

Do Pregnant Women's Information Sources Affect their Attitudes toward the Oral Glucose Tolerance Test? A Descriptive Cross-Sectional Study

Hande Yağcan

Dokuz Eylül University Faculty of Nursing, İzmir, Turkey

Elif Uludağ

Pamukkale University, Faculty of Health Science, Denizli, Turkey

Nuran Nur Aypar Akbağ

Karamanoglu Mehmetbey University, Faculty of Health Science, Karaman, Turkey

Hülya Özberk

Dokuz Eylül University Faculty of Nursing, İzmir, Turkey

Abstract

The occurrence of gestational diabetes has increased recently. This condition, which can have extremely negative consequences for both mother and baby, can be detected by using an oral glucose tolerance test, and remedial action can be taken to prevent or reduce complications based on the results of the test. However, information about the oral glucose tolerance test (the OGTT) from different sources can negatively affect pregnant women and their families, resulting in their not taking the test. The aim of this study is to determine the knowledge and attitudes of women in the third trimester of pregnancy in relation to the OGTT. This descriptive cross-sectional study was conducted at two university hospitals between October 2017 and June 2018. The voluntary participants comprised 303 pregnant women in the third trimester of pregnancy. The research data were collected using "Demographic Data Collection Form and Determination Form for the OGTT Screening Status of Pregnant Women." The relationship between categorical variables was analyzed using chi-square tests. The percentage of pregnant women who did not have the OGTT monitoring was 32.7%. The main reasons for this were media exposure (28.6%), lack of knowledge (19.4%), and doctor's recommendation (19.4%). Forty-three percent of the pregnant women who did not have the OGTT were not aware of why the test done and 73.3% thought that the OGTT was dangerous for the baby. Of these, 58.8% of pregnant women received the information about the OGTT from doctors and 41.2% from midwives and nurses. A significant difference was found between the OGTT status of women according to their place of

residence, number of pregnancies, knowledge about why the OGTT is performed, information sources, and the belief that the test is dangerous to the health of mother and baby ($p < 0.05$). Not having OGTT screening during pregnancy can lead to irremediable negative complications for the health of both mother and baby.

Key words

blood glucose monitoring, gestational diabetes mellitus, health knowledge, mass media, practice

Introduction

Pregnant women's knowledge about monitoring tests performed during pregnancy and their information sources for that knowledge are very important for their own health and that of the fetus. The literature shows that their main information sources regarding the oral glucose tolerance test (the OGTT) are mainly obstetricians, the internet, and the media. Negative and unfounded information in the media and the different approaches of gynecologists affect pregnant women, even if they are well educated and have access to the healthcare system. If they are not screened using the OGTT, this will lead to unhealthy babies and increase health expenditure, damaging the national economy (Bankovic Radovanovic, & Kocijancic, 2015; Bjelke, Martinsson, Lendahls, & Oscarsson, 2016; Özceylan & Toprak, 2020; Yaprak, Gümüştakım, Abdullah, & Doğaner, 2019).

The World Health Organization (WHO) classifies the first instance of hyperglycemia, detected at any time during pregnancy, as gestational diabetes mellitus (GDM) (WHO, 2018). In 2015, it was estimated that hyperglycemia affected 16.2% of all pregnancies worldwide and proportion of hyperglycemia in pregnancy cases due to gestational diabetes was 85.1% (Ogurtsova et al., 2017). Worldwide, the average rate of GDM varies between 6% and 13% (Zhu & Zhang, 2016). In a local study conducted in Turkey, the prevalence of GDM was found to be 7.7% (range: 1.9%–27.9%) (Karaçam & Çelik, 2021).

GDM is an important problem that causes illness and death in both mothers and their babies. Risk factors for GDM include obesity, maternal age (below 20, above 35), family history of diabetes, impaired glucose tolerance in former pregnancies, and fetal macrosomia (Kiani, Ghare Naz, Sayehmiri, Sayehmiri, & Zali, 2017). GDM causes complications such as preeclampsia, premature rupture of the

membrane, premature birth, the need for a cesarean section, fetal macrosomia, polyhydramnios, malformations, shoulder dystocia, neonatal hypoglycemia, and perinatal mortality (Fadl, Ostlund, Magnuson, & Hanson, 2010).

There is currently no global consensus about appropriate monitoring and diagnostic testing for GDM, the diagnostic threshold values of each test, or whether it should be applied selectively or to all pregnant women (ADA, 2020; WHO, 2018). The most widely used test for GDM diagnosis is the OGTT which can be performed in two steps (if the 50 g glucose test is positive, it should be followed by a 100 g, 3-hour test) (ACOG, 2018; ADA, 2020) or one step (using 75 g, 2-hour test) between gestational weeks 24 and 28 (Coustan, Lowe, Metzger, & Dyer, 2010; WHO, 2018). However, there is not enough evidence for why the test should be performed during these gestational weeks. Moreover, taking the OGTT earlier could reduce fetal exposure to hyperglycemia by providing pregnant women with opportunities for earlier treatment. Children of mothers with GDM are at a higher risk of developing diabetes, obesity, and metabolic disorders in their future lives due to their exposure to maternal hyperglycemia prior to diagnosis (Liu et al., 2016).

No evidence has been reported about maternal and/or fetal complications as a result of the OGTT, and the test is important for the early detection of GDM through screening in order to prevent GDM complications (TJOD, 2021). However, after a famous heart and internal diseases specialist in Turkey stated that the OGTT screening in pregnancy is harmful and should not be performed, obstetrics and gynecology specialists are now expressing different opinions about the test (Medimagazin, 2014). In Turkey, due to these discussions, the proportion of pregnant women undergoing the OGTT has decreased in recent years. The primary reason for this is their belief that the test is harmful to themselves and their babies (Başbuğ, Ellibeş Kaya, Sönmez, & Yıldırım, 2018; Hocoğlu et al., 2019; Karasu 2018; Yaprak et al., 2019).

