The Relationship between Maternal Health Literacy and Dietary Self-Efficacy with Pregnancy Outcomes

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A R T I C L E I N F O	**A B S T R A C T**
	Background & aim: The investigation and identification of predictors of health promoting behaviors of women at reproductive age can improve maternal health and pregnancy outcomes. This study aimed to investigate the relationship between maternal health literacy and dietary self-efficacy and their impact on pregnancy outcomes. ***Methods:*** This descriptive-analytical cross-sectional study was conducted on 120 pregnant women referred to health care centers of Mashhad University of Medical Sciences in 2016. The study population was selected using multistage sampling method. The data were collected utilizing Maternal Health Literacy and Pregnancy Outcome Questionnaire, Perceived Dietary Self-Efficacy, Perceived Nutritional Status and Dietary Behavior Questionnaire after the confirming validity and reliability. Data was analyzed in SPSS software (version 15) and descriptive-analytic tests, namely Pearson's correlation coefficient, Stepwise regression method, independent t-test, one-way analysis of variance, as well as Tukey's range test, with the significant level of 95% and 99%. ***Results:*** Health literacy (P<0.01, r=0.679), perceived dietary self-efficacy (P<0.01, r=0.711), perceived nutritional status (r=0.585, P<0.01) and dietary behavior (P<0.01, r=0.682) had a positive and significant correlation with pregnancy outcomes and neonatal birth weight. The results of stepwise regression analysis showed that health literacy (R=0.76), dietary self-efficacy (R=0.71), and dietary behaviors (R=0.77) could significantly predict pregnancy outcomes in the first, second, and third steps, respectively. Totally, these variables could anticipate 59% of the pregnancy outcome variance (P<0.01). ***Conclusion:*** Maternal health literacy and perceived dietary self-efficacy in pregnant women played an important role in the prediction of pregnancy outcomes and neonatal birth weight.

Introduction

The intrauterine growth and development period is one of the vulnerable periods in the human life cycle (1). The proper growth and development of the fetus is important during pregnancy, as its abnormal reduction or increase is associated with mortality and many complications in delivery (2). Improving the health of mothers and neonates as two endangered groups is one of the Millennium Development Goals that reduces maternal mortality and postpartum complications (3). Overweight in pregnancy is an important factor in the determination of the pregnancy outcomes. In fact, maternal weight is effective on the neonatal birth weight (4). The women with low level of knowledge regarding health skills and literacy start prenatal care late, and their referrals were inadequate (5). Prenatal care decreases neonatal

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mortality and low birth weight and increases maternal weight gain during pregnancy (6).

Mothers with low level of literacy had less prenatal care and later started this process. In addition, their newborns were more prone to low birth weight and were mostly admitted to the neonatal intensive care units (7). Health literacy is essential in order to empower people to change their behavior and lifestyle for the improvement of health and quality of life (8). Health literacy in pregnant women is a special knowledge and social skill to diagnose pregnancy risk symptoms, healthy lifestyle, and proper nutrition, and it is effective on pregnancy outcomes through the quality enhancement of prenatal care. Therefore, women with high level of health literacy have fewer neonates with low birth weight, premature birth, and neonatal death (9). It seems that the side effects mostly occur in women with poor health literacy. Maternal health literacy is a skill to diagnose pregnancy risk symptoms. A healthy lifestyle and proper nutrition during pregnancy is a positive factor in maternal health (9).

Health literacy refers to the individual's capacity to gain, interpret, and understand the basic information and health services, which is necessary for appropriate decision-making (10). People with low level of illiteracy have less knowledge of disease management; consequently, they have poorer health status and are less tended to receive preventive care, compare to other individuals (11). The main goal of health literacy improvement is to increase effective communication strategies and health information technology, improve health, and achieve justice in health care (12). Therefore, although it is essential to train the required topics and provide knowledge in pregnancy, the important thing is the level of understanding and the ability to use this information in case of necessity and risk. Consequently, comprehensive efforts are needed to increase maternal health literacy (4).

