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Original Article

The Effect of a Training Intervention Based on Self-efficacy and Health Literacy on Pregnancy Outcomes

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Abstract

Background: Prenatal care is the correct implementation of principles that aim to maintain the health of the mother and her baby. The failure to provide effective prenatal care will lead to an increase in premature birth, low birth weight infants, and maternal and infant mortality. Accordingly, this study aimed to investigate the effect of a training intervention based on self-efficacy and health literacy on pregnancy outcomes in pregnant women.

Methods: This interventional study adopted a pre-test and post-test design with a control group. The participants in the study were 49 women who visited Bahrabad Healthcare Center in Mehrestan County and were placed into the intervention group (25 persons) and the control group (24 persons) in 2022. The inclusion criteria were having literacy, not completing any medical education course or programs, and a gestational age of less than 20 weeks. The data in this study were collected using the Health Literacy Scale, the Pregnancy Outcome Questionnaire, and the Sherer's General Self-Efficacy Scale. After administering the pre-test to the participants in both groups, the training intervention was conducted in eight face-to-face sessions for the participants in the intervention group. The data collected in the pre-intervention and post-intervention phases were analyzed using paired samples t-test, independent samples t-test, and analysis of covariance (ANCOVA) at a significance level of $P<0.05$ to assess differences between groups.

Results: The data from this study indicated that the training intervention significantly improved the self-efficacy ($t=-2.466$; $P=0.021$) and health literacy ($t=-2.163$; $P=0.041$) of the participants in the intervention group. The findings also showed a significant difference in pregnancy outcomes between the intervention and control groups ($t=-7.180$; $P<0.001$). These results indicated that the training intervention had a positive impact on participants' pregnancy experiences and outcomes.

Conclusion: This study revealed that training interventions are effective in promoting self-efficacy and health literacy, which in turn lead to improved pregnancy outcomes. The findings also highlighted the importance of incorporating training programs into routine prenatal care to improve maternal and newborn health. Future research should focus on long-term follow-up and examine the impact of different educational strategies on larger populations.

Keywords: Training interventions, Self-efficacy, Health literacy, Pregnancy outcomes

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Introduction

The health of pregnant women, as an important group in the community, has a significant impact on the health of the family and the future generation and is considered an effective factor in community health development (1). Pregnancy is one of the important and sensitive stages of women's lives that has major effects on their physical and mental health. During this period, women face significant physiological and psychological changes that can affect their daily activities and quality of life (2). Although pregnancy is a natural phenomenon and one of the most important experiences in women's lives, it requires special care to maintain the health of the mother and fetus. Accordingly, health literacy is considered one of the key factors in promoting the health of pregnant women. Health literacy refers to the ability of individuals to acquire, process, and understand health information, which enables them to make better decisions about their health (3). Health literacy in pregnant mothers not only helps to increase their awareness of risk factors during

pregnancy but also makes them choose healthier lifestyles and have proper nutrition. Studies have shown that high health literacy in pregnant mothers is associated with a reduced number of low birth weight infants, preterm birth, and neonatal death (4).

Moreover, as an important psychological concept, self-efficacy plays a significant role in health behaviors. This concept refers to an individual's belief in their ability to perform a specific behavior successfully. Self-efficacy can have a positive impact on mothers' ability to cope with the challenges associated with pregnancy and enable them to engage in more effective health behaviors (5). Various studies have addressed the relationship between health literacy, self-efficacy, and pregnancy outcomes. For example, one study showed a significant relationship between neonatal and maternal outcomes during pregnancy and childbirth and the type of care provided during this period, which mainly depends on the understanding and health literacy of pregnant women. This relationship has been observed in cases such as the initiation of first care, the number of maternal visits, compliance with recommendations provided by the health system, and pregnancy outcomes such as cesarean section rates, preterm birth, fetal death, and breastfeeding (1).

Kharazi et al showed that a training intervention based on self-efficacy theory can improve the health literacy level of pregnant mothers, and consequently lead to improved pregnancy outcomes and the birth of normal-weight infants (1). Moreover, Fallah et al showed that education based on the educational needs of mothers, compared to routine childbirth preparation courses, leads to a greater increase in mothers' self-efficacy scores (2).

In addition, Mousavi et al showed that an awareness-raising intervention can improve pregnant women's awareness of the benefits and safety tips of physical activity during pregnancy, as well as improve their self-efficacy to perform physical activity (6). These findings emphasize the importance of using training interventions as an effective tool in improving the health of pregnant mothers.