Contrary to opinions in the media, TJOD (2021) states that the OGTT does not cause any harm, and that if this test is not carried out, the pregnant woman and fetus are at serious risk. In Turkey, according to Ministry of Health advice, pregnant women attend antenatal care at least four times during the entire period of their pregnancy or, generally, every month after the first trimester. Obstetricians recommend the OGTT should be routinely administered for pregnant women but the final decision lies with the pregnant women themselves (Republic of Turkey Ministry of Health, 2014; HUIPS, 2019).

Some cultural features of the country increase the likelihood of pregnant women developing GDM. When women become pregnant, they are encouraged by

their families to eat frequently and consume carbohydrate- and fat-based diets. This is because they believe that when women do not gain enough weight in pregnancy, their babies are not fed well in the uterus. This weight gained during pregnancy, which is not lost after childbirth due to breastfeeding, affects the health of mothers and their babies (Çalim, Demirci, & Ulaş Şen, 2016; Sarı et al., 2015). According to the 2018-Turkey Demographic and Health Survey, 24.8% of women in Turkey are obese, and obesity during pregnancy is an independent GDM risk factor (HUIPS, 2019; Erem, Kuzu, Deger, & Can, 2015; Kosman et al., 2016).

Literature Review

Pregnant women's knowledge about monitoring tests performed during pregnancy and their information sources are very important for their own health and that of the fetus (Hewage et al., 2020; Thomas, Pienyu, & Rajan, 2019). Pregnant women need information about GDM, the OGTT, blood sugar management, and the diagnosis process (Thomas et al., 2019). Health professionals, GDM outpatient clinics, the internet, the media, the family, and the social environment are among pregnant women's sources of information about GDM (Bjelke et al., 2016; Hewage et al., 2020; Thomas et al., 2019).

According to the literature, although it depends on the development level of different countries, the rate of searching for information on the internet about the pregnancy process is more than 50% (Bjelke et al., 2016; Gao, Larsson, & Luo, 2013). In Turkey, many pregnant women learn this information via social media and studies have determined that their health-related decisions are also affected by health programs seen on television. They do not have information about the OGTT, they do not want to have an OGTT, they do not know the reasons for not having the test, their doctor does not recommend the test, and they think that the OGTT is harmful. Pregnant women develop these opinions from television, the internet, their social environment, and talking with healthcare professionals (Başbuğ et al., 2018; Hocaoğlu et al., 2019; Karasu, 2018; Özceylan & Toprak, 2020; Yaprak et al., 2019). These studies show that speculative and incorrect information acquired by women through mass media reduces their trust in the OGTT and affects their attitude toward the test; it is not an effect caused by the healthcare system. The OGTTs are a freely accessible test, routinely performed in state hospitals and covered by social security insurance in Turkey (Başbuğ et al., 2018; Özceylan & Toprak, 2020; Yaprak et al., 2019).

However, among the reasons for pregnant women in other countries not having

the OGTTs, some are related to individual health systems, such as a lack of obstetric specialists or unavailability of suitable laboratories in which to perform the tests. Those undergoing the test are required to fast and pregnant women do not like being hungry when they go to hospital. There are also difficulties in accessing healthcare systems and a lack of awareness about GDM complications (Bhavadharini, Uma, Saravan, & Mohan, 2016). One study determined that 12.3% of pregnant women are at risk of GDM and 32.2% of these did not have the test. Among the reasons for pregnant women not taking the test were an inability to tolerate the test protocol (21%), social/mental health problems (22%), and difficulties in attending more than one prenatal appointment (15%) (Lachmann et al., 2020).

These results are important in terms of complications due to GDM because one out of every six live births is affected by hyperglycemia during pregnancy and 84% of them have GDM (IDF, 2019). In cases where GDM has not been diagnosed, related complications are more commonly seen than when a successful diagnosis has taken place (Landon et al., 2009). In addition, if pregnant women cannot get enough information from healthcare professionals about GDM and the OGTTs, and they receive false information from the media and internet sources, and if the cultural values of the woman and her family conflict with the GDM diagnosis process, the pregnancy process can become a negative experience if GDM is present (Hewage et al., 2020; Yuen & Wong, 2015). To protect the health of pregnant women and their babies from the effects of this misinformation, the ministry of health, obstetric specialists, nurses, and midwives should improve pregnant women's awareness by providing education and evidence-based, reliable, and correct the OGTT information, using and creating safe media platforms, video tutorials, pregnancy education classes within hospitals, and discussion programs on television to achieve this end.

Current Study

Cultural nutritional habits and misinformation from the mass media affect the OGTT rates of pregnant women in Turkey, potentially increasing the rate of GDM and its related complications. For this reason, it is necessary to determine the factors affecting the OGTT attitudes of pregnant women by identifying their information sources. This study's data could help to prevent an increase in GDM rates by showing health professionals which factors affect the OGTT rates in pregnant women.

Method

The study was conducted descriptively and by using a cross-sectional method to determine the knowledge and attitudes of women toward the OGTT during the third trimester of pregnancy. It was carried out in the obstetrics outpatient clinics at the Dokuz Eylül University Hospital and the Tepecik State Hospital, which are the two main central maternity hospitals in İzmir, Western Turkey (a relatively developed and educated region) between October 2017 and June 2018.

Sample and Participant Selection

The study sample comprised 303 pregnant women who volunteered to participate in the study and satisfied the inclusion criteria. The criteria were as follows: Aged over 18 years, in the third trimester of their pregnancy, visited clinics for routine pregnancy follow-ups, no chronic or psychiatric disorders, could understand the spoken language, and voluntarily agreed to participate in the study. The exclusion criteria were unwillingness to participate in the study, having been diagnosed with gestational diabetes, and having been diagnosed with diabetes before pregnancy. It was planned to collect data from 381 women; however, 26 women were excluded from the study due to incomplete data collection forms, 7 due to having high blood-glucose levels (above 126 mg per dl when fasting; WHO, 2018), and 45 because they did not want to participate.

