

# Assessment of Relationship Between Health Literacy and Level of Knowledge on Prenatal Diagnosis and Antenatal Care in Pregnant Women

## *Gebelerde Prenatal Tanı, Antenatal Bakım Bilgi Düzeyi ve Sağlık Okuryazarlık İlişkisinin Değerlendirilmesi*

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### Abstract

**Introduction:** The goals of this study are to determine the knowledge levels of pregnant women regarding prenatal diagnosis and antenatal care, examine associated variables, and assess their relationship with health literacy.

**Methods:** This cross-sectional study was conducted on 386 pregnant women aged between 17 and 42 who presented to an Education and Research Hospital in Ankara. The research was carried out between March 15, 2020, and September 15, 2020. The knowledge levels of pregnant women about prenatal diagnosis and antenatal care were assessed using 26 information questions. Health literacy level was evaluated using the European Health Literacy Short Form. Chi-square test and logistic regression analysis were used for data analysis. A significance level of  $p \leq 0.05$  was accepted.

**Results:** 37.3% of pregnant women reported obtaining information from healthcare professionals. The most well-known information was "Smoking and alcohol should be completely stopped before getting pregnant," with 96.6%. Pregnant women with sufficient health literacy had significantly higher levels of knowledge about prenatal diagnosis and antenatal care as compared to those with insufficient literacy. Inadequate knowledge about prenatal diagnosis and antenatal care was found in those with lower spouse education levels, poor family income, and irregular prenatal checkups, and those who did not seek information before pregnancy.

**Discussion and Conclusion:** It was observed that pregnant women with adequate health literacy had higher knowledge levels about prenatal diagnosis and antenatal care. Increasing the health literacy levels of pregnant women can enhance their knowledge in the field of prenatal diagnosis and antenatal care, ultimately reducing maternal and infant mortality.

**Keywords:** Pregnant women; Level of knowledge on antenatal care; Health literacy

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Prenatal diagnosis detects health problems in the fetus or embryo before childbirth. These tests are very important to protect maternal and infant health, early diagnosis of possible health problems, and providing required and correct care to newborn with anomaly right after delivery.<sup>[1-4]</sup>

As emphasized in the World Health Organization's "Safe Motherhood" Initiative, antenatal care which is regarded as a basic preventive health service for protecting and improving maternal and infant health involves monitoring mother and fetus regularly during pregnancy by skilled healthcare professionals through required checkups and consultancy.<sup>[5,6]</sup> The purpose of prenatal care is to protect and improve maternal and infant health, diagnose and treat health problems which occur before, or may occur associated with, pregnancy and reduce maternal and fetal mortality and morbidity.<sup>[7-9]</sup> Globally, while 86% of pregnant women access antenatal care with a skilled health personnel at least once, only 62% receive sufficient (four and above) antenatal visits.<sup>[10]</sup> In Türkiye, it was determined that 90% of pregnant women receive prenatal care in 2018.<sup>[11]</sup> According to the 2018 Türkiye Demographic and Health Survey (TDHS) data, women received prenatal care from skilled healthcare professionals such as physicians (96%), midwives (1.4%), and nurses (1.9%).<sup>[11]</sup> It is known that prenatal care will not only facilitate childbirth preparation of pregnant women and their communication with healthcare professionals but also improve the use and quality of women health services after delivery.<sup>[9,12]</sup>

Health literacy refers to the extent to which individuals possess the ability in understanding fundamental health information and accessing necessary services essential for making informed and suitable health-related choices.<sup>[13-15]</sup> Considering that women are often highly motivated to promote their health for a healthy pregnancy for themselves and their offspring, this period is defined as a "teachable moment" where actions in improving health literacy can be targeted and improved through regular interaction between women and healthcare system.<sup>[16]</sup> This is especially true in disadvantageous populations where young women and women who have low academic achievement are more likely to have low compliance with healthcare practices and are therefore less likely to follow health recommendations for pregnancy.<sup>[17]</sup>

The goals of this study are to assess the knowledge level of prenatal diagnosis and antenatal care in pregnant women, examine certain variables believed to be associated, and evaluate its correlation with health literacy.

