The Effects of Evidence-based Management of Labor and Normal Delivery on the Satisfaction and Childbirth Experience among Primiparous Women: A Randomized Clinical Trial

Abstract

Background: According to the World Health Organization (WHO), implementing evidence-based care is vital for improving maternal and neonatal healthcare and outcomes. This study aimed to evaluate the effects of an evidence-based labor and normal delivery management plan on childbirth satisfaction and experience among primiparous women. **Materials and Methods:** A single-blind randomized clinical trial was conducted in 2023 at Sina Hospital in Ahvaz, Iran, involving 256 primiparous women with term, singleton, and low-risk pregnancies. Participants were selected using non-probability sampling and randomly assigned to either the intervention or control groups (128 in each) through block randomization. The intervention included the use of the WHO Labor Care Guide, consideration of maternal preferences such as freedom of movement and positioning, nutritional choices, and the preservation of maternal dignity. Trained healthcare providers implemented the evidence-based labor and delivery management program for the intervention group. Maternal satisfaction was measured using the Mackey Childbirth Satisfaction Rating Scale, and the childbirth experience was evaluated using the Childbirth Experience Questionnaire. Data were analyzed using an independent t-test, Chi-square tests, and Fisher's exact test. **Results:** The mean score for maternal satisfaction was higher in the intervention group compared to the control group ($t_{245.93} = 6.63$, $p < 0.001$). In addition, a statistically significant difference was observed in the average birth experience scores between the intervention and control groups ($t_{254} = 8.57$, $p < 0.001$). **Conclusions:** Evidence-based labor and normal delivery management enhances maternal satisfaction and fosters a more positive natural childbirth experience.

Keywords: *Evidence-based practice, natural childbirth, patient satisfaction, World Health Organization*

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Introduction

Childbirth, as a process that leads to birth, is an individual and sensitive experience influenced by a variety of factors. Pain intensity, mode of delivery, emotional support, the mother's physical condition, anxiety and psychological concerns, level of awareness and prenatal education, hospital environment, and interactions with medical staff play a role in shaping a mother's sense of security, satisfaction, and overall perception of the birth experience.[1] These experiences can range from feeling safe and satisfied, with a willingness to have more children, to experiencing fear, anxiety, and retaining unpleasant memories.[2] Birth experience has emerged as a critical issue in maternal care, with reports indicating that 7%–35% of mothers across various countries have a negative perception of their childbirth experience.[3] Negative maternal birth experiences include lack of participation in care, the occurrence of dystocia, especially emotional dystocia, and cesarean section delivery. Moreover, negative experiences are often linked to routine care procedures and the use of unnecessary interventions during natural childbirth, which not only increase costs but also negatively impact maternal satisfaction and their overall childbirth experience.[4] Patient satisfaction and childbirth experience are crucial factors that affect both short-term and long-term maternal and child outcomes, such as postpartum depression, maternal-infant bonding, and breastfeeding success.[5,6] Satisfaction among mothers with the care

they receive during labor and delivery is a significant concern for health planners and policymakers when measuring quality of care.[7] The rate of satisfaction with childbirth is reported to be 63% in Iran,[8] 52% in South Africa,[9] and 82% in Australia.[10] Variations in childbirth satisfaction levels can be attributed to factors such as the quality of healthcare services and access to maternity care. These figures highlight that childbirth requires comprehensive midwifery care. Achieving this goal necessitates the implementation of evidence-based, comprehensive care derived from research and systematic review of updated evidence across different communities.[11]

