

The impact of educational intervention based on Cognitive-Behavioral Therapy on fear of childbirth in pregnant women; a quasi-experimental intervention study

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The impact of educational intervention based on Cognitive-Behavioral Therapy on fear of childbirth in pregnant women; a quasi-experimental study

Abstract

Background: Fear about giving birth is a frequent issue in pregnancy that can range from significant worry to a level that interferes with daily life or decisions about having a baby .This study aimed to determine the effect of cognitive-behavioral therapy on fear of childbirth in the pregnant women.

Methods: This study was carried out in 2025 among pregnant women visiting comprehensive health service centers in Qom using cluster sampling. The sample size was estimated to be 40 for each intervention and control group. A researcher-made questionnaire and the Wijma Fear of Childbirth Questionnaire, version A, were used. The pre-test questionnaire was completed and collected by both intervention and control groups. The educational program for women in the intervention group included routine prenatal care with a focus on cognitive behavioral therapy during pregnancy, and for the control group, routine prenatal care. The number of educational sessions included 8 90-minute educational sessions held in comprehensive health service centers. Two months after the implementation of the intervention program, the FOC post-test questionnaire was completed in both groups. Data analysis was using SPSS version 27 software using parametric and non-parametric tests. Paired t-test and Wilcoxon test were used for intragroup comparisons, and Fisher or Welch and Kruskal-Wallis analysis of variance were used for intergroup analysis. A p value of less than 0.05 was considered significant.

Results: The mean ages of the intervention and control groups were 25.82 ± 6.12 and 25.15 ± 5.19 , respectively. Chi-square and t-tests showed that the groups did not differ significantly in terms of

education level, occupation, and pregnancy intention ($p<0.05$). The findings showed that the mean scores of knowledge, attitude, and fear of childbirth in the intervention group following the program showed a statistically significant difference. In addition, the comparison between the two groups indicated a significant difference in the mean scores of knowledge, attitude, and childbirth ($p<0.05$).

Conclusion: In this study, the therapy provided to pregnant women enabled them to use cognitive-behavioral therapy to reduce fear of childbirth. The results showed that cognitive-behavioral therapy, relying on behavioral strategies, could not only reduce fear of childbirth and improve attitudes towards childbirth, but also improve childbirth experiences and postpartum mental health.

Keywords: cognitive-behavioral therapy, pregnant women, fear of childbirth, quasi-experimental

Introduction

Pregnancy is among the most significant occurrences and the greatest sources of stress in a woman's life. The primary source of stress during this time is associated with giving birth. Undergoing significant stress and anxiety during pregnancy and fear of childbirth (FOC) can negatively impact the health of both the mother and baby (1), and influence on the labor and delivery process that led to a rise in surgical interventions and complications for the mother (2). The anxiety levels of the pregnant mother appear to be frequently influenced by the FOC (3). FOC is a significant concern impacting the health of expectant mothers and their offspring. It hinders the assistance during pregnancy and obstructs the usual progression of deliveries.

Research from various countries indicates that around 20 to 80 percent of expectant mothers encounter different degrees of FOC, and the prevalence of FOC has risen over the years (4, 5).

Tocophobia, a Greek term meaning an intense fear of childbirth, can inhibit a woman from conceiving (6). Tocophobia is categorized into two main types: primary and secondary. The main type that chiefly impacts first-time mothers is occasionally so intense that even a woman eager to have a child refrains from becoming pregnant. The secondary type is linked more closely to the negative experiences from past pregnancies (3). Women with FOC face a higher risk of maternal complications regarding outcomes and surgical procedures (7). The fear of childbirth encompassed a spectrum from rational anxieties to intense phobias. Many first-time pregnant mothers face typical and logical anxieties stemming from inadequate knowledge regarding the phases of childbirth (8). At times, the intense fear of childbirth leads the mother to evade pregnancy and refuse it (9). The most common concerns identified in FOC include anxiety about the baby's well-being, the unborn child's health, the mother's own health, contraction pain, congenital defects, and potential medical interventions (3). Even when individuals accept vaginal delivery despite hesitance to pursue it, this fear causes them to overestimate pain and diminishes their capacity to manage that pain, resulting in inadequate utilization of their abilities during childbirth (9).

Numerous studies on FOC predictors have produced varying conclusions, suggesting that women experiencing high levels of FOC are more inclined to opt for cesarean delivery. In a study conducted on 486 pregnant women, the results showed that the main reason for elective cesarean section was reported to be fear of labor pain (10). Indicated a rise in FOC among first-time mothers. Research results indicated that heightened negative views on natural childbirth among mothers caused by FOC could greatly lessen their inclination towards natural childbirth (11-13).

