

Original Article**Associations between maternal health literacy and prenatal care and pregnancy outcome***Shahnaz Kohan**, *Saadat Ghasemi***, *Maryam Dodangeh******Abstract**

Background: Health literacy includes the ability to understand instructions come from health workers and units, cognitive and social skills and the competence to use such information and services in ways, which are health-enhancing. Antenatal care is an important key for a healthy maternity. Maternal health literacy and particular cognitive and social skills required for healthy maternity include abilities to detect risk factors and taking actions for healthier life style and better nutrition during pregnancy. The association between maternal health literacy and outcome of pregnancy has been investigated in this study.

Methods: This descriptive study was carried out in Isfahan Beheshti hospital in 2005. 150 parturient were selected randomly in postpartum ward based on inclusion criteria. Women with medical sciences education, chronic disease and pregnancy complications were excluded. Data were collected through questionnaires and analyzed with SPSS.

Results: Based on the scores they were given from the questionnaire, 34% were classified as having low, 48% moderate and 18% good maternal health literacy. Women with adequate health literacy had significant difference in starting earlier and frequency of antenatal care, neonatal birth weight, mother hematocrit (HCT), ferrous and folic acid tablet consumption, pregnancy weight gain, gestational age at birth, method of delivery and breastfeeding. Other birth outcomes were similar between groups.

Conclusion: Our findings suggest that good health literacy among pregnant women is associated with good pregnancy outcome and the fact that poor health literacy causes poor chance to gain a positive pregnancy outcome. A collaborative effort 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 are highly recommended.

Key words: Maternal health literacy, prenatal care, pregnancy outcomes

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Health literacy is a determined key of the health in the society and the first priority in promoting the quality of the health services (1). Health literacy includes the ability of perception and using the information that given by health workers and units. Also health literacy includes the ability of reading and understanding doctor's prescription and instruction, testimonial, pamphlets, drug brochures and ability to achieve the health services (2). The literacy of adults have a relation with the level of their health espe-

cially the women's literacy that is one of the most important factors affects on the family health and the rate of infants' death. However, there is necessarily no relation between general and health literacy (3), as 20 percent of Americans have not any correct perception of the health information and 27 percent can understand it hard (4). The less health literacy can be followed by undesirable economic, social and health outcomes such as increasing in health and treatment expenses, morbidity and mortality and side effects of the diseases.

* PhD Student of Reproductive Health, School of Nursing & Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran.

** MSc, Isfahan Health Center, Isfahan, Iran.

***BSc, Shahid Beheshti Hospital, Isfahan, Iran.

Correspondence to: Shahnaz Kohan MSc.

E-mail: kohan@nm.mui.ac.ir

The studies show that in the chronic diseases like diabetes, cardiac and renal disease the persons who have the less health literacy also have more severe side effects (5). Various studies show the effect of general literacy especially at university levels on the pregnancy outcome through improving the quality of the health services in pregnancy period. These mothers have the high birth weight infants, the less premature infants, the less death of the infants, and the rate of the breast feeding after delivery is two times more than mothers with lower general literacy (6). Although the general literacy is a vital and determined factor in the individual's health literacy but the health literacy is more specific in an expert mood and it is usually lower than the individual's general literacy (7). So, it seems that side effects will occur more in the women with weak health literacy. Maternal health literacy is a skill to diagnose the dangerous symptoms of the pregnancy period, the method of a healthy life and the suitable nutrition in pregnancy period as these are the best points to be a healthy mother. Mothers with the suitable maternal health literacy have the less low birth infancy, the less premature infancy and the less death of the infancy, and the feeding with the mother's milk have been more than the other group (8). Gonzales et al showed a significant relation between the first care, the number of mother's references, performing the advices of the therapy and health system, the rate of cesareans, prematurity, infancy death and breast feeding with the level of the maternal health literacy (9). The increase of mother's knowledge for better adaptation to the pregnancy changes, care in dangerous situations and pregnancy complications are the important strategies for antenatal period care. Training is often verbal and includes the professional and health expression so most mothers can not perceive these words and these trainings are unusable (8). Although the training of the needed issues and giving information in pregnancy period is essential but the most important factor is the rate of perception, understanding and the ability of using infor-

mation in dangerous and inevitable cases. So it is necessary to provide the groundwork to increase the maternal health literacy such as evaluating it in pregnancy cares, determining the issues which mothers have insufficient literacy, identifying available sources, planning for the better usage of the training materials, written and verbal training materials in a simple and understandable words, detecting their perception through the question, using training technology in training environments.

