

# Gestational Diabetes Screening Refusal in Pregnant Women: A Cross-Sectional Survey Study

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**ABSTRACT Objective:** Recently, some pregnant women in Türkiye are hesitant to undergo gestational diabetes mellitus (GDM) screening tests and this trend is more common. The objective of the study is to assess the pregnant women's knowledges, decisions, reasons for hesitations about having the GDM screening tests and test rejection rates. **Material and Methods:** This cross-sectional study included 647 pregnant women who applied for an antenatal outpatient clinic and who had not yet been diagnosed with GDM and a survey was conducted using questionnaire designed by the authors. **Results:** At the beginning, 287 (44.4%) of the participants declared that they would have glucose challenge test, 169 (26.1%) would not and 191 (29.5%) were undecided. The rejection rate was lower in those who had knowledge about the screening tests. After a short information about the content of tests, 30% of the women who decided not to have the test and 78.3% of those who were undecided at the beginning, decided to have the test ( $p=0.001$ ). **Conclusion:** The knowledge level of pregnant women about diabetes screening and diagnosis influences their decision-making. Organizing well-planned trainings for patients and healthcare professionals using public institutions and media may be effective in reducing the burden of diabetes on social health and the economic indicators.

**Keywords:** Decision making; diabetes, gestational; diagnostic screening programs; patient education as topic; refusal to participate

The healthcare providers face a variety of refusals including refusals of blood transfusions, vaccines, screening and diagnosis tests and cessation of life-sustaining treatment in the terminal illnesses. According to a review, the causes of the parents to refusing, delaying or hesitating to vaccinate their children can be grouped into 4 overarching categories: religious, personal belief or philosophical, safety concerns and the demand of more informative approach from healthcare providers.<sup>1</sup>

In obstetrics and gynecology, refusing an investigation, treatment or intervention may raise medical, legal and ethical concerns for both the mother and the fetus. In a population-based study, the patients who refused a medically indicated intervention were older, had higher parity and labor complications than those

who approved the intervention. The refusal of treatment was an independent risk factor for perinatal mortality.<sup>2</sup>

Gestational diabetes mellitus (GDM) is carbohydrate intolerance that is first diagnosed in pregnancy. The prevalence of GDM worldwide varies between 1 and 45% of pregnancies.<sup>3,4</sup> Similar to the obesity and Type 2 DM, the incidence of GDM continues to increase in the world over the past years.<sup>5</sup> GDM can cause maternal and fetal complications such as abortion, large for gestational age, polyhydramnios, intrauterine growth restriction, intrauterine fetal death, pre-eclampsia, delivery complications including cesarean section, birth trauma, neonatal hypoglycemia, hyperbilirubinemia, polycythaemia and the need for neonatal intensive care unit admission,

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thus, early detection and treatment may provide blood glucose regulation and reduce these complications.<sup>6,7</sup>

GDM is usually diagnosed after 20 weeks of gestation, when placental hormones that have the opposite effect of insulin on glucose metabolism increase substantially. In a study, the sensitivity and selectivity for the tests used in the diagnosis of GDM were 50% and 66% for screening based on risk factors, 40% and 90% for random glucose measurement, 40% and 90% for HbA<sub>1c</sub>, 59% and 91% for 50 g glucose challenge test (GCT), 79% and 83% for 75g oral glucose tolerance test (OGTT); based on this finding, OGTT is currently the most sensitive test for diagnosing GDM.<sup>8</sup>

It has recently been observed that, pregnant women in Türkiye are hesitant to undergo GDM screening tests and this trend is becoming more common. We conducted a cross-sectional survey study to assess pregnant women's knowledge, thoughts and decisions about GDM screening/diagnosis tests as well as to investigate the factors that influence their decision not have these tests.

## MATERIAL AND METHODS

This cross-sectional survey study was conducted in University of Health Sciences, Zeynep Kamil Women's and Children's Disease Training and Research Hospital between June 2016-December 2017. This study was approved by the Clinical Research Ethics Committee of Zeynep Kamil Women's and Children's Disease Training and Research Hospital (date: 08.04.2016, no: 95). We performed this study consistent with the Declaration of Helsinki ethical principles.

