



# Influence of Individual Consulting based on Fogg's Behavior Model on Choosing Vaginal Birth after Caesarean

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## ABSTRACT

**Aims** Due to the high rate of repeat cesarean complications, the previous cesarean section mothers need to change their behavior on the mode of birth. Counseling can be effective in changing mothers' behavior. This study assesses the effect of individual counseling based on the Fogg model on this behavior.

**Materials & Methods** In a randomized clinical trial, 62 pregnant cesarean section mothers in Mashhad Health Centers in 2020 were randomly entered into intervention and control groups. Two individual counseling based on Fogg's behavior model in 28-30 weeks of pregnancy for 45-60 minutes and one online session in Telegram channel in the intervention group were presented. The control group had routine care. Data were collected by personnel and obstetric questionnaire and Fogg's behavior model checklist to assess the intention to choose vaginal birth after cesarean at the beginning, two and four weeks after the end of the intervention. Data were analyzed by independent t-test, paired t-test, Mann-Whitney, and Kruskal-Wallis tests in SPSS 25.

**Findings** There was a statistically significant difference in the mean score of Fogg's questionnaire between the two groups ( $p < 0.05$ ). There was a statistically significant difference in choosing vaginal birth after cesarean in the counseling group before and after the intervention ( $p < 0.05$ ) and also the rate of intention to choose between two groups after the intervention ( $p < 0.05$ ).

**Conclusion** The significant increase in planning to choose vaginal birth after cesarean section in the counseling group based on the Fogg model indicates this approach can be used in counseling to choose vaginal birth after cesarean section and other methods.

**Keywords** Consultation; Choice Behavior; Cesarean Section; Vaginal Birth after Cesarean

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## Introduction

Childbirth is a natural phenomenon that starts and ends with the birth of a baby based on a series of conventional changes without intervention. Vaginal birth is regarded as the best mode of delivery in most women and possesses many advantages for mother and baby, but it is decreasing because of the progressing passion for having a cesarean section [1]. There is a significant difference between the rate of cesarean section in most countries globally and the admitted statistics published by the World Health Organization, which means 10-15% of births. Cesarean section rate of more than 10% did not decrease in maternal and neonatal complications, and there was a lower rate of perinatal mortality in regions with the lowest rate of cesarean section [2].

There are some advantages of vaginal birth after a cesarean section, compared to a repeat cesarean section, including a shorter hospital stay and a lower risk of bleeding, infection, blood clots, and placenta accreta. Respiratory distress, newborn Pulmonary Hypertension, and hospitalization in the intensive care unit are similarly less expected. There is a highly low absolute risk of infant mortality in cases of vaginal birth after cesarean section, and it is possible to compare it with the possible risk in the first pregnancy [3-6].

This issue requires providing comprehensive information on the complications and advantages of vaginal birth after cesarean and using the influential role of health care providers to help mothers choose the mode of birth [7]. Women's decision to consider cesarean section may be formed during pregnancy. It may be due to lack of knowledge about the possibility of vaginal delivery after cesarean section [8], uncertainty about delivery results, fear of unpleasant experiences, lack of access to a doctor, pressure People around to be affected by mode of birth (abstract norms), insufficient encouragement system, lack of self-confidence, negative attitude of the mother, lack of self-efficacy in the decision-making process [9-11]. Conducted research in Iran explains that more than 70% of women select to have a cesarean section due to unnecessary reasons, which can be due to baseless fears caused by having no information on childbirth [12]. The study conducted by Baghianimoghadam *et al.* showed that 77.7% of pregnant mothers have information on the mode of birth at the medium level, while only 10.8% of pregnant mothers have enough information [13]. It is possible to reduce the rate of unnecessary cesarean sections by counseling and to educate pregnant mothers. They can select the appropriate method and not experience cesarean section due to unnecessary reasons by informing mothers and the doctor's preference [14]. Homer *et al.* also stated that midwives' counseling and continued care in the prenatal period effectively choose birth in women

who previously experienced cesarean section [15].