In most countries, planned and organized information, in the antenatal period are given to the pregnant women and their husband through the preparation classes for the pregnancy and the practical situations would be provided to improve the ability of using and understanding this information, (10). The weak maternal health literacy in the pregnancy period not only affects mother health but also affects infant health, growth and death (11) and more than half of the women have the weak and minor maternal health (12). Noticing the importance of increasing the maternal health literacy to improve the health of the mother and infant and the limited existing studies in this ground, this study designed for the purpose of determining the maternal health literacy level and their demographic features then comparing with the outcomes of the pregnancy to define a situation in which mother health and health literacy improve the quality of the antenatal cares.

Methods

This was a descriptive study. Sample population included postpartum women in Beheshti hospital in 2005 in Isfahan. 150 women were selected randomly with these criteria: gestational age of 28 weeks or more, women with the general literacy of at least of guidance school level. Women that had dangerous situation in pregnancy period (pre-eclampsia, twin, severe vomiting in pregnancy period and ...) or were graduated in medical sciences were excluded from study. The information were collected by a questionnaire having the questions about demographic features,

outcomes of the pregnancy, and evaluation of the maternal literacy level through the mother's perception and ability of pregnancy care, diagnosis of the dangerous symptoms, taking suitable diet and the quality of a healthy life during pregnancy period (8). The scores were classified according to the total number of answers; 1-20 were considered as having weak level, 21-40 averaged level and 41-60 good level. The information of the first two-section was completed through interview and observation and the third section was completed by the research units. The scientific validity of the questionnaire was determined through the content validity method and to determine the scientific reliability of the questionnaire we used test-retest method. For this purpose, the questionnaire was completed by 10 members of the research sample having the characteristics of the research units and after two weeks, the questionnaire was completed by the same members again. Then, the reliability coefficient of the first exam questions and the second were calculated and it was used in the final questionnaire.

Also, the amount of hematocrit was measured in mothers, in labor ward.

Data were analyzed by the statistical software SPSS. The descriptive and analytic statistics of mean, standard deviation, frequency, t-test and χ^2 were used.

Results

The findings showed that 68% (102/150) of the research samples were housewives and 61 percent (91/150) graduated at the level of high school or more, 54 percent were in the averaged socioeconomically situation, and 58 percent had the age interval 20-28. 18 percent of the women had good maternal health literacy, 48 percent had averaged maternal health literacy and 34 percent had weak maternal health literacy. The mean of gestational age in first antenatal care was calculated based on the week from the last menstruation period. In good health literacy group it was 9 ± 1.2 week, in the averaged group was 11 ± 2.2 week, and in the weak group was 14 ± 6.4 week; A statistical-

ly significant difference was seen between the first and the third group ($p < 0.01$). Also, the mean of the antenatal cares in women with sufficient health literacy was 14.1 ± 0.7 times, in women with averaged health literacy was 11 ± 1.1 times and it was 6.1 ± 2.8 times in the women with weak health literacy. A significant statistical difference was observed between the first and the third groups ($p < 0.01$). The daily use of ferrous tablets (50 mg) during the antenatal period was 106 ± 8 in women with good health literacy and 72 ± 16 in the women with weak health literacy. A significant difference between good and weak groups was seen ($p < 0.01$). 53 percent of the women had started ferrous tablets before 16 weeks. The average time of starting ferrous tablets was 13 ± 2 week in good health literacy group and 15 ± 2.5 week in averaged group and 20 ± 4.4 week in weak group. A significant difference between good and weak group was seen ($p < 0.05$). So, most women with a good health literacy had taken ferrous tablets before the advised time and women with weak health literacy started using of it later ($p < 0.01$). The mean of hematocrit in labor ward was 39 ± 2.1 percent in good health literacy women and 36.8 ± 3.6 and 31 ± 5.4 percent in averaged and weak group, respectively. A significant statistical difference was seen between the first and second group ($p < 0.001$). 48 percent of the women with good and averaged health literacy and 27 percent with weak health literacy had taken 500 μg acid folic daily between 8-14 weeks. A significant difference between two groups was seen ($p < 0.01$). The mean of weight gain during pregnancy was 12.8 ± 1.8 kg in good health literacy group, 11.2 ± 2.3 kg in averaged health literacy and 7.2 ± 3 kg in weak health literacy group that the comparison of the means showed a significant statistical difference ($p < 0.01$). The frequency of iron deficiency anemia in women with good, averaged and weak health literacy was 4, 8.2, and 11 percent respectively. A significant statistical difference were seen among three groups ($p < 0.01$). the frequency of prematurity was 8, 11 and 14 percent in women with good,

