

The Effect of Health Literacy and Self-Efficacy Intervention on Nutrition of Pregnant Mothers and Infant Weight

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ABSTRACT

Background and Objectives: Maternal health literacy during pregnancy is essential in maintaining health of themselves and their children. The aim of this study was to determine the effects of a maternal education intervention based on the self-efficacy theory and health literacy on birth weight.

Materials and Methods: This clinical trial study was performed on 76 pregnant mothers, referred to Mashhad University of Medical Sciences health centers, Mashhad, Iran for routine prenatal checkups in 2016. The participants were assigned to two groups based on multistage cluster sampling method. Study questionnaires included demographic, maternal health literacy, pregnancy outcome and perceived dietary self-efficacy questionnaires. Educational intervention including oral presentation, group discussion and multimedia tutorials. The questionnaires were completed at baseline, after intervention and at three months of follow up.

Results: The mean age of mothers was 24.92 ± 4.84 years (23.92 ± 4.59 and 25.92 ± 4.94 years in intervention and control groups respectively). There was no significant difference between the intervention and control groups in terms of age, maternal health literacy and self-efficacy at baseline. Intervention resulted in significant improvement in health literacy ($p < 0.001$) and nutrition self-efficacy ($p < 0.001$) in the intervention group compared to control group. The mean birth weight of children was significantly higher in the intervention group (3324.14 ± 416.12 g) compared to the control group (3007.73 ± 468.63 g) ($p = 0.003$).

Conclusion: The present findings indicate the effectiveness of the designed educational intervention based on self-efficacy theory in improving maternal health literacy and promoting normal birth weight in newborns.

Paper Type: Research Article

Keywords: Maternal Health Literacy, Self-Efficacy, Pregnancy Outcomes, Low Birth Weight.

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Introduction

Based on the definition by the World Health Organization, low birth weight refers to weight at birth below 2500 g(1). Birth weight has a significant impact on the incidence of neonatal morbidity and mortality, long-term health, and weight in adulthood(2). Birth weight can be influenced by various factors including maternal nutrition, socio-economic and demographic status, fetal and maternal diseases, genetic factors, poor prenatal care, body mass index (BMI), and weight gain during pregnancy (3). In general, low birth weight is considered a serious challenge in maternal and neonatal health in developed and developing countries. According to statistics, mortality rates in infants weighing less than 2500 g and 1500 g is 40 and 200 times higher than those born with a weight of more than 2500 g, respectively(4).

The prevalence of low birth weight is higher in Asian countries compared to other parts of the world, which is mainly due to maternal malnutrition before and during pregnancy(5). Health literacy is the capacity of individuals to obtain process and understand basic health information and services needed to make healthy decisions (6). Health literacy is a social component of health (7).

Health literacy represents a set of social and cognitive skills including reading, listening, analyzing, and decision-making, as well as the ability to apply these skills in different health situations; this phenomenon is not necessarily related to the individual's educational level or basic reading skills(8). Health literacy represents cognitive and social skills, which promote one's motivation and capacity for understanding and using health information with the purpose of health maintenance and promotion. With the improvement of people's access to health information and their capacity to use it effectively,

health literacy becomes a necessary factor in the process of empowerment(9). Health literacy can absolutely influence women's pregnancy outcomes. Mother's understanding of the associated risks for pregnancy complications could influence her inclination to follow prenatal care recommendations(10).

The concept of maternal health literacy, as a cognitive and social skill, indicates the motivation and ability of women to obtain appropriate access and understanding and use health information to promote and protect their own and their children's health(11) .

Non-print media are one of the effective ways of delivering health messages to those who have little practical knowledge. These media may include images and radio tapes, videotapes, or interactive computer programs. Even those patients who could easily read prefer non-print materials such as comics, video tapes, audio tapes, or multimedia presentations ((12).

