The effect of an instructional program based on health belief model in decreasing cesarean rate among primiparous pregnant mothers

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ABSTRACT

Introduction: Although cesarean section has saved many mothers' and infants' lives, the problem is in its increasing prevalence. According to recent statistics, the current rate of cesarean in Iran is in fact 3–4 times as more than the standard rate defined by WHO. Therefore, the present study is aimed to estimate the effect of an instructional program based on health belief model on reducing cesarean rate among primiparous pregnant women. **Materials and Methods:** In this semi-experimental research, 60 primiparous women who had visited Bandar Abbas Healthcare Centers were selected as the subjects. They were in their 26–30th week of pregnancy. They were selected in a multi-stage cluster sampling method (a combination of clustering and simple randomization), and were divided into two groups, subjects and control group. The data were gathered using a valid and reliable questionnaire. The instructional intervention was done after the completion of the pretest questionnaire based on the sub-constructs of the health belief model in six instructional sessions. 1 month after the intervention, posttest questionnaires were completed by the subjects in both groups. The data were analyzed using descriptive statistics, standard deviation, independent *t*-test, and paired *t*-test. The significance level was set at <0.05. **Results:** Two groups had a significant difference between awareness score, perceived sensitivity, intensity, benefits, barriers, self-efficacy, and the performance ($P < 0.001$). In the experimental group, nine subjects (30%) had a natural delivery. **Conclusion:** According to the findings of the current research, an instructional program illuminated (designed) by the health belief model can significantly influence pregnant women's awareness, intention, and choice of delivery type.

Key words: Health belief model, instruction, performance, pregnant women

INTRODUCTION

Natural vaginal delivery (NVD) is considered as the best delivery type among the majority of pregnant women. However, due to the rising prevalence of cesarean section (CS), the rate of natural delivery is decreasing. In many cases, CS has saved the lives of many mothers and babies; however, the matter of concern is the ever-increasing prevalence of this childbirth type.[1] Yet the fact is that CS, as compared to NVD, is accompanied by more side-effects such as severe infections, postpartum hemorrhage, surgical problems, thromboembolism attacks, and pelvic injury in the mother.[2] Moreover, the mortality rate induced by CS is

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7 times as high as NVD. On the other hand, re-hospitalization due to CS is twice as frequent as NVD.[3] Among the infantile side-effects of CS, premature birth, lung high blood pressure as well as physical damages such as injuries made to the baby during uterine incisions, skull fractures, and so on can be mentioned.[4] According to the existing statistics, 25.7% of all deliveries are of the CS type. This rate ranges from 2.3% in Angola to 46.2% in China.[5] In the U.S., the rate of CS has varied from 20.7% in 1996 to 32.8% in 2011.[6] An investigation of 23 countries worldwide has reported the rate of CS for nonmedical purposes to be 0.01–2.1%.[7] According to a review research conducted in 2010 in 137 countries, 54 of them reported a rate of CS below 10%; 69 of those countries reported it above 15%; the remaining 41 countries reported this rate to be 10–15%. Among all these nations, Iran was in the second rank with a rate of 41.9%, while Brazil stood first with a rate of 45.9% CS. According to the results of a review research, theory-driven interventions were more effective than other interventions.[8] A diverse research has been done concerning the effect of instruction on selecting childbirth type.[9-14] However, few research is done on theory-driven instructional interventions in this field.[11,15,16] There is a lot of theory-based interventional research on people who willingly decide to undergo a CS.[3,13,17] To change pregnant women's behavior, who comprise a vulnerable population in society, in favor of NVD healthcare and health improvement theories seem to be helpful. Since the value of instructional programs lies in the efficacy of the program which in turn depends to a great extent on a correct use of theories and models, one of the most effective models has appeared to be the health belief model. This model is based on the idea that people only behave in a healthy manner in the following conditions: Once they feel a threat (perceived susceptibility construct), when the hazards of the unhealthy behavior are serious (perceived severity construct), when showing the healthy behavior is beneficial for them (perceived benefits construct), barriers to the healthy behavior can be removed (perceived barriers construct), and once they feel competent enough to behave in a healthy manner (perceived self-efficacy). Statistical findings concerning childbirth in Bandar Abbas in 2012 reported 17,715 delivery cases in this county from among which 9554 cases (48%) were of the natural type and 8161 cases (41%) were of the cesarean type. These statistics attest to a high rate of cesarean in this county. According to the existing estimations and their divergence from the ideal WHO figure (15%), there is a need for certain interventions to delve into the cause of this increase and then suggest strategies to reduce these figures and statistics.[18] Therefore, the present research seeks to determine the effect of an instruction based on the constructs of the health belief model on reducing rate of CS among primiparous women who visit the healthcare centers of Bandar Abbas. It is hoped that the findings of this study can be helpful in decreasing the frequency of unnecessary CSs.

