



# Determining Health Literacy Level and Its Related Factors Among Pregnant Women Referred to Medical and Health Centers of Tehran in 2019: A Cross-sectional Study

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## Abstract

**Background:** The ability to acquire, process, and understand health information to make informed decisions about health is defined as health literacy. A low level of health literacy disrupts women's ability to understand and use health information in order to take appropriate and timely measures during pregnancy.

**Objectives:** Due to the importance of health literacy during pregnancy and its direct impact on fetal health, this study was conducted to determine the level of health literacy and its related items among the pregnant women referred to medical and health centers in Tehran.

**Methods:** This descriptive-analytical study was conducted on 270 pregnant women referred to the medical and health centers of Tehran in 2019. The participants in this study were selected by the mixed sampling method (cluster and random methods to select health centers and the convenience method to select participants). Data collection tools included a questionnaire for demographic and midwifery characteristics and a specialized questionnaire for maternal health literacy in pregnancy (MHLEIP). Data analysis was performed by SPSS-19 software.

**Results:** The mean age of the participants was  $28.16 \pm 5.70$  years, and the mean gestational age was  $24.50 \pm 9.25$  weeks. The mean score of health literacy among pregnant women was  $63.14 \pm 9.63$ , and 48.9% of them had limited (inadequate and insufficient) health literacy. The results showed positive correlations between the total score of health literacy and the demographic variables of age ( $P = 0.025$ ), education ( $P = 0.003$ ), and income ( $P = 0.008$ ), but no significant relationship was found between the mean total score of health literacy and employment status ( $P = 0.614$ ) or parity ( $P = 0.614$ ).

**Conclusions:** It was found that limited health literacy had a high prevalence among pregnant women. Given the importance of pregnancy, it seems necessary for healthcare policymakers to design programs to promote women's health literacy during pregnancy.

**Keywords:** Health Literacy, Pregnant Women, Related Factors, Tehran, Iran

## 1. Background

Health literacy is a set of cognitive and social skills that motivate individuals to obtain, understand, and use health information to maintain and improve their health (1). Today, health literacy is an important global issue (2).

Health literacy is one of the factors that directly affect women's health and an important factor in women's ability to promote their and their children's health (3). In examining health literacy levels in women of reproductive

age, Jarrahi (2017) and Sajjadi (2016) showed that about 50% and 62% of the studied women had low (marginal and inadequate) levels of health literacy, respectively (4, 5).

During pregnancy, health information enables women to identify pregnancy complications and risks and undertake preventive behaviors such as taking folic acid and iron supplements and considering weight gain and other health promoting measures (6). A multinational cross-sectional study by Lupattelli et al. found that poor health

literacy might lead to smoking, hypertension, depression, urinary tract infections, and cardiovascular disorders during pregnancy (7). Evidence suggests that providing women with appropriate health information and counseling before and during pregnancy can significantly reduce the rate of cesarean section (8) and improve the sexual relationship between spouses in this period (9). The study of Celikel (2014) also showed that women's knowledge of vaccination during pregnancy influenced their behavior towards receiving the vaccine (10). In a study by George et al. (2012), the results showed a high rate of poor oral hygiene among pregnant women. They also found that the lack of awareness of women about the importance of this issue was among the most important barriers to seeking oral health care (11). Taheri et al. (2018), in their qualitative study, identified some important facilitating and deterring factors influencing the obtaining of maternal health information by women (12).

General health literacy tools have been used to assess health literacy among pregnant women, resulting in different levels of health information (13-18). In their studies on pregnant women, Kohan et al (2008) and Amiresmaili et al. (2014) found that about 24% of women had optimal health literacy while about 30% of them had low levels of health literacy (6, 17). Charoghchian Khorasani et al. (2017), in their study on pregnant women also found that their participants had low levels of health literacy (18).

Despite the importance of health literacy, healthcare providers are often unaware of patients' health literacy levels, which is a challenge for health care providers and health systems. Therefore, healthcare workers should assess their patients' health literacy to identify those with low information, who may require additional support.

## 2. Objectives

This study was conducted on the pregnant women referred to the medical and health centers of Tehran to determine their level of health literacy and its related variables.