The study population was calculated using a sample size calculation formula for a finite universe. This formula is provided below. The finite universe was learned from the archive records of the hospitals, based on the number of patients who went to the same hospitals' obstetrics clinics for routine pregnancy follow-ups one year later. According to these records, the finite universe was found to be 36,246 pregnant women. The standardized values (p , q , d , t), according to this formula, were used in the calculation.

N = Finite Universe = 36,246

p = Frequency of the event examined = 0.5

q = (1-p) frequency of non-occurrence of the event examined = 0.5

d = Effect size = 0.05

t = t value for error margin at 95% confidence level, which is the theoretical value in the table t at a certain degree of freedom and at the determined error level: 1.96.

$$n = \frac{Nt^2pq}{d^2(N-1)+t^2pq}$$

$$\frac{(36246) \cdot (1,96)^2 \cdot (0,5) \cdot (0,5)}{(0,05)^2 \cdot (36247) + (1,96)^2 \cdot (0,5) \cdot (0,5)} \rightarrow 381 \quad X^{***}$$

Collecting the Research Data

Data collection was performed using the Demographic Data Collection Form and Determination Form for the OGTT Screening Status of Pregnant Women. The study data were collected from pregnant women who attended obstetric and gynecology outpatient clinics; they were given information about the study after the visit and their verbal and written informed consent forms were collected in the waiting room. The researchers conducted face-to-face interviews with the women who agreed to take part in the study to administer the data collection tools.

Data collection tools

Demographic data collection form: The demographic data collection form was developed by the researchers, comprising 9 questions concerned with socio-demographic features: age, education, occupation, income status, social security, family type, kinship status with spouse, obstetric week of pregnancy, and pregnancy history.

Determination form for the OGTT screening status of pregnant women: This was developed by the researchers based on the literature (ADA, 2020; Carolan, Steele, & Margetts, 2010; EMAT, 2020). The form comprised 6 questions concerned with the OGTT screening status and participants' knowledge of the OGTT screening during pregnancy. To assess the appropriateness of the questionnaire's content, 10 nurses and doctors, who were obstetrics experts in either a clinical or academic setting, reviewed the questionnaire items. The experts were asked to respond to each item using "1: not relevant," "2: somewhat relevant," "3: highly relevant," and "4: extremely relevant." They were asked to give suggestions for responses other than "extremely relevant." Once the experts' opinions had been gathered, the Scale Content Validity Index (S-CVI) was calculated. The SCV-I was found to be .98 (minimum recommended is .90; Polit & Beck, 2006), indicating that the questionnaire was appropriate. To establish the intelligibility of ques-

tionnaire items for the women, a pilot study was performed. The pilot study sample comprised 30 women who gave informed consent forms and fulfilled the inclusion criteria. It was observed that the women had no problems in understanding the questionnaire items. The data used in the pilot study were excluded from the study.

Data Analysis

Research data and analyses were performed using the SPSS for Windows version 25 (Statistical Package for Social Sciences) software. Data were analyzed using descriptive statistics (frequency, percentage and mean \pm std. deviation values) for the demographic characteristics of the pregnant women. The relationship between the OGTT Screening Status of Pregnant Women and the affecting factors/independent variables were analyzed using chi-square tests. A *p*-value of < 0.05 was accepted for the significance level of statistical tests.

Research Ethics

Institutional permits were obtained from the relevant university hospitals (No: 91829616/804, 82010743-045-3681) and the Non-Interventional Ethics Committee of a relevant research university (Date: 15/06/2017, No: 3275 GOA/16-35). It was explained to the women that they would not suffer any harm from this study. Informed consent forms and verbal consent were obtained from all of the women who participated voluntarily in the study. The confidentiality and anonymity of the participants was maintained by using codes, which were produced using data collection tools, and their identity information was not retained. In addition, the collected data was not shared with anyone.

Results

The mean age of the pregnant women participating in the study was 27.89 ± 5.86 years and the mean gestational age was 35.52 ± 2.94 weeks. The mean number of pregnancies was 2.00 ± 0.81 . It was determined that 33.3% of the pregnant women were primary school graduates, 84.2% were unemployed, and 83.1% had social insurance. The income level of 47.2% was between 0 and 2058 Turkish Lira (TL) (0-312 Euros, below the hunger limit for a family of four), 77.9% lived in nuclear families, and 78.2% did not have any kinship/ consanguineous status (the marriage between people that are “of the same blood” or close relatives) with their spouses (Table 1) (Hurriyet Daily News, 2019).

Table 1
 Socio-Demographic Characteristics of Pregnant Women

Characteristics		
	<i>n</i>	%
Age (years. avg/ $\bar{x}\pm SD$) (min-max)	27.89 \pm 5.86	(16.0-43.0)
Gestational Week	35.52 \pm 2.94	(21.0-42.0)
Number of Pregnancies	2.00 \pm 0.81	(1.0-3.0)
Educational Status		
Not iterate	14	4.6
Primary school	101	33.3
Secondary school	82	27.1
High school	70	23.1
University/postgraduate	36	11.9
Employment Status		
Yes	48	15.8
No	255	84.2
Social Security		
Insurance	252	83.1
Green card**	25	8.3
None	26	8.6
Income Status		
TL 0-2058 = 0-312 Euro*	143	47.2
TL 2059-6705 = 313-1016 Euro	83	27.4
Not stated	77	25.4
Family Type		
Nuclear family	236	77.9
Extended family	67	22.1
Kinship/Consanguineous Status with Spouse		
Yes	66	21.8
No	237	78.2

Note. N = 303

* Groupings were made based on the hunger limit of TL 2058 and the poverty limit of 6705 as determined for a family of four by the Confederation of Turkish Trade Unions in October 2019. ** The government funded non-contributory health insurance for poor people.