MATERIALS AND METHODS

The present research is of a semi-experimental type. The research population consisted of all primiparous pregnant women who visited the healthcare centers of Bandar Abbas. With no medical reason, they had willingly opted for a cesarean surgery. They were in their 20–30th week of pregnancy. After obtaining informed consent, the samples were selected by a combination of clustering and simple randomized method. Initially, from among 20 Healthcare Centers in Bandar Abbas, 12 were selected in clusters (6 centers in the treatment group and 6 centers in the control group). Subsequently, in order to select the sample in each cluster simple randomization was used. The sample size was determined using Cohen's formula, $\left(n = \frac{(z_{1-\alpha/2} + z_{1-\beta})^2}{d^2} \right)$ with a 5% error, a power of 80% and an effect size of 0.5 for each group. Finally, 30 subjects were assigned to each. Inclusion criteria were: Primiparous women volunteering for a CS, pregnancy age of 26–30 weeks, having no evident or diagnosable barriers of NVD at the time of sampling, for example, any medical reasons. Exclusion criteria were: Noncontinuous attendance at instructional sessions (being absent for more than 2 sessions), not completing the questionnaire, having indications of cesarean. The data-gathering instrument was a questionnaire the validity and reliability of which (α = 0.84) was established by Ghaffari *et al*. in 2009.[19] The above-mentioned questionnaire was comprised of three sections, the first of which contained 14 demographic and midwifery descriptive information. The second part consisted of 20 items about one's awareness of cesarean and natural delivery. Each correct response scored 1 point while each incorrect response scored nil. The third section consisted of items concerning the health belief model. The perceived susceptibility construct had 6 items rated in a five-grade Likert scale. Scoring for each item was a range between 0 and 4. The perceived severity construct consisted of 7 items to be rated in a five-level Likert scale. And the scoring system was between 0 and 4. The hypothetical barriers included 17 items rated in a five-grade Likert scale (0–4). Similarly, the perceived benefits and perceived self-efficacy constructs had, respectively, 21 and 5 items rated in the same way. The last item, that is, cues to action had 1 three-choice (natural, cesarean, not decided yet) item. Moreover, the average awareness score as well as the scores of each construct was reported in percentages. After obtaining a written letter of permission from the research deputy of the university and abiding by all ethical rules such as confidentiality of data, guarantee for no abuse of the data, and mothers' full consent to participate, this study was conducted. For those participants who were unable to fill out the written questionnaires, the researcher did the job after an oral presentation of the questions. The pretest questionnaire was submitted to the two treatment and control groups. After analyzing the pretest results, the instructional intervention based on the health belief model was provided for the treatment group in 3–6-member groups during six 50–60-min instructional sessions in the form of speech, group discussions, questions and answers, and PowerPoint presentations. The control group only received the routine and empirical instructions. It needs to be reminded that all the subjects were present all throughout the

research, and there was no attrition. 1 month after the end of the intervention, the posttest questionnaire was submitted to the two groups in order to evaluate the effect of the instructional intervention. In order to track the delivery type finally conducted, mothers' or their family members' phone numbers were requested. Once the data were collected, they were analyzed using SPSS 16 [SPSS Inc.: Chicago] using descriptive statistics (relative frequency, tables, and figures), independent *t*-test and matched *t*-test. The significance level was set at $P < 0.05$.

