Exploring the Effect of Cognitive-Behavioral Educations on Childbirth Selfefficacy, Childbirth Fear, and Adaptation of Maternal Role Among Primiparous Women: A Quasi-Experimental Study

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3 childbirth fear, and adaptation of maternal role among primiparous women: A quasi4 experimental study

5 Running title: Cognitive-behavioral educations and childbirth self-efficacy, fear of
6 childbirth, and maternal role adaptation

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Exploring the effect of cognitive-behavioral educations on childbirth self-efficacy,
childbirth fear, and adaptation of maternal role among primiparous women: A quasiexperimental study

6 Abstract

Background and Aim: Prenatal education based on a psychological approach can play a
significant role in maternal and neonatal health. The current study aimed to determine the
effect of cognitive-behavioral education on childbirth self-efficacy, childbirth fear, and
adaption of maternal role among primiparous women.

11 Methods: This quasi-experimental study included 74 primiparous women in the Tehran province of Iran. Convenience sampling was used to recruit participants, who were 12 subsequently were divided into two groups (intervention and control). The intervention group 13 received cognitive-behavioral education, held via eight 90-minute-long sessions. Pre-test data 14 collection occurred during participants' 26-28th week of pregnancy via a survey tool 15 16 comprising demographic questions, the Wijma Delivery Expectancy/Experience 17 Questionnaire-A (W-DEQ-A), and the Child Birth Self-Efficacy Inventory (CBSEI). Post-test data collection occurred after the intervention period again via a survey tool comprising both 18 19 the W-DEQ-A and CBSEI tools. The maternal role adaptation questionnaire was also completed two weeks and two months after the childbirth. 20

Results: After the intervention, a statistically significant difference was observed between the intervention and control groups in terms of the fear of childbirth, outcome expectancy, and self-efficacy expectancy (p < 0.05). Results demonstrated a medium effect size between the two groups in terms of the fear of childbirth score, and a large effect size in terms of both

outcome expectancy and self-efficacy expectancy scores. There were no statistically
 significant differences between the two groups in terms of compliance with the maternal role
 adaptation at either 2 weeks or 2 months after the childbirth.

4 Conclusion: This cognitive-behavioral educational intervention was effective in reducing
5 fear of childbirth and improving childbirth self-efficacy. This suggests that cognitive6 behavioral educations may usefully be offered to pregnant women in addition to childbirth
7 preparation classes.

Keywords: Fear of childbirth, childbirth self-efficacy, cognitive-behavioral educations,
group education, and maternal role adaptation.

10 Trial Registration: IRCT.ir: IRCT20180427039436N3; Dec 31, 2018.
11 https://www.irct.ir/trial/31593.

12 Background

13 Pregnancy is a significant time, though many women experience stress and fear of pain during labour and childbirth (Altman et al., 2020). As well as this fear of pain, women can 14 also fear a loss of self-control, being physically and mentally inadequate during labor, 15 childbirth related death, pelvic floor injuries, injuries to the baby and baby loss along with 16 having a lack of trust in perinatal staff, all of which contribute to the fear of childbirth (FOC), 17 18 (Rondung et al., 2018). The prevalence of FOC has been estimated in China to be approximately 10%-30%, where 4.8%-11% of women suffer from severe FOC, which is the 19 main reason for high prevalence elective cesarean section (Qiu et al., 2020). In Iran 39.33% 20 of cesarean sections are conducted due to FOC (Azami-Aghdash et al., 2020). These figures 21 22 are concerning, as cesarean section is a high-risk medical intervention.

Primiparous women have a higher level of FOC and lower level of self-efficacy duringpregnancy and childbirth and are therefore more likely to request to birth via cesarean section

(Wulcan & Nilsson, 2019). Providing information during the prenatal period can reduce FOC and increase the self-efficacy of pregnant women (Tilden et al., 2016). In Iran, attending childbirth preparation classes alongside cognitive-behavioral education has particularly been shown to increase self-efficacy expectancy, which in turn may empower women to overcome FOC and birth their babies vaginally (Abbasi et al., 2018). As increasing self-efficacy in childbirth can lead to positive experiences in maternal role (Salmela-Aro et al., 2012), it may be usefully addressed in perinatal education, particularly for first time mothers.