## Research Questions

1. What is the level of knowledge on prenatal diagnosis and antenatal care in a pregnant woman?
2. What is the level of health literacy in a pregnant woman?
3. Is there a relationship between a pregnant woman's health literacy and their level of knowledge on prenatal diagnosis and antenatal care?

## Materials and Methods

### Design and Sample

This cross-sectional study was conducted on pregnant women attending a Training and Research Hospital in Türkiye, from March 15, 2020, to September 15, 2020. The minimum required sample size for this study was determined as 386 using the "Minitab 16 Statistical Software Package" ( $p=0.50$ , Comparison  $p=0.42$ ,  $\alpha: 0.05$ , power of test: 0.88). The study group comprised pregnant women attending the pregnancy follow-up polyclinic of the hospital during the study period who willingly participated. Thirteen pregnant women who declined to participate and eight pregnant women with multiple pregnancies were excluded from the study.

### Instruments

A questionnaire was developed based on the literature to gather data, encompassing various aspects. The questionnaire covered socio-demographic characteristics of pregnant women, details about obstetric and prenatal diagnosis tests, 26 knowledge-based questions aimed at assessing the level of knowledge on prenatal diagnosis and antenatal care, variables thought to be associated, and items from the health literacy scale.

In our study, we evaluated the knowledge of pregnant women with regard to prenatal diagnosis and antenatal care by utilizing a set of 26 knowledge-based questions developed from existing literature. The professional opinions of 4 Public Health physicians, 2 Obstetricians-Gynecologists, and 4 faculty members at Obstetrics and Gynecology Nursing Department were sought, and these specialists confirmed that the questions were acceptable. The knowledge questions were prepared with the options of "Correct," "Incorrect," and "I Don't Know" (for example "If both spouses are carrier of thalassemia, they can have a healthy child through pre-implantation genetic diagnosis under public health insurance" or "Using any kind of drugs and having an X-ray should be avoided while planning or during a pregnancy").

Knowledge questions in the questionnaire were scored, and each correct answer was given "1 point." The scores to be obtained from the knowledge questions ranged from 0 to 26. A DUMMY variable was created with a standard deviation of 0.00001 and a mean of 0.0001 showing normal distribution. The pregnant women were divided into two clusters through K-means clustering according to their knowledge scores by using this variable. Then, the scores obtained on the basis of these cluster characteristics were assessed with ROC analysis. The value with the highest sensitivity and specificity (100%) based on ROC analysis was considered cut-off.<sup>[18]</sup> Participants who achieved a score of 16.5 and above, as determined through a receiver operating characteristic (ROC) analysis, were categorized as having a "sufficient level of knowledge on prenatal diagnosis and antenatal care." The internal consistency coefficient, assessed through Cronbach's Alpha coefficient, was calculated as 0.81 in the conducted analysis.

The health literacy levels of pregnant women were evaluated using the Short Form of the European Health Literacy Survey Questionnaire. This survey questionnaire, developed by the European Health Literacy Project Consortium in 2012, served as the instrument in assessing health literacy in our study.<sup>[19]</sup> The validity and reliability study of the survey questionnaire in Türkiye was conducted by Öztürk Emir al. et al.<sup>[20]</sup> in 2018. The questionnaire included 16 questions, each rated on a 5-point Likert scale with scores ranging from 0 to 4. The "Standardized index score" formula is applied in calculating the total score obtained from the survey questionnaire, where the index score is determined as  $\{\text{Index score} = (\text{average} - 1) * (50/3)\}$ . The resulting index score ranges from 0 to 50, and individuals scoring 33 and above are considered to have sufficient health literacy.

