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The relationship between delivery fear and childbirth experience with the level of adherence to the WHO recommendations for a positive childbirth experience in Iranian women: a cross-sectional study

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Abstract

Background Childbirth experience is a unique event that involves psychological and physiological aspects influenced by social, environmental, organizational, and political factors. In 2018, the World Health Organization (WHO) introduced 56 recommendations for ensuring a positive childbirth experience at different stages of labor and delivery. Owing to the importance of implementing these guidelines, we have chosen to assess adherence to the WHO recommendations and their association with the fear and experience of childbirth.

Methods This cross-sectional study was conducted on women hospitalized in the labor departments of the Al-Zahra and Taleghani Educational centers in Tabriz, Iran from 2023 to 2024. Sampling was performed via a convenience method, and data were collected via sociodemographic characteristics questionnaire, childbirth experience questionnaire.2 (CEQ.2), delivery fear scale (DFS), and the WHO recommendation checklist. The data were analyzed via Pearson correlation, independent t tests, one-way analysis of variance, and a general linear model (GLM).

Results The average adherence score to the WHO recommendations among the women studied was 36.4 (SD 9.3), out of a range of 0–56. There was a significant negative correlation between adherence to the recommendations and delivery fear ($r = -0.249$; $p < 0.001$) and a significant positive correlation with childbirth experience ($r = 0.414$; $p < 0.001$). The GLM results, after adjusting for sociodemographic variables, revealed a significant increase in positive childbirth experience with increasing adherence score ($B = 0.01$; 95% CI 0.005 to 0.02, $p = 0.001$) and a nonsignificant association between delivery fear and adherence score ($B = -0.1$; 95% CI -0.4 to 0.04 , $p = 0.114$).

Conclusion This study highlights the need to improve the implementation of WHO recommendations in educational and therapeutic centers and to consider various factors that affect the experience and fear of childbirth. Policymakers and medical center managers should place greater emphasis on training, monitor the complete implementation of the recommendations, and provide psychological and social support to pregnant women. This approach can help improve the childbirth experience, reduce delivery fear, and increase the preference for natural childbirth.

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Keywords WHO recommendations, Positive childbirth experience, Delivery fear

Plain English Summary

Childbirth is an important life event that can be influenced by various factors, such as a woman's social environment and the care she receives. In 2018, the World Health Organization (WHO) issued 56 recommendations to ensure women have positive childbirth experiences. This study focused on how well these guidelines were followed in two hospitals in Tabriz, Iran, and explored the relationship between guideline adherence, fear of childbirth, and the overall childbirth experience. We collected data from women who gave birth in 2023 and 2024. Surveys measured their fear of childbirth, their experience during labor, and how well the WHO recommendations were followed. Our findings showed that when the hospitals followed more of the WHO guidelines, women had better childbirth experiences and less fear. However, the impact on reducing fear was less clear. This study suggests that better implementation of the WHO guidelines in hospitals could improve childbirth experiences and reduce fear, potentially encouraging more women to opt for natural childbirth. Hospitals should prioritize training, monitoring, and providing emotional and social support for pregnant women to achieve these improvements.

Background

The experience of childbirth is an individual life event that involves psychological and physiological aspects influenced by various social, environmental, organizational, and political factors [1]. It is a profound experience that can significantly impact a mother's well-being in the short and long term, creating lasting memories and leading to feelings of empowerment or vice versa [2]. Women's experiences of pregnancy, labor, and birth are complex and can involve a wide range of emotions, from joy to anxiety and panic [3]. The fear of childbirth, known as tokophobia, is a psychological condition that can manifest as a mild to severe fear of giving birth [4]. In Iran, the fear of childbirth varies from 17.3% in Talesh city to 89.3% in Tuyserkan city, particularly among first-time mothers. This fear can be caused by factors such as fear of pain, birth complications, and uncertainty about managing the birth process [5].

The quality of care and medical staff's interactions with women strongly influence the childbirth experience. A lack of trust in medical teams and a lack of respect for patients' rights and dignity can increase fear and anxiety in pregnant women [6, 7]. The World Health Organization (WHO) has developed guidelines to promote positive birth experiences, emphasizing the importance of respecting women's rights and providing evidence-based care [8].