## 3. Methods

### 3.1. Study Design and Participants

This cross-sectional descriptive analytical study was conducted to determine the level of health literacy in 270 pregnant women referred to the medical centers of Tehran, Iran, in 2019. Inclusion criteria were having basic literacy in reading and writing, being Iranian, having no health-related academic degree, and completing a consent form for participation in the study. Also, experiencing stressful life events during the past six months, such as losing a

loved one, etc., and the incomplete completion of the questionnaires were considered as exclusion criteria.

### 3.2. Questionnaires

Data gathering tools included a questionnaire for demographic and midwifery characteristics and another specialized questionnaire for maternal health literacy in pregnancy (MHELIP). Demographic characteristics included age, education, income, employment status, parity, gestational age, spouse's education, participation in pregnancy classes, and access to the Internet. The maternal health literacy in pregnancy questionnaire was designed and validated by Taheri et al. (2018) in a sequential, exploratory, and mixed-method study (19). For qualitative content validity assessment, the questionnaire's items were reviewed by 10 experts, and necessary modifications were made to them. For qualitative face validity analysis, 15 pregnant women were asked to read the questionnaire and provide feedback. For assessing construct validity, after performing factor analysis in a sample of 320 pregnant women, four factors covering 48 items explained 46.49% of total variance. In terms of internal consistency, after confirming the construct validity of the tool, a Cronbach's alpha coefficient of 0.94 was obtained in a sample of 320 pregnant women. Regarding the consistency of the questionnaire and based on the data obtained from a group of 20 pregnant women referred to the medical and health centers of Tehran (a test-retest design with a 2-week interval), the intra-cluster correlation coefficient (ICC) of the whole tool was 0.96 (95% confidence interval). The MHELIP questionnaire has two sections: "maternal health knowledge" and "functional health literacy". All items of the questionnaire were based on a 5-point Likert scale. In the section of maternal health knowledge (questions 1 to 21), response options ranged from "I do not know at all = score 1", "I know a little = score 2", "I know somehow = score 3", "I know = score 4" to "I know well = score 5". The functional health literacy domain included the subdomains of maternal health information search (questions 22 to 27), maternal health information assessment (questions 28 to 33), and maternal health decision-making and behavior (questions 34 to 48). The Likert scale ranged from never to always (always= score 1, rarely= score 2, sometimes= score 3, often= score 4, and always= score 5) (19). Based on the cut-off points of 50, 66, and 84, health literacy scores were categorized into four levels of inadequate (zero to 50), insufficient (50.1 to 66), desirable (66.1 to 84), and excellent (84.1 to 100). The inadequate and insufficient health literacy levels were defined as limited health literacy (20).

### 3.3. Data Collection

In total, 270 pregnant women who met the inclusion criteria were enrolled in this study by the convenience sampling method. Sampling began in March 2019 and continued until June 2019, following several stages (i.e., simple cluster and random sampling to select health centers and convenience sampling to select participants). First, the researcher randomly selected a center from three comprehensive health centers affiliated to Tehran University of Medical Sciences. After selecting a center in the south of Tehran, 11 out of 37 prenatal care centers were randomly selected by lottery. Then the pregnant women who met the inclusion criteria were included in the study by convenience sampling.

Sample size was calculated to be 270 using the Cochran formula ( $z = 1.96$ ,  $p = q = 0.5$ , and  $d = 0.06$ ) based on similar studies on pregnant women, such as Ghanbari et al. in 2012 (15) and Safari Moradabadi in 2017 (14). The questionnaires were completed by self-reporting in a quiet place to avoid participants being distracted. The average completion time of the MHELIP questionnaire was 10 (the range of 8 to 14) minutes.

### 3.4. Data Analysis

Data were analyzed by descriptive (frequency distribution, percentage, and mean/standard deviation) and analytical (the Pearson and Spearman correlation coefficients) statistics using SPSS-19 software at the significance level of  $P < 0.05$ . It should be noted that three pregnant women refused to complete the questionnaire, whose data were not included in the final analysis. Overall, we analyzed 270 questionnaires and reported the results.