Another study on the effect of training intervention based on self-efficacy theory on the general health status of women showed that after the intervention, there was a significant negative correlation between general health and self-efficacy and a significant positive correlation between general health and the number of children (1). Moreover, Aslantekin Özçoban et al examined the level of health literacy and self-efficacy of pregnant women in Turkey and showed that the health literacy of pregnant women was average, and those with higher health literacy showed better self-efficacy behavior in the pre-pregnancy period (7). Besides, Gani et al showed a significant correlation between communicative and critical health literacy and self-care management of pregnant women (8). These studies confirm that self-efficacy and health literacy are key factors in promoting health-promoting behaviors during pregnancy and that education based on these two concepts can improve pregnancy outcomes and prevent problems.

The present study seeks to investigate the effect of a training intervention developed based on self-efficacy and health literacy on pregnancy outcomes in pregnant women visiting healthcare centers. The insights from this study can contribute to developing and implementing effective training programs to improve maternal and neonatal health and health policies.

Methods

This interventional study adopted a pre-test and post-test design with a control group. The participants in the study were pregnant women who visited Bahrabad Healthcare Center in Mehrestan County in 2022. The sample size in this study was estimated as 56 women based on the Cochrane's table. Accordingly, of 67 women visiting the mentioned healthcare center, 49 who were willing to participate in the study were assigned to the intervention and control groups. First, a list of all pregnant women visiting this center was prepared and the women were coded. Then, the assigned codes were randomly divided into two groups, and 25 women were assigned to the intervention group and 24 women to the control group. The participants in the intervention group attended the intervention program, but the participants in the control group only received routine care in the healthcare center. The participants in both groups completed the pre-test and post-test.

The content of the training sessions that focused on self-efficacy and health literacy on pregnancy outcomes was reviewed and approved by experts in health education, medical education, nursing, community-oriented education, and reproductive health. The training program was conducted in eight 60-minute face-to-face sessions (2 sessions per week) through lectures, educational videos, group discussions, and pamphlets. Two months after the completion of the intervention, the questionnaires were completed again by the participants in both groups to examine the retention effect of the training program. The content of the training sessions focused on pregnancy health, recognizing risk factors during pregnancy, reducing stress, proper nutrition during pregnancy, and self-care during pregnancy.

The data in this study were collected using the Health Literacy Scale (10), the Pregnancy Outcome Questionnaire (10), and Sherer's General Self-Efficacy Scale:

A. *Health Literacy Scale:* The scale has 14 items scored based on a four-point scale (strongly agree, agree, disagree, and strongly disagree). Kharrazi et al confirmed the content validity of the scale using factor analysis and it could explain 54.8% of the variances in health literacy. The reliability of the scale was also

confirmed with Cronbach's alpha of 0.87, indicating the acceptable validity and reliability of this tool (9).

B. *Pregnancy Outcome Questionnaire:* The questionnaire contains 12 items scored on a four-point scale (strongly agree, agree, disagree, and strongly disagree). The items measure the mother's ability and understanding of the initiation of the first care, the number of prenatal care, recognition of pregnancy risk factors, adherence to a proper diet, following a healthy lifestyle during pregnancy, and the birth of an infant with an optimal weight. Kharrazi et al assessed and confirmed the content validity of the questionnaire using factor analysis and the items in the questionnaire accounted for 51.5% of the variances in pregnancy outcomes. The reliability of the questionnaire was also confirmed with Cronbach's alpha coefficient of 0.67. Overall, the findings demonstrated the acceptable validity and reliability of the questionnaire. The total scores from the Health Literacy Scale and the Pregnancy Outcome Questionnaire range from 14 to 70 and 12 to 60, respectively. Higher scores indicate greater health literacy and better pregnancy outcomes (9).

C. *Sherer's (1982) General Self-Efficacy Scale:* The scale contains 17 items developed based on a five-point Likert scale (strongly disagree, somewhat disagree, undecided, somewhat agree, and strongly agree). Items 1, 3, 8, 9, 13, and 15 are scored as 5 = strongly disagree, 4 = somewhat disagree, 3 = undecided, 2 = somewhat agree, and 1 = strongly agree. The remaining items are scored in reverse. The minimum score on this scale is 17 and the maximum score is 85. A high score indicates a high sense of self-efficacy. The reliability of the scale was assessed by Soliemanifar and Shabani and confirmed with Cronbach's alpha coefficient of 0.77 (10).

The data in this study were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics including the paired samples t-test, independent samples t-test, and analysis of covariance (ANCOVA). Statistical procedures were performed with SPSS-22 software at a significance level of $P < 0.05$.

Results

Table 1 shows the distribution of the participants in the two groups by age and education. As can be seen, a majority of the participants (45.8%) in the control group were 15-24 years old, while a majority of the participants (68.0%) in the intervention group were 25-34 years old. In addition, the distribution of the participants based on education indicated that a majority of the participants in both the control (50.0%) and intervention groups (40.0%) had a diploma, confirming that a significant portion of the participants had secondary education and a small number of participants in both groups had higher education.