In this study, women who are actively involved in a revenue-generating job were categorized as "working." Family income was evaluated by pregnant women themselves, who perceived it as low, average, or high. Those who regularly smoked at least one cigarette per day were classified as "smokers." Conversations with pregnant women occurred in the waiting room of the pregnancy follow-up polyclinic. Prior to their participation, informed consent was obtained from pregnant women after providing them with information about the study's subject and objectives. The questions were answered by the pregnant women under the supervision of the researchers. The researchers provided pregnant women with information on unknown medical terminology in the questions. This procedure had a duration of approximately 15–20 minutes.

## Ethical Statement

The study received approval from the Ankara Yıldırım Beyazıt University's Ethics Committee (resolution dated 07.31.2019, number 09). Moreover, requisite permissions were secured from the hospital administration in gathering the necessary data. After the participating pregnant women in the study were informed about the study, their verbal and written consent (Informed Consent Form) was obtained. Artificial intelligence-enabled technologies were not used in our study. The study was conducted in compliance with the Declaration of Helsinki.

## Data Analysis

The collected data were analyzed using the IBM SPSS (version 20.0) Statistical Package Program and Minitab 16 Statistical Software Package on a computer. Chi-squared test and logistic regression analysis (Stepwise Backward Wald Regression) were employed for the analyses. A statistical significance level of  $p \leq 0.05$  was considered.

## Results

The age of women in the study group ranged from 17 to 42, with a mean age of  $28.34 \pm 5.20$  years. Pregnant woman's scores on knowledge questions about prenatal diagnosis and antenatal care varied from 4 to 26, with a mean score of  $18.35 \pm 4.47$ . The knowledge question which received the highest accuracy rate was "Smoking and alcohol consumption should be entirely stopped before pregnancy" with 96.6%, whereas the least accurately answered question was "If both spouses are carrier of thalassemia, they can have a healthy child through pre-implantation genetic diagnosis under public health insurance" with 21.0%. Based on the scores on knowledge questions, 263 women (68.1%) were identified to have a sufficient level of knowledge on prenatal diagnosis and antenatal care. The distribution of pregnant women with and without sufficient level of knowledge on prenatal diagnosis and antenatal care by some socio-demographic characteristics is provided in Table 1.

In the study group, 139 women (36.0%) had 1 pregnancy and 163 women (42.2%) did not give birth before. 361 women (93.5%) had regular health checkups during pregnancy, 260 women (67.4%) obtained information on prenatal diagnosis and antenatal care before pregnancy, and 326 women (84.5%) have heard the screening tests for Trisomy 13, 18, and 21. The distribution of pregnant women by some characteristics related to obstetrics and prenatal diagnostic tests is provided in Table 2.

**Table 1.** Distribution of pregnant women with and without sufficient level of knowledge on prenatal diagnosis and antenatal care by some sociodemographic characteristics

Some socio-demographic characteristics	Level of knowledge on prenatal diagnosis and antenatal care						Test value X <sup>2</sup> ; p
	Insufficient		Sufficient		Total		
	n	%*	n	%*	n	%*	
Age group							3.759; 0.053
29≤	82	35.7	148	64.3	230	59.6	
≥30	41	26.3	115	73.7	156	40.4	
Educational level							<b>25.731 ;0.000</b>
Secondary school and below	44	44.4	55	55.6	99	25.6	
High school	60	37.3	101	62.7	101	41.7	
University	19	15.1	107	84.9	126	32.6	
Working status							<b>8.501; 0.004</b>
Working	11	16.2	57	83.8	68	17.6	
Not working	112	35.2	206	64.8	318	82.4	
Family income status							<b>21.079; 0.000</b>
Low	9	81.8	2	18.2	11	2.8	
Average	96	34.4	183	65.6	279	72.3	
High	18	18.8	78	81.3	96	24.9	
Family type							0.085; 0.771
Nucleus	106	31.5	231	68.5	337	87.3	
Extended	17	34.7	32	65.3	49	12.7	
Smoking							<b>6.502; 0.011</b>
Non-smoker	89	28.7	221	71.3	310	80.3	
Smoker	34	44.7	42	55.3	76	19.7	
Spouse's educational level							<b>27.741; 0.000</b>
Secondary school and below	52	52.0	48	48.0	100	25.9	
High school	44	28.9	108	71.1	152	39.4	
University	27	20.1	107	79.9	134	34.7	
History of a physician-diagnosed disease requiring constant drug use							0.626; 0.429
No	110	32.7	226	67.3	336	87.0	
Yes	13	26.0	37	74.0	50	13.0	
Regular exercise							0.000; 0.987
No	78	31.8	167	68.2	245	63.5	
Yes	45	31.9	96	68.1	141	36.5	
Family history of a physician-diagnosed disease requiring constant drug use							0.662; 0.416
No	99	32.9	202	67.1	301	78.0	
Yes	24	28.2	61	71.8	85	22.0	
Consanguine marriage							0.280; 0.597
No	88	731.1	217	68.9	315	81.6	
Yes	25	35.2	46	64.8	71	18.4	
History of a genetic disease in the family/close relatives							0.000; 1.000
No	113	31.8	242	68.2	355	92.0	
Yes	10	32.3	21	67.7	31	8.0	
Healthcare professional in the family							<b>4.556; 0.033</b>
No	109	34.4	208	65.6	317	82.1	
Yes	14	20.3	55	79.7	69	17.9	
Total	123	31.9	263	68.1	386	100.0	