Or expectant mothers with FOC, the importance of psychological prenatal support is greater (14). Previous studies suggest that social norms and expectations can affect pregnant women's emotions regarding childbirth and also conclude that for women with FOC, the quality of their interactions with medical personnel is crucial (15, 16). Approximately 85-90% of deliveries can occur vaginally without the need for medical assistance (7). When mothers perceive labor pain as excessive, they view it as a detrimental experience, forming a negative understanding of pain (17). Numerous psychological, social, and cultural influences affect the experience of labor pain, such as fear, the wish for painless labor, pain intolerance, maternal personality characteristics, concerns about negative outcomes, insufficient social support, and a low educational background, lack of psychological preparation for childbirth, fear of perineal injury, and teenage pregnancy, which leads to inadequate understanding of the conditions of childbirth (18).

In the meantime, various methods have been used to reduce FOC during pregnancy, including therapeutic writing, music therapy, exercise, physical activity, and distraction therapy (19). CBT is another safe and non-invasive method used for this purpose. Traditional prenatal education (like childbirth classes) is informational but often not sufficient for women with high fear or anxiety. CBT is structured, skills-based, and personalized: Targets maladaptive thoughts (e.g., "I will be unable to cope with labor pain"). Encourages behavioral experiments (e.g., controlled exposure to labor simulations or relaxation exercises). Teaches coping strategies, stress management, and cognitive reframing. Group CBT sessions can provide peer support, further reducing anxiety (20). This method targets the thoughts and behaviors of individuals and is hence the optimal choice for addressing and handling FOC and its associated variables because it is short-term, modifiable, and self-directed (21). In CBT, people are guided to recognize their flawed thinking patterns and ineffective behaviors. In this approach, individuals are taught to

assess and examine their thoughts and perceptions regarding distressing events objectively (22). The therapist subsequently employs targeted structured activities to modify these thoughts and behaviors. This treatment utilizes an educational method that incorporates cognitive and behavioral therapy via in-session exposure, past cognitive reconstruction, and assignments to complete at home. In addition to being useful in creating a positive perception of childbirth and correct behavior during childbirth, it can additionally aid in pinpointing the factors and influences of FOC and can be useful in organizing and delivering services to pregnant women. Therefore, it can be said that CBT-based training has been considered as a suitable approach for anxiety disorders in studies (23). Because CBT focuses on how problematic beliefs and behaviors play a role in the development of mental disorders (24). and can be effective in reducing FOC (25). The aim of this study was to investigate the effect of educational intervention with a CBT in pregnant women.

Materials and Method

This quasi-experimental research took place in 2025 involving pregnant women visiting all comprehensive health service centers in Qom. The study's statistical population comprised all pregnant women visiting comprehensive health service centers and health bases in Qom, selected through cluster sampling. From the 42 inclusive healthcare service centers in Qom, 20 centers that functioned as training centers for childbirth preparation classes were chosen. In the next stage, among the selected centers, four centers were introduced as the experimental group and 4 centers as the control group. In each center, a list of pregnant women was extracted, and after completing the FOC questionnaire and considering that they had obtained a score higher than 67 in terms of FOC test score, 10 pregnant women were randomly selected and entered into the study. The eligibility requirements included signing the consent form, being aged 18 to 35 years,

having a gestational age of 20 to 28 weeks, possessing at least a high school diploma, and having a low-risk pregnancy (no chronic or acute illnesses, a normal body mass index of 18.5 to 25, no mental health issues, no use of psychiatric drugs, no infertility history, and no family conflicts). Failure to complete the informed consent form, absence of more than two training sessions, termination of pregnancy due to fetal death, and obtaining a score of less than 67 out of a total of 165 on the FOC questionnaire (FOC score less than or equal to 67) were excluded from the study. The lowest score recorded from the FOC questionnaire was zero, while the highest score reached was 165. A score of 37 or lower indicates low fear levels; a score between 38 and 66 reflects a moderate fear level. A score between 67 and 85 indicated high fear. Study inclusion and exclusion criteria (such as high-risk pregnancy, high BMI, and use of mental health medications) were reviewed based on self-reports of pregnant women and medical records provided by pregnant women at each prenatal care visit and uploaded and recorded in the electronic health system for pregnant women.