The high cesarean rate in Iran, with approximately 50% of births on average, underscores the importance of identifying the factors affecting fear and experience of childbirth [9]. The increasing rate of cesarean delivery and the reduction in the desire for vaginal delivery pose significant challenges to maternal health, leading to potential childbirth complications and placing considerable financial and psychological burdens on the country's health-care system [10]. Negative childbirth experiences and

associated fears play crucial roles in influencing women's preference for cesarean delivery in subsequent pregnancies and their desire not to have children again [11].

In 2018, the World Health Organization (WHO) developed recommendations for intrapartum care to facilitate a positive childbirth experience, comprising 56 items for different stages of labor and delivery. These items highlight the importance of offering respectful care to women during childbirth. It stresses the preservation of their dignity and rights, enabling them to maintain control over the birth process and promoting their active involvement in decision-making, especially with respect to pain management methods. The protocol also underlines the need for continuous specialized support from the medical team and the presence of relatives to foster a sense of security. A safe and supportive birth environment that instills a feeling of security and peace is crucial for a positive childbirth experience [12].

Given the importance of implementing the WHO recommendations, we aimed to assess adherence to these recommendations and their associations with fear and experience of childbirth in the educational centers of Tabriz city.

Methods

Study type and participants

This cross-sectional study was carried out on pregnant women admitted to the labor department of Al-Zahra and Taleghani Educational Centers in Tabriz from 2023 to 2024.

The inclusion criterion was women aged 18 years and above who underwent vaginal delivery with a full-term pregnancy. The exclusion criteria were multiple pregnancies, breech presentation, cesarean delivery, and high-risk pregnancies such as preeclampsia and diabetes.

Sample size

On the basis of Ghanbari et al.'s study, considering a standard deviation of 0.7 and a precision of $d=0.05$, around the mean childbirth experience of $m=2.71$, $\alpha=0.05$, and power=90%, the sample size was determined to be 208 individuals [13].

Sampling

After approval from the Research Council and permission from the Ethics Committee (IR.TBZMED.REC.1400.777) of the Vice President of Research and Technology of Tabriz University of Medical Sciences, the study was conducted with 208 eligible women.

Sampling was performed through the convenience method. The researcher assessed all women in labor to determine eligibility and willingness to participate. Sociodemographic questionnaires were completed for those who met the criteria. The researcher monitored all stages of labor, delivery, and postpartum and completed the WHO checklist during labor and delivery by interviewing the participants and reviewing their health records. The participants were interviewed at a 7 cm dilation for the delivery fear questionnaire and 12 to 18 h after delivery for the childbirth experience questionnaire.

Data collection tools

Sociodemographic characteristics questionnaire

This questionnaire includes questions about age, sufficiency of income for household expenses, education, employment, and obstetric characteristics such as gestational age, number of pregnancies, number of abortions, unwanted pregnancies, and type of previous birth.

Checklist of WHO recommendations on Intrapartum Care for a positive childbirth experience

A total of 56 recommendations from the WHO [12] were used in the form of a checklist. The recommendations cover various aspects of labor, delivery, and postpartum care. Each recommendation is marked with a "yes" or "no" and a score of one for implementation and zero for non-implementation. The total score ranges from 0 to 56, with higher scores indicating higher-quality maternal care.

Childbirth experience questionnaire (CEQ.2)

The questionnaire, developed by Dencker et al. in 2010 and revised later, contains 23 statements measuring women's childbirth experience. It includes domains such as personal capacity, professional support, perceived safety, and participation. The questionnaire uses

a combination of multiple-choice answers and a visual analog scale (VAS) to gather responses. Responses are rated as follows: Strongly Agree (Score 1), Generally Agree (Score 2), Generally Disagree (Score 3), and Strongly Disagree (Score 4). Questions answered on a visual scale are converted to values from 1 to 4: scores of 0–40 equal to Score 1, scores of 41–60 equal to Score 2, scores of 61–80 equal to Score 3, and scores of 81–100 equal to Score 4. Statements with negative concepts (such as experiencing severe pain, fatigue, fear, and having bad memories) are rated negatively. Higher scores indicate a more positive experience of childbirth [14]. Ghanbari et al. confirmed the validity and reliability of this tool in 2019, with a Cronbach's alpha of 0.93 and an ICC of 0.97 [15].

Delivery fear scale (DFS)

It is a 10-item self-assessment questionnaire created by Wijma to measure fear during labor. Scores on the scale range from 1 (do not agree at all) to 10 (completely agree), with a higher score indicating greater fear of childbirth during labor. The questionnaire can be easily completed within 60 to 90 s during labor and delivery [16]. The Persian version of the DFS has been confirmed as a valid and reliable tool for measuring fear in the delivery room (Cronbach's alpha: 0.77 and ICC: 0.83) [17].

