



## The effect of education based on health belief model on postpartum care in pregnant women

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### Abstract

The integrated postpartum care is the most important factor in the prevention and reduction of delivery complications. Despite the free services for pregnant women, mothers do not show their interest to use them as appropriate. Therefore, this research was carried out to determine the effect of training pregnant women based on health belief model (HBM) on increasing the use of postpartum health care. This research was an empirical study (before-after study) conducted on 90 pregnant women referring to healthcare centers of Hamadan. The participants were randomly divided into two intervention (n=45) and control (n=45) groups. The educational intervention in this research was based on HBM performed as lecturing and question/answering in four 1-hour sessions and presenting educational content as leaflet. A researcher-made questionnaire was used in 3 stages of before intervention, and immediately after intervention, and 2 months after delivery to collect data. The comparison of the two groups showed that the mean of knowledge and constructs of HBM (including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy) as well as behavior of mothers after training had a significant increase in the intervention group compared to the control group. According to the obtained results, designing and implementing training programs based on health belief model can help promote mothers' behavior in postpartum care.

**Keywords:** Education, Health Services, Maternal, Postpartum Care

### Introduction

Delivery is a natural phenomenon in women's life which can be accompanied by joy and delight. There is a thought that no complication is threatening mother and child after delivery [1]. However, at post-delivery or puerperium, referred to the six months after delivery, mothers experience different psychological and physiological changes [2]. Although most of these changes return back to the normal state, some of them related to mothers' health may remain for a long time. Some of the associated

complications may be so severe or elongated that they bring mothers to disability or even death after delivery [3]. Based on the reports of world health organization (WHO), 1600 women per day pass away because of consequences of delivery and pregnancy. While the most of the mortality rate is occurred in developing countries, more than half of them relate to postpartum [4]. Since the mortality rate of mothers is an important index in socio-economic development of any

country, trying to maintain mother alive and healthy after delivery could be an investment in the society. Therefore, WHO has determined 75% reduction in mother's mortality rate between 1990 and 2015 as an important goal [5]. In addition to mortality, remarkable changes in physical and psychological status of women in postpartum can result in the loss of life quality in this critical period [6].

The rate of postpartum complications in developing countries is very high so that it is 16 to 20 times higher than that of mothers' death [7]. Offering postpartum services is the most important factor in preventing and reducing the postpartum complications [8]. In this regard, the ministry of health, treatment and medical education of Iran has developed a postpartum program consisting of three stages of care for mother on the days 1-3, 10-15, and 42-60 after the delivery which is offered in all healthcare centers free of charge [9].

The results of studies show that women's awareness of postpartum care is very weak that causes them to show a weak behavior in receiving this essential care, as well. It seems that despite the availability of healthcare services and their usefulness, the rate of utilization is not acceptable [10]. Based on national statistics in 2005, coverage of postpartum care was 67.9% and 16.5% in governmental and private sectors, respectively [11]. Therefore, planning to promote postpartum care in healthcare centers seems to be of great importance.

Health education has been regarded as an approach focusing on the prevention at all levels in developing countries and as a key area to control human diseases [12]. However, the effectiveness of health education programs depends largely on the proper use of theories and models applied in health education [13]. An educational model starts the program in the correct manner and reduces educational intervention ambiguities. Also, it provides a framework for measurement and assessment of the programs, and leads the program to the assessment phase [14]. The health belief model (HBM) is one of the effective models in health education that reveals the relationship between

health beliefs and health behaviors and regards the behavior as a function of knowledge and attitude [15]. This model has been useful in predicting why individuals accept different health behaviors or reject them [16]. The effectiveness of HBM has been reported in different cases such as weight control during pregnancy [17], prevention from tooth decay in pregnant women [18], and prevention from urine infection in pregnant women [19]. Regarding the structure of health belief model and its components, this model seems to be suitable for promoting postpartum care. Therefore, this study was carried out to investigate the effect of educating pregnant women on postpartum care using health belief model.