**Table 2.** Distribution of pregnant women with and without sufficient level of knowledge on prenatal diagnosis and antenatal care by some characteristics in relation to obstetrics and prenatal diagnostic tests

Some characteristics related to obstetrics and prenatal diagnostic tests	Level of knowledge on prenatal diagnosis and antenatal care						Test value X <sup>2</sup> ; p
	Insufficient		Sufficient		Total		
	n	%*	n	%*	n	%*	
Number of pregnancies							0.106; 0.948
1	43	30.9	96	69.1	139	36.0	
2	39	32.0	83	68.0	122	31.6	
≥3	41	32.8	84	67.2	125	32.4	
Gestational week							2.187; 0.335
23≤	24	40.0	36	60.0	60	15.5	
24–35	41	30.8	92	69.2	133	34.5	
≥36	58	30.1	135	69.9	193	50.0	
Number of childbirth							0.472; 0.790
0	52	31.9	111	68.1	163	42.2	
1	40	30.1	93	69.9	133	34.5	
≥2	31	34.4	59	65.6	90	23.3	
History of miscarriage							0.354; 0.552
No	93	31.1	206	68.9	299	77.5	
Yes	30	34.5	57	65.5	87	22.5	
Regular health checkups during pregnancy							<b>8.409; 0.004</b>
No	15	60.0	10	40.0	25	6.5	
Yes	108	29.9	253	70.1	361	93.5	
Having been informed on prenatal diagnosis and antenatal care before pregnancy							<b>21.383; 0.000</b>
Not informed	60	47.6	66	52.4	126	32.6	
Informed	63	24.2	197	75.8	260	67.4	
Prenatal diagnosis test in previous pregnancies *(n=247)							0.723; 0.395
No	51	34.5	97	65.5	148	59.9	
Yes	29	29.3	70	70.7	99	40.1	
Pregnant women with someone in the family/inner circle who had prenatal diagnostic test							1.581; 0.209
No	102	30.5	232	69.5	334	86.5	
Yes	21	40.4	31	59.6	52	13.5	
Having heard of screening tests for Trisomy 13, 18 and 21							<b>6.384; 0.012</b>
No	28	46.7	32	53.3	60	15.5	
Yes	95	29.1	231	70.9	326	84.5	
Total	123	31.9	263	68.1	386	100.0	

The results of the logistic regression analysis generated with variables (age, educational status, spouse's educational status, working status, family income status, smoking, healthcare professional in the family, regular health checkups during pregnancy, having been informed on prenatal diagnosis and antenatal care before pregnancy and having heard of screening tests for Trisomy 13, 18, and 21) determined to be associated with the level of knowledge on prenatal diagnosis and antenatal care of pregnant women are provided in Table 3.

