnerable population with limited experience and knowledge of labor pain management, making the findings particularly relevant for healthcare providers. The use of a structured questionnaire with high reliability ensured consistent and accurate data collection. Moreover, the use of non-pharmacological techniques as the focus of knowledge assessment highlights an area that is often underrepresented in maternal healthcare research, thereby addressing a gap in the existing literature.

This study had several limitations. First, it was conducted at a single center, which may limit the generalizability of the findings to other regions of the world. Second, the study focused exclusively on primigravida women, which may not reflect the knowledge level of multiparous women. Third, the use of non-probability purposive sampling could introduce selection bias, as the participants may not be representative of the broader population. Finally, the sample size was relatively small, which may have affected the power of the statistical analyses.

CONCLUSION

The findings of this study revealed a significant knowledge gap among primigravida women regarding non-pharmacological techniques for managing labor pain. To address this, enhanced educational efforts during antenatal care are needed, focusing on informing women about the benefits, challenges, and options for pain management during labor. Midwives and other healthcare professionals should play a more active role in promoting non-pharmacological techniques through targeted educational programs. Establishing educational forums in maternity hospitals may further enhance knowledge and awareness among pregnant women, empowering them to make informed choices during childbirth.

Recommendations

Based on these findings, several recommendations can be made to improve clinical practice. First, educational programs on non-pharmacological labor pain management techniques should be integrated into routine antenatal care, particularly for primigravida women. Nurses and midwives should be trained to educate pregnant women about the benefits and techniques of non-pharmacological interventions, such as breathing exercises, massage, and relaxation, to enhance their involvement in labor pain management. Healthcare facilities should consider establishing educational forums or clinics dedicated to labor pain management, ensuring that all women, regardless of their background or prior knowledge, are informed about their pain management options. Additionally, regular training and workshops for healthcare providers are essential to overcome existing barriers, such as the lack of knowledge and resources, which prevent the effective implementation of these methods in clinical settings. Expanding these practices could help bridge the knowledge gap, promote safer childbirth experiences, and reduce the reliance on pharmacological interventions.

REFERENCES

1. Olza I, Leahy-Warren P, Benyamini Y, Kazmierczak M, Karlsdottir SI, Spyridou A, et al. Women's psychological experiences of physiological childbirth: a meta-synthesis. BMJ Open. 2018;8(10):e020347.
2. Vogel JP, Jung J, Lavin T, Simpson G, Kluwgant D, Abalos E, et al. Neglected medium-term and long-term consequences of labour and childbirth: a systematic analysis of the burden, recommended practices, and a way forward. Lancet Glob Health. 2024;12(2):e317-30.
3. Navarro-Prado S, Sánchez-Ojeda M, Marmolejo-Martín J, Kapravelou G, Fernández-Gómez E, Martín-Salvador A. Cultural influence on the expression of labour-associated pain. BMC Pregnancy Childbirth. 2022;22:836.
4. Gibson E. Women's expectations and experiences with labour pain in medical and midwifery models of birth in the United States. Women and Birth. 2014;27(3):185-9.
5. Czech I, Fuchs P, Fuchs A, Lorek M, Tobolska-Lorek D, Drosdzol-Cop A, et al. Pharmacological and non-pharmacological methods of labour pain relief-establishment of effectiveness and comparison. Int J Environ Res Public Health. 2018 Dec;15(12):2792.
6. Smith CA, Levett KM, Collins CT, Armour M, Dahlen HG, Suganuma M. Relaxation techniques for pain management in labour. Cochrane Database Syst Rev. 2018;2018(3):CD009514.
7. Nori W, Kassim MAK, Helmi ZR, Pantazi AC, Brezeanu D, Brezeanu AM, et al. Non-pharmacological pain management in labor: a systematic review. J Clin Med. 2023;12(23):7203.
8. Ray-Griffith SL, Wendel MP, Stowe ZN, Magann EF. Chronic pain during pregnancy: a review of the literature. Int J Womens Health. 2018;10:153-64.
9. Leela TK, Baboo S. Need of integrated care model for positive childbirth experience in Indian maternity care services. J Educ Health Promot. 2024;13.
10. Abdel-Fatah Ibrahim H, Alshahrani MS, Al-Qinnah AJ, Elgzar WT. Nonpharmacological pain relief for labour pain: knowledge, attitude, and barriers among obstetric care providers. Peer J. 2024;12:e16862.
11. Pietrzak J, Mędrzycka-Dąbrowska W, Wróbel A, Grzybowska ME. Women's knowledge about pharmacological and non-pharmacological methods of pain relief in labor. Healthcare. 2023;11(13):1882.
12. Cuschieri S. The STROBE guidelines. Saudi J Anaesth. 2019;13(Suppl 1):S31-4.
13. Nagvanshi S, Linson CC. Assess the knowledge regarding selected non-pharmacological interventions among pregnant women. J Pharm Rese Int. 2021;105-9.
14. Matabane SE, Musie MR, Mulaudzi MF. Childbirth preparation: knowledge of the use of non-pharmacological pain relief methods during childbirth in Tshwane District, South Africa: a cross-sectional study. Nurs Rep. 2024;14(1):1-11.
15. Heim MA, Makuch MY. Pregnant women's knowledge of non-pharmacological techniques for pain relief during childbirth. Eur J Midwife. 2022;6:5.
16. Elgzar WT, Alshahrani MS, Ibrahim HA. Non-pharmacological labor pain relieve methods: utilization and associated factors among midwives and maternity nurses in Najran, Saudi Arabia. Reprod Health. 2024;21(1):11.
17. Tavananezhad N, Bolbanabad AM, Ghelichkhani F, Effati-Daryani F, Mirghafourvand M. The relationship between health literacy and empowerment in pregnant women: a cross-sectional study. BMC Pregnancy Childbirth. 2022;22:351.
18. Nawabi F, Krebs F, Vennedey V, Shukri A, Lorenz L, Stock S. Health literacy in pregnant women: a systematic review. Int J Environ Res Public Health. 2021;18(7):3847.
19. Solomon ET, Kassie FY, Mekonnen DG, Mihret MS, Abate AT, Dessie AA. Knowledge, attitude, and practice towards labor pain management and associated factors among skilled birth attendants working at hospitals found in central, west, and north Gondar Zones, northwest Ethiopia, 2019: a multicenter cross-sectional study. Pain Res Manage. 2021;2021(1):8835677.

20. Hakala M, Rantala A, Pölkki T. Women's perceptions of counselling on pain assessment and management during labour in Finland: a cross-sectional survey. Midwifery. 2022;114:103471.
21. Ogboli-Nwasor EO, Adaji SE. Between pain and pleasure: pregnant women's knowledge and preferences for pain relief in labor, a pilot study from Zaria, northern Nigeria. Saudi J Anaesth. 2014;8(Suppl 1):S20-4.