The sample size for the study was estimated to be about 36 people in each group, with a study power of 95% and a type I error of 1%. The mean score of fear of pregnancy before and after the intervention was estimated to be 74.09 ± 11.35 and 48.78 ± 20.64 in the intervention group, respectively, based on the study by Alivand et al. (26). Considering the possibility of dropout in the study group and assuming a dropout rate of 10%, the study sample size was increased to 40 subjects in each group. Sample size calculations were performed using the following formula and in the MedCal statistical software.

$$n = \frac{2\delta(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2}{d^2}$$

The questionnaire used in the present study was a researcher-made instrument designed in four sections: demographic information, knowledge, attitude towards childbirth, and fear of childbirth (Appendix file). Demographic information in the first part, the second part of the questionnaire includes questions about knowledge related to pregnancy and childbirth with 14 questions and the score range is variable from 0 to 14. The third part is the Wijma Childbirth Expectancy/Experience Questionnaire, version A (six factors: lack of positive anticipation, anxiety, low self-efficacy, isolation, concern about harm to the fetus, and lack of control) used (27). The validity of the questionnaire was evaluated and validated by Mortazavi et al. (28), Anderson et al. (11), and Abedi et al. (29). Wijma et al. calculated the reliability of the questionnaire using Cronbach's alpha and parallel distribution and obtained values of 0.89 and 0.93, respectively (27). In Australia, the questionnaire showed a reliability of 0.78 according to Cronbach's alpha coefficient (14). This survey was constructed with 6 dimensions and 33 items that assessed FOC using a six-point Likert scale. As a result, the option "completely" received a score of zero and the option "not at all" received a score of 5. The lowest score obtained was zero and the highest score was 165. The fourth part is the Childbirth Attitude Questionnaire (CAQ). This survey contains 13 questions with four possible responses (not at all, very little, medium, and very much), and each question received a score ranging from 1 to 4. Total scores range from 13 to 52, with the highest score reflecting a fearful perspective on childbirth. The study by Gourounti et al. (30) has confirmed the validity of the questionnaire. The questionnaire's validity and reliability (Cronbach's alpha = 0.83) were verified in the Mortazavi study (28), Sanjari's study (31), and Khorsandi et.al (32) through content validation and Cronbach's α (Cronbach's alpha = 0.84).

For the translation process of the CAQ and W-DEQ instruments, the researchers first secured official approval from the primary designer of the CAQ and W-DEQ questionnaire to assess its psychometric properties in Iran. The initial form of the questionnaires was translated from English to Farsi by two specialists in English and reproductive health. Two translators proficient in both languages, who had not seen the original text, translated the Farsi version back into English. The two translations were subsequently analyzed, the questions aligned regarding meaning and concept, and ultimately a finalized version was created. Efforts were undertaken to guarantee the precision of translation and clarity of inquiries. A qualitative approach was employed to assess face validity. For this purpose, 30 randomly chosen pregnant women were requested to evaluate all questions based on difficulty, relevance, and ambiguity. Subsequently, the questionnaires were adjusted as needed based on the feedback received. Content validity was evaluated through a qualitative approach. To achieve this, 10 specialists in midwifery and reproductive health were requested to evaluate the translation of every question regarding grammar, vocabulary usage, and proper arrangement of statements, and to submit their suggested corrections.

One week before the start of the educational program, eligible women participating in the study completed the questionnaire (27). The point of determination and placement of the individual in the educational intervention was based on the mean FOC score obtained based on the Wijma questionnaire. Those whose mean score on the FOC questionnaire was above the average (FOC score greater than or equal to 67) were included in the educational intervention and randomly divided into two intervention and control groups, each group consisting of 40 pregnant women. Before the start of the program, pre-test questionnaire was completed by both the intervention and control groups. According to the training program (Table 4, Figure 1), women in the

intervention group received prenatal care in comprehensive health service centers with a focus on FOC with cognitive behavioral therapy during pregnancy (CBT). Training sessions were held in groups, one day a week, in the childbirth preparation training center in selected comprehensive health service centers. Trainers were selected from the group of senior midwifery consultants and clinical psychologists. The training content was also provided based on the pregnancy training program approved by the Iranian Ministry of Health. In the control group, conventional pregnancy training that every pregnant woman benefits from after pregnancy diagnosis and completion of the file was provided. The training program consisted of eight 90-minute training sessions (Figure 1, Table 1). Two months after of the intervention program, the post-test questionnaire was completed in the intervention and control groups. If during these eight weeks, mothers in the control group received any education related to FOC in any way, they were excluded from the study. The normality of the questionnaire was assessed using the Shapiro-Wilk test by comparing the questionnaire in both groups prior to the intervention, utilizing both parametric and nonparametric tests. For intragroup comparison, the paired t-test was utilized for intergroup analysis, and analysis of variance was applied. Statistical analyses were conducted using SPSS 27 software, with a p value under 0.05 deemed significant.

Results

The mean age of the two intervention and control groups was 25.82 ± 6.12 , 25.15 ± 5.19 respectively. Most participants had a high school diploma. In terms of employment status, about 80% were reported to be household. Chi-square and t-tests showed that the groups did not differ significantly in terms of education level, occupation, and pregnancy intention ($p < 0.05$; Table 1).