Of the pregnant women, 67.3% stated that they had had an OGTT and 32.7% stated that they had not. Pregnant women who had not had an OGTT gave media (28.6%), lack of knowledge (19.4%), and doctor's recommendation (19.4%) as the main reasons. Of the pregnant women who had not had an OGTT, 52.5% lived in a district (as opposed to a city or village) and 43.4% had had three or more pregnancies (Table 2).

When asked the question "Why is the OGTT administered?" 64.2% of pregnant

women who had had the OGTT gave the correct answer, which was “to determine the risk to women.” Of the pregnant women who had not had the OGTT, 43.4% answered by saying, “I don’t know.” It was determined that 76.3% of pregnant women who had had the OGTT received information about the test from doctors, while those who had not had the OGTT had received information from doctors (58.8%) and from midwives and nurses (41.2%). Pregnant women who had had the OGTT (74.5%) stated that there was no danger associated with having the test, but 30.3% of pregnant women who had not received the test stated that it was dangerous and 43.4% said they did not know whether it was dangerous or not. Half of the pregnant women who had had an OGTT and 73.3% of pregnant women who had not had an OGTT thought the test was dangerous for the baby (Table 2).

Table 2
Factors Influencing The OGTT- Screening Status among Pregnant Women

Characteristics	The OGTT- Screening Status (n = 303)				x ²	p
	Those who had the test		Those who did not have the test			
	(n =204)	%	(n =99)	%		
Place of Residence (n=303)						
City	101	49.5	42	42.4	7.376	0.02*
District	78	38.2	52	52.5		
Village	25	12.3	5	5.1		
Number of Pregnancies (n=303)						
One pregnancy	71	34.8	29	29.3	6.404	0.04*
Two pregnancies	74	36.3	27	27.3		
Three or more pregnancies	59	28.9	43	43.4		
Attitude of Pregnant Mothers toward the OGTT						
Why is an OGTT carried out? (n=303)						
To identify risky situations in women	131	64.2	38	38.4	25.904	0.00**
To monitor fetal anomalies	34	16.7	16	16.2		
To determine fetal mental retardation	5	2.4	2	2.0		
I do not know.	34	16.7	43	43.4		
Reason for not having an OGTT (n=98)						
Media	0	0.0	28	28.6	-	-
Scientific research	0	0.0	3	3.0		
Doctor's recommendation	0	0.0	19	19.4		
Lack of knowledge	0	0.0	19	19.4		
Not being able to go to hospital	0	0.0	13	13.3		

My family did not want it	0	0.0	13	13.3		
Due to nausea and vomiting	0	0.0	3	3.0		
From whom did you receive information about the OGTT? (n=207)						
From physician	132	76.3	20	58.8	4.449	0.03*
From midwife or nurse	41	23.7	14	41.2		
Does an OGTT pose any risks? (n=303)						
Yes	20	9.8	30	30.3	64.118	0.00*
No	152	74.5	26	26.3		
I do not know.	32	15.7	43	43.4		
For whom is the test dangerous? (n=50)						
Mother	7	35.0	7	23.3	3.548	0.16
Baby	10	50.0	22	73.3		
I do not know.	3	15.0	1	3.4		

Note. * $p < .05$. ** Fisher Chi-Square analysis result was taken

The chi-square analysis revealed a statistically significant difference between the OGTT screening status of the women and where they live (χ^2 : 7.376, $p < 0.02$), their number of pregnancies (χ^2 : 6.404, $p < 0.04$), knowing the reason for having an OGTT (χ^2 : 25.904, $p < 0.00$), information sources (χ^2 : 4.449, $p < 0.03$), and the belief that an OGTT is dangerous for mothers and their babies (χ^2 : 64.118, $p < 0.00$). However, no significant relationship was found between the opinions of pregnant women about harmfulness of OGTT test and their OGTT-monitoring status (χ^2 : 2.106, $p < 0.38$).

Discussion

Gestational diabetes mellitus (GDM) is a problem that can cause various complications for both the mother and her baby. To minimize these complications, it is extremely important to screen pregnant women and for them to receive appropriate treatment and care if they are diagnosed with GDM during the early period (ACOG, 2018; Pilliod et al., 2015; WHO, 2018). Although the importance of the OGTT is known, the knowledge and attitudes of women need to be determined if the test is to be successfully applied.

According to the study results, approximately one-third of the participants did not take an OGTT. A study by Özceylan and Toprak, which investigated the effects of media and internet controversies on the attitudes and behaviors of women toward the OGTT, determined that 18.99% of women were unaware of the test. Of those with a negative attitude toward the OGTT, many cited negative opinions

from the media and the internet as the reason (Özceylan & Toprak, 2020). Similarly, Başbuğ et al. (2018) stated that the group who did not have the test said that information from the media was a reason. Regardless of who informs pregnant women, the power of mass media in the monitoring of diabetes has also come to the forefront in this research. A famous physician stated that the OGTT was harmful; this had a negative effect on the test's application frequency in a university hospital, which decreased from 2013 to in 2017 (Karasu, 2018). It is reported that social media has a negative effect on the application of the OGTT worldwide (Martis, Brown, McAra-Couper, & Crowther, 2018; Yaprak et al., 2019). Different channels can be used as sources of information by groups that do not have sufficient access to health services (Shrestha et al., 2013). In this respect, it is known that the mass media is a very important source of public information. At the same time, it is thought that the media, which has a very sensitive position in society, can cause serious problems when used incorrectly.

Although people looking for information about health matters mostly consult health personnel, this study showed that a significant number of participants used other sources. In addition to the mass media, it was determined that family elders were used as sources of health information. Türkyılmaz, Keleştemur, Karataş Eray, Öcal, and Yavuz Avşar (2016) evaluated that most pregnant women benefited from information they received from radio and television when deciding whether to have the OGTT screening. Similarly, in the study conducted by Çakır and Çalık (2020), it was stated that more pregnant women obtained information about the OGTT from the internet or the media (49.1%) than any other source. Easier, cheaper and time-independent access to information increases the use of mass media (Türkyılmaz et al., 2016). In addition, weak decision-making abilities and the implementation mechanisms of women in patriarchal societies may prevent access to reliable health information. In a study that evaluated monitoring rates for GDM and reasons for women in rural and remote Western Australia not having an OGTT, it was determined that the will of family members was significant (Kirke et al., 2019). Women and their spouses, who have to live with family elders such as their mothers-in-law and fathers-in-law who hold authority, may have to do what is said to be a community tradition. This cultural norm may also have caused women to identify family elders as a source of health information in Turkey.