Nutritional training before and during pregnancy and counseling women of childbearing age can be an ideal opportunity to regulate the daily consumption of iron and folic acid in pregnant cases. In the theory of health education, it is predictive of the consequences of the programs and provides a framework in order to plan educational intervention that

helps researchers to analyze success or failure (13). According to the literature, one of the most famous theories on how to predict and describe behaviors is the self-efficacy theory, which is used to change behavior. Bandura describes self-efficacy as a person's belief in one's ability to succeed in specific situations or accomplish a task; accordingly, when people believe that they are capable to perform an action effectively, it is more likely to show that particular behavior. A person with low self-efficacy is less likely to try to display a new health behavior or change a behavior, which has been a habit.

In fact, a strong sense of self-efficacy is associated with health promotion. Furthermore, empirical evidence supports the relationship between self-efficacy and the establishment and maintenance of health behaviors; therefore, it can be a tool for health promotion, training, and adherence to various dietary regimens (14). Self-efficacy is one's belief in the ability to organize and perform actions to achieve the levels of a particular activity. Self-efficacy as a key determinant plays an important role in the amount of effort that an individual devotes to achieve a goal. In the absence of self-efficacy, individuals have no incentive to act. Bandura describes self-efficacy as the most important determinant to change behavior, since it can affect person's choice at the stages of displaying behavior. In addition, it encourages the person to try harder to achieve a goal and endure difficulties and obstacles (15).

Change in health behaviors is the best way to reduce diseases and mortality and improve the quality of life. The comprehension of behavior predictors facilitates the implementation of interventions in order to change the behavior. One of the most important predictors of behavior is self-efficacy. Individuals with high self-efficacy consider leading goals and become more committed; consequently, their behavior is more desirable. While those with low self-efficacy have inappropriate behavior outcome (16). Self-efficacy has been known as an important predictor of behavior change in the management of nutritional habits, smoking cessation, and weight control. Self-efficacy is the basic structure of Bandar's social cognitive theory and reflects the individual's self-confidence in being able to adopt and show a particular behavior (15).

Therefore, the study and identification of predictive variables regarding health in behavior enhancement of women of reproductive age can be a step toward the improvement of maternal health and pregnancy outcomes. Over the past decades, the use of healthy foods has been strongly promoted; however, the desire and ability to adopt a healthy lifestyle and change people's behaviors towards healthy habits is a complex issue (17). Moreover, women with an unhealthy lifestyle and inappropriate nutrition are at risk of a complicated and difficult pregnancy and adverse pregnancy outcomes with the side effects, such as low birth weight and neural tube defects. Nutritional anemia has undesirable effects on pregnancy outcomes and birth of the neonate. Mother's diet influences maternal and fetal health. Nutritional behaviors affect the maternal weight gain during pregnancy and the delivery of a healthy newborn.

Insufficient nutrition and supplements during pregnancy can lead to inappropriate functioning during pregnancy, such as low birth weight and intrauterine growth restriction. The comprehension of nutritional status and dietary self-efficacy can change the diet of pregnant women, which is beneficial for the mother and neonate. By the enhancement of pregnant women awareness, nutritional anemia can be reduced by a healthy diet; subsequently, it prevents low birth weight (18). Considering the importance of health literacy improvement and self-efficacy in women in order to provide maternal and neonatal health, especially birth weight, and the limited number of studies in this field, this study aimed to determine the relationship between maternal health literacy and self-efficacy and its effect on pregnancy outcomes and birth weight in order to take measures regarding the promotion of maternal and neonatal health.

Materials and Methods

In this descriptive-analytic study, 120 pregnant women were randomly selected from five health care centers of Mashhad University of Medical Sciences in 2016. The sampling method was multistage sampling in which from all of the urban areas of Mashhad, each region was considered as a cluster, and four clusters were randomly chosen. Then, from each cluster, four urban health centers were randomly selected (i.e., a total of 16 health care centers). Finally, by the referrals to health centers and evaluation of the family files, pregnant women that were eligible to participate in the study were chosen and asked (by telephone) to refer at a specified time to complete the questionnaire if they wished.