Table 2 shows the results of the paired samples t-test to examine the differences in the mean scores of self-efficacy and health literacy in the control and intervention groups before and after the training intervention. As shown, the mean score of self-efficacy for the participants in the intervention group increased significantly after the training intervention (t = -2.466; $P = 0.021$). However, there was no significant difference between the mean scores of self-efficacy for the participants in the control group before and after the intervention (t = -0.125; $P = 0.954$) (Table 2):

The data in the table above indicate that the mean health literacy score for the participants in the intervention group increased significantly after the training intervention (t = -2.163; $P = 0.041$), but no significant difference was observed in the control group (t = 1.625; $P = 0.341$) (Table 2).

The ANCOVA was used to examine the effect of the training intervention on the participants' self-efficacy and health literacy. The findings showed the significant effect of the training intervention on the participants' self-efficacy. The data also indicated that the training intervention had a significant effect on the participants' health literacy (F = 13.676; $P = 0.001$).

The independent samples t-test was run to examine the differences in the mean scores of pregnancy outcomes in the intervention and control groups after the intervention. The data in Table 3 show a significant difference between the mean scores of pregnancy outcomes in the intervention group and the control group after the training intervention

Table 1. The demographic characteristics of the pregnant women in the two groups

Variable	Categories	Intervention group	Control group
Education	Primary school	3 (12.0%)	5 (20.8%)
	Middle school	5 (20.0%)	4 (16.7%)
	Diploma	10 (40.0%)	12 (50.0%)
	Associate's degree	1 (4.0%)	1 (4.2%)
	Bachelor's degree	6 (24.0%)	2 (8.3%)
Age group (year)	15-24	5 (20.0%)	11 (45.8%)
	25-34	17 (68.0%)	10 (41.7%)
	35-44	3 (12.0%)	3 (12.5%)

Table 2. The impact of the training intervention on self-efficacy and health literacy of the participants in the control and intervention groups before and after the intervention

Variable	Groups	Pre-intervention	Post-intervention	*P* value
Self-efficacy	Intervention	61.60 ± 7.93	68.04 ± 8.034	0.021
	Control	57.96 ± 6.617	58.08 ± 6.807	0.954
	P value	0.047	0.000	
Health literacy	Intervention	57.96 ± 10.577	63.56 ± 6.820	0.041
	Control	58.17 ± 6.995	56.54 ± 6.331	0.341
	P value	0.732	0.001	

Table 3. The impact of the training intervention on pregnancy outcomes in the two groups after the intervention

Variable	Groups	Stage	Frequency	Mean	SD	df	t	Sig.
Pregnancy outcomes	Control	Post-intervention	24	44.38	3.716	47	-7.180	0.000
	Intervention	Post-intervention	25	51.92	3.639			

(t = -7.180; $P = 0.000$).

Discussion

The findings from the present study showed that the training intervention based on self-efficacy and health literacy significantly increased the self-efficacy and health literacy scores for pregnant women in the intervention group compared to the control group. Likewise, Kharazi et al showed that training interventions based on self-efficacy can help promote health and positive pregnancy outcomes (1). Moreover, Fallah et al and Mousavi et al found that training based on the educational needs of pregnant mothers increases their self-confidence and self-efficacy (2,6).

Studies have shown that self-efficacy beliefs play a decisive role in the amount of time and effort an individual spends on performing their tasks. These beliefs also affect an individual's persistence in the face of difficulties and flexibility in different situations. Self-efficacy as a personal factor influences the management of activities and coping styles with stress, and ultimately leads to improved pregnancy outcomes such as the mother's ability and understanding of when to initiate, how to receive, and the number of prenatal care sessions, recognizing pregnancy risk factors, maintaining a proper diet, and maintaining a healthy lifestyle during pregnancy, which leads to the birth of a baby with a desirable weight (11). These findings also indicated that since prenatal education is a dynamic process that increases the mother's information and awareness about pregnancy, childbirth, and child care, training interventions can significantly improve these outcomes in the intervention group. The training intervention led to reduced medication use during labor and delivery, decreased maternal pain, reduced stress, and increased maternal comfort, and ultimately helped the mother have an enjoyable childbirth experience (2).