Table two presents the comparison of the mean scores of the study constructs (awareness, attitude towards childbirth and FOC) in the intervention and control groups. The findings of the

table show that the mean scores of awareness, attitude and FOC in the intervention group had a statistically significant difference after the educational program. In addition, the comparison between the intervention and control groups also indicates the significance of the difference in the mean scores of awareness, attitude and FOC.

The results of comparing the mean score of FOC and its subscales in the intervention and control groups show that in the intervention group, the total score of FOC and its subscales showed a statistically significant decrease after the educational intervention, While no difference was seen in the control group (Table 3).

Discussion

The present study aimed to investigate the effect of cognitive-behavioral therapy on FOC in pregnant women. The results of the study showed that training based on CBT skills reduced all dimensions of FOC in pregnant women trained with CBT therapy compared to women who received conventional prenatal education. In the context of the effect of CBT on FOC, the present study showed that the CBT approach was able to positively affect the attitude towards childbirth and thereby reduce the level of FOC. Scientific finding that was consistent with the studies of Ucar et al. (33), Borghei et al. (10). Previous studies have also shown that CBT intervention using behavioral strategies is effective in reducing pain and increasing the desire for natural childbirth (34). In this regard, Nieminen investigated the effect of group training based on CBT skills in Swedish primiparous pregnant mothers and found similar results, finding this method effective in reducing FOC (35). Similar to the results of the present study, in the study by Khojasteh et al., which aimed to investigate the effectiveness of cognitive behavioral approach on FOC and sleep quality of pregnant women, it was shown that after the intervention, FOC in the intervention group was significantly reduced compared to the control group (36).

There are conflicting findings in this regard, including the findings of Rondung et al., who examined Internet-based CBT skills in primiparous mothers in Sweden, who found that there was no significant difference in FOB levels between the two groups after training (37). This discrepancy may be because the study was conducted virtually and mothers did not have the advantage of being in a group. In contrast to the present study, the results of Trenström et al., who found that CBT-based training and counseling did not show any difference in reducing FOB in primiparous mothers (38). In this case, the reason for the difference in results may be due to the quality of CBT-based training and counseling. The present study conducted a face-to-face training program at a childbirth preparation-training center of a comprehensive health service center, with the presence of a senior pregnancy counselor and a clinical psychologist, followed by a face-to-face training course and follow-up until near delivery. Amiri et al. (18) claimed that CBT does not significantly reduce FOC and the results of their study were inconsistent with the findings of the current study. This discrepancy could be due to the study population, educational content, demographic characteristics such as literacy level, miscarriage, family emotional support for pregnant women, or family income level, which were not examined in the above study.

It seems that CBT-based education on FOC can meet the needs of pregnant mothers. As we know, the FOB score in Iranian pregnant women, especially primiparous women, is high and there is no specific counseling program to reduce it. Therefore, planning to reduce FOB in all pregnant women through a CBT approach seems necessary. Primiparous women should attend face-to-face and group counseling sessions because most of their fears are similar. Because attending group sessions leads to normalization and positive motivation to continue attending educational sessions because mothers realize that other people have similar problems. In this way, they may overcome their fears.

278 The findings of the present study showed that CBT-based training was effective in improving
279 pregnant mothers' attitudes towards childbirth, and therefore, the level of FOB in the group of
280 mothers trained with CBT decreased. In line with the present results, in a quasi-experimental
281 study, it was found that training with a CBT approach, while identifying unconscious negative
282 thoughts and replacing them with positive thoughts, increased mental health and reduced stress
283 in pregnant women (35). Also, Imanparast et al., in a quasi-experimental study, achieved
284 fundamental changes in the beliefs and attitudes towards childbirth pregnant women and found
285 more adaptive behaviors when faced with worrying thoughts and concluded that CBT-based
286 training reduced anxiety of primiparous pregnant mothers about natural childbirth and FOC
287 (39). In line with present study, Niemen et al. determined that the success of the CBT stemmed
288 from participants adopting a more realistic perspective regarding impending labor and delivery,
289 increased self-confidence, and enhanced active coping strategies. This research found that the
290 training offered to participants assisted pregnant women in addressing common inquiries and
291 rectifying prevalent cognitive mistakes, even though they were knowledgeable about their own
292 anatomy, while also utilizing relaxation therapy to decrease FOC and enhance their sleep quality
293 (40). In the study by Ghazaei et al., the findings showed that 84 percent of pregnant women in
294 the CBT group and 64 percent of pregnant women in the psychoeducation group had a favorable
295 attitude change towards childbirth and wanted a natural birth (34). In the Study by Tofighi
296 indicate the effectiveness and efficiency of CBT on pregnant women's attitudes towards
297 childbirth and believe that in 80 percent of cases, CBT have caused a change in attitude in
298 pregnant women, which is in line with the present study (41). In the present study, educating
299 pregnant women and increasing their awareness about natural childbirth and using cognitive

behavioral therapy against anxiety and pain resulted in pregnant women trained with cognitive behavioral therapy receiving lower fear of childbirth scores.