averaged and weak health literacy group so a significant statistical difference was observed between good and weak group ($p < 0.01$). The averaged birth weight in good health literacy group was 3120 ± 145 g, 2830 ± 220 g in averaged group and 2160 ± 285 g in weak group respectively. A significant difference among these three groups were seen ($p < 0.001$). Frequency of low birth weight (LBW) was 8%. LBW was seen in 4% of women with good health literacy, 6.2% of averaged and 11.3% of weak health literacy. A significant difference among three groups were observed ($p < 0.01$). Frequency of Cesarean was 42 percent and the most rate of it was observed in good health literacy group (56 percent). Cesarean rate was 42 percent in averaged group and 35.8 percent in weak group. There was significant difference comparing three groups ($p = 0.01$). Also, 60 percent of women with good health literacy and 22 percent of the weak group delivered by elective Cesarean.

The mean time between starting breast feeding from the birth after omitting the hospitalized infants was 168 ± 24 minutes in women with good health literacy, 71 ± 31 in averaged group and 38 ± 16 in weak group. A significant difference between the first and second group ($p < 0.05$) and also the first and third group ($p < 0.0001$) were seen. There was not any significant difference comparing the level of the health literacy and the outcome of the pregnancy, APGAR score, infant death, meconium plague, post partum hemorrhage, premature rapture of membrane (PROM) ($p > 0.05$).

Discussion

Although more than 61 percent of the women were graduated at high school level or higher and all of them had at least 8 years of general literacy, but only 18 percent of them had good health literacy. Though the general literacy is a vital criteria in predicting the level of the health literacy but the health literacy is usually more technical and often is less than the individual's general literacy (7). Terry believe that there is necessarily no direct relation between the individual's level of the education and the

health literacy so that 20 percent of Americans can not perceive the health information and 27 percent can perceive it hard (4). Some authors believe that the antenatal cares have an efficient role in decreasing the infant's death and pregnancy complications. It should start after the first delay of Menstruation, and no care in the first trimester means insufficiency of it (13).

Some authors consider the number of the antenatal cares 9-14 times in low risk women and they believe the times below 9 are insufficient (14). The study by Bennett showed that 61 percent of women with weak maternal literacy have begun the antenatal cares late and 51 percent of them had insufficient follow up in comparison with women with good maternal literacy who had 19 percent delay and 23 percent of insufficient follow up (7). As it was seen in this study all women with good health literacy began the first antenatal care during first trimester and they had sufficient care, while more than 60 percent of the women with weak health literacy had insufficient antenatal care. Cunningham et al believe that the best time for beginning ferrous tablets is after 16th week of pregnancy to decreasing mothers' vomiting and possibility of infancy side effects (13). In a similar research by Mora, she indicated that the most important reason of using insufficient ferrous tablets in pregnancy period is the limited healthy knowledge. She estimated that the number of taken ferrous tablets in women with less healthy literacy in pregnancy period was 54 ± 12 , while it expected to be 150-170 during a pregnancy period (15). More than half of the studying women began ferrous tablets consumption before the end of 16 weeks; also the women of good and averaged health literacy groups mentioned more used ferrous tablets. Klossner et al consider hematocrit over 36 to be suitable in pregnancy period (16). The priority of women with good health literacy had sufficient use of ferrous tablets and they have reached to the mentioned Hematocrit. As women with weak health literacy had pregnancy anemia, in a research in Thailand, the

researchers discovered an identified and reversed relation between the level of health literacy and the rate of anemia during pregnancy (17).