Mothers with low health literacy levels seem to have fewer prenatal visits and receive prenatal care with delay. Consequently, the newborns are at a greater risk of low birth weight and are more frequently hospitalized in neonatal intensive care units(13). Ratzan considered high health literacy to be effective in reducing the prevalence of premature birth(14). In addition, risk of infant's low birth weight is twice as high in women with low health literacy, compared to other women. Apparently, promotion of maternal health literacy is a key factor in the management of low birth weight in newborns (15). Health literacy in pregnant mothers is special knowledge and special social skills to diagnose pregnancy risk symptoms, healthy lifestyle and proper nutrition during pregnancy, and is effective on pregnancy outcome through improving the quality of prenatal care. So that mothers with

high health literacy had less infants with low birth weight, early birth and neonatal death(16).

The American Congress of Obstetricians and Gynecologists (ACOG) has proposed dietary guidelines for mothers during pregnancy and has highlighted the importance of food intake during pregnancy as a major source of nutrients for the fetus. These guidelines advise pregnant women to adhere to a proper nutritional plan in order to ensure adequate intake of nutrients, iron, and folic acid supplements and prevent the use of foods which should be avoided during this period(17). If the mother does not enjoy a proper nutrition during pregnancy, the adverse effects can be irreversible on the fetus(18). Mother's dietary habits affect not only the health of the mother but also the fetus. In fact, nutritional habits affect the mother's weight gain during pregnancy, as well as pregnancy outcomes. Inadequate intake of nutrients and supplements during pregnancy leads to malfunctions such as low birth weight and delayed physical and mental development of the fetus(19).

Pregnant women in their third trimester of pregnancy should have more frequent meals with smaller portions. This diet will prevent feeling of fullness during this period and will have a positive impact on the fetus and newborn(17). Through understanding pregnant women's nutritional status and dietary self-efficacy, we can change their dietary behaviors in favor of maternal and child health. Neonatal weight could be influenced by various factors such as nutrition, social and economic conditions, mother's demographic characteristics, maternal and fetal diseases, genetic factors, poor prenatal care, maternal body mass index, and weight gain during pregnancy(20). Therefore, although it is essential to train the needed topics and to provide knowledge in pregnancy, but what is important is the level of understanding and the

ability to use this information in the cases of necessity and risk. Therefore, comprehensive efforts to increase maternal health literacy is needed(21).

One of the most renowned theories which are employed on how to anticipate and explain the behavior of a person is the self-efficacy theory, which could be used for changing behaviors. Bandura defined self-efficacy as one's belief in one's ability to accomplish a specific task(22). Self-efficacy involves assessing one's ability to cope with stressful situations and to perform essential behaviors(23). This concept is employed in healthcare research and etiological study of health and diseases. In general, self-efficacy is regarded as a major predictor of behavioral changes in the management of nutritional habits, smoking cessation, and weight control. Self-efficacy is a fundamental concept in Bandura's socio-cognitive theory and represents a person's confidence in adopting a certain behavior(24). Experimental evidence obtained from previous studies supports the relationship between self-efficacy and development and maintenance of healthy behaviors. Therefore, self-efficacy can be used as a tool in health promotion and patient education and can help improve adherence to different treatment regimens(22). Through understanding pregnant mothers' nutritional status and dietary self-efficacy, we can change their dietary habits in favor of both the mother and the infant. By raising the awareness of pregnant women, nutritional anemia can be reduced during pregnancy with a healthy diet(19). Consequently, investigation and identification of predictors of healthy behaviors in women of childbearing age can be a step towards the improvement of maternal health and pregnancy outcomes. According to the results in some studies, design and implementation of educational interventions based on self-efficacy and health

literacy of pregnant women can increase exclusive breastfeeding(25).