Then, the mothers completed the consent forms for participation in the study, and the duration of data collection for this descriptive study lasted three months. The participants were fully informed and aware of the purpose of the study. The questionnaires used in this study were coded, unnamed, and confidential. The inclusion criteria were: 1) willingness to participate in the study, 2) non-graduation from the University of Medical Sciences, 3) lack of a chronic disease, and 4) high-risk pregnancy.

To measure maternal health literacy, Maternal Health Literacy and Pregnancy Outcome Questionnaire (MHLAPQ) was with 33 items in three sections including, 1) demographic information, 2) maternal health literacy level, and 3) pregnancy outcomes. The examined items were the mother's ability and understanding at the time of starting and receiving and number of prenatal care, diagnosis of pregnancy risk symptoms, proper diet and healthy lifestyle during pregnancy, as well as the birth of a neonate with favorable weight. The answers to the questions were completely agree, agree, disagree, and completely disagree.

The validity and reliability of the questionnaire were confirmed in a study by Kharrazi et al. (2016) (19). In this study, the reliability of the health literacy section (α=0.89) and its subcategories (α=0.87, α=0.66) were confirmed using Cronbach's alpha coefficient. Regarding the pregnancy outcome section, Cronbach's alpha coefficients were obtained as 0.67 for the section and 0.72 and 0.69 for the subcategories. The results of test-retest showed the stability of the questionnaire and subcategories. Varimax rotation in the section of health literacy demonstrated two factors and in the section of pregnancy outcome showed two factors that in total, in the first and second sections explained 54.82% and 51.09% of the variance, respectively. In both parts of the questionnaire, the confirmatory factor analysis results based on the 2-factor model derived

from the exploratory factor analysis revealed consistency with the obtained data.

Demographic Characteristics and Pregnancy History Questionnaire contains 22 items, including demographic characteristics (11 items) and information on the present pregnancy history (11 items). Required information was asked from each mother, including mother's age, nationality, mother and father's educational level, mother and father's job, family income level, and information about pregnancy consisted of the first day of the last menstrual period, gestational age, common complaints, planned or unplanned pregnancy, and other laboratory information (i.e., hemoglobin level, weight, body mass index).

Perceiving Nutritional Status Questionnaire was used to determine the level of nutritional understanding of pregnant women. The questionnaire consisted of 12 items. Perceived Nutritional Self-Efficacy Questionnaire was utilized to discover the level of nutritional perceived self-efficacy of pregnant women with 20 items, including components related to dietary quality (10 items), supplementation (6 items), and prohibited diet (4 items). Dietary quality means a normal balanced diet for fetal adequate growth and appropriate maternal nutrition. The supplements included iron, folic acid, and multivitamins. Prohibited diet defines the foods, which are harmful for the mother and fetus.

Nutritional Behavior Questionnaire was employed to diagnose the common behavior of pregnant women and consists of 20 items with three components. These components included diet quality (11 items), supplement (5 items), and prohibited diet (4 items).

The last three questionnaires were used by Sham in 2010 and consist of three parts and their internal consistencies were confirmed by Cronbach's alpha coefficients reported as 0.86, 0.82, and 0.86 in the perceiving nutritional status, nutritional self-efficacy, and nutritional behavior questionnaires, respectively (18). Considering that this questionnaire has not been used in Iran so far, the localization as well as content and face validity of the questions were determined using the translation and re-translation techniques. The re-test method was utilized to determine the scientific reliability of in nutritional status, nutritional self-efficacy,

the tools. The validity and reliability of the perceiving nutritional status, nutritional self-efficacy, and nutritional behavior questionnaires were (r=0.994, α=0.79), (r=0.992, α=0.90), and (r=0.996, α=0.89), respectively. Therefore, Cronbach's alpha coefficients were confirmed for perceiving nutritional status (α=0.79) and its subcategories (α=0.74, α=0.75), nutritional self-efficacy (α=0.90) and its subcategories (α=0.84, α=0.83, α=0.77), nutritional behavior (α=0.89) and its subcategories (α=0.84, α=0.77, α=0.78).