The present findings showed that FOB did not significantly decrease in the control group that did not receive any education. These results were consistent with the findings of Guskovska, who suggested that Conventional Prenatal Education may not effectively reduce FOB (42). Jadoo reported that Conventional Prenatal Education does not include materials to reduce FOB (43). Borghei et al. concluded that the current Iranian prenatal education program does not meet the needs of pregnant mothers and should be revised (10).

Conclusion

CBT for pregnant women represents a shift from general prenatal education to structured psychological interventions. This training not only reduces fear, but also improves the birth experience and postpartum mental health. In the present study, the training provided to pregnant women enabled them to increase their awareness of childbirth, correct common mental errors, and use relaxation therapy described in the training content to improve their attitude toward childbirth and reduce their fear of childbirth.

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Authors' contributions

EV-M initiated and designed the study. SM and AM performed data processing and analysis. E V-M, MY, performed validation of results and BK and A KH were responsible for creating and revising all figures. The initial draft of the article was written by E V-M, BK, and MY Final revisions and editing were performed by E V-M. All authors reviewed and approved the final version of the article for submission.

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Declarations

Ethics approval and consent to participate

Every procedure carried out in research involving human subjects adhered to the ethical guidelines of the relevant institutional and/or national research committee, as well as the 1964 Declaration of Helsinki and its subsequent revisions or comparable ethical standards. Additionally, all data is openly accessible for scientific research, and researchers have the freedom to utilize and publish findings without limitations. This research has been granted ethical approval (Ethics Code: IR.MUQ.REC.1404.030) by the Ethics Committee of the Vice-Chancellor for Research and Technology at Qom University of Medical Sciences.

The research team declares that written informed consent was obtained from each individual who agreed to participate in the study prior to the start of the educational program.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due but are available from the corresponding author on reasonable request.

Consent for publication

Consent to publication does not apply to the present manuscript. Therefore, according to the journal guidelines, this section will be marked as “not applicable” for the submitted article.

Competing interests

The writers state that there are no conflicting interests.

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360 **Table 1.** The characteristics of pregnancy women in the CBT, and control groups

Variable	CBT Group (n=40) N (%)	Control Group (n=40) N (%)	p
Age	25.82 (6.12)	25.15 (5.19)	0.158*
18-25	15 (37.5)	14(35)	
26-30	22 (55)	21 (52.5)	
31-35	3 (7.5)	5 (12.5)	
Level of education			0.056**
Elementary	6 (15)	2 (5)	
Diploma	26 (65)	21 (52.5)	
Academic	8 (20)	17 (42.5)	
Occupation			0.291**
Employee	5 (12.5)	8 (20)	
household	35 (87.5)	32 (80)	
Monthly income			0.608**
Weak	5 (12.5)	4 (10)	
Moderate	31 (77.5)	29 (72.5)	
Good	4 (10)	7 (17.5)	
Miscarriage			0.765**
Yes	6 (15)	7 (17.5)	
No	34 (85)	33 (82.5)	
Gravidity			0.085*
One pregnancy	22 (55)	15 (37.5)	
Two pregnancy	13 (32.5)	12 (30)	
3and more than pregnancy	5 (12.5)	13 (32)	
Gestational age			0.115**
20-22 week	10 (25)	16 (40)	
23-24 w	11 (27.5)	9 (22.5)	
25-26w	9 (22.5)	7 (17.5)	
27-28w	10 (25)	8 (20)	
willingness of pregnancy			0.587**
Wanted	32 (80)	32 (80)	
Unwanted	8 (20)	8 (20)	
Income status			0.608**
Mild	5 (12.5)	4 (10)	
Moderate	31(77.5)	29 (72.5)	
Good	4 (10)	7 (17.5)	

361 Mean (SD), *One-way ANOVA, **Chi-Square test

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Table 2. Comparing of the mean score of Knowledge, Attitude and fear of childbirth in the CBT, and control groups