## Method

This study was an experimental research with pre and posttest design. The statistical population included all pregnant women who referred to healthcare centers in Hamadan, Iran in 2013. Before the educational intervention, the status of postpartum care was evaluated based on HBM in healthcare centers of Hamadan, and based on the obtained results, an educational intervention was designed to promote the current situation. Also, it was revealed that coverage of postpartum care in the east Hamadan is less than that in the other regions of the city; therefore, the east Hamadan was adopted for the research [20]. The sample size was determined based on Mirmolaei et al. study [9] and using the formula for comparing two independent groups by considering the test power=80%,  $\alpha=0.05$ , 9.71, 6.97, and  $d=5$ . Thus, the number of participants in each group was determined as 45. To select the participants, initially 2 out of 6 healthcare centers located in the eastern part of the city were randomly chosen. An inventory of pregnant women was extracted from the office of continuous care of mothers. Regarding the inclusion criteria, 50 mothers from each center were chosen according to the systematic sampling method and invited to participate in the research. Finally, 90

mothers in total announced their agreement to participate in the study. The inclusion criteria included being in 30-34 weeks of pregnancy, lacking physical and psychological problems, and signing the informed consent form. The exclusion criteria included not willing to continue with the study, being absent in more than two sessions, being in the group of high risk pregnant women (bleeding, pre-eclampsia, urine infection, psychological problems, reduced fetal movements, etc.), and being at risk of premature pregnancy.

The data collection tool was a researcher-made questionnaire consisting of 69 questions in three sections: demographic questions section (7 items), knowledge section (29 items), and health belief model questions section (33 items). The knowledge section contained yes/no questions; the score one was allocated to each correct answer and zero to wrong answer. Therefore, a higher score showed the greater knowledge of respondents on postpartum care and complications.

In the section related to HBM components, 7 questions on perceived susceptibility, 5 on perceived severity, 6 on perceived benefits, 7 on perceived barriers, 5 on cues to action, and 3 on self-efficacy were designated. A 6-point Likert scale (including strongly agree, agree, somewhat agree, somewhat disagree, disagree, and strongly disagree) was used to assess the respondents in terms of HBM constructs. Regarding the number of questions of HBM components, the gained score ranged from 7 to 42 for perceived susceptibility and perceived barriers, 5 to 30 for perceived severity and cues to action, 6 to 36 for perceived benefits, and 3 to 18 for self-efficacy. For the sub-scales of perceived susceptibility, perceived severity, and perceived benefits, the higher the score is, the greater the individual's perception about postpartum cares will be. In case of perceived barriers, the higher the score is, the greater barriers the person perceives to do a behavior. Regarding cues to action section, a higher score indicates the stronger sources towards engaging in healthy behaviors. In case of self-efficacy, a higher score shows the individual's

more ability to obey the healthy behavior. The mothers' behavior about postpartum care was assessed two months after the delivery based on the health records. To do this, the number of mothers who received the first, second, and third postpartum care was determined.

To assess the validity of the questionnaire, the content validity method was used. Thus, the questionnaire was confirmed by five specialists in the field of health education. The reliability was assessed by using Cronbach's alpha method on 30 mothers with the same demographic characteristics and the values of 0.77, 0.91, 0.76, 0.74, 0.79, 0.73, and 0.88 were obtained in knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy, respectively. Before performing the educational intervention, the pre-test was carried out on both groups of control and intervention. Then, the educational intervention was administered to the intervention group in two weeks. Four educational sessions of 60 min were held as lecturing, question and answering, and group discussion. The materials and educational content were consistent with the pre-determined objectives based on health belief model. Valid resources from the ministry of health, treatment and medical education were utilized to train mothers on what they must know about postpartum care. They were also provided with the educational content as leaflet at the end of the educational sessions. In addition to education of mothers, to measure the cues to action construct, physicians and health personnel of healthcare centers were trained in one session. As the content of previous sessions was reviewed in the last session, the mothers were asked to bring someone from their family members whom they are intimate with. At the end of the fourth session, the questionnaire was filled out by the participants in the intervention and control groups for the second time. The mothers in the intervention group were contacted in the first week after the delivery to remind them the significance of postpartum

care. The data also were collected from both groups two months after the delivery. It should be mentioned that all the participants signed the informed consent form based on the issues of ethics committee of Hamadan university of medical sciences numbered 16/35/9/397 (21.04.2013). The data analysis was conducted using SPSS-16. The descriptive statistics were used to measure mean and standard deviation of quantitative data. Independent t-test was used to compare the groups in terms of quantitative data and chi-square was used to compare the groups in terms of demographic characteristics and paired t-test to compare data obtained in pre and posttest. The ANOVA with repeated measure was used to compare the means in the

three time intervals. The significance level was considered at  $p < 0.05$ .