RESULTS AND FINDINGS

The average age of the subjects in the treatment group was 26.56 ± 5.75 years and in the control group it was 26.90 ± 6.33 years. The average pregnancy age in the treatment group was 27.66 ± 1.94 years and in the control group it was 28.16 ± 2.25 years. The average age of marriage in the treatment group was 22.8 ± 4.07 while in the control group it was 23.20 ± 5.53 years. The other background data are indicated in Table 1.

Matched *t*-test showed a statistically significant difference between the awareness score before and after the instructional intervention ($P > 0.001$). However, no such significant divergence was observed in the control group ($P = 0.098$) [Table 2].

Before conducting the instructional intervention, both groups (60 pregnant women) had intended to select CS. After the intervention, in the treatment group, 12 subjects (40%)

Table 1: Comparison of background data of the control and treatment groups

Variable	Frequency (%)		Significance level*
	Treatment group	Control group	
Education			
Junior high school	3 (10)	2 (6.7)	0.695
Diploma	11 (36.7)	11 (36.7)	
Academic	16 (53.3)	17 (56.7)	
Spouse's education			
Primary and junior high school	3 (10)	1 (3.3)	0.586
Diploma	5 (16.7)	11 (36.7)	
Academic	22 (73.3)	18 (60)	
Spouse's occupation			
Blue-collar	1 (3.3)	2 (6.7)	0.835
White-collar	20 (66.7)	16 (53.3)	
Freelance	9 (30)	12 (40)	
Accommodation			
Own house	18 (60)	18 (60)	0.865
Rented	10 (33.3)	9 (30)	
Other	2 (6.7)	3 (10)	
Economic level			
Average	21 (70)	25 (83.3)	0.229
Good	9 (30)	5 (16.7)	

*Independent *t*-test

mentioned natural delivery as their final choice. After the phone call follow-ups, nine subjects (30%) were revealed to have had a natural delivery [Table 3].

DISCUSSION AND CONCLUSION

The present research sought to investigate the effect of an instruction based on the health belief model on reducing cesarean rate among primiparous women. Findings revealed that the mean awareness score in the treatment and control groups were significantly divergent after the instructional intervention. The results obtained by Sharifirad *et al.* in 2009 concerning a reduce in the amount of CS showed a significant difference between awareness scores in the two groups after the instructional intervention.[11] Moreover, the findings of the present research are consistent with those conducted previously on this topic.[10,14,20-23] On the other hand, they are not consistent with the findings of Asadi *et al.* (2014),[3] Sanavi *et al.*,[13] Kjærgaard *et al.*,[24] and Ryding *et al.*[25] This discrepancy could be due to the different instructional content and features of the target group (age, education, economic status, culture,…) in the above-mentioned studies. According to the findings obtained after the intervention, a significant divergence was found between the mean perceived susceptibility score in the two groups. These findings were consistent with those obtained by Sharifirad *et al.* in 2010[19] which focused on reducing CS rate with the help of the health belief model, as well as the research conducted by Rahimikian *et al.* in 2009[26] which made use of the health belief model to affect the choice of delivery type (either natural or cesarean). We can infer that instructions directed by the health belief model are more effective in pregnant mothers' perceivement than nonsystematic instructions. The results of the present research showed a significant divergence in the mean scores of perceived severity in the two research groups after the instructional intervention. The designed instructions seem to have been effective in increasing women's perceived severity. Considering the role of the instructional sessions held, this finding is very well expected and quite natural. These findings were consistent with Sharifirad *et al.* findings with this concern[19] and Rahimikian *et al.* results which showed a decreased rate of cesarean.[26] Results of this study revealed that perceived barriers, after the intervention, were significantly reduced in comparison to the control group which had received no instruction. The instructional program seems to have been successful in terms of this construct. The body of previous research shows that perceived barriers are the most important part of the health belief model.[26] This finding is constant with Rahimikian *et al.*[26] which was focused on a decrease of perceived barriers. However, this finding was not similar to Sharifirad *et al.*[19] Findings showed a significant difference between the two groups in terms of the perceived benefits score. In fact, the subjects in the treatment group showed to gain a higher perception of the benefits of natural delivery. It should be reminded that an individual's better perception of benefits would pave the way for a more appropriate action. The correlation of perceived benefits and improved preventive behaviors was