In Iran, pregnancy care is largely limited to physical care and does not wholly address the 8 9 psychological needs of pregnant women (Salehi & Kohan, 2017). In this regard, studies have 10 shown that the provision of education about the maternal role to primiparous women during pregnancy and postpartum period can lead to more positive experiences (Kordi et al., 2016). 11 12 Equally, cognitive-behavioral therapy, which affects women's thoughts, emotions, and behaviors, may also be an efficacious choice for those experiencing FOC. This is because in 13 the process of cognitive reconstruction, pregnant women with FOC are asked to replace 14 dysfunctional thoughts with functional ones (Salmela-Aro et al., 2012). 15

In Finland, cognitive therapy has been shown to improve maternal self-efficacy in women but 16 had no effect on maternal role (Salmela-Aro et al., 2012). In the Netherlands, online 17 psychology education with the aim of changing the mindset and self-awareness of pregnant 18 women could not reduce FOC alone (Klabbers et al., 2019). In addition, the systematic 19 review and meta-analysis of Hosseini et al. (2018) showed that educational interventions 20 which promote knowledge and awareness about the physical aspects of FOC can only 21 improve some causes of FOC. Considering the above, it is reasonable to assume that both 22 physical and psychological education methods are required to reduce FOC overall (Hosseini, 23 Nazarzadeh & Jahanfar, 2018). 24

1 Cognitive-behavioral education is concise and problem-focused. Its overall goal is to replace 2 the cognitions, emotions, behaviors, and non-adoptive coping skills of pregnant women with adaptive ones (Salmela-Aro et al., 2012; Khanzadeh et al., 2017; Ghazaie et al., 2016; Karimi 3 4 et al., 2017; Karimi et al., 2020). These is important, as pregnant women may have limited knowledge in the area of pregnancy and birth and therefore require education in addressing 5 misconceptions and identifying dysfunctional thoughts in order to reduce their FOC and 6 7 improve their adaptation to their maternal role (Salmela-Aro et al., 2012; Hassanzadeh et al., 2020; Waldum et al., 2020). As such, the aim of the present study was to determine the effect 8 9 of cognitive-behavioral education on the childbirth self-efficacy, FOC, and adaptation to maternal role in primiparous women. 10

11 Methods

12 Trial Design and Participants:

The present study is a parallel quasi-experimental study with two intervention and control groups. This study was conducted on primiparous women, who had been referred to the prenatal clinic of Lolagar Hospital in Tehran, to receive prenatal care. Reporting of this study is in accordance with the Consolidation Standards of Reporting Trials (CONSORT) statement (Appendix 1) (Schulz, Altman & Moher, 2010).

Pregnant women were invited to participate if they were of Iranian nationality, between 18-35 years old, between their 24th-28th week of pregnancy, had a high school diploma or university degree, were carrying a singleton pregnancy, had a childbirth fear score of 65 or more measured by W-DEQ A (Wijma Delivery Expectancy/Experience Questionnaire A), and a score of 3.5 or lower on the 12-item General Health Questionnaire (GHQ). Participants were excluded if they were deemed to have a high-risk pregnancy, and/or a reported history of either infertility or mental illness.

1	To collect data, the researcher first selected eligible individuals among pregnant
2	women referred to the prenatal clinic of Loalagar Hopsital, using the convenience sampling
3	method. The recruitment of pregnant women occurred from December 2018 to February
4	2019. Follow-up concluded in September 2019.
5	Women who gave their informed consent to participate were then divided into either an
6	intervention group (given cognitive-behavioral education and childbirth preparation classes
7	as two separate classes; n=36) or a control group (given only childbirth preparation classes; n
8	= 38). Women who experienced preterm labor or had any symptoms of high-risk pregnancy
9	along with those who were unwilling to continue with the study, received any psychological
10	treatment other than the study intervention, or did not participate in more than two sessions of
11	cognitive-behavioral education were excluded from the study (withdrawal criteria). Figure 1
12	shows the CONSORT flow diagram of study.
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21	Assessed for eligibility (n= 92)
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23	
24	Allocation
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16 Figure 1: CONSORT flow diagram of study