While "nuchal scan" was the most known prenatal test with 32.1%, "umbilical cord sampling" was the least known prenatal test (6.5%) that the pregnant women in the study have heard of. As one person may have heard of more than one prenatal diagnostic test, the numbers represent known prenatal diagnostic tests, not persons. The distribution of the prenatal diagnostic tests that the pregnant women have heard of is given in Table 4.

**Table 3.** Results of logistic regression analysis generated with variables determined to be associated with the level of knowledge on prenatal diagnosis and antenatal care of pregnant women (final step)

Variables	β	SE	p	OR	95% CI
Working status (reference: working)					
Not working	-0.722	0.377	0.055	0.486	0.232–1.017
Family income status (reference: high)					
Average	2.305	0.857	0.007	10.020	1.868–53.765
Low	1.628	0.821	0.047	5.092	1.019–25.445
Spouse’s educational status (reference: university)					
High school	0.939	0.326	0.004	2.556	1.349–4.843
Secondary school and below	0.744	0.294	0.011	2.104	1.183–3.742
Regular health checkups during pregnancy (reference: yes)					
No	0.798	0.472	0.091	2.221	0.881–5.600
Having been informed on prenatal diagnosis and antenatal care before pregnancy (reference: No)					
Yes	0.949	0.249	0.000	2.583	1.585–4.212
Having heard of screening tests for Trisomy 13, 18 and 21 (reference: yes)					
No	-0.723	0.313	0.021	0.486	0.263–0.896
Constant	-2.156	0.993	0.030	–	–

SE: Standard error; OR: Odds ratio; CI: Confidence interval.

**Table 4.** Distribution of the prenatal diagnostic tests that the pregnant women have heard of

Prenatal diagnostic tests that the pregnant women have heard of	Number	Percentage
Nuchal scan	287	32.1
Triple test	261	29.2
Chorionic villus sampling	59	6.6
Ultrasound	113	12.7
Umbilical cord sampling	58	6.5
Amniocentesis	115	12.9
Total	893	100.0

A total of 260 pregnant women (67.4%) reported that they had received information about prenatal diagnosis and antenatal care before becoming pregnant. As a pregnant woman may have obtained information from multiple resources, the information resources refer to number of resources, not persons. While the most used resource for obtaining information on prenatal diagnosis and antenatal care was healthcare professionals (37.3%), the least used resource was newspapers/magazines (4.4%). The distribution of resources used by pregnant women for obtaining information on prenatal diagnosis and antenatal care is given in Table 5.

Within the study group, 263 women (68.1%) demonstrated an adequate level of health literacy. The analysis revealed that the understanding of prenatal diagnosis and antenatal

**Table 5.** Resources used by pregnant women in obtaining information on prenatal diagnosis and antenatal care

Information resources on prenatal diagnosis and antenatal care	Number	Percentage
Healthcare professionals	154	37.3
TV/Radio	24	5.8
Newspapers/Magazines	18	4.4
Books/Brochures	55	13.3
Internet/Social media	128	31.0
Inner circle/Friends	29	7.0
Other	5	1.2
Total	413	100.0

care was notably higher among those with sufficient health literacy in contrast to those lacking adequate health literacy. The distribution of knowledge levels regarding prenatal diagnosis and antenatal care among pregnant women, categorized by sufficient and insufficient levels of health literacy, is outlined in Table 6.

### Discussion

Antenatal and postnatal healthcare services are extremely important in reducing preventable maternal and infant death. Having high health literacy levels is desirable for obtaining positive results from antenatal healthcare services. In this study, which aimed to explore the relationship between health literacy and the knowledge



**Table 6.** Distribution of level of knowledge on prenatal diagnosis and antenatal care of pregnant women in the study group by those with and without sufficient level of health literacy

Level of health literacy	Level of knowledge on prenatal diagnosis and antenatal care				Total	
	Insufficient		Sufficient			
	n	%	n	%		
Insufficient	57	46.3	66	53.7	123	31.9
Sufficient	66	25.1	197	74.9	263	68.1
Total	123	31.9	263	68.1	386	10.0

$\chi^2=17.424$ ;  $p=0.000$ .