The study was conducted with 647 pregnant women who applied to the antenatal outpatient clinic. Pregnants who were literate in Turkish language and not yet diagnosed with GDM between 24-28 weeks of gestation were included in the study. They were invited to take part in the survey and the informed consent was obtained from each participant who accepted to fulfill the survey. The survey was conducted using a 4-page questionnaire which was designed by the authors. The questions and items in the questionnaire were generated on the basis of the

experiences related to the hesitations and possible reasons encountered in the follow-up of pregnant women regarding the test recommended for GDM screening in our daily practice. Pregnants who were diagnosed with diabetes or glucose intolerance and who have a disability to take the survey were excluded from the study.

## QUESTIONNAIRE

On page 1, pregnant women were briefly informed about the purpose of the study, the importance of diagnosis and treatment, possible maternal and fetal complications of diabetes in pregnancy and how the planned tests for screening and diagnosis of GDM will be performed.

Following 3 questions were designed to determine whether the pregnant women have knowledge about the tests and whether they were considering having them. Pregnant women who answered "no" or "undecided" to Q3 were asked to respond to 3 questions on page 2. It was intended to look into the reasons why people did not want to take the test. On page 3, following information was provided: *Fifty grams of sugar used in the screening test by drinking sugary drinks has the same amount of calories as one of the following foods you eat in your daily life for the purpose of diagnosing diabetes: 1 slice of cake, 3 slices of bread, 2 tablespoons sugar, 3 tablespoons of honey, 2 glasses of lemonade, 2 glasses of cherry juice, 1 serving of rice pudding.* After this information, 4 questions were asked about the frequency of consuming these foods, participants' thoughts about having the test and other methods they found safe to diagnose GDM. On page 4, in addition to maternal demographic and clinical characteristics, current body mass index (BMI), gravidity, parity, level of education, profession, 3 questions were asked to investigate the presence of diabetes in herself and her family. The questionnaire is given in [Table 1](#).

## STATISTICAL ANALYSIS

Statistical analysis was performed using the SPSS for Windows version 17.0 software (SPSS Inc., Chicago, IL, USA). Descriptive data were expressed as mean±standard deviation for continuous random variables and number (%-percentage) for discrete

**TABLE 1:** The questionnaire.

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<b>Page 1</b>	
Question (Q)1	Do you have any information on 2-step diabetes screening and diagnosis tests for pregnant women? (Choices (C): Yes/No)
Q2	Do you know what advantages you will have if diabetes is detected and treated as a result of these tests? (C: Yes/No).
Q3	Will you have the 2-step 50 g screening and 100 g diagnosis tests recommended by your doctor along with a sugary drink? (C: Yes/No/Undecided)
<b>Page 2</b>	
Q4	Can you write down the reasons why you did not accept your doctor's recommendation, along with your own thoughts? (Optional)
Q5	Was it your decision or desire to refuse 2-step diabetes screening and diagnostic tests while pregnant? Which of the following mediums influenced your decision? (The state of being influenced by at least one media such as television, radio, newspapers and the internet, friends' and family members' views, a physician) (C: Yes, I was influenced by a source/No, I wasn't influenced by a source, it was my own decision)
Q6	What kind of harm do you think 2-step diabetes screening and diagnostic tests during pregnancy will cause you or your baby? [C: Diabetes emergence/fetal demise/declaration of other consequences (Optional) Yes/No]
<b>Page 3</b>	
	On page 3, following information was provided: 50 grams of sugar used in the screening test by drinking sugary drinks has the same amount of calories as one of the following foods you eat in your daily life for the purpose of diagnosing diabetes: 1 slice cake, 3 slices of bread, 2 tablespoons sugar, 3 tablespoons honey, 2 glasses lemonade, 2 glasses cherry juice, 1 serving of rice pudding
Q7	How frequently do you eat any of these foods? (C: Any/once daily/more than once daily/once a week/once a month)
Q8	After considering this information, would you refuse your doctor's recommendation for a 50g GCT (test to screen for diabetes)? (C: Yes/No)
Q9	Do you know of any other safe ways to detect diabetes during pregnancy? (C: Yes/No)
Q10	If you answered yes to the previous question, could you please describe other methods that you believe are safe? (Optional, your own words)
<b>Page 4</b>	
Q11	Do you have a history of diabetes from a previous pregnancy?
Q12	Do you have any other medical conditions from previous pregnancies?
Q13	Is there a diabetic in your family?

random variables. The chi-square test was used to compare categorical variables between the groups. The one-way ANOVA test was used to compare groups' means for continuous random variables. A p value of <0.05 was considered statistically significant.