17

18 Description of Intervention:

The content of the cognitive-behavioral education administered to the intervention group 19 20 was derived from the practical guide to group cognitive therapy by Michael Free (Free, 21 2007), and Rob Wilson & Rena Branch's (Willson & Branch, 2006) guide to cognitive behavioral therapy along with the educational dimensions of childbirth self-efficacy and 22 adaptation to motherhood (Salmela-Aro et al., 2012). Cognitive-behavioral education 23 classes were held whilst participants were between their 28th to 35th weeks of pregnancy. 24 Eight 90-minute sessions were delivered weekly. Each session hosted 8-12 women. The 25 full programme is outlined in table 1. 26

To reach the required sample size, this programme of 8 sessions was delivered three times. PowerPoint, whiteboard, and an educational video (showing pregnant women experiencing childbirth) were used for teaching. The classes were conducted by a midwife certified to conduct cognitive-behavioral education, and under the supervision of

- 1 a clinical psychologist based at Lolagar Hospital. The intervention group also received
- 2 routine prenatal classes, whilst the control group only participated in the routine prenatal
- 3 classes. Participants in both groups were followed-up for two months after the delivery.

Pregnancy week	Session	Structure and content of meetings	Practice in each session
28	First session	Introducon of the instructor to the group members. The group members welcoming eachother and getting acquainted with one another. Reviewing the structure of meetings and its related rules and regulations, and expressing the value and importance of education sessions. Educating clients about FOC and its impact on the delivery and pregnancy process.	Introducing each other, having one on one interaction, de-sensitizing, calming, task-setting and feedback.
29	Second session	Haivng a brief review of the previous session. Pregnant women have a chance to get familiar with cognitive and behavioral education (thinking and feeling), A-B-C model, visualisation and guided mental imagery.	Checking the assigned homework, writing a three-column form for an active event, belief or thought and it's emotional consequences, assigning homework and feedback.
30	Third session	Having a brief review of the previous session. Group members have a chance to get familiar with important cognitive distortions or any logical errors in order to identify these intellectual errors in their thoughts and deal with them using the downward arrow method.	Checking the assigned homework, writing and completing form 2, A-B-C or the self-assessment method, assigning homework and feedback.
31	Fourth session	Having a brief review of the previous session. Group members getting familiar with writing and completing form 2, A-B-C or the self- assessment method. Mindfulness education in order to empower participants carry out their daily activities with mindfulness. Screening pregnant women's experience of childbirth, writing a statement (a problem), keeping an eye for identifying progression.	Checking the assigned homework, practicing mindfulness meditation at home, scoring your emotional problems, assigning homework and feedback.

4 Table 1: Intervention group education program (cognitive-behavioral education)

32	Fifth session	Having a brief review of the previous session, maternal role and self-efficacy of emotional adjustment and problem solving, efficiency and coordination analysis.	Checking the assigned homework, writing a list of beliefs based on performance and coordination analysis, assigning homework and feedback.
33	Sixth session	Having a brief review of the previous session, logical analysis training and it's application.	Check homework given, write examples of logical analysis, assigning homework and feedback.
34	Seventh session	Having a brief review of the previous session, dissent training and it's implementation, perceptual change, self-punishment and self- rewarding.	Checking the assigned homework and dissent practice, writing examples of perceptual change, self- punishment and self- rewarding, assigning homework and feedback.
35	Eighth session	Talking about questions from the previous session's content (dissertation training, changing perceptual assumptions, and self-punishment - self-reflection on belief), examining the pratice of writing a main list on belief based on dissension, changing perceptual assumptions, self-punishment and self-rewarding, encouraging members to continue with the exercises, having members giving written feedback to each other and to the therapist, having a group decision- making and farewell, and lastly, post-test date setting.	Checking the assigned homework and dissent practice, changing the impact of perceptual assumptions such as self- punishment and self- rewarding on belief, using maintenance techniques.

1

2 Instruments /Outcomes:

3 *Demographic questionnaire*

4 The demographic questionnaire was designed in two parts. The first part addressed individual

5 characteristics (women's age, education, occupational status, economic status, ethnicity)

6 while the second part addressed pregnancy history (history of abortion, gestational age at the

time of sampling, gestational age at birth, sex of neonate, weight of neonate, type ofchildbirth and infant feeding method).