### Results

The mean age of the participants in the intervention and control groups was  $25.13 \pm 5.19$  and  $26.15 \pm 5.80$ , respectively. The most frequent education level was high school for the women and secondary school for their partners. 62.2% had monthly income less than 5 million Rials. The majority of mothers were housewives, 60% were experiencing their first pregnancy, and therefore their family size was 2. The findings showed all demographic characteristics were similar in both groups without any significant difference ( $p > 0.05$ ) (Table 1).

**Table 1** Comparison of demographic variables in intervention and control groups

Variables	Intervention group		Control group		p- value*
	N	%	N	%	
Age					
<25	25	55.5	18	40	0.52
25-29	11	24.4	14	31.1	
30-34	6	13.3	9	20	
$\geq 35$	3	6.3	4	8.9	
Education: Mother					
Illiterate or primary school	8	17.8	8	17.8	0.30
Secondary school	10	22.2	11	24.4	
High school	22	48.9	15	33.3	
Academic	5	11.1	11	24.5	
Education: household head					
Illiterate or primary school	12	26.6	8	17.8	0.46
Secondary school	20	44.4	17	37.8	
High school	11	24.4	15	33.3	
Academic	2	4.4	5	11.1	
Household income					
Under 5 million Rials	30	66.7	26	57.7	0.65
5-10 million Rials	12	26.7	16	35.6	
Above 10 million Rials	3	6.6	3	6.7	
Gravidity					
1	28	62.2	26	57.8	0.89
2	12	26.7	14	31.1	
$\geq 3$	5	11.1	5	11.1	

\*Chi-square test

In Table 2, the two groups are compared in terms of knowledge and constructs of HBM.

Before the intervention, the mean scores of knowledge and HBM components including

perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy had no significant differences between the groups based on

independent t-test while immediately after the intervention and two months after the delivery, there was a significant difference between the groups in all the variables ( $p < 0.05$ ) (Table2).

**Table 2** Comparison of mean scores of knowledge and constructs of Health Belief Model in intervention and control groups

Variables	Time	Intervention group	Control group	T-test result
		SD± Mean	SD± Mean	
Knowledge about postpartum cares	Before Intervention	3.95 ± 9.26	3.65± 9.33	p=0.934
	Immediately after intervention	1.67 ± 14.80	3.40 ± 9.29	*p<0.001
	Two months after delivery	1.53 ± 15.04	3.71 ± 9.35	*p<0.001
Knowledge about postpartum complications	Before Intervention	3.22 ± 6.44	3.38 ± 6.06	p=0.589
	Immediately after intervention	1.77 ± 9.62	3.24 ± 6.13	*p< 0.001
	Two months after delivery	1.61 ± 10.07	3.27 ± 6.24	*p< 0.001
Perceived Susceptibility	Before Intervention	6.22 ± 24.78	5.47 ± 24.18	p=0.629
	Immediately after intervention	3.57 ± 32.09	5.20 ± 24.11	*p< 0.001
	Two months after delivery	3.19± 33.11	3.61 ± 25.02	*p< 0.001
Perceived Severity	Before Intervention	5.26 ± 15.29	5.00 ± 15.22	p=0.951
	Immediately after intervention	2.80 ± 22.33	4.85 ± 15.36	*p< 0.001
	Two months after delivery	2.36 ± 23.40	2.70 ± 15.42	*p< 0.001
Perceived Benefits	Before Intervention	6.72 ±19.33	5.81 ± 20.73	p=0.293
	Immediately after intervention	3.43 ± 27.98	4.82 ± 20.78	*p< 0.001
	Two months after delivery	2.78±28.58±	3.85 ± 21.02	*p< 0.001
Perceived Barriers	Before Intervention	4.24 ± 22.89	4.84 ± 23.13	p=0.800
	Immediately after intervention	3.43± 13.78	4.34 ± 22.73	*p< 0.001
	Two months after delivery	2.70 ± 13.60	3.71 ± 22.56	*p< 0.001
Cues to action	Before Intervention	5.96 ± 14.60	4.47 ± 14.06	p=0.618
	Immediately after intervention	2.55 ± 20.11	3.86 ± 13.97	*p< 0.001
	Two months after delivery	2.66± 22.4	3.77± 14.71	*p< 0.001
Self-efficacy	Before Intervention	3.83 ± 9.33	3.02 ± 8.71	p=0.395
	Immediately after intervention	1.42 ± 14.97	2.48 ± 8.64	*p< 0.001
	Two months after delivery	1.58 ± 15.26	1.82 ± 8.26	*p< 0.001