According to the positive effect of counseling and education during pregnancy, it is possible to state that educating and counseling mothers can increase their level of awareness and create a positive attitude and improve their self-confidence, and also can increase their trust in health care providers and consequently, results in a better interaction to have a more suitable choice [16]. The results of Hoseini *et al.* showed that the use of shared decision-making methods increases the awareness of previous cesarean section women about the choice of birth and reduces decision conflict [17]. Also, these authors revealed that using motivational interviewing techniques increases knowledge, motivation, and plan to choose vaginal birth after cesarean section [18]. Additionally, Moeini *et al.* [19] conducted a study in 2011 on pregnant women in Rasht, Iran, that explained the effectiveness of the theory of planned behavior on the selection of childbirth methods. Most of the studies in this field are more educational than advisory and have many structures requiring much time. In 2007, Dr. Fogg introduced the Fogg Behavioral Model (FBM) as a practical model to guide technology design to maximize motivation and product selection. According to this model, a behavior occurs when three factors of motivation, ability, and stimulus simultaneously. Ability means the ease or difficulty of intervening in behavior, motivation means how a person tends to intervene in behavior, and the stimulus in this model means the factors that can potentially contribute to the behavior. This model suggests that people with high motivation and ability perform the behavior after a stimulus occurs. The construct of motivation deals with the three concepts of fear/hope, pain/pleasure, rejection/social acceptance, and the construct of ability deals with the concepts of resources, including money and time, mental and physical conflict, social deviation, and abnormality. Fogg's model changes attitudes and increases the motivation and ability of clients, and focuses on positive points such as pleasure, hope, support, empowerment, self-efficacy, and encouragement [20]. On the other hand, although it is suggested to have a vaginal birth after cesarean section as a proper action in qualified women who experienced the cesarean section previously, its number has decreased in recent years, although unnecessary repeat cesarean section is not associated with obvious benefits for the infant and increases side effects for the mother and imposes economic costs on the family and society; hence, it is possible to reduce unnecessary cesarean section by decision making properly through counseling with mothers during pregnancy [5, 21].

This study aimed to assess the influence of individual consulting based on Fogg's behavior model on choosing vaginal birth after cesarean.

## Materials and Methods

This experimental study was a randomized controlled clinical trial conducted on 62 pregnant women who had previously had one cesarean section. They had visited the health centers of Mashhad between June and December 2020. Sampling was performed by using a multi-stage method and the sampling framework in comprehensive health centers in Mashhad. Participants were divided into two randomly selected groups (consulting based on the Fogg model and control). Four health centers were randomly in the intervention group and four control groups to prevent interaction and dissemination of information in two research groups. Sampling in centers was performed by conventional methods. We estimated the possible effect of the intervention to determine the sample size based on the research finding by Esmaili Darmian *et al.* with 95% confidence and 80% test power [7]. Thirty-one people were considered in each group (62 people in total). Based on the calculation and considering the 10% probability of sample reduction, 34 people in each group were calculated.

$$n = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 (p_1(1-p_1) + p_2(1-p_2))}{(p_2 - p_1)^2} = \frac{(1.96 + 0.84)^2 (0.903(1-0.903) + 0.613(1-0.613))}{(0.613 - 0.903)^2} = 31$$

Inclusion criteria at the start of the study include eagerness to participate in the study, Iranian nationality and living in Mashhad, literacy of reading and writing, age between 18-40 years old, history of a previous cesarean section, pregnancy stage based on the first day of the last menstrual period or ultrasound of the first trimester of pregnancy 28-30 weeks, single pregnancy, live fetus, cephalic presentation, normal placental status and amniotic fluid volume based on second-trimester ultrasonography relative to normal pregnancy age, low transverse cesarean scar and more than six months interval between previous childbirth until the first day of the last menstrual period in the current pregnancy. They should not have medical or obstetric problems and indications for cesarean section. Also, they should not participate in at least one counseling session, not participate in research's post-test, indication for the termination of pregnancy before completing the research period and completing the questionnaires, not to receive the contents of the channel and pamphlet, medical disease, and obstetric complications during the research.