With this background in mind, in this study, we aimed to assess the effects of an educational program based on self-efficacy theory on health literacy and birth weight of pregnant women, referred to healthcare centers of Mashhad, Iran in 2015. What distinguishes the present study from previous research on the improvement of birth weight in Iran is the education of mothers through health literacy strategies and self-efficacy theory. In order to improve mothers' nutritional self-efficacy, four sources of Bandura self-efficacy, including success in performance, succession experiences, verbal encouragement and emotional and physiological arousal, were used in training sessions. Also, in this intervention, by using health literacy strategies in the field of communication, verbal, written and supportive communication, an attempt was made to improve the level of health literacy of pregnant mothers in nutrition during pregnancy. Also, in this intervention the level of health literacy of pregnant mothers in nutrition during pregnancy were improve through health literacy strategies in the field of communication, verbal communication, written and supportive. It is hoped that the present results can help healthcare planners and authorities improve maternal and neonatal health and increase maternal health literacy.

Materials and Methods

This clinical trial was performed on pregnant women, who resided in Mashhad and referred to healthcare centers affiliated to Mashhad University of Medical Sciences. Mashhad is the second most populous city in Iran and the capital of Khorasan Razavi Province. It is located in the northeast of the country, close to the borders of Turkmenistan and Afghanistan. The study

population consisted of 38 women who were classified into intervention and control groups (figure1). The sample size was determined based on a similar study (26) with 95% confidence interval and 80% power.

Sampling was performed in several steps. For determining samples for experimental and control groups in order to implement the educational intervention, at the first stage two health centers from 5 health centers in Mashhad city were chosen as the experimental group and two centers were considered as the control group. The health centers number one, three, Samen and five were randomly selected. The health centers number one and three, were randomly selected as the intervention group and the health centers number five and Samen were randomly selected as the control group. Four health centers were randomly selected from each one (a total of 16 health centers were surveyed). These centers were geographically at a fixed distance from each other so there was no possibility of contact with other participants. Then four health centers, which were randomly selected in the first stage, were visited and the eligible mothers were identified and were invited to participate in the study. Subjects were randomly selected among the eligible mothers based on inclusion/exclusion criteria. Eligible mothers were approached through phone call and were asked to refer to their health center for completing the questionnaires in case they were willing to participate in the study.

At the beginning of data collection, the researcher explained the purpose and the procedures of the study, and were asked to sign a consent form. Then the researcher completed the questionnaires in the form of structured interviews (within 45-30 minutes per mother) for volunteer mothers.