The research results indicate that the rate of the OGTT application in pregnant women living in a city was significantly higher than those living in smaller settlements. When the OGTT status of pregnant women living in New Zealand

and Western Australia for screening diabetes was evaluated, it was found that difficulties in accessing hospitals negatively affected their participation in screening (Kirke et al., 2019; Martis et al., 2018). In contrast to these results, a study carried out in Turkey determined that those living in villages (77%) had higher testing rates than those living in cities (56%) (Yaprak et al., 2019). Turkey's 2018 national demographic and health survey (2018) (rural: 458 women) revealed that the number of women attending antenatal care in rural areas had decreased compared to data from 2013 (rural: 479 women). In addition to this, the data showed that the follow-up deficiencies in the first trimester continued in rural areas, where the rate of those who did not receive care before the 14th gestational week was 14% (HUIPS, 2019).

The results of our study showed that not enough pregnant women who live in the west of the country take up the OGTT screening due to unfounded information in the mass media, generally originating with the well-known heart and internal diseases specialist mentioned in Karasu's study (2018). Considering that women living in the west of the country are better educated than in other regions, this reveals the magnitude of the impact. There are no scientifically approved side effects associated with the OGTT (Andrade, Pedrosa, & Passo, 2016). However, there is no consensus among experts, national, or international organizations regarding this screening. As a result, pregnant women may be affected by different expert opinions in the media. During the antenatal period, it is also very important to ensure the participation of families that are from different cultures. To achieve this, women should be invited to training together with their families in antenatal follow-ups, or home visits should be made. The family education should be tailored according to family structure and provided in such a way as to ensure antenatal follow-ups. Thus, it is thought that the responsibility of having the test should be shared with the mother, which can contribute to a more comfortable process for the woman.

It has been determined that the OGTT screening rates of women decrease significantly as the number of pregnancies increases. In another study in Turkey, 64.8% of primiparous women and 68.3% of multiparous women found the OGTT inconvenient (Genç Koyuncu, 2018). Furthermore, a qualitative research study found that the absence of diabetes in previous pregnancies adversely affected the decision to have screening tests in later pregnancies (Martis et al., 2018). Experience plays a very important role in people's lives. According to the test results, not having a negative experience or not having a diagnosis of GDM in a previous pregnancy causes pregnant women to assume that it will not occur in sub-

sequent pregnancies (Türkyılmaz et al., 2016). However, it is known that the incidence of GDM increases as the number of pregnancies increases (Qazi, Fahim, Qureshi, & Ul Haque, 2016). As women's age, weight, and metabolism change over time, risks in pregnancy also vary.

It was determined that information about the OGTT, generally provided by a physician, has a significant positive effect on the uptake of OGTT tests. This may be due to the fact that in Turkey antenatal follow-ups are performed during brief appointments, so nurses and midwives do not provide enough information to pregnant women about the OGTT and GDM during the visit; this means that pregnant women do not trust the knowledge of other health personnel and home visits cannot be performed due to it is not part of the health services generally available (Genç Koyuncu, 2018; Türkyılmaz et al., 2016). It is thought that women who are given high-quality and sufficient information will have less hesitation in having an OGTT and will not avoid accepting that responsibility. For subsequent follow-ups, the process should be improved by addressing misconceptions or unknown issues.

In this study, as with another study conducted in Turkey (Bakır & Şentürk, 2020), it was determined that pregnant women who did not have an OGTT did not have sufficient information about why the test was performed. In another study, the knowledge and application status of pregnant women about screening tests were determined and, according to the results of the study, only 30% of the pregnant women had heard about the OGTT, 40% did not know why the test was done and 65.4% did not know when it was done. The majority (77.3%) of the women did not have the test and 27% stated that they believed the test would be harmful (Cambaz Ulaş & Köken Durgun, 2018). In addition, a qualitative study stated that family members' negative opinions about the test and frightening information on social media are among the conditions that prevent monitoring tests (Martis et al., 2018). The media also reports that the OGTT is harmful to the fetus or newborn, which are further reasons for not wanting to have the test (Genç Koyuncu, 2018; Hocaoğlu et al., 2019; Martis et al., 2018).

In the study, half of the pregnant women could not explain what kind of dangers they thought the OGTT posed. It was also found that concerns that the test would be harmful did not have a significantly meaningful effect on the decision whether or not to have the test. Contrary to the results of our study, it was stated that concerns that it will harm the baby are among the reasons to refuse the OGTT (Başbuğ et al., 2018; Türkyılmaz et al., 2016). Reading news about the harmful effects of the test in the press (24.5%) is cited (Destegül & Gençdal, 2020)

as one of the reasons for rejecting the test. During pregnancy, mothers are more concerned about the health status of their babies than their own health. Being more sensitive and having incorrect information may cause them to find it difficult to make decisions or to make wrong decisions. This problem can be solved by giving women and their families access to reliable information.

Limitations of the study

Although the pregnant women included in our study group represent a large group, they do not cover the general population of the country. Therefore, future research should repeat the process using a larger sample group, preferably including home visits through family medicine centers and multicenters.

Conclusion

GDM is a common problem in pregnancy and early detection and appropriate treatment are important to prevent maternal and fetal complications. Therefore, the existing OGTT test should be explained to pregnant women through various sources of information. As one of the most important information sources, correct use of the media is critical.