American academy of children advises folic acid to be started before pregnancy and continue it to the end of pregnancy because of the increasing need in this period for fetal-placenta divisions and also to decrease the neural tube defect (18). In a study by Endres that 22 percent of the women had weak health literacy and the rest had suitable health literacy, 42 percent of the women with weak health literacy and 62 percent of women with good health literacy have taken daily folic acid tablets in the first trimester of pregnancy but only 33% of the women with weak health literacy took folic acid tablets in the beginning of the pregnancy. The amount of weight gain in pregnancy is an important factor in identifying the pregnancy outcome and predicting the adaptation of mother and fetus growth. In fact, mother weight affects birth weight as shown in the study of the social factors on pregnancy weight gain that 56 percent of the women with low education and 27 percent with high education could not reach to the accepted weight by institute of medicine (IOM) (19). In present study 54 percent of the women with weak health literacy and 17 percent of women with good health literacy had not acquired suitable pregnancy weight. Although we exclude the high risk pregnancy women in this study, approximately half of them underwent cesarean. There was a significant difference between the rates of elected cesarean in the women with good and averaged health literacy and the women with low health literacy. Although cesarean is a vital process in dystocia and fetal distresses but the world health organization advise 5-15 percent of cesarean to be acceptable. However, the rates over 15 percent indicate over application of it for the reasons other than saving mother and infant (20). In similar studies, women with high general education had less cesarean rates than the women with low general education (21). The time of the first breast feeding is

a fundamental factor in continuation and quality of the breast feeding and the process of the bonding between mother and infant (22). As it was observed, the women with good health literacy without considering their intensity and suitable skill of breast feeding comparing the women with low education started breast feeding with 2 hours delay Kaufman's et al showed that in 23 percent of women with weak health literacy and 54 percent with good health literacy, feeding was started as soon as birth (23). This delay in our study may result from the high rate of cesarean because it cause the first contact of mother and infant to be delayed for the worry of the side effects of anesthetic drug and also later transmission of mother from recovery ward.

Pechlivani et al showed a significant relation between the type of birth, the start of breast feeding after birth and continue with exclusive breast feeding ($p < 0.01$), while the most women with vaginal delivery started breast feeding very soon (24). The pregnancy age in weak and averaged health literacy groups was less than good literacy group as the most premature deliveries were occurred in them. One of the common reasons of prematurity is no prediction of their occurrences. So the first step for prevention is the recognition of the risk factors and on time interventions (25).

In a study by Luo, premature delivery had a strong relation with the level of maternal health and general literacy comparing other infant diseases (11). LBW is a serious problem of infancy and it may increase mortality and morbidity up to 8 times (16). The frequency of LBW was 8% in our study and women with weak maternal health literacy delivered low weighted infants two times more than others. It seems that promoting maternal health literacy is a key factor in controlling LBW. Mother's education is the only social factor which has a strong and meaningful relation with birth weight, as mother with low literacy are faced with LBW three times more than mothers with good health literacy (17).

In comparison of the health literacy levels with the outcome of pregnancy, there was no considerable difference in the APGAR scores, meconium plague, post partum hemorrhage, PROM and neonatal death. In similar research by Luo, there was no difference with mentioned findings but only the neonatal death was increased. It seems that the existence of the above side effects are beyond the effects of social factors and mother's interference (11). Neonatal death was estimated in the study by Lvo but in the present study only the first 24-hour neonatal death was examined. As it was observed, the quality of the pregnancy cares and the outcome of the birth in the women with good and averaged health literacy meaningfully were better than the women with low health literacy as most of them acquired sufficient antenatal cares and they had

adequate weight gain. Finally their delivery was in proper time and their infants had better weight than the low health literacy group. It seems that the relation between maternal health literacy with the outcomes of the antenatal cares is stronger than the outcomes of the birth. Regard to the fact that half of the women having at least guidance school education would have insufficient maternal health literacy at the end of the pregnancy; it demands all-aspect affairs to increase the maternal health literacy through the centers presenting antenatal cares. It is useful to evaluate maternal health literacy at the beginning of the antenatal cares, plan for a better materials and methods training, provide pamphlets and written training materials in a simple and understandable style, and verbal training with simple words.

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