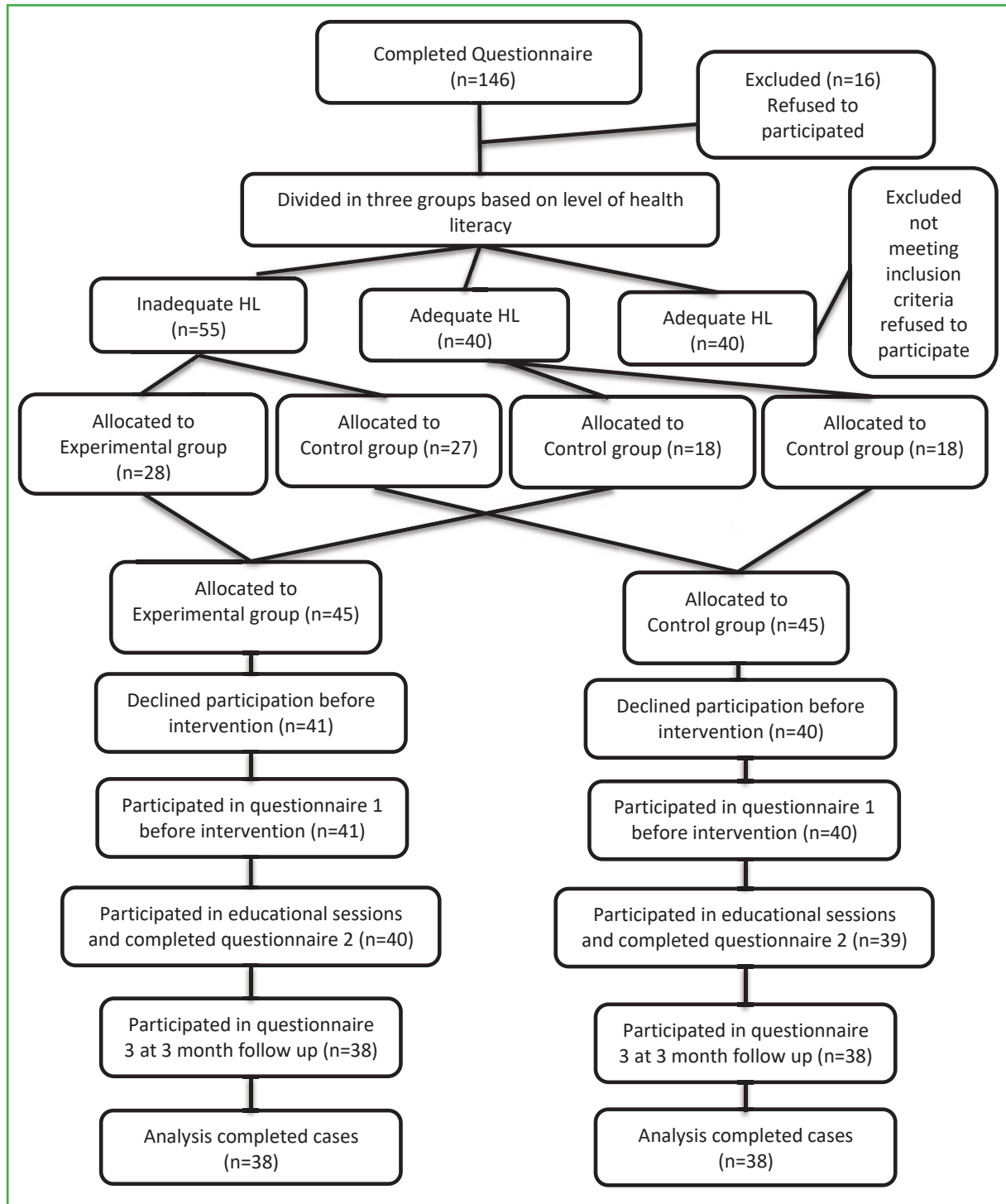


Figure1: Flow chart of the study

The inclusion criteria were as follows: 1) willingness to participate in the study; 2) no prior education in medical sciences; 3) gestational age more than 20 weeks; and 4) lack of chronic diseases or risk of serious pregnancy

complications. Mothers were excluded if they were not able to read or write or have mental disorders that prevent them from comprehension of the questions and providing reliable answers. Then, according to the guidelines obtained in

the initial descriptive study, the experimental group training program was developed over a period of one month.

Training Method is the way through which training for individual or target group is provided (Shojaei-Zadeh et al., 2009). In this study, considering the characteristics of pregnant women as the target group and the objectives of the training program, different methods of oral, written and a combination of the methods were prepared and presented to the intervention group. The methods included presentations with question and answers, brainstorming, group discussions, practical demonstrations, role playing and providing educational media including pamphlets, posters, leaflets and digital versatile disc (DVD) tutorials as training packages for trainees. Among the various factors that affect the selection of media in training programs are training objectives and characteristics of the learners in terms of age and level of literacy. The educational intervention for the intervention group was done based on four sources of information provided by Bandura and health literacy strategies during three training sessions. According to the characteristics of the target group, pregnant women, and the objectives of the educational program, different oral, written and combined methods and various media have been used for education, such as lectures with questions and answers, brainstorming, group discussions, practical demonstrations and role-playing and educational media such as educational booklets, posters and educational CDs in the form of educational packages. It was prepared and presented for learners for independent study.