Data gathered by the researcher were concerning personal characteristics include mother's age, mother's education, mother's occupation, family income level, use of insurance also pregnancy information (age of the pregnancy, number of

pregnancies, number of children, the distance between current pregnancy and previous childbirth, history of natural childbirth, satisfaction to previous cesarean section, planning for pregnancy, Spouse's advice for the type of delivery). The researcher developed a checklist based on the Fogg behavior model in three parts. The first part includes 23 phrases related to the first theme of the model (motivation), the second part includes 29 phrases related to the second theme (ability), and the third part includes two phrases related to the third theme (motive or stimuli). The first and second parts had been classified based on a 5-point Likert scale (completely agree, agree, no idea, disagree, and completely disagree), and the third part has been classified based on a 5-point Likert scale (very high, high, medium, low, and very low). After the cesarean section, the choice behavior of vaginal birth was assessed by a question before, two, and four weeks after the intervention. The content validity method was used in this study to evaluate the validity of the personal-obstetric information form, a questionnaire based on the Fogg's behavior model, and a checklist to examine the plan to select a vaginal birth after the cesarean section. Accordingly, these forms were prepared by studying new books and papers directed by supervisors and consultants. They were provided to 7 faculty members of Mashhad University of Medical Sciences; the final instrument was applied after considering the required suggestions and corrections. The reliability of the questionnaire was calculated based on the Fogg model (internal consistency) with a Cronbach's alpha coefficient of 0.72. The evaluators agreed to determine the reliability of the checklist to examine the plan to select vaginal birth after the cesarean section and was confirmed with kappa=0.92.

After approval by the ethics committee of Mashhad University of Medical Sciences, individuals who met the inclusion criteria were included in the study and randomly assigned to one of the two intervention or control groups, then completed the personal-obstetric questionnaires and the Fogg model and the plan to select the type of childbirth. This questionnaire was completed before and two weeks after the intervention. Individual counseling was performed based on the Fogg model by the researcher through face-to-face interaction in two sessions (45-60 minutes) also one session of online counseling through the Telegram channel every two weeks and as much as possible based on the days when the mother refers to the health center in 28-34 weeks of pregnancy in the intervention group, concurrently with routine care at the health center. In the first session, the counselor provided information about creating a positive motivation to have a vaginal birth, including describing the advantages of vaginal birth for mother and infant, the complications of repeat cesarean section for the mother, and the effect on fertility. The second

session provided the content of the ability structure focusing on empowering the mother in accepting the selected delivery for her, strategies to reduce childbirth pain, helping the mother to realize her potential abilities to make informed choices, and examining the things that the client states about her choice, developing positive points in her choice, eliminating barriers to select vaginal birth in terms of her perspective or planning to overcome them and help her to make them practical. In the third session, which was held online due to the pandemic of COVID-19, all issues related to delivery methods (movie related to cesarean section and vaginal birth, various massages to reduce labor pain, exercise during pregnancy and delivery, interviews with mothers who had a successful vaginal birth after the cesarean experience, educational pamphlet (questions and answers about natural childbirth after cesarean section based on vaginal birth after cesarean guideline [22]) were presented to the research participants in the Telegram channel. Participating in an individual counseling program was recognized as an identical motive in the intervention group in this study, and its effect was examined compared to the control group. Research instruments were completed again in groups two weeks after the intervention, and the educational pamphlet was provided to the control group.

After data collection, data were analyzed by SPSS software version 25 using independent t-test, Mann-Whitney, Chi-square and Fisher, paired t-test or Wilcoxon. A 95% confidence interval and  $p < 0.05$  was the significance level in all tests.

## Findings

Eighty women were included at the beginning of the study, and 18 people were excluded. Data were analyzed on data achieved by 62 women at the end of the study (Diagram 1).

The results of the Mann-Whitney test revealed that the two groups had no statistically significant difference in terms of mother's age, pregnancy age, number of pregnancies, number of children, and the distance between previous delivery and current pregnancy and were homogeneous ( $p < 0.05$ ). The results of Fisher's exact test revealed that the two groups were homogeneous in terms of occupation quality variables, history of vaginal childbirth, education, family income, insurance coverage, type of pregnancy, and spouse's advice for recent childbirth ( $p < 0.05$ ). Also, the Chi-square test results explained that the two groups were not statistically significant in terms of qualitative variables of satisfaction with the previous cesarean sections ( $p < 0.05$ ; Table 1).