Statistical analysis

Data collected from all participants were analyzed via SPSS 27 software. The normality of the quantitative variables was assessed via skewness and kurtosis, all of which showed a normal distribution. In the bivariate analysis, Pearson's correlation test was used to determine the correlation of adherence to the WHO recommendations with childbirth experience and fear of childbirth. To evaluate how adhering to the WHO recommendations affects positive childbirth experience and delivery fear, we used a general linear model (GLM) while adjusting for sociodemographic and obstetric characteristics. First, we examined the relationships between sociodemographic and obstetric characteristics and childbirth experience and fear of childbirth via Pearson's correlation tests, one-way analysis of variance, and independent t tests. The variables that subsequently displayed a statistically significant relationship with fear and experience of childbirth (dependent variables) were included in the GLM, alongside adherence to the WHO recommendations (independent variable). We considered a P value of less than 0.05 to indicate statistical significance.

Results

In this study, 208 women who delivered were examined. The mean (SD) age of the women was 28.4 (6.4) years. The mean (SD) weight of the babies was 3227.9 (485.2) grams, and the mean (SD) height was 50.3 (2.5) cm. Approximately two-thirds of the pregnancies (67.8%) were wanted, and almost all the women (99%) had received prenatal care. The Socio-demographic and obstetric characteristics of the patients are shown in Table 1.

The mean (SD) score of adherence to the WHO recommendations in these women was 36.4 (9.3), which was outside the range of 0–56. There was a significant negative correlation between adherence to the recommendations and delivery fear ($r = -0.249$; $p < 0.001$) and a significant positive correlation with childbirth experience ($r = 0.414$; $p < 0.001$) (Table 2).

The GLM results, after adjusting for sociodemographic and obstetric variables, revealed a significant increase in childbirth experience score with increasing adherence score ($B = 0.01$; 95% CI 0.005 to 0.02, $P = 0.001$). Other variables related to childbirth experience included sufficiency of income, having control over delivery, and desire for future NVD (natural vaginal delivery). Compared with women with insufficient income, those with completely sufficient income had significantly greater scores for childbirth experience ($B = 0.2$; 95% CI 0.02–0.5, $P = 0.029$). Additionally, having control over delivery ($B = 0.4$; 95% CI 0.2–0.5, $P < 0.001$) and the desire for future NVD ($B = 0.1$; 95% CI 0.01 to 0.2, $P = 0.034$) increased the score of childbirth experience (Table 3).

On the basis of the results of the GLM, after adjusting for sociodemographic and obstetric characteristics, an increase in adherence to WHO recommendations was associated with a decrease in the delivery fear score ($B = -0.1$; 95% CI -0.4 to 0.04 , $P = 0.114$), although the result was not statistically significant. Other variables associated with fear of childbirth included having control over delivery and a desire for future NVD. Having control over delivery ($B = -13.2$; 95% CI -18.3 to 8.0 , $P < 0.001$) and desire for future NVD ($B = -9.0$; 95% CI -13.5 to 4.5 , $P < 0.001$) were both associated with decreased delivery fear scores (Table 4).

Discussion

The findings of this study indicate that the level of adherence to WHO recommendations on intrapartum care for a positive childbirth experience in Tabriz educational centers was relatively favorable. Both fear and experience of childbirth were related to adherence to the recommendations. In addition to income sufficiency, having control over delivery and a desire for future NVD were

identified as factors influencing the fear and experience of childbirth.

In the present study, adherence to the WHO recommendations was moderate. A study conducted in a Venezuelan hospital revealed that, in most cases, adherence was average; 87% of patients reported moderate adherence to the recommendations for delivery and postpartum care [18]. Other studies have also demonstrated that fully implementing the WHO guidelines in health centers is challenging. For example, research in Brazil indicated that while the WHO safe childbirth checklist was widely accepted in one hospital, it faced challenges in another center, suggesting various factors affecting this field [19]. These findings point to systematic difficulties in implementing the guidelines, including resource constraints, educational limitations, and cultural resistance. A lack of coordination between treatment teams and differences in internal treatment center policies may also contribute to moderate adherence to guidelines.