The results of test-retest showed the stability of the questionnaires and their subcategories. Varimax rotation demonstrated two, three, three factors in the perceiving nutritional status, nutritional self-efficacy, and nutritional behavior questionnaires, respectively. Totally, it explained 61.84%, 63.57%, and 54.68% of the variance in the first, second, and third questionnaires, respectively. In all three questionnaires, the results of confirmatory factor analysis based on the two and three factor model obtained from the exploratory factor analysis showed consistency with the obtained data. The scoring scale in the nutritional self-efficacy questionnaire was from 1-5 and includes 1=completely disagree, 2=disagree, 3=somewhat agree, 4=agree, and 5=completely agree. Higher scores represent higher levels of each variable. The overall score is 1-5. This spectrum is divided into three levels, which were low (1.00-2.33), middle (2.34-3.67) and high (3-68-5.00).

The data were analyzed by SPSS software (version 15) using descriptive analytical tests, Pearson's correlation coefficient, stepwise regression analysis, independent t-test, one-way analysis of variance (ANOVA), along with Tukey's range test with the significant level of 95% and 99%.

Results

Table 1 tabulates Pearson's correlation coefficient between the study variables. According to Table 1, there is a significant positive correlation between nutritional status, nutritional self-efficacy, nutritional behavior, and health literacy with pregnancy outcomes, as well as a positive correlation between nutritional self-efficacy and health literacy (P<0.01). As the subjects obtained higher scores nutritional behavior, and health literacy, the

scores of pregnancy outcomes also increased. Stepwise regression analysis was used to evaluate the role of each variable in the prediction of pregnancy outcome scores (Table 2).

Table 2 presents that nutritional self-efficacy in the first step, as the first predictor of pregnancy outcomes was included in the regression model among other variables. According to the correlation coefficient of 0.71, it can predict 50% (R^2) of the variance of pregnancy outcome scores. In the second step, maternal health literacy was included in the regression equation that increased the correlation coefficient by 76%. Regarding the increase in R^2 to 57%, adding health literacy to nutritional self-efficacy enhanced the ability to predict the outcome of pregnancy by 7%, or. In other words, nutritional self-efficacy, along with maternal health literacy was able to predict 57% of the dispersion of pregnancy outcomes scores. In the third step, the nutritional behavior entered the regression equation and increased

the predictive power of the equation to R^2=0.59.

In other words, adding nutritional behavior to nutritional self-efficacy and maternal health literacy increased the predictive power of the model by 2%. Considering the significance of F and R values, all of these steps were significant and considering the final results of multiple correlation coefficients, in the last step, it can be said that self-efficacy and nutritional behavior and maternal health literacy could predict 59% of the variance of pregnancy outcome scores.

Table 3 displays the standard and non-standard beta coefficients in stepwise regression analysis in the last step. Considering that, the value of standard beta coefficients and t-values were all significant (P<0.01), it can be concluded that the variables of nutritional self-efficacy, health literacy, and nutritional behavior were able to anticipate pregnancy outcomes with standard beta coefficients of 0.28, 0.34, and 0.3, respectively.

Table 1. Mean, SD, and Pearson Correlation Coefficient among the variables

Variable	(1)	(2)	(3)	(4)	(5)
(1) Nutritional status perception	1				
(2) Nutritional self-efficacy	0.761**	1			
(3) Nutritional behavior	0.731**	0.845**	1		
(4) Mothers' health literacy	0.558**	0.648**	0.625**	1	
(5) Pregnancy outcome	0.585**	0.711**	0.682**	0.679**	1

Table 2. multiple correlation coefficient in stepwise regression to predict mothers' pregnancy outcome

Statistical indices (stepwise model)	R	R^2	justified R^2	F	P-value
First step (nutritional self-efficacy)	0.711	0.505	0.501	121.400	P<0.001
Second step (mothers' health literacy)	0.758	0.575	0.568	79.823	P<0.001
Third step (nutritional behavior)	0.768	0.590	0.579	59.077	P<0.001