3 Wijma Delivery Expectancy/Experience Questionnaire A

The English version of W-DEQ A (Wijma Delivery Expectancy/Experience Questionnaire A) 4 was designed by Wijma et al. (1998). This tool contains 33 items on a 6-option Likert scale 5 6 ranging from zero (absolutely) and 5 (not at all), with a minimum score of 0 and a maximum 7 score of 165. The results of reliability testing in the last three months of pregnancy were calculated as follows: Cronbach's alpha of 0.89, split-half reliability of 0.91, and internal 8 9 consistency of 0.93 for the tools (Wijma, Wijma & Zar, 1998). The Persian version of this questionnaire in Iran was translated by Abedi et al., with Cronbach's alpha of 0.64 (Abedi et 10 al., 2016). 11

12 Childbirth self-efficacy inventory

The childbirth self-efficacy inventory (CBSEI) was designed by Lowe (2000). It is 13 segmented into 4 sections. The first and second sections (31 items) address the outcome 14 expectancy, while the third and fourth sections (31 items) measure the self-efficacy 15 expectancy of childbirth. Each section is based on a 10-point Likert scale, ranging from 1 (not 16 helpful at all) to 10 (very helpful). The total score of this inventory ranges from 31 to 310. A 17 study that used the Hebrew version of this tool reported its high validity with the Cronbach's 18 19 alpha of 0.95 and 0.97 (Lowe, 2000). A Persian version of this tool has been made by Khorsandi and colleagues (2013) consisting of two parts. The first part, which is related to 20 the labor expectancy scale, consists of 18 questions based on a 10-point Likert scale. These 21 22 range from 1 (completely useless) to 10 (quite useful). The minimum and maximum scores for this tool range from 18 to 180. Higher scores indicate higher levels of self-efficacy and 23 outcome expectancy for birth. This questionnaire has a high inner alignment that ranges from 24

0.84 to 0.91. As the women in this study were not able to distinguish between the first and
second stages of birth, the long version of this questionnaire was modified into a shorter
version after seeking the permission from the author. Additionally, two religious items were
added for cultural adjustment (Khorsandi et al., 2013).

5

Maternal role adaptation questionnaire

6 The maternal role adaptation questionnaire allowed us to identify and assess the 7 maternal role adaptation status of our participants (Javadifar et al. 2013). This questionnaire contains 33 items (based on a 5-point Likert scale) and 7 subscales, including "supporting and 8 9 strengthening couples' relationships" with 6 phrases (6-30), "difficulty and dissatisfaction" within 7 phrases (7-35), "child dependency" with 4 phrases (4-20), "worry and anxiety" with 10 4 phrases (4-20), "emotional development" with 4 phrases (4-20), "performance" with 4 11 12 phrases (4-20), and "adaptation and social development" with 4 phrases (4-20). In positive statements, the lowest score for each phrase is (1) and for the options of "completely 13 disagree" and "strongly agree", the highest score is (5). In negative statements, the lowest 14 score for each phrase is (1), and for the options of "completely agree" and "completely 15 disagree" the highest score is (5). The total score of each subscale is determined by 16 17 calculating the scores of the items related to that subscale. Also, the total score of the questionnaire is determined by calculating the scores of the items. The tool's lowest overall 18 19 score is 33 and the highest overall score is 165 (Javadifar, 2013).

The pre-test took place whilst participants were between their 26th to 28th week of pregnancy, using the demographic, W-DEQ A, and CBSEI questionnaires, while the post-test took place at the last session of the cognitive-behavioral education, using W-DEQ A and CBSEI tools. The maternal role adaptation questionnaire was completed two weeks and two months following childbirth.

3 Sample size:

To determine the required sample size with 95% confidence level and 90% test power, the measured impact of the cognitive-behavioral education on each variable of childbirth selfefficacy, maternal role adaptation and FOC in primiparous women in comparison with the control group was assumed to be at least ES = 0.6 to be considered statistically significant and meaningful.

8 The estimated sample size was calculated to be 30 participants for each group. Also, 9 considering the probability of 15% sample drop, the final sample size was considered to be 10 35 individuals in each group.