## RESULTS

Six hundred and forty-seven pregnant women took part in the study. At the beginning of the questionnaire, 287 (44.4%) of the participants declared that they would have 50 g GCT, 169 (26.1%) did not and 191 (29.5%) were undecided. The median age of the participants was 29 [interquartile range (IQR): 23-33] and the median current BMI was 26.4 (IQR: 23.2-29.7). There was not any statistically significance among groups for age, gravidity and parity, pre-preg-

nancy BMI, current BMI, profession and educational level (Table 2).

The carbohydrate consumptions of the participants were not statistically significant between groups (Table 3).

When asked if they knew about the 2-step screening and diagnostic tests for GDM performed during pregnancy, 51.2% of those who said they would "not have the test", 62.6% of those who said they "would", and 40.6% of those who were "undecided" said they would. The difference between the groups was statistically significant (p=0.0001).

When the benefits of diabetes diagnosis and treatment through the tests were questioned, it was discovered that 35.5% of those who decided "not to have the test", 52.4% of those who said that they would "have it" done, and 33.9% of those who were

**TABLE 2:** Maternal demographics and clinical characteristics.

	Decision to have a 50 g GCT						p value
	Not to have the GCT test n=169		Have the GCT test n=287		Undecided n=191		
	Mean±SD		Mean±SD		Mean±SD		
Age	29.2±5.0		29.3±5.0		29.5±6.0		0.833 <sup>a</sup>
Pre-pregnancy BMI	24.8±4.7		25.3±5.3		24.9±4.8		0.575 <sup>a</sup>
Current BMI	26.9±4.6		27.2±5.3		26.8±4.5		0.628 <sup>a</sup>
Gravidity	2.0±1.3		2.3±1.3		2.2±1.5		0.207 <sup>a</sup>
Parity	0.7±0.8		0.9±0.9		0.8±0.9		0.151 <sup>a</sup>
	n	%	n	%	n	%	
Education level (n=631)							
Just literate	1	0.6	2	0.7	2	1.0	
Primary school	37	22.4	33	12.0	32	16.8	
Middle school	16.4	55	20.0	25	13.1		
High school	47	28.5	76	27.6	64	33.5	0.165 <sup>b</sup>
Junior college	15	9.1	38	13.8	23	12.0	
University & postgraduate	38	23.0	71	25.8	45	23.6	
Profession (n=630)							
Official/worker	23	13.9	69	25.2	39	20.8	
Housewife	127	76.5	183	66.8	127	66.8	
Day worker	1	0.6	1	0.4	1	0.5	0.103 <sup>b</sup>
Other	15	9.0	21	7.7	23	12.1	

<sup>a</sup>The One Way ANOVA test was used; <sup>b</sup>Chi-square test was used; GCT: Glucose challenge test; SD: Standard deviation; BMI: Body mass index.

**TABLE 3:** Pregnant women's daily carbohydrate consumption.

Question* 7	Decision to have a 50 g GCT						Total	p value
	Not to have the GCT test n=169		Have the GCT test n=287		Undecided n=191			
	n	%	n	%	n	%		
Any	0	0.0	0	0.0	1	0.6	1	
Once a day	7	4.6	8	6.7	4	2.3	9	
More than once a day	79	51.6	63	52.5	89	50.2	231	0.514 <sup>a</sup>
Once a week	31	20.3	26	21.7	47	26.6	104	
Once a month	36	23.3	23	19.1	36	20.3	95	
Total	153	100.0	120	100.0	177	100.0	450	

<sup>a</sup>Chi-square test was used; \*The clear version of the questions, their explanations and answer options are given in Figure; GCT: Glucose challenge test.

“undecided” had knowledge on the subject. A statistically significant difference was found (p=0.0001).

The groups were found to be similar in terms of being influenced by TV shows, radio shows, newspaper articles, internet articles, public expert interviews, friends, family members and physicians, all of which can influence test decision making (p>0.05). However, when the situation of being influenced by

at least one of the media mentioned in the question was evaluated, it was detected that the rate in the group who decided “not to have the test” of being influenced by one of the media, was found statistically significant and lower with 32,6% (p<0.0001).