Women living in rural areas should be provided with planning education to the same extent as women who live more urban areas. Prejudices against the OGTT should be reduced by evaluating women's experiences. It is recommended that the level of women's awareness be improved by evaluating the efficacy of current health promotion behaviors and increasing the importance attached to antenatal screening.

Implications for Practice

It is not acceptable for unreliable and misleading information shared in the media to have irremediable consequences for the health of mothers and their babies and lower socio-economic groups are often assessed as tending to accept information from the media without verifying it. An effective strategy to prevent this damage would be to analyze publications in the media in more detail, strengthen control mechanisms, and teach health literacy from childhood. It is also important to raise public awareness of ways to access reliable information through health literacy.

Ensuring that pregnant women receive reliable and scientifically proven information from healthcare personnel who work in primary healthcare centers is crucial. They should provide preventive health services, reach pregnant women through home visits, and strengthen the content and methods of antenatal education.

Nowadays, it is important to prepare women for pregnancy and provide them with all necessary information, beginning before conception. However, although it may be possible for women in remote areas to access some information through social media, they may not be able to do so when they wish, or they may find it difficult to obtain reliable information. Therefore, health personnel have a responsibility to ensure that all women, regardless of where they live, have access to and receive reliable information and health services.

References

- ACOG (American College of Obstetricians and Gynecologists). (2018). Practice Bulletin No. 190: Gestational diabetes mellitus. *Obstetrics & Gynecology*, *131*(2), 49–64. doi: 10.1097/AOG.0000000000002501
- ADA (American Diabetes Association). (2020). Management of diabetes in pregnancy: Standards of medical care in diabetes. *Diabetes Care*, *43*(1), 183–192. doi: 10.2337/dc20-S014
- Andrade, H. F. D. A., Pedrosa, W., Diniz, M. D. F. H. S., & Passos, V. M. A. (2016). Adverse effects during the oral glucose tolerance test in post-bariatric surgery patients. *Archives of Endocrinology and Metabolism*, *60*(4), 307–313. doi: 10.1590/2359-3997000000149
- Bakır, N., & Şentürk, S. (2020). Knowledge, opinions and attitudes about the oral glucose tolerance test in pregnant women. *ESTUDAM Public Health Journal*, *5*(2), 196–207. doi: 10.35232/estudamhsd.661235 (In Turkish)
- Bankovic Radovanovic, P., & Kocijancic, M. (2015). How well are pregnant women in Croatia informed about the oral glucose tolerance test? *Biochemia Medica*, *25*(2), 230–236. doi: 10.11613/BM.2015.023
- Başbuğ, A., Ellibeş Kaya, A., Sönmez, C. I., & Yıldırım, E. (2018). An important problem in gestational diabetes screening: Why do pregnant women refuse to have the oral glucose tolerance test? *Konuralp Medical Journal*, *10*(2), 144–148. doi: 10.18521/kt.424671 (In Turkish)
- Bhavadarini, B., Uma, R., Saravanan, P., & Mohan, V. (2016). Screening and diagnosis of gestational diabetes mellitus—relevance to low and middle income countries. *Clinical Diabetes and Endocrinology*, *2*(13), 1–8. doi: 10.1186/s40842-016-0031-y
- Bjelke, M., Martinsson, A. K., Lendahls, L., & Oscarsson, M. (2016). Using the internet as a source of information during pregnancy—a descriptive cross-sectional study in Sweden. *Midwifery*, *40*, 187–191. doi: 10.1016/j.midw.2016.06.020
- Cambaz Ulaş, S., & Köken Durgun, S. (2018). *Knowledge status and practices of last trimester pregnant women about routine tests performed in the antenatal period*. Paper presented at the 3rd International Science Symposium, September 5–8. Proceeding Book: 1B 7PB. Retrieved September 26, 2018, from <https://docplayer.biz.tr/111923029-Iss2018-proceeding-book-3rd-international-science-symposium-science-festival-new-horizons-in-science.html> (In Turkish)
- Carolan, M., Steele, C., & Margetts, H. (2010). Knowledge of gestational diabetes among a multi-ethnic cohort in Australia. *Midwifery*, *26*(6), 579–588. doi: 10.1016/

j.midw.2009.01.006

- Coustan, D. R., Lowe, L. P., Metzger, B. E., & Dyer, A. R. (2010). The Hyperglycemia and adverse pregnancy outcome study: Paving the way for new diagnostic criteria for gestational diabetes mellitus. *American Journal of Obstetrics and Gynecology*, 202(6), 654.e1–654.e6. doi: 10.1016/j.ajog.2010.04.006
- Çakır, A., & Çalık, K. Y. (2020). The effect of media on the oral glucose tolerance test (the OGTT) status of pregnant women. *Sürekli Tıp Eğitimi Dergisi (STED)*, 29(5), 318–328. doi: 10.17942/sted.811631 (In Turkish)
- Çalın, S., Demirci, H., Ulaş, C., & Şen S. (2016). Observation of maternal weight loss status during the first year after giving birth. *Journal of Human Sciences*, 13(3), 4325–4337. doi: 10.14687/jhs.v13i3.3996 (In Turkish)
- Destegül, E., & Gençdal, S. (2020). Oral glucose tolerance test in pregnant women and factors affecting their decisions. *Cumhuriyet Medical Journal*, 42(2), 224–229. doi: 10.7197/cmj.vi.659607
- EMAT (Endocrinology and Metabolism Association of Turkey). (2020). *Guidelines for diagnosis, treatment and follow-up of diabetes mellitus and complications*. Ankara, Turkey: Bayt Printing Press. Retrieved June 25, 2020, from https://temd.org.tr/admin/uploads/tbl_kilavuz/20200625154506-2020tbl_kilavuz86bf012d90.pdf (In Turkish)
- Erem, C., Kuzu, U. B., Deger, O., & Can, G. (2015). Prevalence of gestational diabetes mellitus and associated risk factors in Turkish women: The Trabzon GDM Study. *Archives of Medical Science*, 11(4), 724–735. doi: 10.5114/aoms.2015.53291
- Fadl, H. E., Ostlund, I. K., Magnuson, A. F., & Hanson, U. S. (2010). Maternal and neonatal outcomes and time trends of gestational diabetes mellitus in Sweden from 1991 to 2003. *Diabetic Medicine*, 27(4), 436–441. doi: 10.1111/j.1464-5491.2010.02978.x
- Gao, L. L., Larsson, M., & Luo, S. Y. (2013). Internet use by Chinese women seeking pregnancy-related information. *Midwifery*, 29, 730–735. doi: 10.1016/j.midw.2012.07.003
- Genç Koyuncu, R. (2018). Pregnant women's attitudes towards the glucose tolerance test in the context of gestational diabetes risk factors. *Health and Society*, 28(2), 65–72. Retrieved September 26, 2018, from <https://ssyv.org.tr/wp-content/uploads/2018/12/9.-Gestasyonel-Diyabet-Risk-Fakt%C3%B6rleri-%C3%87er%C3%A7evesinde-Gebelerin-Glukoz-Tolerans-Testine-%C4%B0li%C5%9Fkin-Tutumlar%C4%B1.pdf> (In Turkish)
- HUIPS (Hacettepe University Institute of Population Studies). (2019). 2018 Turkey Demographic and Health Survey-THDS. Hacettepe University Institute of Population Studies, T.R. Presidency of Turkey Directorate of Strategy and Budget