Edgar Dale's Cone of Experience shows that for younger learners it is better to use educational media at the bottom of the cone and for older and less educated people Audio and visual Media and media that are placed on top of the

pyramid should be used (Berahmandpour and Ardestani, 2012). In this program, depending on the age of participants, level of literacy, and the objectives of the training program, a part of which was set in the emotional domain, audio and visual media including PowerPoint presentation and educational DVDs were used. Moreover, for providing educational content related to cognition, pamphlets, fact sheets, boards, and posters were used. In this study, with regard to educational purposes, for presentation of images data projector was used. The use of this educational device provided the possibility of strengthening the visual and audio senses simultaneously, and as a result, providing a better learning opportunity.

For the purpose of evaluation of educational interventions, study questionnaires were filled at the beginning of the study and three months after the commencement of the intervention (follow up stage). Questionnaires were completed as structured interviews with the participants. Then the results were collected by the researcher using statistical software and descriptive and analytical tests, based on variables. Moreover, during the training the control group did not receive any special training regarding self-efficacy and health literacy. Maternal health literacy with questionnaire and birth weight was examined. Data obtained from the completed questionnaires were entered into the statistical package for social sciences (SPSS) software version 22 (IBM Inc., Chicago, IL, USA). The impact of educational programs in the period immediately after training and three months after the intervention through post-test and completion of the questionnaires on both groups were analyzed and compared using descriptive statistics (mean, standard deviation, and frequency) and analytical statistical tests (t-test, Chi-square, one-way analysis of variance (ANOVA), and repeated measures ANOVA).

Data collection tools

1. Maternal Health Literacy and Pregnancy Outcome Questionnaire (MHLAPQ) (27) was used to assess maternal health literacy. This questionnaire consists of 33 items measuring demographic variables, level of maternal health literacy, healthy pregnancy and pregnancy outcomes. Every mother responded to the items based on a 4-point Likert scale ranging from strongly agree, agree, disagree, and strongly disagree. Validity and reliability of this questionnaire have been previously confirmed by the researchers. The Cronbach's alpha coefficient of the maternal health literacy section was 0.89 and that of its subscales were 0.66 and 0.87. The Cronbach's alpha coefficient of the pregnancy outcome section and its subscales was 0.67, and 0.69 and 0.72, respectively. Varimax rotation indicated two factors in the maternal health literacy and pregnancy outcome sections that in total explained 54.82% and 51.09% of the variance observed, respectively. The confirmatory factor analysis, based on the two-factor model obtained in the exploratory factor analysis, represented an acceptable fit to the obtained data(28). Pregnancy Outcome were assessed using a pregnancy outcome questionnaire and birth weight.

2. Demographic Characteristics and Pregnancy History Questionnaire (DCPHQ) that consists of 22 items, including demographic characteristics (11 items) and information about current pregnancy (11 items). The required information included the mother's age, religion, education, occupational, family income. Pregnancy information including last menstrual period, gestational age, common problems, planned or unplanned pregnancy (Chunuan and Rani Shom, 2010).

3. In the present study, Perceived Dietary Self-Efficacy Questionnaire (PDSEQ) was used to determine the level of pregnant women's

understanding of nutritional self-efficacy. This questionnaire consists of 20 items, including quality of diet (10 items), supplementary diet (6 items), and avoiding diet (4 items). Quality of diet refers to a balanced and normal diet, which ensures adequate growth and good nourishment for the health of the fetus and pregnant woman. Supplementary diet involves different kinds of additional diet items such as iron, folic acid, and multi-vitamin supplements. Also, avoiding diet refers to foods which are harmful to both the mother and the child. PDSEQ was used in a study by Ela Rani Shom in 2010, and its internal consistency was confirmed by calculating Cronbach's alpha coefficient (0.83%) (Chunuan and Rani Shom, 2010). Scoring scale in nutritional self-efficacy Questionnaire was from 1 to 5 as follow: 1=strongly disagree, 2=disagree, somewhat agree, 4 = agree, 5 = strongly agree. Higher scores indicated higher levels of each variable. Total score ranged from 1-5. The range of score was divided into three levels by using Keiss's cut off points: 1.00-2.33= low, 2.34 - 3.67= moderate and 3.68 – 5.00= high.