Evidence-based care integrates the most current scientific evidence with clinical experiences and patient preferences to improve the quality of care.[12] Some evidence-based care practices that promote physiological labor include spontaneous initiation of labor, avoidance of unnecessary interventions, allowing maternal mobility during labor stages, providing physical and psychological support throughout labor, spontaneous pushing in an upright position, and early initiation of breastfeeding.[13] Farahat *et al*. reported that implementing a birth plan can increase maternal satisfaction and foster a positive birth experience.[14] Increasing access to individualized care aligned with each mother's preferences and avoiding routine interventions during childbirth are essential strategies to reduce maternal complications.[15] In 2020, the World Health Organization (WHO) based its evidence-based recommendations for improving the quality of labor care and enhancing the delivery experience on the "next generation" partograph, known as the Labor Care Guide (LCG).[16] According to the WHO global recommendations, improving the quality of care and optimizing maternal and neonatal outcomes require the implementation of evidence-based care and effective interventions to reduce prolonged labor and its consequences.[17] In this context, efforts should focus on creating safe natural childbirth for both mother and baby to improve pregnancy outcomes and ensure that mothers have a positive experience. As the effect of evidence-based interventions, including the implementation of the WHO LCG, on maternal satisfaction and experience has not yet been evaluated in Iran, this study aimed to evaluate the effects of an evidence-based labor and normal delivery management plan on childbirth satisfaction and experience among primiparous women.

Materials and Methods

This parallel randomized clinical trial (code: IRCT20181214041963N2) was conducted from April to October 2023 on 256 primiparous women with term pregnancies who were referred for natural delivery to the maternity ward of Sina Hospital in Ahvaz, Iran. This study is part of a larger mixed-methods research project, which constituted a PhD thesis. It examined birth experience outcomes and satisfaction among primiparous women following the implementation of an evidence-based program. Participants were selected based on the study's inclusion criteria, and sampling was conducted using a non-probability method. They were then randomly assigned to either the intervention or the control group. The inclusion criteria were as follows: willingness to participate in the study, primiparity, singleton pregnancy, active phase of labor, a live fetus, maternal age between 15 and 49 years, gestational age between 37 and 42 weeks, cephalic presentation, and a normal fetal heart rate. The exclusion criteria included: a history of any uterine incision, abnormal pelvic dimensions detected via vaginal examination, abnormal vaginal bleeding, use of epidural anesthesia, presence of fetal abnormalities or intrauterine growth restriction, indication for cesarean section, documented maternal medical conditions, rupture of membranes lasting more than 8 hours, and high-risk pregnancy.

The sample size, calculated for comparing two proportions with $\alpha = 0.05$ (95% confidence level) and power $(1 - \beta) = 0.99$, using event rates from previous studies[18] ($p1 = 0.41$, $p2 = 0.68$), was 116 women per group. Considering a 10% dropout rate, the final sample size was set at 128 women per group, resulting in a total of 256 women. Participants were allocated to the intervention and control groups by using the random block method, with a block size of 4 and an allocation ratio of 1:1. For allocation concealment, the type of intervention was placed in consecutively numbered opaque envelopes by a person blinded to the study objectives. At the beginning of the study, both the researchers and the participants were unaware of the group assignments. Participants were informed of their group allocation after the initial assessment. Due to the nature of the study, healthcare providers (midwives and gynecologists) and participants could not be blinded to the intervention; however, the data analyst and outcome assessors (who completed the questionnaires) were blinded to group assignments. Before commencing the sampling process, the researcher (AE) selected the healthcare provider team (comprising seven midwives and three obstetricians) based on their monthly shift schedules. She then explained the study objectives to the team members. After obtaining their informed consent and ensuring their cooperation, a training session was held for the healthcare providers. During the session, the researcher explained the latest evidence and guidelines related to labor care and normal delivery. The researcher (AE) was also actively involved in the intervention implementation group.