- and TÜBİTAK, Ankara, Turkey. Retrieved November 2, 2019, from <http://www.hips.hacettepe.edu.tr/eng/tdhs2018/>
- Hewage, S., Audimulam, J., Sullivan, E., Chi, C., Wei, T. Y., & Yoong, J. (2020). Barriers to gestational diabetes management and preferred interventions for women with gestational diabetes in Singapore: Mixed methods study. *JMIR Formative Research*, 4(6), e14486. doi: 10.2196/14486
- Hocaoğlu, M., Turgut, A., Guzin, K., Yardimci, O. D., Gunay, T., Demircivi Bor, . . . & Karateke, A. (2019). Why do some pregnant women refuse the glucose challenge test? Turkish pregnant women's perspectives for gestational diabetes mellitus monitoring. *Northern Clinics of Istanbul*, 6(1), 7–12. doi: 10.14744/nci.2018.37167
- IDF (International Diabetes Federation). (2019). *IDF Diabetes Atlas*. Retrieved April 19, 2020, from <https://diabetesatlas.org/en/>
- Karaçam, Z., & Çelik, D. (2021). The prevalence and risk factors of gestational diabetes mellitus in Turkey: A systematic review and meta-analysis. *Journal of Maternal Fetal and Neonatal Medicine*, 2, 1–11. doi: 10.1080/14767058.2019.1635109 [Epub ahead of print]
- Karasu, Y. (2018). What happened to the glucose loading test? The impact of media on public health. *Medical Journal of Ankara Training and Research Hospital*, 51(1), 54–58. [in Turkish] Retrieved May 26, 2018, from <https://dergipark.org.tr/tr/download/article-file/553198>
- Kiani, F., Ghare Naz, M. S., Sayehmiri, F., Sayehmiri, K., & Zali, H. (2017). The risk factors of gestational diabetes mellitus: A systematic review and meta-analysis study. *International Journal of Women's Health and Reproduction Sciences*, 5(4), 253–263. doi: 10.15296/ijwhr.2017.44
- Kirke, A. B., Atkinson, D., Moore, S., Sterry, K., Singleton, S., Roxburgh, C., . . . & Marley, J.V. (2019). Diabetes screening in pregnancy failing women in rural Western Australia: An audit of oral glucose tolerance test completion rates. *Australian Journal of Rural Health*, 27, 64–69. doi: 10.1111/ajr.12465
- Kosman, M. W. M., Eskes, S. A., Van Selst, J., Birnie, E., Van Gemund, N., Karsdorp, V. H. M., . . . & Castro Cabezas, M. (2016). Perinatal outcomes in gestational diabetes in relation to ethnicity in the Netherlands. *The Netherlands Journal of Medicine*, 74(1), 22–29. Retrieved June 26, 2017, from <http://www.njmonline.nl/getpdf.php?id=1660>
- Lachmann, E. H., Fox, R. A., Dennison, R. A., Usher-Smith, J. A., Meek, C. L., & Aiken, C. E. (2020). Barriers to completing oral glucose tolerance testing in women at risk of gestational diabetes. *Diabetic Medicine*, 37(9), 1482–1489. doi: 10.1111/dme.14292