The present study showed that the training intervention significantly increased the mean health literacy score in the intervention group. In the same way, Aslantekin Özçoban et al pointed to a direct relationship between the level of health literacy and care behaviors of pregnant women and showed that improving health literacy not only increases health awareness and information but can also lead to better decision-making and more preventive behaviors during pregnancy (7). This is to argue that women's health and their perception of health information, especially during pregnancy, have a direct impact on children's health. Women's education is of vital importance for promoting the health of children and families and is one of the fundamental factors in changing unhealthy behaviors. Thus, women are known as a key population for increasing health literacy (12), and with proper education and regular educational programs, measuring their knowledge and attitudes can be used as an important factor in preventing diseases and promoting community health (13). In the healthcare system, improving health literacy through education can be effective in making correct decisions on healthcare, nutrition, and lifestyle and help neonatal health.

The data in this study also indicated that there was a significant difference between the intervention and control groups in terms of pregnancy outcomes after implementing the training intervention. Similarly, Gani et al showed that comprehensive and practical educational programs during pregnancy can be effective in improving pregnancy outcomes, decreasing preterm birth rates, and reducing neonatal mortality (8). Similarly, Mousavi et al. showed that proper and planned education can improve the self-efficacy level of pregnant women and have a positive effect on maternal and neonatal health (6).

The findings of this study indicated that most participants in both intervention and control groups had a high school diploma, and all mothers were in the young age category. Accordingly, some studies have shown that the education and age of pregnant mothers can affect the level of self-efficacy and acceptance of health education. Similar studies have shown that women with higher levels of education are more likely to understand and implement health recommendations, which can help improve pregnancy outcomes (8,14-18).

To create a positive attitude towards natural childbirth and reduce its fear, comprehensive educational programs should be designed and incorporated into routine prenatal care (14). Effective education can significantly affect pregnancy outcomes, increase maternal and newborn health, and improve the quality of the birth experience. Accordingly, given the positive impact of training interventions on health literacy and self-efficacy, such interventions should be included as comprehensive and continuous programs in specialized pregnancy health centers, so that pregnant mothers can receive up-to-date and useful information at every stage of pregnancy.

Furthermore, creating educational videos, mobile apps, and online platforms to transfer information to pregnant mothers can have a significant impact on increasing mothers' access to useful information and raising their awareness. These tools are particularly useful for working mothers or those living in remote areas and can facilitate

their learning. Organizing practical workshops on self-efficacy and pregnancy-related skills (such as prenatal and postpartum care) can increase the understanding and acceptance of health information and encourage mothers to actively participate in their pregnancy care. Husbands and other family members can also attend pregnancy education programs, as family support can help improve pregnancy outcomes and encourage mothers to implement health recommendations.

Finally, the present study indicated that pregnant mothers' education and age can affect the acceptance and understanding of education. Thus, training programs need to be developed with simpler language and more interactive methods for mothers with lower education or older age.

Limitations

The present study was conducted with some limitations such as difficulty selecting the participants and the ineffective cooperation of some participants in answering the items in the questionnaires. To cope with these problems, the researchers tried to recruit interested and volunteer individuals to participate in the study. Besides, problems in access to educational technologies and limited time for holding the training may have limited the positive effects of the intervention. Information exchange among the participants in the intervention and control groups may also have affected the findings.

Given the limitations of this study, future studies need to conduct similar interventions for larger populations and with longitudinal designs to enable long-term follow-up of results. Moreover, the use of diverse and attractive training techniques such as videos and practical workshops can help increase the engagement and interest of participants in such studies.

Conclusion

The findings from the present study suggested that training interventions based on self-efficacy and health literacy can play an effective role in improving the health of pregnant mothers. Thus, such interventions need to be incorporated into routine pregnancy care programs. This study also highlighted the need to pay attention to the educational needs of mothers and the development of regular and comprehensive educational programs to enhance the quality of life and health of pregnant women. Accordingly, to increase the effectiveness of training interventions, especially during pregnancy, holding continuous and long-term training courses is essential to improve women's knowledge and self-efficacy. Furthermore, developing a specific clinical guide with practical training images can help increase women's awareness of pregnancy, lead to better recognition of pregnancy symptoms, improve their self-efficacy and health literacy, and enhance pregnancy outcomes. The use of modern technologies and attractive educational videos, promoting the engagement of husbands and family members, and focusing on vulnerable groups can help health policymakers and planners improve the quality of pregnancy education programs and promote maternal and newborn health.

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Authors' Contribution

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Competing Interests

None of the authors of this study, individuals, or institutions have any conflict of interest for the publication of this article.

Ethical Approval

To comply with ethical protocols in this study, the questionnaires were filled out anonymously. All responses were reviewed confidentially. The participants also signed a written informed consent form. Sufficient information was provided to the participants in understandable language about the aims and instruments of the study. The sampling procedure was carried out based on a permit by the Ethics Committee of Kerman University of Medical Sciences and the approval of the research project with the Code of Ethics IR.KMU.REC.1401.499.

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