11 Statistical analysis:

12 Data were analyzed using SPSS software (version 22), using descriptive and inferential 13 statistics. Descriptive statistics such as numerical indexes and frequency distribution tables were used to describe the data. Chi-square test and Fisher's exact test were used to compare 14 the characteristics of the two groups for categorical variables. Independent t-test and 15 16 ANOVA test were used for quantitative variables. Within-group comparisons were also Efficacy was evaluated via an analysis of covariance 17 performed via paired t-test. (ANCOVA), an extension of ANOVA which allows assessment of group differences in terms 18 of dependent variable after controlling the effect of other covariates (e.g., time 1 variables). 19

Clinical significance was estimated, using the partial eta square effect size from ANCOVA, which represents variance explained by the cognitive-behavioral training vs. control group, after eliminating the effect of covariates. According to Colin and colleagues (2012), partial eta square effect sizes are classified as small (0.01), medium (0.06) and large (0.14>) (Colin, 2012). The effect sizes in within groups comparisons were reported based on Cohen's d. Standardized Mean Difference was reported based on Cohen's d effect size (null effect = 0, trivial effect = 0 - 0.19, small effect = 0.2 - 0.49, medium effect = 0.5 - 0.79, large effect = 0.8 - 1.19, very large effect = 1.2 - 1.99, and huge effect ≥ 2) (Cohen et al.,
1988; Sawilowsky, 2009). It should be noted that, the analysis process of the current study
was performed by using both intention to treat and per protocol approaches. Also, the missing
state and trait anxiety values were imputed with a multiple imputation model (Tabachnick,
Fidell & Ullman, 2007). In all tests, a significance level of less than 0.05 was considered.

6 Ethics approval and informed consent:

7 The protocol of present study has been approved by the Ethics Committee of Iran University of Medical Sciences, Tehran, Iran (IR.IUMS.REC.1397.346). This study has also been 8 9 registered in the Iranian Registry of Clinical Trials (IRCT) with the number: IRCT20180427039436N3. All participants were fully informed about the objectives and 10 process of the study and provided a written informed consent. The information obtained 11 12 during the study process remained confidential. Women were informed that they could withdraw from the study at any time. During the study process, no costs were imposed on the 13 samples and all services were completely free. In the present study, only one code was 14 15 written in each questionnaire and all information related to the pregnant women were entered into the information software anonymously. 16

17 **Results**

18 Samples' characteristics

In the present study, 74 participants were included, yet some in each group were excluded at
different stages for a variety of reasons. The analysis in the current study was performed by
both intention to treat and per protocol approaches on 74 and 67 participants, respectively
(Figure 1).

Except for the variable of women's age, no significant difference was observed betweenthe two groups in terms of demographic characteristics. To investigate the effects of age on

the results of this study, statistical tests were performed, which showed that the women age
had no significant relationship with childbirth self-efficacy, FOC, and maternal role
adaptation. Therefore, this was not considered a confounding variable (Table 2).

- 4 Table 2: Participants' characteristics and the tests used to compare pre-test
- 5 differences between the two groups

	Cognitive- behavioral educations group (n = 36)	Control group (n = 38)	P value ^a
Women's age (year), mean ± SD ^b	27.58 ± 3.96	29.57 ± 3.21	0.02**
Education status, n (%)			
High school diploma	9 (25)	11 (28.9)	0.92
Bachelor's degree and higher	27 (75)	27 (71.1)	-
Occupational status, n (%)			
Housewife	31 (86.1)	32 (84.2)	0.54
Employed	5 (13.9)	6 (15.8)	
Economic status, n (%)			
Relatively desirable	30 (83.3)	31 (81.6)	0.54
Desirable	6 (16.7)	7 (18.4)	
Ethnicity, n (%)			
Fars	26 (72.2)	27 (71.1)	0.86
Turk	7 (19.4)	10 (26.8)	0.80
Kurd	3 (8.4)	1 (2.1)	-
History of abortion, n (%)			
Yes	4 (11.1)	5 (13.2)	0.54
No	32 (88.9)	33 (86.8)	
Gestational age at the time of sampling (wk), mean \pm SD	26.27 ± 1.23	26.23 ± 1.26	0.89
Gestational age at childbirth (wk), mean \pm SD	38.63 ± 0.96	38.78 ± 1.14	0.54
Type of delivery, n (%)			
Vaginal childbirth	25(69.4)	21 (55.3)	0.21
C-section childbirth	11(30.6)	17 (44.7)	1
Sex of neonate, n (%)			0.42