level of prenatal diagnosis and antenatal care, 263 women (68.1%) were found to possess a sufficient level of knowledge in these areas. Ogamba et al.<sup>[21]</sup> reported that 63% of pregnant women in their study were informed about prenatal screening and diagnosis in the first three months of pregnancy, while another study suggested that women in the study group were knowledgeable about test procedures and detectable anomalies.<sup>[22]</sup> The scores obtained by pregnant women from knowledge questions on prenatal diagnosis and antenatal care indicated a moderate level of knowledge. Similarly, existing literature includes studies highlighting a lack of knowledge on preconception care.<sup>[23–29]</sup>

Our study revealed that there is a positive correlation between the level of education in pregnant women and their sufficiency of knowledge on prenatal diagnosis and antenatal care. Nevertheless, logistic regression analysis indicated that this difference was nullified, as shown in Table 1. Some studies showed that women with low educational status usually have less information on antenatal care services and experience more difficulties in accessing such services.<sup>[30–32]</sup> Unlike our study, Seven et al.<sup>[33]</sup> found no relationship between the women's decision of having antenatal screening test and their educational status and level of knowledge on antenatal tests. Women with a higher educational status are inclined to be more aware of the existence of antenatal care services and the benefits associated with utilizing these services.

It was found that, among pregnant women in the study group with a revenue-generating job, the number of women with sufficient level of knowledge on prenatal diagnosis and antenatal care was higher than that of the unemployed women. Basli<sup>[29]</sup> reported that awareness on the concept of preconception consultation and care is lower in unemployed women. It may be because of the fact that working women

have higher social interactions and more means of access to information. However, the logistic regression analysis showed that this difference was eliminated (Table 1).

In our study, it was observed that the number of women with a sufficient level of knowledge on prenatal diagnosis and antenatal care was significantly lower among women with low family income. Amanak and Karacam<sup>[34]</sup> also reported that the rate of receiving preconception consultancy and care is lower in those with low income. It is known that income status facilitates the access to information. In the literature, this is also associated with the easier access to health information and spending power of individuals with good financial situation.<sup>[35,36]</sup> Further analysis showed that the level of knowledge on prenatal diagnosis and antenatal care was 5.092 times lower in those with low family income (Table 1).

The better the education pregnant women's spouse have, the higher their sufficiency of knowledge on prenatal diagnosis and antenatal care is. The logistic regression analysis also showed the existence of this relationship (Table 1). Basli<sup>[29]</sup> reported that the women's level of knowledge on preconception consultancy and care decreases with spouse's educational status. It is known that education facilitates access to healthcare services and information and increases level of knowledge on antenatal care. There are studies supporting the existence of a positive and strong relationship between educational status and health information.<sup>[37,38]</sup>

The sufficiency of the level of knowledge on prenatal diagnosis and antenatal care was higher in those with a healthcare professional in the family. Atar<sup>[39]</sup> found that the pregnant women obtain information from their relatives and friends. Sahin et al.<sup>[40]</sup> reported that the level of knowledge on childbirth was higher in those with a healthcare professional in the family than those without a healthcare professional family member. It is known that healthcare professionals having an educational role are effective in increasing awareness on health information and developing positive health behaviors in their immediate families.

In our study, it was found that women who obtained information on prenatal diagnosis and antenatal care before pregnancy have higher level of knowledge on prenatal diagnosis and antenatal care. The logistic regression analysis showed that sufficiency of level of knowledge was 2.583 times higher in those who obtained information on prenatal diagnosis and antenatal care before pregnancy (Table 1). Preconception period is important in increasing the level of knowledge on prenatal diagnosis and antenatal care. This is a period when health-related information

and behaviors can be learned. This period which can be considered as a preparation process for pregnancy is an opportunity in increasing the level of knowledge on prenatal diagnosis and antenatal care. Furthermore, preconception educational services for women planning to become pregnant should be more common.