The study indicates that adherence to WHO guidelines has a moderate, statistically insignificant effect on reducing delivery fear. It suggests that while the WHO recommendations promote safe and healthy childbirth practices, they may not directly address psychological aspects like fear of childbirth. Delivery fear can be influenced by various factors such as cultural beliefs, previous birth experiences, personal perceptions of pain, and societal attitudes toward childbirth interventions. Clinical guidelines alone may not fully address these factors [20]. To effectively reduce delivery fear, interventions may need to extend beyond clinical guidelines and include more targeted psychological and emotional support. It could involve addressing individual concerns through education, counseling, and continuous support during labor from trusted caregivers such as midwives or doulas [21].

In this study, a significant relationship was found between childbirth experience and adherence to WHO recommendations. A study in Brazil explored how implementing WHO-recommended “best practices” for natural childbirth affected mothers’ evaluations of the care they received. The results revealed that the presence of a spouse, maintaining privacy, and receiving clear information and empathetic support from caregivers during labor and delivery were the most crucial factors for a positive childbirth experience [22]. A recent systematic review in Iran examined the effect of various interventions before and during childbirth on the childbirth experience. The meta-analysis included 20 trials with 22,800 participants from 12 countries. The findings indicated that supporting women during childbirth, providing minimal intervention during childbirth, preparing for childbirth, and addressing possible complications effectively improved

Table 1 Sociodemographic characteristics of the participants ($n=208$)

Characteristic	Mean (SD) ^a	Characteristic	Number (Percent)
Age (Year)	28.4 (6.4)	Prenatal care	
Spouse age	33.3 (5.8)	Yes	206 (99.0)
Neonate weight (gr)	3227.9 (485.2)	No	2 (1.0)
Neonate height (cm)	50.3 (2.5)	Place of most prenatal care	
Neonate head circumference (cm)	34.1 (1.6)	Health center	117 (56.3)
Birth attendant age (y)	31.7 (7.6)	Medical center	37 (17.8)
	Number (Percent)	Private office	52 (25.0)
Education		Having control over delivery	
Under diploma	147 (70.7)	Yes	158 (76.0)
Diploma	50 (24.0)	No	49 (23.6)
University	11 (5.3)	Type of recent delivery	
Spouse education		NVD ^a without incision	53 (25.5)
Under diploma	125 (59.9)	NVD with incision	112 (53.8)
Diploma	65 (31.3)	NVD with rupture	43 (20.7)
University	18 (8.7)	Birth attendant	
Job		Midwife	96 (46.2)
Housewife	201 (96.6)	Resident	112 (53.8)
Working	7 (3.4)	Neonate Gender	
Spouse job		Female	112 (53.8)
Employee	71 (34.1)	Male	96 (46.2)
Freelance	137 (65.9)	Apgar 1st min	
Living place		<6	6 (2.8)
City	128 (61.5)	6–8	12 (5.8)
Village	80 (38.5)	9 ≤	190 (91.3)
Income sufficiency		Apgar 5th min	
Quite enough	31 (14.9)	3–4	3 (1.5)
Relatively enough	158 (76.0)	7–8	7 (3.3)
Not enough	19 (9.1)	9–10	198 (95.2)
History of Violence		Breastfeeding time	
Yes	22 (10.6)	The 1st hour	163 (78.4)
No	186 (89.4)	The 2nd hour	13 (6.3)
Support		After the 2nd hour	32 (15.4)
Husband	120 (57.7)	NICU Admission	
Father/Mother	72 (34.6)	Yes	32 (15.4)
Other	16 (7.7)	No	176 (84.6)
Gestational age		Birth shift	
< 37 w	13 (6.3)	Morning	57 (27.4)
37–38 w	63 (30.3)	Noon	76 (36.5)
39 w ≤	132 (63.5)	Night	75 (36.1)
Abortion		Desire for future pregnancy	
Yes	36 (17.3)	Yes	77 (37.0)
No	172 (82.7)	No	131 (63.0)
Planned pregnancy		Desire for future NVD delivery	
Yes	120 (57.7)	Yes	119 (57.2)
No	88 (42.3)	No	89 (42.8)
Wanted pregnancy		Birth attendant marital status	
Yes	141 (67.8)	Single	85 (40.9)
No	67 (32.2)	Married	123 (59.1)
Prenatal classes		Birth attendant history of birth	
Yes	43 (20.7)	Yes	35 (16.8)
No	165 (79.3)	No	173 (83.2)

Table 1 (continued)^a Natural vaginal delivery

* Standard deviation

Table 2 Status of adherence to WHO guidelines, childbirth experience, and delivery fear in participants ($n = 208$)