	Cognitive- behavioral educations group (n = 36)	Control group (n = 38)	P value ^a
Girl	20 (55.6)	23 (60.5)	
Boy	16(44.4)	15 (39.5)	
Weight of neonate (gr), mean ± SD	3016 ± 301.07	2964 ± 214	0.39
Infant feeding method, n (%)			
Exclusive breastfeeding	22 (61.1)	19(50)	0.65
Formula-milk	2 (5.6)	2 (5.3)	
Combined feeding	12 (33.3)	17 (44.7)	

1 2

 a p < 0.05 is significant, b Standard Deviation

3

4 The effect of intervention on childbirth self-efficacy, childbirth fear, and adaption to 5 maternal role

As shown in Table 3, there was no statistically significant difference between the two groups in terms of the mean score of FOC, outcome expectancy, and self-efficacy expectancy before the intervention. After the intervention, a statistically significant difference was observed in the FOC (p = 0.003), outcome expectancy (p < 0.001), and self-efficacy expectancy (p < 0.001) between the intervention and control groups, once their means were adjusted for pre-intervention scores by using ANCOVA test.

12 The results showed a medium effect size between the two groups in terms of the FOC score clinically based on partial eta square. Also, the results showed a large effect size between the 13 14 two groups in terms of both outcome expectancy and self-efficacy expectancy scores 15 clinically based on partial eta square. There was no statistically significant difference between the two groups in terms of compliance with the maternal role adaptation at 2 weeks 16 and 2 months after the delivery. The difference in the pattern of change for the intervention 17 and control groups is illustrated separately in tables 3 and 4 based on intention-to-treat and 18 19 per protocol analysis.

Table 3: Effect of intervention on outcomes – Intention-to-treat sample

Variables	Cognitive- behavioral educations group (n = 36)		Control group (n = 38)		MD ^e (CI ^f 95%)	ES ^g (Betwee n)	P-value (Between (groups
	Mean (SD ^a)	ES ^h (within)	Mean (SD ^a)	ES ^h (within)			
Fear of childbirth							
^b Pre intervention	76.52 (4.55)	-	74.07 (4.68)	-	2.45 (4.59 to 0.306)	-	0.026
^c Post intervention	44.52 (10.61)	3.04	50.05 (8.32)	2.81	-5.52 (-1.11 to - 9.93)	0.12	0.003
^d P-value (within groups)		< 0.001		< 0.001			
Childbirth self-Effic	cacy (Outcome e	xpectancy)					
^b Pre intervention	105.19 (13.14)	-	102.73 (12.4)	-	2.45 (8.38 to - 3.46)	-	0.41
^c Post intervention	126.63 (14.42)	1.83	107.45 (10.77)	0.58	19.19 (25.07 to 13.31)	0.48	< 0.001
^d P-value (within groups)		< 0.001		0.002			
Childbirth self-Effic	cacy (self-efficac	y expectancy)					
^b Pre intervention	97.86 (13.28)	-	99.21 (12.14)	-	-1.35 (4.54 to - 7.24)	-	0.65
^c Post intervention	124 (14.93)	3.12	106.5 (10.74)	0.9	17.5 (23.5 to 11.5)	0.59	< 0.001
^d P-value (within groups)	< 0.001		< 0.001				
Maternal role adapt	tation						
^b Pre intervention	88.14 (15.9)	-	87.71 (14.95)	-	0.43 (7.57 to - 6.72)	-	0.905
^c Post intervention	81.75 (18.23)	0.81	80.71(17.18)	0.88	1.04 (9.25 to - 7.16)	0.001	0.74
^d P-value (within groups)	< 0.001		< 0.001				

^a Standard Deviation ^bIndependent-samples t-test ^c ANCOVA ^d Paired-sample T Test ^e Mean Difference ^f Confidence Interval ^g Effect size (ES) based on partial eta square, ^h effect sizes based on Cohen's d.