Table 2: Comparing the mean scores of the sub-constructs of health belief model in the treatment and control groups before and after the intervention

Variable	Group	SD±mean Score/100		Mean score difference before and after the intervention	Matched *t*-test
		Before the intervention	After the intervention		
Awareness	Treatment	40.66±14.24	71.83±13.86	31.16	<0.001
	Control	39.5±17.68	42.33±14.72	2.83	0.098
Independent *t*-test		0.779	<0.001		
Perceived susceptibility	Treatment	48.75±17.85	68.88±14.17	20.13	<0.001
	Control	47.91±14.50	49.72±13.35	1.80	0.377
Independent *t*-test		0.843	<0.001		
Perceived severity	Treatment	49.64±16.09	68.21±13.50	18.57	<0.001
	Control	48.33±9.55	50.35±11.76	2.02	0.098
Independent *t*-test		0.703	<0.001		
Perceived benefits	Treatment	57.85±10.42	73.65±8.76	15.79	<0.001
	Control	58.57±10.22	59.16±8.08	0.595	0.404
Independent *t*-test		0.790	<0.001		
Perceived barriers	Treatment	39.40±9.96	50.43±12.16	11.03	<0.001
	Control	39.80±9.41	40.47±10.06	0.674	0.515
Independent *t*-test		0.875	<0.001		
Self-efficacy	Treatment	34.16±20.17	50.66±14.95	16.50	<0.001
	Control	30.16±19.84	32.83±18.08	2.66	0.161
Independent *t*-test		0.442	<0.001		

Table 3: Comparing three delivery type after intervention in the treatment and control groups

Selecting delivery type	Group	Before intervention, frequency (%)	After intervention, frequency (%)	After delivery, frequency (%)
Cesarean	Treatment	30 (100)	13 (33.43)	21 (70)
	Control	30 (100)	21 (70)	27 (90)
Natural	Treatment	0	12 (40)	9 (30)
	Control	0	5 (16.66)	3 (10)
Undecided	Treatment	0	5 (16.66)	0
	Control	0	4 (13.33)	0

reported to be strong.[27] This finding was similar to the body of prior research.[11,26,28] Findings showed a significant difference between the two groups' self-efficacy score after the intervention. A myriad of research had already attested to the important role of self-efficacy in selecting natural delivery.[11,15,29-31] It can be concluded that an instruction based on the health belief model has been more effective in raising pregnant women's belief in natural delivery than systematic instructions. Similarly, as for one's intention of selecting the delivery type a significant divergence between the two groups was observed. This issue also attested to the effectiveness of the instructional program in altering mothers' tendency towards natural delivery. This finding was similar to that of a body of previous research.[11,22,25,32,33] As for the effect of the instructional program on the type of delivery finally chosen, a significant divergence was found between the two groups. Similarly, the research findings obtained by Rahimikian *et al.*[26] indicated that an instruction based on the health belief model managed to improve the treatment group's performance as compared to the control group. This

finding was similar to other previous studies investigating the effectiveness of an instructional intervention.[15,22,26,32,34] Among the limitations of the present study are the small sample size and the restrictive inclusion criteria (primiparous, 26–30th week of pregnancy, intending to have a cesarean, no opportunity for researcher's intervention to make sure of the real reason for the cesarean and making sure if at last the surgery was conducted or not, and dealing with pregnant women with their special mental and emotional conditions. Another limitation was an exclusion of rural pregnant women. Due to the effectiveness of instructions in mothers' awareness, belief, and performance, mothers are suggested to be offered instructional pamphlets about the advantages of natural delivery and disadvantages of cesarean during their pregnancy. This can be accompanied by instructional sessions about the same subject by midwives in medical healthcare centers. For further research, the awareness and perception of the subjects' spouses on this subject can be investigated.