Table 3. final model of stepwise regression to predict pregnancy outcome

Indices	Non-standard coefficient		Standard coefficient	t	p-value
	B	Standard error	Beta(β)		
Constant value	8.203	2.936		2.794	0.006
Nutritional self-efficacy	0.161	0.068	0.283	2.369	0.019
Mothers' health literacy	0.271	0.065	0.342	4.190	P<0.001
Nutritional behavior	0.136	0.066	0.229	2.055	0.042

According to Table 4, in the evaluation of the variables related to pregnancy outcomes, there was a significant relationship between birth weight, the onset of prenatal care, number of referrals for receiving prenatal care, use start of prenatal care and number of

of ferrous sulfate supplementation, use of multivitamin supplementation, and anemia with maternal health literacy (P≤0.05). Tukey's test in the examination of the difference between the mean of health literacy and the referrals for receiving prenatal care showed

that this difference was related to the participants that had ≥6 referrals and those who referred in the second trimester for the first prenatal care. Others did not have any difference.   The mean of nutritional self-efficacy demonstrated

statistically significant relationship with the use of ferrous sulfate supplementation (P=0.001), multivitamin supplementation (P<0.001), and anemia (P=0.007); however, this relationship was not observed between other mentioned variables (P>0.05).

Table 4. comparison of mean and standard deviation of variables related to pregnancy outcome with nutritional self-efficacy, nutritional status perception, nutritional behavior, and maternal health literacy

Variable		nutritional self-efficacy	nutritional status perception	nutritional behavior	maternal health literacy
Infant's birth weight	<2500	78.0±7.9	50.0±5.9	72.0±11.1	27.33±4.8
	≥2500	80.2±12.6	46.1±7.0	75.0±12.0	43.2±6.8
Test result		t=-0.433 P=0.666	t=1.315 P=0.191	t=-0.660 P=0.550	t =-5.630 P<0.001
Onset of prenatal care	First trimester Second trimester Third trimester	80.7±12.3 78.8±12.6 82.8±13.7	46.0±6.5 46.5±8.1 49.0±5.8	75.2±12.2 73.6±11.5 79.0±11.1	44.9±6.9 38.4±7.1 38.8±6.2
Test result		F=0.438 P=0.646	F=0.437 P=0.647	F=0.554 P=0.576	F=12.543 P<0.001
Number of care received during pregnancy	<5 5 ≥6	36.6±7.5 40.3±5.5 45.0±6.8	36.6±7.5 40.3±5.5 45.0±6.8	71.7±10.9 71.8±10.6 76.7±12.3	36.6±7.5 40.3±5.5 45.0±6.8
Test result		F=1.337 P=0.267	F=0.934 P=0.396	F=2.542 P=0.083	F=15.920 P<0.001
Using ferrous sulfate supplement	Yes No	82.3±11.3 73.6±13.4	47.2±6.1 43.7±8.7	76.4±11.2 70.2±13.0	44.5±6.1 36.3±8.1
Test result		t=3.515 P<0.001	t=2.384 P=0.019	t=2.545 P=0.012	t=5.843 P<0.001
Using multivitamin supplement	Yes No	83.0±11.0 73.4±12.9	47.4±6.2 43.7±8.1	76.9±11.1 70.1±12.6	45.3±5.9 35.8±7.5
Test result		t=4.171 P<0.001	t=2.704 P=0.008	t=2.۹۴۶ P=0.0·۴	t=7.630 P<0.001
Anemia	Have Don't have	81.5±11.5 73.4±14.5	47.3±6.2 41.5±9.0	75.9±11.2 69.4±14.1	43.7±6.8 36.1±8.1
Test result		t=2.739 P=0.007	t=3.566 P<0.001	t=2.283 P=0.024	t=4.378 P<0.001

According to the results of the Table 4, the results of one-way ANOVA and independent t-test revealed no significant relationship between the mean values of perceiving nutritional status and the neonatal birth weight (P=0.191), time of starting prenatal care (P=0.647), and number of referrals for receiving prenatal care (P=0.396); however, a significant relationship was observed with the use of ferrous sulfate, multivitamins, and anemia (P≤0.05). In addition, the mean value of nutritional behavior showed significant correlation with the use of ferrous sulfate

(P=0.012), multivitamin (P=0.004), and anemia (P=0.024); However, this relationship was not noticed with other variables (P>0.05).