\*Significant at the 0.01 level

In addition, the results of paired t-test showed that in the intervention group, there were significant differences in the scores of variables before and immediately after the educational intervention. Also, two months after the delivery compared to immediately after the intervention, there was a significant difference in the scores of knowledge about postpartum complications, perceived susceptibility, perceived severity, perceived benefits, and cues to action while there was no significant difference in the control group. Analysis of variance with repeated measure showed that there were statistically

significant increments during the intervention in the mean scores of knowledge and constructs of HBM in the intervention group but not in the control group (Table 3). Table 4 shows the comparison of mothers` behavior on postpartum care between the groups. Based on the results, in the intervention group, 86.6%, 93.2%, and 100% of mothers received the first time care, the second time care, and the third time care, respectively, which showed a significant difference from the percentages of the control group (Table 4).



**Table 3** The mean score of HBM constructs of pregnant women about postpartum care in the intervention and control groups at Baseline, Immediately after Intervention, and Two months after Intervention

Variables	Group	F	ANOVA Test Result
Knowledge about postpartum care	Intervention	98.68	*p<0.001
	Control	0.08	p=0.915
Knowledge about postpartum complications	Intervention	64.01	*p<0.001
	Control	1.06	p=0.349
Perceived Susceptibility	Intervention	98.61	*p<0.001
	Control	3.09	p=0.076
Perceived Severity	Intervention	85.68	*p<0.001
	Control	0.13	p=0.762
Perceived Benefits	Intervention	91.15	*p<0.001
	Control	0.16	p=0.770
Perceived Barriers	Intervention	135.5	*p<0.001
	Control	1.11	p=0.313
Cues to action	Intervention	78.47	*p<0.001
	Control	2.07	p=0.135
Self-efficacy	Intervention	107.18	*p<0.001
	Control	1.63	p=0.208

\*Significant at the 0.01 level

**Table 4** Comparison of mothers` behavior related to postpartum care in intervention and control groups

	Intervention group		Control group	
	N	%	N	%
First care	39	86.6	17	37.7
Second care	43	93.3	30	66.6
Third care	45	100	41	91.1
Cochran Test Result	*p<0.001			

\*Significant at the 0.01 level

### Discussion

Based on the obtained results, an educational program based was effective in increasing mothers` behavior in receiving the care after delivery because of a significant difference in the mean scores of knowledge, HBM constructs, and mothers` behavior in the intervention group compared to the control group. This study showed that mothers did not have enough knowledge about postpartum care and associated complications though they were at the third trimester of pregnancy. This can be due to the weak system of information transmission from caregivers to pregnant women and less efficacy of non-systematic educations than model-based educations in healthcare centers. The increase of knowledge score after the educational intervention in this study is consistent with the findings of Karimi et al. in the prevention from brucellosis [12],

Davari et al. in the diet of menopausal women [21], and Gammage et al. in the prevention from osteoporosis [22]. The findings of this study showed that mean score of perceived susceptibility before educational intervention in both groups was at a moderate level so that half of the mothers did not believe that they are prone to postpartum complications. This construct was recognized as a predictor of mothers` behavior for postpartum care in the study of Hazavehei et al. [20]. There was also a significant difference after educational intervention in the mean score of perceived susceptibility between the intervention and control groups. This can be a good evidence of the effect of educational intervention on the promotion of mothers` perceived susceptibility. In other words, the majority of mothers in the intervention group believed

that they may be susceptible to postpartum complications. This finding is consistent with the results obtained on the application of health belief model in increasing pregnant women's perceived susceptibility about prevention from osteoporosis [23]. However, it is not consistent with the findings of the study of Somi et al. [24], which can be attributed to the low duration of educational program to change women's attitude regarding the screening for cervix cancer.

In this study, the promotion of perceived severity after the intervention can be due to the mothers' participation in the educational sessions of common and uncommon complications of postpartum that was held by the healthcare center midwife. Also, the delivery experience of other women was discussed in the sessions to emphasize the severity of complications after delivery. These findings are consistent with those of Mardani et al. in adhering to diabetic diet [25], and shojaezadeh et al. in the prevention of osteoporosis [26].