Characteristic	Mean (SD) *	Obtained score range	Obtainable score range	Correlation with adherence to WHO guidelines r (p) [†]
Adherence to WHO guidelines	36.4 (9.3)	17.0 to 56.0	0.0 to 56.0	1
Childbirth experience	3.0 (0.5)	1.4 to 4.3	0.8 to 4.7	0.41 (< 0.001)
Delivery Fear	45.1 (17.6)	10.0 to 98.0	10 to 100	− 0.24 (< 0.001)

* Standard deviation

[†] Pearson correlation test**Table 3** Relationship of childbirth experience with adherence to WHO guidelines based on the adjusted General Linear Model

Variable	β (95% CI)*	p value
Adherence to WHO guidelines	0.01 (0.005 to 0.02)	0.001
Income sufficiency (Reference: Not sufficient)		
Completely sufficient	0.2 (0.9 to 3.2)	0.029
Relatively sufficient	0.1 (− 0.07 to 0.3)	0.206
Spouse Education (Reference: University)		
Under diploma	− 0.06 (− 0.2 to 0.1)	0.577
Diploma	− 0.1 (− 0.3 to 0.1)	0.355
Spouse job (Reference: Freelance)		
Employee	− 0.07 (− 0.2 to 0.06)	0.292
Support (Reference: Other)		
Husband	− 0.1 (− 0.3 to 0.09)	0.246
Father/Mother	− 0.2 (− 0.4 to 0.02)	0.080
NICU Admission (Reference: No)		
Yes	− 0.1 (− 0.3 to 0.02)	0.088
Abortion (Reference: No)		
Yes	0.1 (− 0.04 to 0.2)	0.156
Birth Attendant (Reference: Resident)		
Midwife	0.1 (− 0.01 to 0.2)	0.070
Place of most prenatal care (Reference: Private office)		
Health center	0.005 (− 0.1 to 0.1)	0.952
Medical center	− 0.01 (− 0.2 to 0.1)	0.920
Having control over delivery (Reference: No)		
Yes	0.4 (0.2 to 0.5)	< 0.001
Desire for future NVD delivery (Reference: No)		
Yes	0.1 (0.01 to 0.2)	0.034
Apgar 1st min	0.1 (− 0.1 to 0.3)	0.293
Apgar 5th min	− 0.1 (− 0.3 to 0.1)	0.460

* 95% confidence interval

the childbirth experience [23]. These studies, along with the present study, demonstrate that implementing WHO recommendations and providing appropriate support to

mothers during childbirth can enhance the experience and generate positive emotions in mothers. This study highlights the association between childbirth experience

Table 4 Relationship of delivery fear with adherence to WHO guidelines based on the adjusted General Linear Model

Variable	β (95% CI*)	p value
Adherence to WHO guidelines	– 0.1 (– 0.4 to 0.04)	0.114
Income sufficiency (Reference: Not sufficient)		
Completely sufficient	– 1.9 (– 10.76 to 6.9)	0.667
Relatively sufficient	– 3.3 (– 10.7 to 4.0)	0.373
Abortion (Reference: No)		
Yes	– 2.5 (– 8.2 to 3.2)	0.386
Having control over delivery (Reference: No)		
Yes	– 13.2 (– 18.3 to – 8.0)	< 0.001
NICU Admission (Reference: No)		
Yes	0.146 (– 6.6 to 6.9)	0.966
Desire for future NVD delivery (Reference: No)		
Yes	– 9.0 (– 13.5 to – 4.5)	< 0.001
Apgar 1st min	– 8.4 (– 16.7 to – 0.01)	0.050
Apgar 5th min	6.6 (– 3.1 to 16.3)	0.181

* 95% confidence interval

and adherence to WHO recommendations, significantly shaped by cultural and contextual factors. In Iran, cultural norms favor medical interventions like cesarean sections, which can conflict with WHO's emphasis on minimizing interventions for low-risk births. Research suggests that many women in Iran face societal and family pressures that make them believe cesarean sections are less painful and safer. This mindset diverges from WHO guidelines that promote natural childbirth [24]. Additionally, Iran's healthcare system often prioritizes medical care, making it challenging to adhere to WHO recommendations. As a result, childbirth experiences in Iran are influenced more by local medical practices than international standards [21]. This situation underscores the importance of creating culturally sensitive approaches that can bridge local practices with global health guidelines.