Discussion

Maternal health literacy is a cognitive and social skill that shows the motivation and ability of women to access, understand, and use information to maintain maternal and neonatal health (20, 21). Maternal health literacy, which is dependent to training and empowerment, affects the determinants of maternal malnutrition and can be quickly corrected (21, 22). Regarding the

significant relationship between the score of maternal health literacy and the level of maternal education and monthly income, it is necessary to improve maternal health literacy, especially in low-income and low-educated people (23). According to the results of this study, there was a significant positive correlation between maternal health literacy and pregnancy outcomes, which is consistent with the results of the previous studies (4, 24, 25). Furthermore, self-efficacy showed a positive and significant correlation with pregnancy outcome, which is in line with the results of other studies (26, 27).

Maternal health literacy is very important regarding the risks before delivery. Maternal perception of danger may affect their eagerness to follow pregnancy recommendations (28, 29). The perception of nutritional status and dietary self-efficacy can change the diet of pregnant women, which benefits the mother and neonate. Increasing the awareness of pregnant women results in the reduction of nutritional anemia with a healthy diet (18). Moreover, self-efficacy is an essential and efficient structure in health studies and reflects the individual's self-confidence in being able to adopt and display a particular behavior (15). One of the important factors affecting pregnancy outcomes is maternal nutrition during pregnancy. Therefore, nutrition is a very important determinant of health during pregnancy and as a result, in pregnancy outcomes. Proper nutrition during pregnancy not only affects maternal health, but also influences fetal health (30).

Ellen et al. (2014) in a cross-sectional study conducted on 124 mothers in Los Angeles in 2014 have shown that maternal self-efficacy is effective in the health of mothers and their children In the mentioned study, self-efficacy had the highest correlation with health literacy among the sample (r=0.684, P<0.01), indicating that people with higher self-efficacy would have higher health literacy that was consistent with the results of other studies (31).

Along with this study, Peyman et al., in a study conducted on the relationship between health literacy and self-efficacy in postpartum women, introduced health literacy as an effective factor in self-efficacy. In their cross-sectional descriptive-analytical study, 120

mothers with the neonates under three months with the age range of 20-35 years were randomly selected from health care centers in Mashhad. The data collection tool was the Self-efficacy Questionnaire for physical activity, Quick Assessment of Adult Health Literacy Questionnaire, and TOFLA Health Literacy Summary Questionnaire. The results of their study showed that the mean level of health literacy was 51.4±12.3, and 27.5%, 5.42%, and 30% of the participants had good, borderline, and unfavorable health literacy, respectively. The mean score of maternal self-efficacy was 84.3±41.4. Moreover, 18.3%, 47.5%, and 34.2% of the subjects had high, moderate, and low levels of self-efficacy. There was a significant relationship between health literacy and self-efficacy of the pregnant women. The women with adequate health literacy had significantly more self-efficacy (32). The reason for the lack of similarity between some results can be the difference in the measurement tool in both variables of health literacy and self-efficacy, as well as the different place of the study.

In a study conducted by Dumming et al., high health literacy scores predicted changes in self-efficacy (33). Furthermore, in a study carried out by Raeisi et al., functional health literacy was the most important predictor of self-efficacy of diabetic patients for performing self-care behaviors (34). Oyseren et al. showed that there is a significant relationship between health literacy and self-efficacy (35).