Variable	Group	Before Mean (SD)	After Mean (SD)	P Paired t test
Knowledge	CBT	20.85±3.37	22.70±2.01	0.046
	Control	19.5±2.95	19.2±3.15	0.718
	Independent Sample t test	0.060	0.025	
Childbirth Attitude Questionnaire	CBT	25.62±5.85	30.55±7.66	0.001
	Control	27.90±8.14	28.85±8.49	0.978
	Independent Sample t test	0.649	0.004	
Fear of childbirth	CBT	105.01±20.89	62.89±10.75	0.039
	Control	109.19±20.44	103.14±30.52	0.269
	Independent Sample t test	0.266	0.046	

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379 **Table 3.** Comparing the mean score of FOC and subscales between CBT, and control groups

Subscales	CBT		P	Control		p
	Before Mean (SD)	After Mean (SD)		Before Mean (SD)	After Mean (SD)	
How do you think your labour and delivery will turn out as a whole?	7.37 (2.1)	4.07 (1.7)	0.001	6.85 (2.09)	6.92 (2.1)	0.889
How do you think you will feel in general during the labour and delivery	54.32 (12.2)	32.67 (6.1)	0.001	55.60 (12.01)	51.55 (19.9)	0.190
How do you think you will feel during the labour and delivery?	18.60 (4.8)	10.61 (3.3)	0.001	18.87 (4.7)	18.75 (7.1)	0.921
What do you think will happen when labour is most intense?	10.25 (3.06)	6.02 (2.3)	0.001	10.87 (2.5)	9.40 (3.8)	0.178
How do you imagine it will feel the very moment You deliver the baby.	11.27 (3.9)	8.27 (3.9)	0.002	12.20 (3.04)	12.30 (5.03)	0.904
Have you, during the last month. had fantasies About the labour and delivery?	3.20 (2.06)	1.25 (1.3)	0.001	4.80 (2.5)	4.22 (2.6)	0.334
Total score	105.01	62.89		109.19	103.14	

380 *Paired t-test

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391 **Table 4.** Educating protocol of intervention group

sessions	Gestational age	Content
Cognitive Behavioral Therapy		
1	week 20-22	CBT as a treatment modality is education about the fear and anxiety of childbirth. Expectant mothers' expectations of the impending birth and the anatomical and physiological changes and common complaints during pregnancy.
2	week 23-25	What an expectant mother may expect during pregnancy and labor, nutrition during pregnancy, body mass index/weight and managing weight gain during pregnancy. Participants will also share their experiences, stories and memories of pregnancy and childbirth with other women.
3	week 26-29	Mental health, education and practice with tools to deal with physical reactions to fear, for example, breathing focus therapy , retraining in everyday situations.
4	week 30-31	Topics such as fetal development and development, danger signs during pregnancy, headaches, epigastric pain, fever, the difference between thoughts and feelings and how they interact. Participants identify and challenge their fearful thoughts and then develop alternative and more helpful thoughts about labor and delivery.
5	week 32-33	Training program on the type of delivery, cesarean section or vaginal delivery, different methods of pain relief
6	week 34-35	Topics related to the different stages of labor, the type of position of women during labor and delivery, interventions during labor, how to manage situations. What is control? How to control our thoughts?
7	week 36	Advantages of different modes of delivery for one's own situation. Summary of the program.
8	week 37	How to deal with setbacks. Participants work out an individual program to maintain their progress. Description of own expectations of the imminent labor and delivery.
Conventional Prenatal Education		
1	week 20-22	The impact of sleep deprivation, hunger, anatomical and physiological changes, and common complaints during pregnancy.
2	week 23-25	Nutrition during pregnancy, calculating body mass index and managing weight gain during pregnancy
3	week 26-29	Mental health and personal hygiene
4	week 30-31	Fetal development and danger signs during pregnancy
5	week 32-33	Education about the type of delivery, different methods of pain relief, facing imminent delivery
6	week 34-35	Different stages of childbirth, women's position during childbirth and position control
7	week 36	Postpartum care and postpartum danger signs
8	week 37	Breastfeeding education, preparing other family members, caring for the baby