Statistical analysis

Data obtained from the completed questionnaires were entered into the statistical package for social sciences (SPSS) software. The impact of educational programs in the period immediately after training and three months after the intervention through post-test and completion of the questionnaires on both groups were analyzed and compared using descriptive statistics (mean, standard deviation, and frequency) and analytical statistical tests including t-test, Chi-square, one-way analysis of variance (ANOVA), and repeated measures ANOVA).

As MHLAPQ and PDSEQ have been never applied in Iran, they were translated into Persian and then were back-translated. Qualitative and quantitative face validity and Content validity were

evaluated. The Farsi version was evaluated using a random sample of 113 pregnant women referring to health care centers in Mashhad. To determine reliability, a test-retest administration with a two-week interval was used and to examine the internal consistency, Cronbach's alpha coefficient was calculated. Confirmatory and exploratory factor analyses were employed to determine the construct validity of the questionnaires.

The alpha reliability coefficient for Maternal Health Literacy Questionnaire was 0.89 and for the subscales were 0.66 and 0.87 and for Perceived Dietary Self-Efficacy Questionnaire was 0.90 and for the subscales were 0.84, 0.83 and 0.77. The exploratory factor analysis of the Maternal Health Literacy Questionnaire revealed that 14 items were loaded indicating a two-factor and Perceived Dietary Self-Efficacy Questionnaire 20 items were loaded indicating a three-factor, that jointly explained %54.82 and %63.57 of variance observed. Test-retest results showed stability for both of the questionnaires as well as for the

subscales. The confirmatory factor analysis related to two and three-factor model represented an acceptable fit. Finally, the obtained data analyzed by SPSS software were analyzed.

Results

The mean age of pregnant women was 24.92 ± 4.84 years. The mean age of pregnant women in the intervention and control groups were evaluated 23.92 ± 4.59 and 25.92 ± 4.94 years in the present study. There was no significant difference between groups in terms of age, $t=-1.83$, $p=0.07$. The difference between the two groups in terms of education, occupational status, gravida, and abortion history was not statistically significant. The mean age of pregnant women in the intervention and control groups was evaluated 23.92 and 25.92 in the present study. The difference between the two groups in terms of age, education, occupational status, gravidity, and abortion history was not statistically significant (Table 1).

Table 1. Demographic characteristics in intervention and control groups

Variable		Intervention n (%)	Control n (%)	χ^2	p
Education	Elementary	7 (18.4)	12 (31.6)	2.04	0.56
	Junior high school	14 (36.8)	11 (28.9)		
	High school diploma	15 (39.5)	14 (36.8)		
	College educated	2 (5.3)	1 (2.6)		
Occupation	Housewife	38 (100.0)	37 (97.4)	1.01	0.31
	Employed	0 (0.0)	1 (2.6)		
Gravida	1	19 (50.0)	12 (31.6)	3.38	0.18
	2	14 (36.8)	16 (42.1)		
	≥ 3	5 (13.2)	10 (26.3)		
Abortion history	Yes	6 (15.8)	7 (18.4)	1.35	0.51
	No	32 (84.2)	31 (81.6)		

Comparison of health literacy and nutrition self-efficacy scores between baseline, after intervention and after follow up are shown in Table 2.

Based on the results of table two, given the mean scores of self-efficacies, pre- and post-intervention and the follow-up period, the mean difference before and after the intervention in the experimental group (8.342) was statistically significant ($P < 0.001$). Moreover, mean differences between pre-intervention and follow up period (10.0) was significant ($P < 0.001$). The mean difference after the intervention and follow up period (1.658) was also significant ($P = 0.011$). On the other hand, no significant difference was observed in the control group between different stages of evaluation, and no major changes were reported.