Findings of this research show that the instructional program conducted according to directions of the health belief model managed to positively affect mothers' awareness and perception of choosing the safest delivery type. Therefore, it seems that if physicians, midwives, and healthcare providers instruct pregnant mothers based on behavioral modification models such as the health belief model they can achieve positive outcomes.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Liu NH, Mazzoni A, Zamberlin N, Colomar M, Chang OH, Arnaud L, *et al.* Preferences for mode of delivery in nulliparous Argentinean women: A qualitative study. Reprod Health 2013;10:2.
2. Zamanialavijeh F, Shahry P, Kalhory M, Haghighizadeh M, Sharifirad G. Identification of factors related to elective cesarean labor: A theory-based studty. Daneshvar Med 2011;19:1.
3. Asadi ZS, Solhi M, Taghdisi MH, Hoseini VM, Javan R, Hashemian M. The effect of educational intervention based on Theory of Reasoned Action (TRA) on selected delivery method, for selective cesarean section in pregnant women. Iran J Obstet Gynecol Infertil 2014;17:1-8.
4. Rahmanian K, Rahmanian V, Ghasvar M. The knowldege of pregnant women about short comings of cesarean and its associated factors in 2009. J Res Dev Nurs Midwifery 2013;10:84-91.
5. Cunningham FG, Leveno KJ, Bloom SL. Williams Obstetrics and Gynecology. 23th ed. USA: McGraw-Hill; 2010.
6. Kozhimannil KB, Law MR, Virnig BA. Cesarean delivery rates vary tenfold among US hospitals; reducing variation may address quality and cost issues. Health Aff (Millwood) 2013;32:527-35.
7. UNDP, UNFPA, WHO. Caesarean section without medical indication increases risk of short-term dverse outcomes for mothers. Policy brief WHO/RHR/HRP/1020; 2010. p. 2.
8. Glanz K, Rimer BK, Viswanath K. Health Behavior and Health Education: Theory, Research, and Practice.London: John Wiley & Sons; 2008.p592.
9. Amidi M, Akbarzadeh K. The effects of health education on pregnant woman's knowledge and attitude ob cesarean section. J Ilam Univ Med Sci 2005;14:17-26.
10. Niaki MT, Behmanesh F, Mashmuli F, Azimi H. The effect of prenatal group education on knowledge, attitude and selection of delivery type in primiparous women. Iran J Med Educ 2010;11:124-30.
11. Sharifirad GR, Moghadam MH, Fathyian F, Rezaeian M. The effect of health education using behavior intention model on of cesarean in Khomainy-shahr, Iran. Iran J Nurs Midwifery Res 2009;14 (3):105-10.
12. Toghyani R, Ramezani M, Izadi M, Shahidi S, Aghdak P, Motie Z. The effect of prenatal care group education on pregnant mothers' knowledge, attitude and practice. Iran J Med Educ 2008;7:317-24.
13. Sanavi FS, Ansari-Moghaddam A, Rakhshan F, Navabi Rigi S. Two teaching methods to encourage pregnant women for performing normal vaginal delivery. Iran J Med Educ 2012;12:184-92.
14. Azh N, Ghadam SS, Younesian M. The effect of health education on the rate of cesarean section. J Qazvin Univ Med Sci 2011;.14 (4):71-6.
15. Khorsandi M, Ghofranipour F, Hidarnia A, Faghihzadeh S, Ghobadzadeh M. The effect of PRECEDE PROCEED model combined with the health belief model and the theory of self-efficacy to increase normal delivery among nulliparous women. Procedia Soc Behav Sci 2012;46:187-94.