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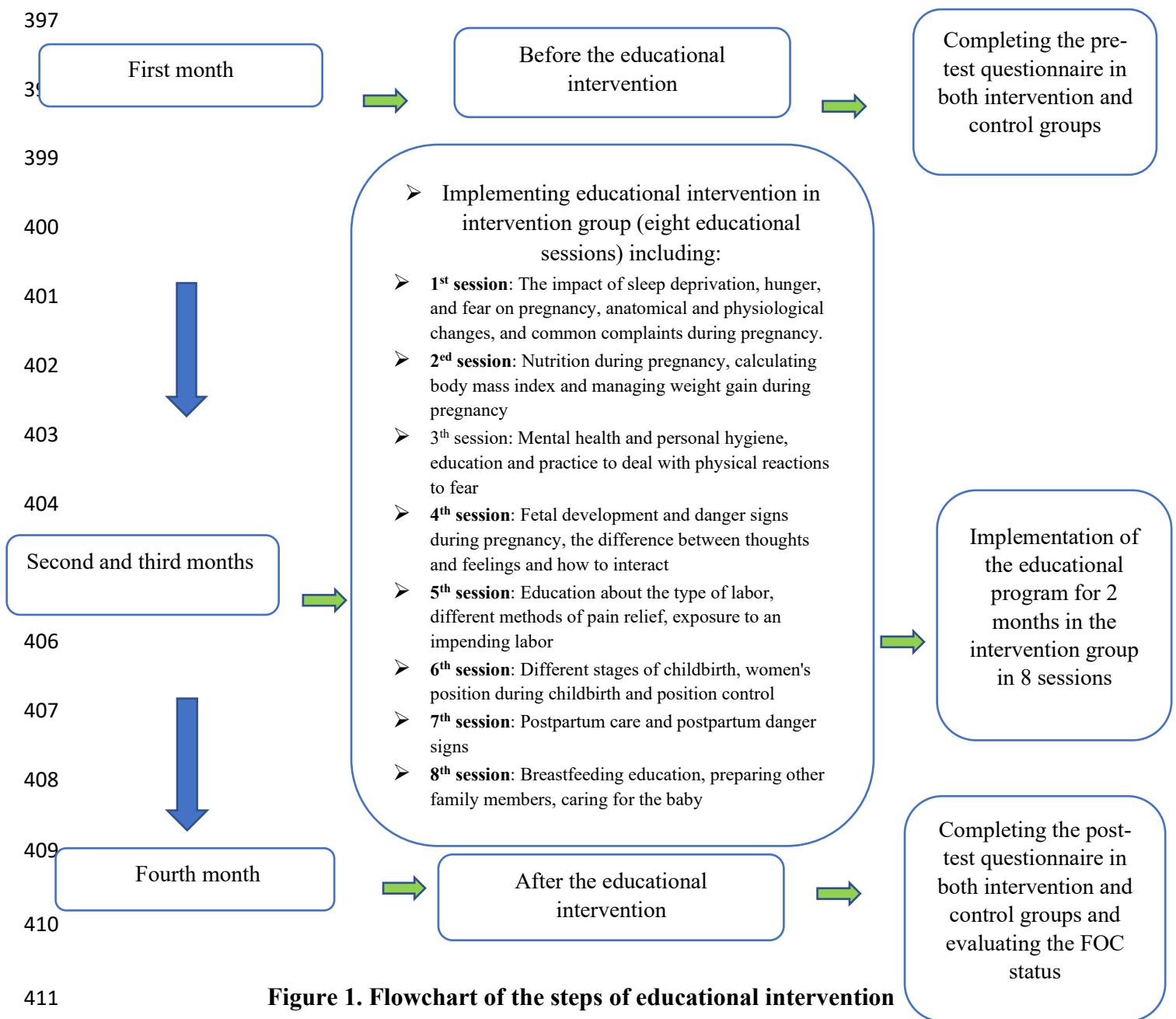


Figure 1. Flowchart of the steps of educational intervention

Appendix:

Questionnaire

414 **1.Demographic Characteristics**

415 Age in years.....: Height (cm): Weight (kg):

416 Body Mass Index (BMI): Less than 18.5 ☐, 18.5 to 24.9 ☐, 25 to 29.9 ☐, More than or equal to 30 ☐

417 Education status: Elementary ☐, Diploma ☐, Academic ☐

418 Mother's job status: Working ☐, housewife ☐

419 Miscarriage: Yes ☐, No ☐

420 Gravidity: First pregnancy ☐, Second pregnancy ☐, Third pregnancy and more ☐

421 Gestational age (weeks of pregnancy): 20-22 weeks ☐, 23-24 weeks ☐, 25-26 weeks ☐, 27-28
422 weeks ☐

423 Willingness of pregnancy: Wanted ☐, unwanted ☐

424 **2. Knowledge**

425 1- I know that I must have an ultrasound and tests before pregnancy and delivery.(Yes ☐, No ☐, Don't
426 Know ☐)

427 2- I know that the discharge of blood-stained discharge and uterine muscle contractions are signs of the
428 onset of natural labor.

429 3- The best time to receive prenatal education courses is from the second half (week 20 of pregnancy) to
430 the end of pregnancy (week 38).

431 4- No need for surgery, less bleeding, stronger emotional connection, and no need for anesthesia are
432 the advantages of natural childbirth.

433 5- Mothers suffering from some viral diseases, heart diseases, kidney disease, and high blood pressure
434 are contraindications for natural childbirth.