### 3.5. Ethical Considerations

In order to comply with the ethical considerations, necessary permissions were obtained from the Deputy for Research of Tehran University of Medical Sciences and the Ethics Committee of the university (IR.TUMS.VCR.REC.1395.1866). We initially obtained the necessary permits from the Deputy of Health and Treatment of Tehran University of Medical Sciences and then attended the chosen prenatal care clinics and comprehensive health centers. Complete explanations about the purpose and method of the study were given to the participants and informed written consent was obtained from all of them. The participants were assured that their answers would completely remain confidential and there would be no interruption in receiving services at the centers. They were also told that they could withdraw from the study at any time.

## 4. Results

The mean age of the subjects was  $28.16 \pm 5.70$  years, and their mean gestational age was  $24.50 \pm 9.25$  weeks. Most participants were 18 - 35 years old (84.1%) and were in the third trimester of their pregnancy (46.7%). Overall, 53.3% of them were nulliparous, and 73.3% had planned pregnancy (Table 1). Most of the women studied had a high school diploma (40.7%) and were housewives (95.6%). In most cases, income ranged from 200 - 400 \$. (46.7%), and the spouse's education was under diploma in 40.8% of the participants. Most participants had never attended any pregnancy class (64.1%), and they mostly had Internet access (74.4%) (Table 2).

The results showed that the mean score of health literacy in the studied pregnant women was  $63.14 \pm 9.63$ . The lowest mean score was related to the area of maternal health-related knowledge ( $58.01 \pm 11.34$ ), and the highest mean score was related to the area of maternal health decision-making and behavior ( $80.66 \pm 10.28$ ) (Table 3).

Based on the cut-off points of 50, 66, and 84, health literacy levels in the pregnant women were categorized into the four levels of inadequate (zero to 50), insufficient (50.1 to 66), desirable (66.1 to 84), and excellent (84.1 to 100). Inadequate and insufficient health literacy categories were defined together as limited health literacy (20). As displayed in Figure 1, overall health literacy was inadequate in 2.2% of the participants and insufficient in 46.7% of them. In other words, 48.9% of the pregnant women participated in this study had limited health literacy (Figure 1).

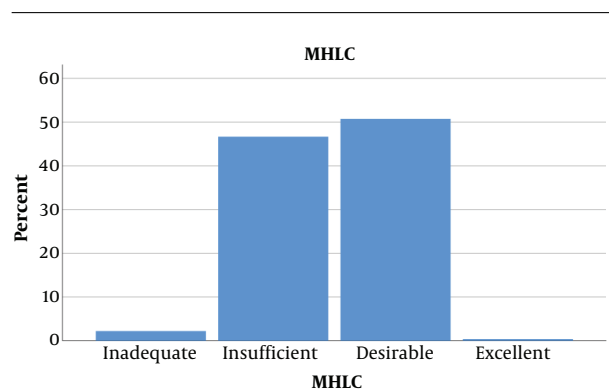


Figure 1. The percent distribution of maternal health literacy among pregnant women

Based on the observed Pearson correlation coefficient, a positive relationship was present between the mean total score of health literacy and age ( $r = 0.136$ ,  $P = 0.025$ ), but there was no significant relationship between the mean total score of health literacy and parity ( $P = 0.614$ ). According to the Spearman correlation coefficient, the health literacy

**Table 1.** The Frequency Distribution of Age, Gestational Age, Number of Pregnancies, and Type of Pregnancy in the Studied Subjects

Variables	Frequency (n)	Percentage (%)	Mean $\pm$ SD
<b>Age (y)</b>			28.16 $\pm$ 5.70
< 18	1	0.4	
18 - 35	227	84.1	
$\geq$ 35	42	15.5	
<b>Gestational age (weeks)</b>			24.50 $\pm$ 9.25
< 14	37	13.7	
14 - 28	107	39.6	
$\geq$ 28	126	46.7	
<b>Number of pregnancies</b>			
Nulliparous	144	53.3	
Multiparous	126	46.7	
<b>Type of pregnancy</b>			
Intended	199	73.7	
Non-intended	71	26.3	
<b>Total samples</b>	270	100	

total score was positively correlated with mothers' education ( $r = 0.180$ ,  $P = 0.003$ ) and household income ( $r = 0.161$ ,  $P = 0.008$ ), but no relationship was found between the mean total score of health literacy and employment status ( $P = 0.614$ ).