While “nuchal scan” was the most known prenatal screening test with 32.1%, “umbilical cord sampling” was the least known prenatal screening test (6.5%) that the pregnant women in the study group have heard of. The fact that nuchal scan is known more may be the result of the fact that it is done routinely early in the pregnancy. As umbilical cord sampling is an invasive procedure which is done in case of increasing doubts about fetal health, it is possible that it is less known. Pregnant women and their family should be informed well about genetic diseases, screening tests, how they are conducted and interpreted as well as following tests to be conducted.<sup>[41,42]</sup>

The study found that pregnant women primarily obtained information on prenatal diagnosis and antenatal care from healthcare professionals. Based on the 2018 TDHS data, 96% of women received prenatal care from healthcare professionals.<sup>[11]</sup> Some studies reported that the information resource used for preconception consultancy is mostly healthcare professionals.<sup>[28,34]</sup> van der Zee et al.<sup>[43]</sup> reported that women in the study used social media and internet in accessing relevant information. While it is important to access information through reliable online resources, the pregnant women are aware of the importance of prenatal diagnosis and antenatal care. Therefore, the fact that the most used information resource is healthcare professionals is considered a positive result.

The research findings indicated a significantly higher level of knowledge concerning prenatal diagnosis and antenatal care among pregnant women with adequate health literacy in comparison to those lacking sufficient health literacy. 68.1% of the women in the study group had sufficient level of health literacy. Health literacy is particularly important for identifying risk factors in pregnant women as well as for ideal diet during pregnancy and healthy lifestyle. It affects the status of pregnancy and delivery of a healthy infant. The studies conducted in this regard reported that mothers with high health literacy have a lower rate of low birthweight infant, preterm delivery, and neonatal baby mortality rate, and breastfeeding is more common in these women. However, it is reported that low health literacy may cause problems in pregnancy and increased complication risk, and low birth weight infant delivery is twice more common in such women.<sup>[44]</sup> Therefore, promoting maternal

health is one of the key factors in controlling neonatal low birth weight.<sup>[45,46]</sup> Ghanbari et al.<sup>[47]</sup> found that 45.4% of the women have sufficient level of health literacy, Guler et al.<sup>[44]</sup> reported that 33.9% of the pregnant women have sufficient health literacy, and Hom et al.<sup>[48]</sup> concluded that the score for health literacy in pregnant women is normal and there is a significant relationship between awareness and health levels of women. Enhancing maternal health is one of the pivotal goals outlined in the Millennium Development Goals. Pregnancy represents one of the most critical phases in a woman's life, and a significant proportion of deaths during pregnancy or labor can be prevented through appropriate interventions. Hence, ensuring high-quality healthcare services throughout pregnancy and in the postnatal period stands as a fundamental strategy in advancing maternal and infant health while also serving as a crucial measure in preventing fatalities.<sup>[49]</sup>

### Limitations

The limitations of the study may encompass its cross-sectional design, the absence of a specific scale for assessing the level of knowledge on prenatal diagnosis and antenatal care, and the restriction to pregnant women from a single hospital.

### Conclusion

The findings of this study unveiled that 31.9% of pregnant women demonstrated inadequate knowledge levels concerning prenatal diagnosis and antenatal care. Noteworthy is the question which garnered the lowest accuracy, relating to the belief that “If both spouses are carriers of thalassemia, they can have a healthy child through pre-implantation genetic diagnosis under public health insurance,” with a response rate of 21.0%. This emphasizes the fact that new prenatal tests, newly introduced preconception, antenatal and newborn preventive healthcare services, and screening programs should be publicized. It would be advantageous for all healthcare professionals involved in pregnancy care, particularly midwives and nurses, to provide consultancy and education services which will increase the level of knowledge on prenatal diagnosis and antenatal care in pregnant women. These topics should be added to educational content in achieving sufficient health literacy. Efficient announcements such as public service ads and easily accessible materials like brochures and posters are needed. Elevating the health literacy of pregnant women holds significance in augmenting the count of mothers accessing prenatal diagnosis and antenatal care, thereby contributing to a decrease in maternal and infant mortality rates.



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