To design the intervention program, the latest studies and evidence-based guidelines on natural childbirth management were collected, synthesized, and critically evaluated. Key components related to labor and natural childbirth were then extracted from the literature and organized into a checklist based on the structured feedback and prioritization of 20 obstetricians and midwives. This

process aimed to identify care priorities and effective interventions to improve childbirth outcomes and enhance the quality of maternal care, incorporating expert input for further refinement. The finalized intervention included components such as guidelines for using LCG checklists in managing various stages of labor, consideration of maternal preferences (e.g., freedom to choose body position, mobility, nutrition, and other personal choices), and assurance of maternal dignity throughout the childbirth process. The interventions in the experimental group were conducted in a separate room specifically designed to support physiological childbirth. Participants in this group received continuous and comprehensive care across all stages—admission, labor, delivery, and postpartum—delivered by a trained and specialized team according to an evidence-based program. This approach aimed to improve the quality of maternal and neonatal care and enhance maternal satisfaction with the childbirth experience. In contrast, the control group received routine hospital care provided by general service providers (not part of the trained intervention team), in accordance with the national obstetric care protocol. Evidence-based components of the intervention program—such as use of the LCG and individualized maternal care—were not implemented in the control group. When specific clinical conditions required intervention for the mother or fetus, care was administered according to standard hospital procedures.

After allocating the mothers into two groups, demographic and reproductive history questionnaires were completed by the researcher. This facilitated the standardization of interventions and allowed for effective monitoring of the implementation process. Following the completion of the fourth stage of labor and stabilization of the mother in the obstetrics ward, trained evaluators—blinded to the study objectives—administered satisfaction questionnaires related to childbirth and the overall childbirth experience. The MacKey Childbirth Satisfaction Questionnaire (34 items, 5-point Likert scale; total score range: 34–170) was used to measure satisfaction, and the Childbirth Experience Questionnaire (CEQ) (25 items, 4-point scale; score range: 25–100) was used to assess overall birth experience. The validity and reliability of both tools have been confirmed in Iran.[19,20] Data were analyzed using SPSS software version 22 (IBM Corporation, Armonk, NY, USA). The mean scores of the continuous variables were compared using the independent-sample *t*-test. Categorical variables were analyzed using the Chi-squared test and Fisher's exact test, as appropriate. A *p* value of <0.05 was considered statistically significant.

Ethical considerations

The study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (IR. AJUMS.REC.1401.514). It was also registered with the Iranian Registry of Clinical Trials on February 03, 2023.

Ethical considerations included obtaining informed consent, allowing participants to withdraw at any stage, maintaining confidentiality, ensuring research integrity, and committing to truthful results.

Results

This study was conducted on 256 pregnant women. Participants were randomly assigned to the intervention group (*n* = 128) and control group (*n* = 128). The sampling process and participant flow are illustrated in Figure 1. Demographic and clinical characteristics of the study population, along with a comparison between the two groups, are presented in Table 1. The mean age of the participants was 22.04 years, with a standard deviation of 4.43. Approximately 83% of the participants were housewives.

No significant differences were observed between the groups in terms of maternal age, gestational age (weeks), maternal occupation, education level, economic status, pregnancy condition, receipt of prenatal care, participation in maternal readiness class, gravidity, and body mass index [Table 1]. According to the independent *t*-test, the mean overall satisfaction score regarding childbirth was significantly higher in the intervention group compared to the control group, with a mean difference (MD) of 0.82 (95% confidence interval (CI): 0.57–1.08, *p* < 0.001). In addition, the mean scores across various satisfaction domains were also significantly higher in the intervention group: self-satisfaction (MD = 0.82, 95% CI: 0.56–1.07, *p* < 0.001), satisfaction with the midwife (MD = 0.94, 95% CI: 0.68–1.20, *p* < 0.001), satisfaction with the physician (MD = 0.82, 95% CI: 0.54–1.05, *p* < 0.001), satisfaction with the baby (MD = 0.80, 95% CI: 0.54–1.05, *p* < 0.001), satisfaction with the husband (MD = 0.33, 95% CI: 0.08–0.57, *p* = 0.008), and overall childbirth satisfaction (MD = 0.30, 95% CI: 0.06–0.55, *p* = 0.015) [Table 2]. There was also a statistically significant difference in the overall childbirth experience scores between the intervention and control groups, with higher scores observed in the intervention group (MD = 1.07, 95% CI: 0.80–1.33, *p* < 0.001). Furthermore, the mean scores in all four CEQ domains were significantly higher in the intervention group: personal capacity (MD = 0.99, 95% CI: 0.73–1.25, *p* < 0.001), professional support (MD = 0.97, 95% CI: 0.71–1.23, *p* < 0.001), perceived safety (MD = 1.12, 95% CI: 0.85–1.38, *p* < 0.001), and participation (MD = 0.79, 95% CI: 0.53–1.04, *p* < 0.001) [Table 3].