In order to compare the two groups during intervention training, by employing T test-independent mean scores of self-efficacies in two groups were analyzed. The results showed that at the beginning of intervention no significant differences ($P = 0.071$) between two group in terms of mean scores were observed, but after the intervention ($P = 0.017$) (5.13) and follow up (6.95) ($P = 0.001$) there was significant difference in mean scores of self-efficacies.

Table 2. Comparison of mean and standard deviation of nutritional self-efficacy between case and control groups, before, after intervention and follow-up course

Variable	Intervention Mean±SD	Control Mean±SD	Test result
Baseline	75.07±10.01	79.28±10.14	t=1.832 P=0.071
End of intervention	83.39±8.38	78.26±9.79	t=2.453 P=0.017
Follow-up	85.05±8.38	78.10±9.63	t=3.353 p≤0.001
Test result	F=46±481 p≤0.001	F=3.055 P=0.053	

As the findings revealed, a significant difference was observed in the mean scores of maternal

health literacy in the intervention group (6.974) between the baseline and post-intervention stage ($P < 0.001$). Moreover, a significant difference was found between the baseline and follow-up scores (8.579) ($P < 0.001$). In addition, the difference between the post-intervention and follow-up (1.605) scores was significant in this group ($P = 0.001$).

In regard to the mean scores for maternal health literacy, in the prior periods after intervention and the follow-up stage, mean difference before and after the intervention in the experimental group (6.974) was statistically significant ($P < 0.001$). Moreover, mean difference between pre-intervention and follow-up phase (8.579) was significant ($P < 0.001$). The mean difference after the intervention and follow up period (1.605) was significant ($P = 0.001$).

Based on the findings, the difference between various stages of the study was not significant in the control group and no major changes were reported. In order to compare the two groups during the intervention by using independent t-test, maternal health literacy mean scores in both groups were examined. But in the next stage after the intervention (6.55) ($P < 0.001$) and follow-up (8.21) ($P < 0.001$) There was no significant difference in maternal health literacy scores (Table 3).

Table 3. Comparison of mean and standard deviation of maternal health literacy between case and control groups, before, after intervention and follow-up course

Variable	Intervention Mean±SD	Control Mean±SD	Test result
Baseline	38.79±6.45	39.47±6.71	t=0.453 P=0.652
End of intervention	45.76±5.29	39.21±7.03	t=4.589 P≤0.001
Follow-up	47.36±5.40	39.16±7.07	t=5.711 p≤0.001
Test result	F=112.105 p≤0.001	F=1.495 P=0.231	

Independent t-test results showed no significant difference between the intervention and control groups in terms of birth weight ($P=0.013$).

Table 4. Comparison of mean and standard deviation of maternal health literacy and birth weight in follow-up course

Variable	Intervention Mean \pm SD	Control Mean \pm SD	Test result
Birth weight	3284 \pm 479	3007 \pm 492	t=2.549 P=0.013
Maternal health literacy	47.36 \pm 5.40	39.16 \pm 7.07	t=5.711 p \leq 0.001

The frequency of low birth weight (birth weight < 2500 gr) in the intervention and control groups was 2.6% and 5.3%, respectively. The mean and standard deviation of infant's birth weight in the control and intervention groups were 3007 \pm 4929 and 3284 \pm 479, respectively (Table4). The mean birth weight of children in the intervention group was 3324.14 \pm 416.12 g which was significantly higher than the birth weight of children in the control group (3007.73 \pm 468.63 g) t=3.10, p=0.003.

Discussion

The objective of this study was to investigate the effect of training based on self-efficacy theory on health literacy of pregnant women and birth weight. The results indicated that the level of health literacy in the intervention stage and at the follow-up significantly increased from its baseline level in the intervention group compared to the control group. The difference between the two groups was significant in terms of health literacy in evaluation after intervention and follow up both in the intervention group and compared to the control group.