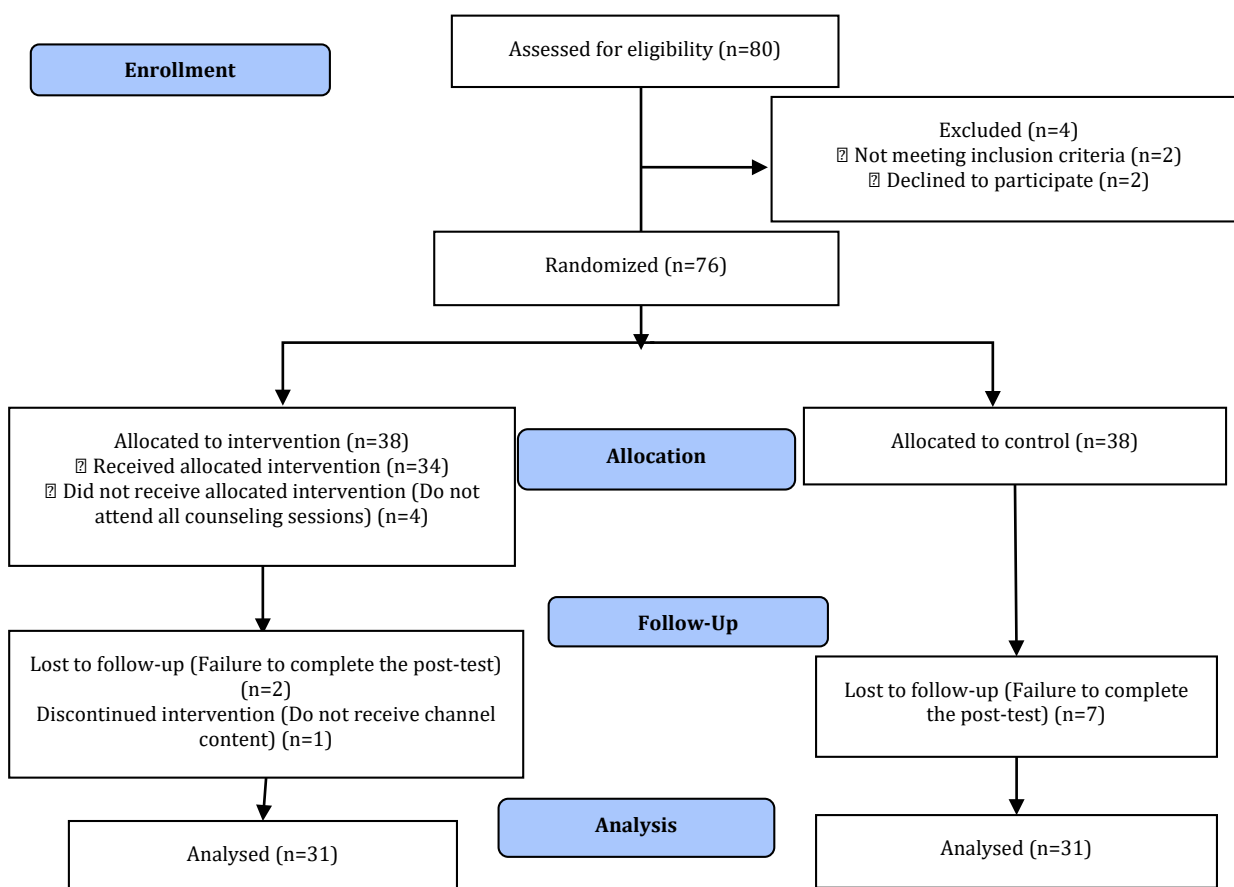


Diagram 1) Consort 2010 flow diagram

**Table 1)** Comparing individual-midwifery components of previous cesarean section women referring to health centers in Mashhad in two intervention and control groups (N=31 in each group)