Discussion

This study aimed to evaluate the effect of evidence-based management on primiparous women's satisfaction and their childbirth experience during labor and normal delivery. The findings demonstrated that implementing evidence-based care led to increased scores in all subscales of satisfaction and childbirth experience.
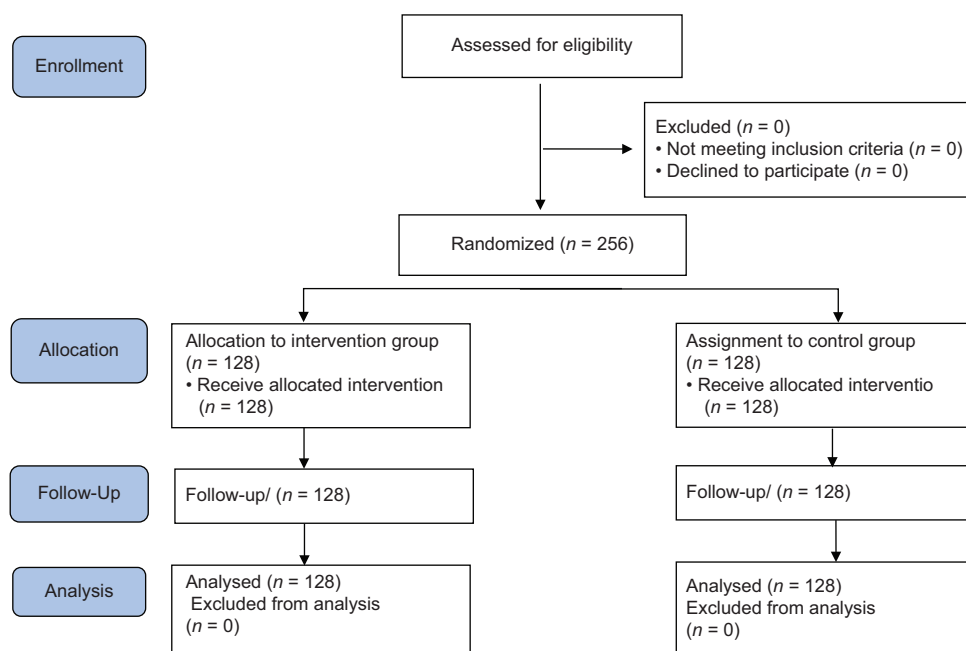
Figure 1: CONSORT diagram of the study

Studies by Farahat *et al.* and Lothian *et al.* similarly indicated that a positive relationship with the midwife, as well as the mother's involvement in decision-making during labor, which are core components of evidence-based care, were associated with higher levels of satisfaction and improved childbirth experience.[14,21] The present study confirmed that women who received evidence-based management achieved significantly higher scores across all dimensions of satisfaction and childbirth experience. These findings are consistent with previous research and reinforce the positive impact of evidence-based practices on maternal outcomes.

Women in the intervention group scored higher in the personal capacity subdomain compared to the control group. Ozkan *et al.*'s study showed that restricting food and fluid intake during labor is associated with an unfavorable experience for some mothers.[22] It can be inferred that the consumption of food and liquids may help women better cope with uterine contractions and tolerate labor more effectively, which aligns with the findings of the present study. Hodnett emphasized the importance of meeting the nutritional and fluid needs of pregnant women to maintain their strength, which may contribute to a more positive childbirth experience.[23] According to WHO recommendations, encouraging low risk mothers to adopt forward leaning positions and allowing free mobility during labor can enhance their experience (WHO, 2018).[17] Scholten *et al.* demonstrated that the birthing position significantly influences perceived satisfaction with childbirth, particularly when women are granted autonomy and the freedom to choose their preferred posture.[24] In our study, focusing on the priorities of mothers and eliminating nutritional and physical restrictions in low-risk mothers led to an increase in their personal capacity. This may be one of the reasons for the increased satisfaction and childbirth experience, which is consistent with the findings of the above studies.