These findings were in line with the findings of previous studies. In a study conducted by Tol et al. among women with type2 diabetes referring to selected hospitals affiliated to Tehran University

of Medical Sciences, a significant difference was observed between the scores of Knowledges and Health Literacy in intervention compared to the control group(29). Moreover, this study indicated that education with small group's strategy was effective in the intervention group, in comparison to current education The study by Behzad and Peyman(30) also reported a significant difference between the experimental and control groups in health literacy after implementing an educational intervention; however, before the intervention, no significant difference was observed in terms of health literacy. In addition, a clinical trial by Cavanaugh, K. et al. indicated that interventions designed for the improvement of communicative skills can raise the awareness and health literacy of diabetic patients. These findings were consistent with the results of the present study on the efficacy of the applied intervention(31). A clinical trial discovered that intervening the level of patients' communicational skills could improve awareness and health literacy of diabetic patients. They found that the level of health literacy and knowledge of their patients were appropriate. Findings of Kandola were in line with the findings of our study. The intervention method in Kandula's study was based on educational multimedia that was consistent with this study(32).

A cross-sectional study indicated that women with a lower educational level received less prenatal care. Furthermore, these women started prenatal care at a higher gestational age, and infants born to these mothers had a lower birth weight(33). Consistent with the results of the present study, Douglas showed that low birth weight and mortality were less frequent in mothers with more prenatal care visits, while weight gain during pregnancy was increased in majority of these mothers. The difference between the present study and the study by

Douglas et al. is in the type of intervention and sample size(34).

Additionally, it was previously suggested that training classes can be helpful in improving the level of maternal health literacy, especially for individuals with low income and socioeconomic status(35); it should be noted that the present study was performed under similar circumstances. Similarly, in a study by Renkert, training classes based on maternal health literacy were effective in improving women's decision-making and practical skills. This study emphasized on the importance of self-confidence and self-efficacy in an uncomplicated pregnancy(9).

As confirmed in the present study, numerous studies have identified average or inadequate level of health literacy in pregnant women(1, 12, 24, 36). Different studies identified the effectiveness of training in improving health literacy. Therefore, major attempts should be made to increase health literacy at healthcare centers. Presentation of written educational materials in a simple and comprehensible language (with familiar words) is one of the possible measures which can be taken.

A collaborative effort is recommended in order to increase maternal health literacy by assessing maternal health literacy levels in prenatal care unit, revision of educational materials into simple language and provision of pregnant women with oral and video instruction in addition to written educational materials.

Given the importance of maternal health literacy and its importance in improving the health of the entire society and families and considering the fact that health literacy has a direct impact on health behaviors(37), it is necessary that governmental health authorities develop more educational programs to promote health literacy and empower this group of the society. Therefore, necessary practical interventions in

improving health literacy, including the use of comprehensible communication techniques with mothers, employing understandable and illustrated written materials, visual aids and creating an encouraging environment for the expression of questions, can improve limited maternal health literacy.

One of the major drawbacks of this study was conducting the research in healthcare centers, which led to less participation of employed or student mothers. Another limitation of the present research was its cross-sectional nature, which did not facilitate the process of interpreting time sequence of relationships between the variables.

Conclusion: The present study identified a significant effect for maternal health literacy and self-efficacy intervention on newborn's weight. It is suggested that further studies be conducted using the maternal health literacy and self-efficacy intervention on larger samples. Therefore, it is recommended that self-efficacy to be considered as an integral part of educational interventions for pregnant women at health centers. Moreover, the level of health literacy of mothers should be considered and information and education should be provided to the mothers in a manner that is simple and comprehensible. Given the important role of structured education to improve maternal health and considering the significant relationship between health literacy and nutritional self-efficacy, the need for large-scale training with different tools to improve prenatal care in pregnant women during pregnancy and normal birth weight, is felt more than ever and this issue is one of the most important public health priorities.

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