Variables	Control		Consulting		p-value
	Mean±SD	N (%)	Mean±SD	N (%)	
Age (year)	29.39±1.14	-	29.56±4.14	-	0.301*
Pregnancy age (weeks)	29.39±1.14	-	28.74±1.18	-	0.351*
Number of pregnancy	2.27±0.57	-	2.47±0.82	-	0.301*
Number of Children	1.00±0.24	-	1.12±0.32	-	0.417*
The interval between the previous delivery and the current pregnancy	4.97±1.94	-	5.06±1.89	-	0.975*
<b>Education</b>					0.157**
Primary	-	1 (3.2)	-	1 (3.2)	
Tips	-	3 (9.7)	-	6 (19.2)	
Secondary	-	12 (38.7)	-	17 (54.8)	
Excellent	-	15 (48.4)	-	7 (22.6)	
<b>Job</b>					0.707**
Housewife	-	26 (83.9)	-	28 (90.3)	
Employed	-	5 (16.1)	-	3 (9.7)	
<b>Family income</b>					0.999**
Less than enough	-	2 (6.5)	-	3 (9.7)	
Enough	-	28 (90.3)	-	28 (90.3)	
More than enough	-	1 (3.2)	-	0	
<b>Insurance coverage</b>					0.238**
Yes	-	31 (100)	-	28 (90.3)	
No	-	0	-	3 (9.7)	
<b>History of natural childbirth</b>					0.707**
Yes	-	3 (9.7)	-	5 (16.1)	
No	-	28 (90.3)	-	26 (83.9)	
<b>Satisfaction with previous cesarean section</b>					0.749***
Yes	-	24 (77.4)	-	26 (83.9)	
No	-	7 (22.6)	-	5 (16.1)	
<b>Spouse's advice for the type of delivery</b>					0.412**
Cesarean section	-	17 (54.8)	-	14 (45.2)	
Natural childbirth	-	1 (3.2)	-	4 (12.9)	
Has no comment	-	13 (41.9)	-	13 (41.9)	
<b>Pregnancy planning</b>					0.165**
By planning	-	22 (71.0)	-	20 (64.5)	
Without planning	-	9 (29.0)	-	11 (35.5)	

\* Mann-Whitney test; \*\*Fisher's exact test; \*\*\*Chi-square test

There was a statistically significant difference in the mean score of Fogg's questionnaire between the two groups after intervention ( $p < 0.05$ ). There was a statistically significant difference in choosing vaginal birth after cesarean in the counseling group before and after the intervention ( $p < 0.05$ ) and also the rate of intention to choose between two groups after the intervention ( $p < 0.05$ ; Table 2).

**Table 2)** Mean±SD of Fogg model structural scores before and two weeks after the intervention

Time of intervention	Consulting	Control	p-value
Before	2.32±0.40	2.45±0.51	0.193
Two weeks after	2.33±0.31	2.79±0.52	<0.001
Mean difference	0.001±0.30	0.33±0.59	0.008
p-value	0.004	0.971	-

Also, the results showed that stimulus for choosing birth method by mothers was satisfaction with prior cesarean section (33.9%), fear of vaginal birth (24.2%), physician demand (24.2%), acceptance of other people opinions by mother (12.9%) and other cases (4.8%).

## Discussion

This study was conducted to determine the effect of counseling based on Fogg's behavior model on the choice of vaginal birth after cesarean in prior

cesarean section mothers referred to health centers in Mashhad in 2020. It is challenging to consult with women who had a previous cesarean section to choose the mode of birth in their next pregnancy. According to Fogg, increasing motivation, ability, and motives change behavior and cause the right choice. Hence, understanding the mothers' motivations, abilities, and motives in choosing healthy behaviors during the counseling process [20]. The intention to choose vaginal delivery after cesarean section before the intervention was not statistically significant in the two groups. But after the intervention in the counseling group, the intention to choose vaginal birth after cesarean section increased by 29% and was statistically significant. Firoozi *et al.* stated that informing mothers about the choice of birth mode and empowering them in shared decision-making can influence women's vaginal birth after cesarean request [23]. Esmaili *et al.*, in their study, reported that training of optimism is effective on the attitude and plan to choose the mode of birth [24]. Although they did not use a counseling approach in their research, the effect of education on the selection of vaginal birth in pregnant women has been defined, that it is possible to compare and study it in this respect. This study showed that the effect of