16. Besharati F, Hazavehei SM, Moeini B, Moghimbeigi A. Womens attitudes toward elective delivery mode based on the theory of planned behavior. J Guilan Univ Med Sci 2011;20 (79):68-76.
17. Sanavi FS, Ansari-Moghaddam A, Shovey MF, Rakhshani F. Effective education to decrease elective caesarean section. J Pak Med Assoc 2014;64:500-5.
18. Statistices. Statistices Cesarean. Bandar Abbas: Hormozgan University Medical Sciences; 2013.
19. Ghaffari M, Sharifirad G, Akbari Z, Khorsandi M, Hassanzadeh A. Health the belief model-based education and reducation of cesarean among pregnant women: An interventional study. Health Syst Res 2011;7:200-8.
20. Jeihooni AK, Shahidi F, Kashfi SM. Effectiveness of educational program based on the theory of reasoned action to decrease the rate of cesarean delivery among pregnant women in Fasa, Southern Iran. J Educ Community Health 2014;1:62-71.
21. Moeini B, Besharati F, Hazavehei S, Moghimbeigi A. Women's attitudes toward elective delivery mode based on the theory of planned behavior. J Guilan Univ Med Sci 201120 (79):68-76.
22. Fathian Z, Sharifirad GR, Fathian Z, Pezeshkihebi F. Frequency of cesarean section and its related factors in Khomeinyshahr-Isfahan province 2005. Health Syst Res 2011;6 (4):786-93.
23. Lagrew DC Jr, Morgan MA. Decreasing the cesarean section rate in a private hospital: Success without mandated clinical changes. Am J Obstet Gynecol 1996;174:184-91.
24. Kjærgaard H, Wijma K, Dykes AK, Alehagen S. Fear of childbirth in obstetrically low-risk nulliparous women in Sweden and Denmark. J Reprod Infant Psychol 2008;26:340-50.
25. Ryding EL. Investigation of 33 women who demanded a cesarean section for personal reasons. Acta Obstet Gynecol Scand 1993;72:280-5.
26. Rahimikian F, Mirmohamadaliei M, Mehran A, Ghforoodi KA, Barough NS. Effect of education designed based on health belief model on choosing delivery mode. Hayat 2009;14:25-32.
27. Freimuth V, Linnan HW, Potter P. Communicating the threat of emerging infections to the public. Emerg Infect Dis 2000;6:337-47.
28. Hatefnia E, Niknami S, Mahmoudi M, Ghofranipour F, Lamyian M. The effects of health belief model education on knowledge, attitude and behavior of Tehran pharmaceutical industry employees regarding breast cancer and mammography. J Kermanshah Univ Med Sci 2010;14.(1):42-53.
29. Lowe NK. Maternal confidence for labor: Development of the Childbirth Self-Efficacy Inventory. Res Nurs Health 1993;16:141-9.
30. Svensson J, Barclay L, Cooke M. Randomised-controlled trial of two antenatal education programmes. Midwifery 2009;25:114-25.
31. Ip WY, Tang CS, Goggins WB. An educational intervention to improve women's ability to cope with childbirth. J Clin Nurs 2009;18:2125-35.
32. Saisto T, Toivanen R, Salmela-Aro K, Halmesmäki E. Therapeutic group psychoeducation and relaxation in treating fear of childbirth. Acta Obstet Gynecol Scand 2006;85:1315-9.
33. Park S, Chang S, Chung C. Effects of a cognition-emotion focused program to increase public participation in Papanicolaou smear screening. Public Health Nurs 2005;22:289-98.
34. Sharifirad G, Rezaeian M, Soltani R, Javaheri S, Mazaheri MA. A survey on the effects of husbands' education of pregnant women on knowledge, attitude, and reducing elective cesarean section. J Educ Health Promot 2013;2:50.