4 5

 Table 4: Effect of intervention on outcomes – Per protocol sample

Variables	Cognitive- behavioral educations group (n = 34)		riables Cognitive- behavioral educations group (n = 34) Control group (n = 33)		MD ^e (CI ^f 95%)	ES ^g (Betwee n)	P-value (Between (groups
	Mean (SD ^a)	ES ^h (within)	Mean (SD ^a)	ES ^h (within)			
Fear of childbirth							•
^b Pre intervention	76.52 (4.55)	-	74.07 (4.68)	-	2.45 (4.59 to 0.306)	-	0.026
^c Post intervention	44.52 (10.61)	3.05	50.06(8.32)	2.86	-5.52 (-1.11 to - 9.93)	0.12	0.003

^d P-value (within groups)	< 0.	.001	< 0.001				
Childbirth self-Efficacy (Outcome expectancy)							
^b Pre intervention	105.19 (13.14)	-	102.73 (12.4)	-	2.46 (8.4 to -3.46)	-	0.41
^c Post intervention	126.63 (14.42)	1.83	106.71 (10.92)	0.72	19.92 (26 to 13.85)	0.54	< 0.001
^d P-value (within groups)	< 0.001		< 0.001 0.002				
Childbirth self-Efficacy (Self-efficacy expectancy)							
^b Pre intervention	97.86 (13.28)	-	99.21 (12.14)	-	-1.35 (4.54 to - 7.24)	-	0.65
^c Post intervention	124 (14.93)	3.11	105.77 (10.9)	1.04	18.22 (24.43 to 12.02)	0.66	< 0.001
^d P-value (within groups)	< 0	.001	< 0.001				
Maternal role adapt	tation						
^b Pre intervention	88.17 (16.14)	-	87.77 (15.6)	-	0.4 (7.97 to -7.17)	-	0.91
^c Post intervention	81.77 (18.5)	0.82	80.68 (17.92)	0.88	1.08 (9.77 to -7.6)	0.002	0.73
^d P-value (within < 0.00 groups)		.001	< 0.00)1			

¹

^a Standard Deviation ^bIndependent-samples t-test ^c ANCOVA ^d Paired-sample T Test ^e Mean Difference ^f Confidence
 Interval ^g Effect size (ES) based on partial eta square, ^h effect sizes based on Cohen's d.

4

5 **Discussion**

6 In the present study, we have demonstrated that cognitive-behavioral education reduced the 7 FOC in the intervention when compared to the control group. Also, the results showed a 8 medium, large, and large effect size between the groups in terms of the FOC, outcome expectancy, and self-efficacy expectancy scores, respectively. Consistent with these findings, 9 10 Toohill et al. (2014) also demonstrated that a psychological intervention program could 11 significantly reduce FOC (Toohill et al., 2014). Moreover, the results of another study in regard to the effect of mindfulness-based cognitive education on FOC are also consistent with 12 the results of present study (Aminolroayaee & Aghaei, 2019). Nevertheless, the findings of 13 14 Klabbers and colleagues (2019) are inconsistent with the findings of the present study. Yet in the above study, the psychology program was delivered by virtual networks, which may not 15 be comparable to the face-to-face intervention examined in this study (Klabbers et al., 2019). 16

1 After the cognitive-behavioral education, no statistically significant difference was observed 2 between the two groups in terms of the mean score of adaptation to maternal role two weeks and two months after the delivery. Consistent with this finding, cognitive-behavioral therapy 3 4 in the study of Salmela-Aro et al. (2012) also failed to improve the maternal role among primiparous women with severe FOC during pregnancy (Salmela-Aro et al., 2012). In 5 addition, the findings of a study by Ngai et al. (2009) showed that three education sessions 6 7 based on Rosenbaum's theory of learned competence could not improve maternal role competence in primiparous women (Ngai, Chan & Ip, 2009). In contrast, the study of Kordi 8 9 et al. (2016), which examined the effect of maternal role education on postpartum maternal role competence of primiparous women, showed an increase in maternal role competence 10 following the education (Kordi et al., 2016). As such, further research may be required to 11 12 understand what may work for whom, it what circumstances and why?

Although cognitive-behavioral education did not make a significant difference in maternal 13 14 role adaptation in the intervention group compared to the control group, it did improve the compliance with the maternal role in both groups. This is important, as the adaptation to 15 becoming a mother is an event during which, the mother takes on a new role, can feel 16 increased harmony, and augmented self-confidence, competence and happiness along with 17 the development of their maternal identity (Kordi et al., 2016). Whilst this intervention was 18 19 delivered during pregnancy, women who receive postpartum child care education clinically 20 and professionally show better adaptation to maternal role (Kordi et al., 2016; Jamshidbiki, 2014). Thus there may be scope for expanding such education to include those in postnatal 21 22 recovery.