In case of benefits of postpartum care, the findings of this research showed that before the educational intervention, the mothers' perception of postpartum care was slightly better than the moderate level in both groups. It improved immediately after intervention and 2 months after delivery in the intervention group remarkably. It seems that mothers' attention to the idea that postpartum care can lead to the timely diagnosis of complications and reduction of its consequences, which can be effective in the promotion of perceived benefits. These results are consistent with those of Rahnavard et al. in preventive behaviors of smoking in youth girls [27]. The investigation of Davati on women in Tehran showed that perceived benefits has the strongest relationship with protective behaviors against sun rays [28].

There was an attempt in this study to make the mothers able to have a correct analysis of negative consequences of failing in postpartum care. The significant difference after the educational intervention in perceived barriers between mothers in both groups showed the positive effect of education on remarkable

reduction of perceived barriers. Therefore, it can be said that alleviating the barriers by mothers is necessary as a driving force to increase postpartum care coverage. The studies show that perceived barriers are the strongest tool in predicting health behaviors [15-29]. In Karimi et al. research, an educational program had no significant effect on the examined participants probably due to the effect of sociocultural factors that were out of the researcher's control [30].

In case of cues to action, before the educational intervention, both groups reported healthcare personnel as the best sources of cues to action while educational leaflet and health personnel became the most important sources immediately after the educational intervention. Two months after the delivery, educational leaflet and mothers' physical complications were reported to be the best. It seems that puerperium and postpartum complications caused mothers to pay attention more and more to the educational leaflet. After the educational intervention, there was a significant difference between cues to action scores in both groups that is consistent with the results of Pirzadeh et al. in Pap smear test [31] and also Davari et al. [21]. In Shamsi et al. study, the scores of internal and external cues to action were measured before and after educational intervention in frequency distribution that is different from the method of data presenting in the present study [15,18]. The results of study of Hazavehi et al. are different from those of this study as they held educational sessions for mothers alone and neglected the role of family and partner as the sources of cues to action [29].

In comparison with other studies, this research was effective in increasing perceived self-efficacy of mothers in the intervention group from a moderate level (51.85%) to a high score immediately after the intervention (83.20%) and a higher level two months after delivery (84.81%). This promotion of self-efficacy score in the intervention group is a direct outcome of education on diagnosis skills of postpartum complications and adherence to the

health practice to prevent other complications. The significant difference observed after the educational intervention in self-efficacy score between intervention and control groups is consistent with the findings of Ghafari et al. in reducing the rate of cesarean [32] and Toomy in breast self-examination in women [33].

In case of mothers' behavior, it can be said that increasing mothers' knowledge of the postpartum care and associated complications after delivery and consequently, change of their attitude about probability and severity of inflicting common symptoms of puerperium, the perceived benefits from postpartum care increased and mothers came to this belief that the high cost of treatment in future will be removed if they perform the simple care practices on time. Using cues to action such as health personnel, family members, and educational media like leaflet, the mothers' behavior in the intervention group compared with the control group about postpartum care was significantly different. The greatest difference was between two groups in the rate of receiving the first care (1 to 3 days after the delivery). As the first care has the most significant role in detecting and solving the postpartum complications in early stages, it is more important than the second and third cares. The results of our study were similar to those of Ceber et al. in breast self-examination [34], Abedi et al. in changing life style of menopausal women [35], and Sharifirad et al. in the increase of weight in pregnancy [17]. In Shojaezadeh study, no improvement in the behavior of control group was observed that can be attributed to the effect of socio-economic factors on changing long-term behaviors [26]. The limitations of this research may be related to the self-reporting tool that was used to collect data on mothers' attitude aspects and also limited follow-up of health behavior during a short period of time for postpartum care that had to be investigated in two months.

### Conclusion

The results of this study showed that education based on health belief model increased knowledge and health belief model components

that finally improved the use of health services of postpartum care. It is suggested to increase care coverage and reduce inability and mortality rate of mothers after delivery by educating pregnant women based on health belief model at all healthcare centers.

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### Contribution

Study design: ZL, SMH, BM

Data Collection and analysis: ZL, GHR

Manuscript preparation: ZL, BM

### Conflict of Interest

"The authors declare that they have no competing interests."

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