## 5. Discussion

Our results showed that the mean total health literacy score in the studied pregnant women was  $63.14 \pm 9.63$ . Overall, 48.9% of the pregnant women had limited (either inadequate or insufficient) health literacy. The mean total health literacy score was significantly associated with age, mothers' education, and household income, but not with employment status and parity.

In line with the results of the present study, Charoghchian Khorasani et al. (2017) reported an undesirable level of health literacy in pregnant women using a questionnaire designed by Naigaga et al. (2015) (18, 21). In another study on pregnant women, Kohan et al. (2008) and Amiresmaili et al (2014) found that about 24% of studied women had optimal health literacy, and about 30% of them had undesirable health literacy levels (6, 17). Gilder et al. (2019) reported low levels of health literacy among pregnant women using a locally developed tool (22).

Izadirad et al. (2007), in their study, used the Iranian Adult Health Literacy Questionnaire (HELIA) and reported that 47% of young pregnant women had limited health

literacy (16). Ghanbari et al. (2012) also examined pregnant women's health literacy using the TOFHLA tool and reported that limited health literacy was a common problem among pregnant women and could interfere with the proper understanding of messages and recommendations (15). However, Baghaei et al. (2017) used a functional health literacy questionnaire in adults (S-TOFHLA) and reported adequate functional health literacy in most of the studied pregnant women (13).

In the present study, the MHELIP questionnaire was used to assess the health literacy of pregnant women. Our results were somewhat in line with the results of previous studies, especially the results of Izadirad et al. (2017) (16), despite the fact that different tools had been used in these studies in terms of content and health literacy dimensions and cut-off points. The difference between the results of the above studies can be explained by the different characteristics of subjects in these studies, such as age, education, socioeconomic status, gestational age, number of pregnancies, and the tools used in these studies.

In addition, some of these studies have only measured the health literacy in pregnant women with general and non-specific questionnaires for pregnancy.

The results of the present study are in line with the study of Charoghchian Khorasani et al. (2017), who used a validated tool to assess maternal health literacy and pregnancy outcomes in nulliparous women (18); however, our study was conducted on both multiparous and nulliparous women. Nevertheless, it can be argued that the re-

**Table 2.** The Frequency Distribution of Education, Occupation, Family Income, Spouse's Education, Participation in Pregnancy Training Courses, and Access to the Internet

Variables	Frequency (n)	Percentage (%)
<b>Education</b>		
Sub-diploma	99	36.6
Diploma	110	40.8
University	61	22.6
<b>Occupation</b>		
Housewife	258	95.6
Employed	12	4.4
<b>Family income (Dollars)</b>		
Less than 100	20	7.4
Between 100 to 200	95	35.2
Between 200 and 400	126	46.7
more than 400	29	10.8
<b>Spouse's education</b>		
Illiterate	6	2.2
Sub-diploma	110	40.8
Diploma	109	40.4
Academic	45	16.7
<b>Participation in pregnancy training courses</b>		
Never	173	64.1
Rarely	33	12.2
Often	25	9.3
Sometimes	19	7
Always	20	4/7
<b>Access to the internet</b>		
Yes	201	74.4
No	69	25.6
<b>Total</b>	<b>270</b>	<b>100</b>

sults obtained from two different questionnaires in different groups and periods may not be the same. The tool used in the present study was designed to measure aspects such as pregnancy knowledge, seeking health information, assessment and decision making, as well as maternal health behaviors. However, the maternal health literacy and pregnancy outcomes questionnaire used in the recent report evaluated only the two aspects of self-management and speech and hearing perceptions. This could be considered as one of the strengths of our study.

The results of the present study showed a positive correlation between the mean total score of health literacy and age so that with increasing age, the level of health lit-

eracy also increased. In line with the present study, Amiresmaili et al. (2014) showed a significant relationship between age and health literacy level (17). It should be noted that in contrast with the results of the present study, Safari Morad Abadi et al. (2017) reported a statistically significant but negative correlation between age and health literacy so that health literacy decreased with age (14). However, the findings of our study were consistent with the study of Ghanbari et al. (2012), who showed that with increasing in age, health literacy level raised as well (15). The reason for this discrepancy may be different studied populations, the age distribution and dispersion of target groups, type of the tools used, and the level of education of the studied participants.