The subdomain of perceived professional support and the mother's participation in the care provided during labor and delivery were also significantly higher in the intervention group. Studies by Demirci *et al.* and Zamani *et al.* have highlighted that effective communication, support from healthcare providers, and active maternal participation during labor are key factors associated with a positive childbirth experience.[25,26] In our study, receiving professional care based on LCG, effective communication between care providers and the mother, and active maternal involvement during labor and delivery in the intervention group may explain the enhanced childbirth experience.

The subdomain of perceived safety was also significantly higher in the intervention group. A study conducted by Fernandes *et al.* aimed to investigate the impact of evidence-based practices during childbirth on maternal experiences. The results indicated that mothers who received evidence-based care, including freedom of movement during labor, the ability to choose their delivery position, non-pharmacological pain relief methods, and reduced unnecessary interventions, felt more in control of their bodies and experienced greater safety regarding themselves and their birthing environment.[27] In the present study, maintaining maternal dignity, providing continuous support, managing pain based on the mother's preferences, and minimizing unnecessary medical interventions were contributing factors to the increased perceived sense of safety among mothers. These findings are consistent with the results of the aforementioned study.

Table 1: Comparison of sociodemographic characteristics of study group participants

Variable	Intervention group (*n*=128)	Control group (*n*=128)	Statistic	df	*p*
Mother's age (years), mean (SD)	22.32 (4.31)	21.76 (4.54)	1.00	254	0.318*
Weeks of gestation, mean (SD)	39.34 (1.09)	39.20 (1.07)	1.03	254	0.301*
Job, *n* (%)					
Housewife	107 (83.60)	105 (82)			0.162**
Student or employed	21 (16.40)	23 (18)			
Education level					
Mother, *n* (%)					
Illiterate	13 (10.20)	17 (13.30)			0.397***
Junior high school	75 (58.60)	82 (64.10)			
Senior high school	34 (26.60)	23 (18)			
University	6 (4.70)	6 (4.70)			
Economic status, *n* (%)					
Less than enough	39 (30.50)	49 (38.30)			0.413***
Fair	84 (65.60)	74 (57.80)			
More than enough	5 (3.90)	5. (3.90)			
Pregnancy condition, *n* (%)					
Desired	110 (85.90)	104 (81.30)			0.311***
Undesired	18 (14.0)	24 (18.80)			
Receive prenatal care, *n* (%)					
Yes	124 (96.90)	125 (97.70)			0.701**
No	4 (3.10)	3 (2.30)			
Participation in maternal readiness class, *n* (%)					
Yes	30 (23.40)	32 (25)			0.770***
No	98 (76.60)	96 (75)			
Gravida, *n* (%)					
1	114 (89.10)	111 (86.70)			0.567***
2	14 (10.90)	17 (13.30)			
Body mass index (kg/m^2), *n* (%)					
Underweight	0 (0)	0 (0)			0.802***
Normal weight	23 (18)	32 (25)			
Overweight	84 (65.60)	75 (58.60)			
Obesity	21 (16.40)	21 (16.40)			

*Independent sample *t*-test, **Fisher's exact test, ***Chi-square test. SD=Standard deviation

Table 2: Mean of postpartum maternal satisfaction scores in the study groups

Variable	Mean (SD)		Statistic (independent sample *t*-test)	df	*p*
	Intervention	Control			
Total satisfaction score	149.23 (18.98)	131.91 (22.86)	6.63	245.93	<0.001
Self-satisfaction score	39.73 (5.29)	34.83 (6.57)	6.56	243.06	<0.001
Satisfaction with midwife	38.07 (3.58)	33.34 (6.08)	7.58	205.66	<0.001
Satisfaction with physician	33.78 (5.84)	28.93 (5.98)	6.56	254	<0.001
Satisfaction with baby	12.86 (2.04)	11.46 (2.05)	6.42	254	<0.001
Satisfaction with husband	7.87 (1.47)	7.37 (1.53)	2.66	254	0.008
Overall childbirth satisfaction	16.92 (2.61)	15.98 (3.44)	2.45	237.04	0.015