Results from the present study demonstrated a statistically significant difference between the two groups in terms of the mean score of childbirth self-efficacy after the delivery of the intervention. The results of a study by Byrne et al. (2014), which aimed to evaluate the effect of mindfulness-based childbirth education (MBCE) on the improvement of childbirth selfefficacy demonstrated similar results (Byrne et al., 2014). Elsewhere, it was also reported that
skill-based delivery preparation education in primiparous women can increase the childbirth
self-efficacy (Howarth & Swain, 2019). Meanwhile, face-to-face counseling has been shown
to have a greater impact on women's childbirth self-efficacy when compared to telephone
support (Khojasteh, Eshteharian Dokht & Ansari, 2018).

7 In contrast, Rastegari and colleagues (2013) demonstrated a small effect of childbirth preparation classes on the childbirth self-efficacy. Yet due to the limited psychological 8 9 education in childbirth preparation classes in the above study, it may not have been able to 10 reduce the childbirth self-efficacy, which is consistent with the present study (Khojasteh, Eshteharian Dokht & Ansari, 2018). Other studies report that the delivery of group education 11 12 designed for pregnant women including the creation of free interactions, facilitation of emotional discharge, the sharing of experiences and knowledge, along with the provision of 13 support creates a sense of trust, self-efficacy, value, and usefulness (Wulcan & Nilsson, 2019; 14 Ghazaie et al., 2016). Consequently, such features may usefully be included in future 15 iterations of this intervention and others. 16

17 In the present study, our overall objective was to reduce FOC by providing cognitivebehavioral education to Iranian pregnant women. Cognitive-behavioral education in the 18 intervention group (69.4) compared to the control group (55.3) resulted in an increase in the 19 number of vaginal births. Yet no statistically significant difference was observed between the 20 intervention and control groups in terms of the mode of birth. According to the results of a 21 meta-analysis done by Azami et al. (2014), fear of childbirth was the cause of 39.33% of 22 cesarean section requests made by pregnant women. In the present study, we tried to reduce 23 the fear of childbirth by providing cognitive-behavioral education to pregnant women. 24 However, other factors such as physicians' advice, midwives' recommendations, the culture 25

and education level of each geographical region, and socio-economic status of women were
not effective in reducing FOC (Azami-Aghdash et al., 2020). However, cognitive-behavioral
education along with psychological education can still be useful in reducing FOC,
particularly if midwives are fluent in cognitive-behavioral education and can deliver
education on the topics of childbirth self-efficacy and FOC (Hosseini, Nazarzadeh &
Jahanfar, 2018; Ghazaie et al., 2016).

Overall, by increasing pregnant women's awareness, prenatal counseling can help pregnant
women to make informed and voluntary decisions in relation to their birth choices (Stoll et
al., 2018). Cognitive-behavioral education can meet the needs of pregnant women both
physically and psychologically by providing information and opportunities for group
discussion with the aim of targeting misconceptions about childbirth (Khanzadeh et al., 2017;
Ghazaie et al., 2016).

13 Study's strengths and limitations, and suggestions for future research:

One of the strengths of present study is the high participation rate we achieved in our followup program. Additionally, the use of the well-validated tools used in this study strengthened our approach overall. Yet as the women participating in this study were all physically fit with low-risk pregnancies, our results cannot be generalized to wider populations at this time. Single pregnancy and had minimum education of high school diploma, which reduce the generalizability of the results. Future studies could usefully explore the delivery of this intervention online and during the postnatal period in order to widen participation.

21 Conclusion and implications for practice

The present study has demonstrated that Iranian women who received a cognitive-behavioral based educational intervention had less FOC compared to the control group. Childbirth selfefficacy also improved after the educational intervention. However, no significant difference was observed in both groups in terms of compliance with the maternal role adaptation at 2
weeks and 2 months after the delivery. Overall, it is suggested that providing information
during prenatal clinic visits or at childbirth prenatal classes, along with cognitive-behavioral
education can reduce the FOC and improve childbirth self-efficacy. Thus, by increasing selfefficacy and reducing FOC, pregnant women may be more likely to choose vaginal
childbirth.

7 Declarations

8 **Consent for publication**: Not applicable

9 Availability of data and material: Not applicable

10 **Competing interests:** There is no conflict of interest

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