There was a positive relationship between the mean total score of health literacy and income, which was in line with the results of Baghaei et al. (2017) study (13). However, in the study of Amiresmaili et al. (2014), no statistically significant relationship was observed between the two variables (17). Regardless of the effects, which are sometimes disruptive, of various factors, especially education level, people with poor economic status are more likely to have lower health literacy, so appropriate teaching methods should be considered for these groups of people.

Accordingly, a positive relationship was also observed between the mean total score of health literacy and education. In line with the present study, Amiresmaili et al. (2014), Safari Morad Abadi et al. (2017), and Baghaei et al. (2017) found that mothers with higher education had also higher health literacy (13, 14, 17). The results of the present study, however, were not consistent with the findings of Kohan et al. (2008) (6). Also, the results of a systematic review by the Agency for Research and Quality in Health Care showed that the low level of health literacy was a major problem, and this was especially prominent in people with education below high school diploma. According to this report, education level was a strong predictor of health literacy (23). In order to minimize the impacts of various factors, including education, on health literacy, people with low levels of health literacy should be provided with health services along with appropriate and easily understanding educational content (e.g., images, cultural examples, media, etc.). Simpler instructions should also be available to empower people with updated health information.

Studies have shown that health literacy of pregnant women increases with the change of their status from housewife to employed (13, 15); nevertheless, the results of our study did not show a significant relationship between the women's being employed and their health literacy.

The present study showed no significant relationship between health literacy and the number of pregnancies, which was consistent with the results of a study by Baghaei

**Table 3.** The Mean and Standard Deviation of the Total Score and the Scores of Different Domains of Health Literacy in Pregnant Women

Domains	Minimum Score	Maximum Score	Mean $\pm$ SD
Information related to maternal health	20	96.19	58.01 $\pm$ 11.34
Maternal health information search	20	90	59.17 $\pm$ 10.95
Maternal health information assessment	20	100	61.41 $\pm$ 14.89
Maternal health decision-making and behavior	34.67	100	80.66 $\pm$ 10.28
Total score of maternal health literacy during pregnancy	20	83.43	63.14 $\pm$ 9.63

et al. (2017) (13). However, Amiresmaili et al. (2014) reported that the level of health literacy was significantly related to the number of pregnancies (17). The reason for this difference could be due to the difference in the tools used to measure health literacy in pregnant women, as well as the impacts of other influential factors such as age distribution, education level, and household income.

As one of the strengths of the present study, it was the first report on health literacy during pregnancy in Tehran using a valid and reliable tool developed in a sequential, exploratory, and mixed-method study. Therefore, the data from this study can provide useful and accurate information on the level of health literacy among pregnant women. The findings of this study can be used by maternal health professionals, such as physicians or midwives, during pregnancy. Boosting the awareness of healthcare professionals, as an effective contributor to health literacy, along with promoting their counseling skills can help to upgrade health literacy in pregnant women. The results of the present study can also be used by policymakers and health managers to design appropriate training packages for pregnant women through educational software and programs, as well as written materials, in order to improve pregnant women's health. One of the limitations of the present study was that it was limited to urban areas, so it is recommended to conduct similar studies in rural areas.

### 5.1. Conclusions

The present study showed the high prevalence of limited health literacy among pregnant women. Given the importance of pregnancy, it seems necessary for healthcare policymakers to implement programs to promote the health literacy of women, especially during pregnancy.

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### Footnotes

**Authors' Contribution:** ST supervised all stages of the study, analyzed and interpreted the data, and wrote the manuscript. ZT and MT participated in planning and supervised all stages of the study. ZM analyzed and interpreted the data. ADM, NR, and NS participated in drafting the manuscript. All authors critically reviewed and revised the manuscript for important contents. All the authors have read and approved the final version of the manuscript.

**Conflict of Interests:** The authors declare that they have no competing interests.

**Ethical Approval:** In order to comply with ethical considerations, necessary permissions were obtained from the Faculty of Nursing and Midwifery of Tehran University of Medical Sciences and the Deputy of Research of the university, as well as the institutional ethics committee (IR.TUMS.VCR.REC.1395.1866).

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**Informed Consent:** Complete explanations about the purpose and method of the study were given to the participants, and an informed written consent was obtained from all of them. The participants were assured that their answers would remain completely confidential and there would be no interruption in receiving health services at the centers. They were also told that they could withdraw from the study at any time.

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