The sufficiency of income was identified as a factor related to a positive childbirth experience. This finding aligns with a study conducted in Hungary, which revealed that factors such as marital status, financial conditions, type of residence, and social support are associated with positive childbirth experiences. Monthly income can act as a financial and emotional support factor for women and significantly influence their childbirth experience [25]. Another study in Iran also revealed a relationship between family income sufficiency and childbirth experience and between family income sufficiency and maternal well-being after childbirth. A previous study revealed that women with higher family incomes had more positive experiences, leading to better psychological health after childbirth [26]. A higher socioeconomic status, including adequate monthly income, may lead to a positive childbirth experience by providing access to better

healthcare and reducing stress related to pregnancy and childbirth.

A sense of control over the delivery process is crucial for a positive childbirth experience and for reducing delivery fear. Studies have shown that women who feel more in control of the birthing process have better experiences. These findings highlight the importance of educational programs and emotional and physical support to improve women's sense of control and overall childbirth experience [27, 28]. A study by Preis et al. revealed that feeling in control of the birth environment was significantly associated with positive emotions, reduced fear, and increased quality of care. This sense of control directly impacts childbirth satisfaction and overall experience [29]. Another study by Martins et al. revealed that having control over birth decisions, particularly regarding information provided by healthcare providers, was associated with greater satisfaction with the birth experience. Women who received adequate and appropriate information were more satisfied with their delivery process [30]. These studies demonstrate that a sense of control during labor can have a positive effect on the labor experience and lead to significant improvements in the quality of care and satisfaction.

The desire to have a normal vaginal delivery again in the future was also identified as a factor affecting the fear and experience of childbirth. Women with positive experience with NVD are more likely to choose it again [31]. Primiparous women, who have never given birth before, often face fear and uncertainty and are influenced by the advice of others. Increasing their awareness can lead to a greater willingness to choose natural childbirth [32]. A study on women who successfully had natural births after

their first cesarean section (VBAC) revealed that these women have a greater tendency to have a natural birth in subsequent pregnancies. This finding demonstrates that a positive experience can change childbirth preferences in favor of NVD [33]. This highlights the need to improve the quality of delivery services and increase women's awareness of the benefits of natural delivery.

Strengths and limitations

This study has notable strengths, such as its sampling from two prominent educational centers in Tabriz city, both of which are referral centers for the surrounding area. Moreover, the study utilized standard tools, facilitating the comparison of the results with those of other studies. However, it is essential to acknowledge certain limitations. The use of convenience sampling reduces the generalizability of our findings, limiting the broader applicability of the study. Additionally, the study's cross-sectional design confines its scope to examining relationships at a specific time, precluding the establishment of causation. It is advisable to develop educational programs and implement specific clinical interventions to encourage adherence to WHO recommendations in upcoming studies.

Conclusion

The study's findings suggest that adherence to WHO recommendations on intrapartum care for a positive childbirth experience in Tabriz educational centers was relatively favorable. Both fear and childbirth experience were found to be significantly linked to adherence to the recommendations. Factors such as income sufficiency, having control over delivery, and a desire for future normal vaginal delivery were identified as influencing the fear and experience of childbirth. This study emphasizes the need to improve the implementation of the WHO guidelines in educational medical centers and to pay attention to various factors affecting the fear and experience of childbirth. Policymakers and medical center managers should focus on training and monitoring the full implementation of the recommendations, as well as providing psychological and social support to pregnant women. This approach can help improve the birth experience, reduce the fear of childbirth, and increase the desire for a natural birth.

Abbreviations

WHO	World Health Organization
DFS	Delivery fear scale
CEQ	Childbirth experience questionnaire
GLM	General linear model
SD	Standard deviation
NVD	Natural vaginal delivery
VBAC	Vaginal birth after cesarean section

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Author contributions

FS, MMi, EL and SG-H conceptualized the study. FS and MMi developed the study design. FS, FY, EL and FR collected the data. FS, MMi, and MMo analyzed and interpreted the data. All authors have critically read the text and contributed with inputs and revisions, and all authors read and approved the final manuscript.

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Data availability

The datasets generated and/or analyzed during the current study are not publicly available due to limitations of ethical approval involving the patient data and anonymity but are available from the corresponding author at reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Tabriz University of Medical Sciences, with the code IR.TBZMED.REC.1400.777. Before participation, the researcher thoroughly explained the study's objectives and methodologies to all participants. Informed written consent was obtained from each participant, affirming their voluntary involvement and understanding of the study's purpose and procedures.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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