Prenatal care is the correct implementation of the principles that aimed to maintain maternal health and the birth of a healthy neonate (21, 36). Kohan et al. in their descriptive-analytic study entitled "A survey on the relationship between maternal health literacy and prenatal care and pregnancy outcome" conducted in Isfahan, stated that women with sufficient health literacy had a significant difference in early onset of prenatal care, birth weight, maternal hematocrit, as well as iron and folic acid consumption. Moreover, the results of pregnancy care and pregnancy outcomes are related to higher health literacy (4). The difference between a study carried out by Kohan and the present study is the type of questionnaire used to measure health literacy. In addition, Kharrazi et al. reported a positive

and significant relationship between maternal health literacy and prenatal care (21). The results of their study are consistent with the findings of the present study.

Gonzales et al. in a study conducted to assess the maternal health literacy in Australia showed that there is a significant relationship between pregnancy-related variables and the level of maternal health literacy (37). Furthermore, Minh Hong reported that increased maternal health literacy is effective in the reduction of postpartum anemia, reducing neonatal low birth weight, and increasing the coverage of pregnancy care (38).

In a study by performed by Mojoyinola in a government hospital in Nigeria entitled "Influence of maternal health literacy on healthy pregnancy and pregnancy outcomes of women attending public hospitals in Ibadan", a significant relationship was observed between maternal health and prenatal care that is in line with the findings of this study; however, there was no significant relationship between maternal health and pregnancy outcomes, which is inconsistent with the results of the present study. The reason for the difference in these results can be the ethnic and racial differences, age, and status of participants, duration of the study, and the items examined to obtain the pregnancy outcomes Mojoyinola in his study used the MHLAPQ questionnaire, which was used in this study. Based on the above findings, it is recommended that health care providers encourage pregnant and lactating women to attend training sessions in order to improve their health literacy and understand the risks of pregnancy (25). In order to increase the level of health literacy in the community, the use of approaches, such as streamlining information can be helpful. However, experience has shown that, along with these measures, the use of communication strategies and the assistance in professionals' health education can contribute to plan and design programs, which are effective in this field (39).

Ghanbari in a study regarding the evaluation of health literacy in pregnant women in Tehran in 2011, reported that limited level of health literacy is a common problem among pregnant women covered by health care centers; since limited health literacy prevent the correct

understanding of messages and health advice, it is imperative that health care staff use effective methods of transferring information to these individuals (40). Amir Esmaeili in a study conducted to assess the level of health literacy in pregnant women in Kerman, Iran, stated that the health literacy of most of the women is moderate, and 30% of the participants had poor health literacy in the field of prenatal care (41). In another study, Bakhshi declared that the most important factor influencing prenatal care is the lack of knowledge regarding the number of referrals for receiving prenatal care and the way it is performed (42).

Conclusion

Regarding the importance of maternal health literacy in the promotion of the whole community and family health and the fact that health literacy has a direct impact on healthy behaviors (43), it is required that health authorities design more educational programs to improve the level of health literacy. Considering many maternal and fetal threats during pregnancy and the adverse effects on the family, special attention to pregnant women should always be considered as a health priority and provide them with more health services; in addition, training pregnant women to increase the level of knowledge for the reduction of the possible risks (41).

Finally, based on the findings of this study, the promotion of maternal health and self-efficacy has a significant effect on the pregnancy outcomes. Since the use of health literacy strategies in trainings based on the theory of maternal self-efficacy leads to an increase in their self-efficacy; therefore, it causes an increase in the understanding of the maternal nutritional status and improving their nutritional behavior and the pregnancy outcomes. Consequently, the necessary interventions to promote health literacy, such as the use of techniques of clear communication with mothers, use of visual and illustrative media, visual teaching aids, and preparation of an encouraging environment to propose questions can enhance maternal health literacy.

Therefore, it is suggested that in educational interventions for pregnant women in health care centers, self-efficacy should be considered as an

integral part of such interventions. Moreover, attention should be paid to the level of maternal health literacy, and information, along with education, should be presented in a manner, which is easy to understand. Regarding the importance of the structured education role in the promotion of maternal health and the significant relationship between health literacy and nutritional self-efficacy, training is required with various tools among pregnant women to improve prenatal care and birth of the neonates with normal weight. This is one of the important health priorities of the community.

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Conflicts of interest

The authors declare no conflicts of interest.

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