counseling on the frequency of plan to select vaginal delivery after the cesarean section has been higher in the intervention group (29%) than the control group (0%). There is insufficient support to select vaginal birth after cesarean section in most current care environments, and mothers' performance, especially those with previous cesarean section affected by physicians and childbirth personnel; hence, the influence of such resources on mothers' decisions in follow-up is not unlikely. There is a significant difference in the plan to select by comparing before and after the intervention in the counseling group in confirming this likelihood and confirming the effect of counseling with this approach.

Chinkam *et al.*, in their study, examined the effect of evidence-based counseling by midwifery manuscripts on the mode of birth in the pre-cesarean section. They reported an increase in information about vaginal delivery after cesarean section. However, the preference of delivery method and intention mothers have not been influential, which is not in line with our study and this difference is due to the fact that having information alone on the intention of previous cesarean section mothers is not enough for the mode of birth. In addition to providing information, our study has increased the motivation and ability of mothers [25].

Hoseini *et al.* conducted a study that showed that motivational interviewing in the intervention group increased to natural childbirth after cesarean section by 17% compared to the control group, which is less than the 29% increase in this study, and this increase in this study can be caused by further investigation and increasing the individuals' level of ability to select vaginal birth [18].

The results of comparing the mean scores of the Fogg model structures in the intervention and control groups before and two weeks after the intervention explained that counseling increases the mean scores of the Fogg model structures. However, no statistically significant difference was observed in motivation.

Najafi *et al.* conducted a study on 486 pregnant women and stated that the mother's attitude was the effective factor in choosing vaginal birth, and fear of labor pain was the most significant cause in determining a cesarean section [26]. Hoseini *et al.* also declared the fear of childbirth as a significant obstacle to selecting vaginal birth [18].

It is moderately in agreement with this study. Because fear and pain of childbirth are important elements of motivation in the Fogg model. The Black *et al.* study showed that women's attitudes toward postpartum cesarean section are shaped by a set of distinct influences, including previous delivery experiences, suggesting that there are opportunities for physicians to address concerns, ideas, and concerns. And related experiences from the first cesarean delivery onwards, classify and personalize

the decision [10]. Satisfaction with a previous cesarean section which means the good and satisfactory experience of previous cesarean delivery, was the first significant factor in convincing mothers to select a cesarean section in this study, in addition to the fear of childbirth and counseling and increasing the women's knowledge and attitude reassured mothers to select vaginal birth after cesarean section.

HamzeKhani *et al.* conducted a study that confirmed the influence and effectiveness of computer education on increasing and self-efficacy in pregnant women to adapt to labor and childbirth [26]. According to Bandura, self-efficacy has no relationship with having skills and refers to having the belief and ability to work in different life situations [28]. The ability means to increase self-efficacy by simplifying tasks and selecting and performing them quickly in the Fogg model. Since self-efficacy and ability are equivalent to each other, it is possible to state that their results agree with the results of this study.

This study has some strengths, including examining the important factors such as motivation, ability, and motive/stimuli to select vaginal birth after cesarean section. There are also some limitations in this research that one of them is that the mental and psychological state and personality differences of the research participants during the study affected their response. Also, coronavirus disease interfered with the mother's decision for vaginal birth after cesarean.

## Conclusion

The significant increase in planning to choose vaginal birth after cesarean section in the counseling group based on the Fogg model indicates this approach can be used in counseling to choose vaginal birth after cesarean section and other methods. This approach is simple and needs low-cost, and is in agreement with the objectives of the Ministry of Health to reduce cesarean section; hence, it is suggested to apply this model in the care of previous cesarean section mothers to improve their ability in determining a mode of birth.

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