SD=Standard deviation

The study conducted by Abdolalipour *et al*. aimed to assess the impact of implementing the WHO childbirth care model on the experience and quality of maternity care. The findings indicated that receiving care based on this model was associated with an improved childbirth experience and greater maternal satisfaction. Participants who received this intervention rated the quality of care across various dimensions, including emotional support, respect, effective interaction with the healthcare team, pain management, nutrition, and mobility during labor, as more favorable. Furthermore, this approach improved women's perception of the childbirth process and increased their sense of control and satisfaction.[28] The results of that study are consistent with the findings of the present study

Table 3: Mean of childbirth experience scores in the study groups

Variable	Mean (SD)		Statistic (independent sample *t*-test)	df	*p*
	Intervention	Control			
Total score childbirth experience	82.29 (11.67)	68.98 (13.11)	8.57	254	<0.001
Personal capacity	28.72 (4.95)	23.66 (5.20)	7.95	254	<0.001
Professional support	16.75 (2.51)	14.19 (2.75)	7.77	254	<0.001
Perceived safety	20.18 (2.78)	16.67 (3.44)	8.97	243.40	<0.001
Participation	16.53 (2.33)	14.46 (2.88)	6.31	243.30	<0.001

SD=Standard deviation

and highlight the importance of providing person-centered, evidence-based care to enhance the childbirth experience.

According to a study by Vogel *et al*., no significant difference was observed in women's experiences when using the WHO LCG, which contrasts with the findings of our study.[29] However, mothers reported high satisfaction with the amount of time the healthcare provider spent with them, the quality of communication, and the overall care they received. One possible reason for the discrepancy between Vogel's study and the present study is that the care women received in Vogel's research was not fully aligned with evidence-based interventions and did not adequately consider the priorities of the women. These findings suggest that implementing evidence-based interventions may be crucial for providing high-quality care.

The longitudinal cohort study conducted by Bossano *et al*. in 2017 found that the impact of childbirth experience on women's mental health can last for over a decade.[30] This highlights the importance of conducting studies related to the childbirth experience.

Various studies have shown that a mother's satisfaction with childbirth can be increased through her participation in interventions, empowerment, and preferences in choosing non-pharmacological methods to reduce pain intensity.[22,31] Our study is consistent with these findings. Aghlmand *et al*.'s study demonstrated that implementing a new maternity care model improves physician compliance with evidence-based care and is associated with increased women's satisfaction scores and a reduction in the cesarean delivery rate. This model was based on identifying mothers' needs, values, and preferences through interviews and a professional consensus process; the best evidence-based interventions were then selected and implemented,[32] which is consistent with the results of our study.

The strength of this study, to the best of our knowledge, lies in the implementation of the WHO obstetric care guidelines as a part of the natural childbirth and delivery program based on evidence-based clinical practice for the first time in Iran. However, the study has certain limitations. It was conducted exclusively among low-risk pregnant women with relatively low educational levels, which may limit the generalizability of the findings to women with higher educational attainment or those

receiving care in private healthcare settings. Furthermore, the results cannot be extended to high-risk pregnancies. These limitations underscore the need for future research targeting at-risk populations and including participants with diverse educational and socioeconomic backgrounds to confirm and broaden the current findings.

Conclusion

The findings of this research show that the natural labor and delivery program based on evidence-based clinical practice is a promising intervention that can enhance satisfaction during labor and foster a positive experience of natural childbirth, which is particularly important given the high rate of cesarean delivery.

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Conflicts of interest

Nothing to declare.

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