- Landon, M. B., Spong, C. Y., Thom, E., Carpenter, M. W., Ramin, S. M., Casey, B., . . . & Anderson, G. B. (2009). A multicenter, randomized trial of treatment for mild gestational diabetes. *New England Journal of Medicine*, *361*(14), 1339–1348. doi: 10.1056/NEJMoa0902430
- Liu, B., Xu, Y., Zhang, Y., Cai, J., Deng, L., Yang, J., . . . & Wang, Z. (2016). Early diagnosis of gestational diabetes mellitus (EDoGDM) study: A protocol for a prospective, longitudinal cohort study. *BMJ Open*, *6*(11), e012315. doi: 10.1136/bmjopen-2016-012315
- Martis, R., Brown, J., McAra-Couper, J., & Crowther, C. A. (2018). Enablers and barriers for women with gestational diabetes mellitus to achieve optimal glycaemic control—a qualitative study using the theoretical domains framework. *BMC Pregnancy and Childbirth*, *18*, 9. doi: 10.1186/s12884-018-1710-8
- Medimagazin. (2014). *Prof. Dr. Canan Karatay responded to those objections from 2 associations*. Retrieved November 9, 2019, from <https://www.medimagazin.com.tr/ana-sayfa/guncel/tr-profdrcanan-karatay-2-dernekten-gelen-o-iritazlara-yanit-verdi-1-11-62663.html> (In Turkish)
- Ogurtsova, K., Da Rocha Fernandes, J. D., Huang, Y., Linnenkamp, U., Guariguata, L., Cho, N. H., . . . & Makaroff, L. E. (2017). IDF diabetes atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes Research and Clinical Practice*, *128*, 40–50. doi: 10.1016/j.diabres.2017.03.024
- Özceylan, G., & Toprak, D. (2020). Effects of controversial statements on social media regarding the oral glucose tolerance testing on pregnant women in Turkey. *AIMS Public Health*, *7*(1), 20–28. doi: 10.3934/publichealth.2020003
- Pilliod, R. A., Page, J. M., Burwick, R. M., Kaimal, A. J., Cheng, Y. W., & Caughey, A. B. (2015). The risk of fetal death in nonanomalous pregnancies affected by polyhydramnios. *American Journal of Obstetrics & Gynecology*, *213*(3), 410-e1. doi: 10.1016/j.ajog.2014.10.1063
- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, *29*(5), 489–497. doi: 10.1002/nur.20147
- Qazi, A., Fahim, A., Qureshi, A., & Ul Haque, M. (2016). Gestational diabetes mellitus; still a great problem. *The Professional Medical Journal*, *23*(1), 15–19. doi: 10.17957/TPMJ/16.3055
- Republic of Turkey Ministry of Health. (2014). Prenatal care management guide. Retrieved April 11, 2020, from <https://sbu.saglik.gov.tr/Ekutuphane/kitaplar/dogumonubakim.pdf> (In Turkish)
- Sarı, O., Babayiğit, M. A., Türker, T., Koçak, N., Aydoğan, Ü., Akpak, Y. K., . . .

- & Kılıç, S. (2015). The levels of knowledge about “nutrition during pregnancy,” the eating habits and the affecting factors in pregnant women. *Journal of Clinical and Analytical Medicine* 6(suppl 4): 467–472. Retrieved June 26, 2017, from <http://www.jcam.com.tr/files/JCAM-3580.pdf> (In Turkish)
- Shrestha, S., Thapa, P., Salch, S., Thapa, N., Stray, B. P., & Khanom, K. (2013). Knowledge of diabetes mellitus among pregnant women in three districts of Nepal. *Journal of Nepal Health Research Council*, 11, 259–263. doi: 10.33314/jnhrc.v0i0.401
- Thomas, S., Pienyu, R., & Rajan, S. K. (2019). Awareness and knowledge about gestational diabetes mellitus among antenatal women. *Psychology, Community & Health*, 8(1), 237–248. doi: 10.5964/pch.v8i1.287
- Turkish Gynecology and Obstetrics Association. (2021). OGTT is vital in pregnant women. Retrieved April 9, 2020, from <https://www.tjod.org/gebelerde-seker-yukle-me-testi-hayati-onem-tasimaktadir/> (In Turkish)
- Turkish poverty threshold rises 3.5 percent in January. (2019, January, 29). *Hurriyet Daily News*. Retrieved from <https://www.hurriyetdailynews.com/turkish-poverty-threshold-rises-3-5-percent-in-january-140862>
- Türkyılmaz, E., Keleştemur, E., Karataş Eray, İ., Öcal, F. D., & Yavuz Avcı, A. F. (2016). Knowledge level, attitude and behaviours about glucose challenge test among Turkish pregnant women. *Ankara Medical Journal*, 16(2), 191–199. doi: 10.17098/amj.34510
- World Health Organization. (2018). *WHO recommendation on the diagnosis of gestational diabetes in pregnancy*. Retrieved March 8, 2018, from <https://extranet.who.int/rhl/topics/preconception-pregnancy-childbirth-and-postpartum-care/antenatal-care/who-recommendation-diagnosis-gestational-diabetes-pregnancy-0>
- Yaprak, M., Gümüştakım, R. Ş., Abdullah, T. O. K., & Doğaner, A. (2019). Determination of oral glucose tolerance test awareness in pregnancy. *Ankara Medical Journal*, 19(3), 635–647. doi: 10.17098/amj.624520 (In Turkish)
- Yuen, L., & Wong, V. W. (2015). Gestational diabetes mellitus: Challenges for different ethnic groups. *World Journal of Diabetes*, 6(8), 1024–1032. doi: 10.4239/wjd.v6.i8.1024
- Zhu, Y., & Zhang, C. (2016). Prevalence of gestational diabetes and risk of progression to type 2 diabetes: A global perspective. *Current Diabetes Reports*, 16(1), 7. doi: 10.1007/s11892-015-0699-x

Biographical Note: **Hande Yağcan** graduated from Ege University Health Science Institute with a PhD from the Women's Health and Disease Nursing Department (Infertile Women Stressors & Neuman System Model Issue). She is now Assistant Professor in the Department of Obstetric and Gynecologic Nursing at Dokuz Eylul University Faculty of Nursing. Email: hande.yagcan@gmail.com

Biographical Note: **Elif Uludağ** graduated from Dokuz Eylul University with a PhD from the Department of Obstetric and Gynecologic Nursing (Birth Issues). She is now Assistant Professor in the Department of Obstetric and Gynecologic Nursing at Pamukkale University Faculty of Health Science. Email: e-eelif_uludag@hotmail.com

Biographical Note: **Nuran Nur Aypar Akbağ** is a PhD student in Dokuz Eylul University, Department of Obstetric and Gynecologic Nursing (her thesis topic is Gestational Diabetes Mellitus). She is also a research assistant in the Department of Obstetric and Gynecologic Nursing at Karamanoglu Mehmetbey University Faculty of Health Sciences. Email: nuraypar@gmail.com

Biographical Note: **Hülya Özberk** graduated from Dokuz Eylul University with a PhD from the Department of Obstetric and Gynecologic Nursing (Preterm Labor Issues). She is now a research assistant in the Department of Obstetric and Gynecologic Nursing at Dokuz Eylul University Faculty of Nursing. Email: hulyaozberk1@gmail.com