435 6- The possibility of bleeding, difficulty breastfeeding, the possibility of infertility, damage to the
436 fallopian tubes, and weakening of the uterine muscles are complications of cesarean delivery.

437 7- The hospitalization period for natural childbirth is shorter than for cesarean delivery.

438 8- The recovery period for natural childbirth is faster and earlier than for cesarean delivery.

439 9- Regular exercise, massage, proper nutrition and the use of relaxation techniques reduce pain before
440 childbirth.

441 10- Natural childbirth is not painful and scary.

442 11- Cesarean section is not suitable for all mothers.

443 12- Miscarriage increases the risk of problems in subsequent pregnancies.

444 13- Depression and anxiety during pregnancy cause premature birth, weight loss and reduced fetal
445 growth.

446 14. Breast tenderness and pain, nausea and vomiting are early signs of pregnancy.

447 **3. Childbirth Attitude Questionnaire (CAQ)**

448 1- I am afraid that my baby will be hurt during labor. (Not at all ○, little ○, Average ○, Very much ○)

449 2- I am worried that I will not be cared for as well as I would like during labor.

450 3- I am worried that I will not be able to cooperate with the midwife or doctor during labor.

451 4- I am afraid of painful labor.

452 5- I am afraid of heavy bleeding during labor.

453 6- I have nightmares about labor and cannot rest well.

454 7- I prefer a cesarean section to a vaginal delivery.

455 8- I think that I will die during labor.

456 9- I am afraid that I will lose control during labor.

457 10- I have always been afraid of labor.

458 11- I am afraid that my baby will be born with a defect or be stillborn.

459 12- I think labor is a positive and good experience.

460 13- I think labor is something unusual and unnatural.

461 **4. The Wijma Delivery Expectancy / Experience Questionnaire (W-DEQ)**

462 **Version A Instruction**

I- How do you think your labour and delivery will turn out as a whole?						
1	1 Extremely fantastic	2	3	4	5	6 Not at all fantastic
2	1 Extremely frightful	2	3	4	5	6 Not at all frightful
II. How do you think you feel in general during the labour and delivery?						
3	1 Extremely lonely	2	3	4	5	6 Not at all lonely
4	1 Extremely strong	2	3	4	5	6 Not at all strong
5	1 Extremely confident	2	3	4	5	6 Not at all confident
6	1 Extremely afraid	2	3	4	5	6 Not at all afraid
7	1 Extremely deserted	2	3	4	5	6 Not at all deserted
8	1 Extremely weak	2	3	4	5	6 Not at all weak
9	1 Extremely safe	2	3	4	5	6 Not at all safe
10	1 Extremely independent	2	3	4	5	6 Not at all independent
11	1 Extremely desolate	2	3	4	5	6 Not at all desolate
12	1 Extremely tense	2	3	4	5	6 Not at all tense

13	1 Extremely glad	2	3	4	5	6 Not at all glad
14	1 Extremely proud	2	3	4	5	6 Not at all proud
15	1 Extremely abandoned	2	3	4	5	6 Not at all abandoned
16	1 Totally composed	2	3	4	5	6 Not at all composed
17	1 Extremely relaxed	2	3	4	5	6 Not at all relaxed
18	1 Extremely happy	2	3	4	5	6 Not at all happy
III. How do you think you will feel during the labour and delivery?						
19	1 Extreme panic	2	3	3	5	6 No panic at all
20	1 Extreme hopelessness	2	3	4	5	6 No hopelessness at all
21	1 Extreme longing for the child	2	3	4	5	6 No longing for the child at all
22	1 Extreme self confidence	2	3	4	5	6 No self-confidence at all
23	1 Extreme trust	2	3	4	5	6 No trust at all
24	1 Extreme pain	2	3	4	5	6 No pain at all
IV. What do you think will happen when labour is most intense?						
25	1 I will behave extremely badly	2	3	4	5	6 I will not behave badly at all
26	1 I will dare to totally surrender control of my body	2	3	4	5	6 I will not dare to surrender control to my body at all
27	1 I will totally lose control of myself	2	3	4	5	6 I will not lose control of myself at all
V. How do you imagine it will feel the very moment you delivery the baby?						
28	1 Extremely funny	2	3	4	5	6 Not at all funny
29	1 Extremely natural	2	3	4	5	6 Not at all natural
30	1 Extremely self-evident	2	3	4	5	6 Not at all self-evident
31	1 Extremely dangerous	2	3	4	5	6 Not at all dangerous
VI. Have you, during the last month, had fantasies about the labour and delivery, for example:						
32	...fantasies that your child will die during labour/delivery?					
	1 Never	2	3	4	5	6 Very often
33	...fantasies that your child will be injured during labour/delivery?					
	1 Never	2	3	4	5	6 Very often

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