When asked about the risks of diabetes screening tests to the mother and infant, the groups were statistically identical.

Within the scope of the study, there was an information paragraph in the questionnaire comparing the 50 grams of glucose used in the screening test with the food consumed daily. Following this briefing, the patients were again questioned at the same meeting about their decision to have 50 g GCT. Thirty percent of the women who decided “not to have the test” at the start of the study and 78.3% of those who were “undecided” at the start of the study decided to have the test. This result showed a statistically significant difference (p=0.001)

The fourteen point 2 percent of those who did “not to have the test” thought there were safer methods to diagnose diabetes in pregnancy. This rate was found to be statistically higher than that of the other groups (p=0.001).

Three groups were detected to be similar in terms of diabetes history in previous pregnancy, history of another obstetric complication in previous pregnancy and presence of diabetes in the family in cases who had a previous pregnancy (Table 4).

## DISCUSSION

It has recently been observed that, some pregnant women in Türkiye are hesitant to undergo GDM screening tests and this trend is becoming more common. In a study conducted in Türkiye, the prevalence of GDM was found to be higher among women who refused the GDM screening test than the control group (30.9%, 8.8%, respectively). The risk of polyhydramnios in late pregnancy was also reported as 12% in women who did not accept the test.<sup>9</sup> Ho-

**TABLE 4:** Participants' opinions on whether or not to have a gestational diabetes screening test.

Question (Q)*		Decision to have a 50 g GCT						p value
		Not to have the GCT test n=169		Have the GCT test n=287		Undecided n=191		
		n	%	n	%	n	%	
Q1	No	82 <sup>a</sup>	48.8	107 <sup>b</sup>	37.4	111 <sup>c</sup>	59.4	0.0001
	Yes	86	51.2	179	62.6	79	40.6	
Q2	No	107 <sup>a</sup>	64.5	136 <sup>b</sup>	47.5	123 <sup>a</sup>	66.1	0.0001
	Yes	59	35.5	150	52.4	63	33.9	
Q5	No	97 <sup>a</sup>	67.4	21 <sup>b</sup>	42.9	75 <sup>b</sup>	45.2	0.0001
	Yes	47	32.6	28	57.1	91	54.8	
Q6 Diabetes emergence	No	28	24.1	16	33.3	46	31.7	0.319
	Yes	88	75.9	32	66.7	99	68.3	
Fetal demise	No	106	91.4	45	93.8	134	9.1	0.826
	Yes	10	8.6	3	6.3	10	6.9	
Declaration of other consequences	No	98	83.1	42	87.5	110	76.4	0.169
	Yes	20	16.9	6	12.5	34	23.6	
Q8	I do not refuse	45 <sup>a</sup>	30.0	109 <sup>b</sup>	93.2	123 <sup>c</sup>	78.3	0.0001
	I refuse	105	70.0	8	6.8	34	21.7	
Q9	No	126 <sup>a</sup>	85.8	115 <sup>b</sup>	98.3	158 <sup>c</sup>	92.9	0.001
	Yes	21	14.2	2	1.7	12	7.1	
Q11	No	89	95.7	157	92.4	100	90.9	0.407
	Yes	4	4.3	13	7.6	10	9.1	
Q12	No	84	92.3	143	85.1	97	88.2	0.238
	Yes	7	7.7	25	14.9	13	11.8	
Q13	No	105	64.4	152	57.1	115	61.8	0.296
	Yes	58	35.6	114	42.9	71	38.2	

<sup>a,b,c</sup>Different upper letters denote groups with statistically significant difference; \* The clear version of the questions, their explanations and answer options are given in Figure; GCT: Glucose challenge test.

caoglu et al. from Türkiye conducted a study in which 312 pregnant women were polled on their thoughts and practices regarding 50 g GCT. Forty-two point five percent of women expressed their desire, 40.9% expressed their reluctance to have GCT who were  $\leq 28$  weeks of gestation and the most frequently stated reason for reluctance was the belief that GCT is harmful to both the mother and the baby.<sup>10</sup> Similarly, in our study, 44.4% of the participants stated that they would have the test.

Uy et al., investigated the most common themes of an outpatient diabetes consult, including diagnosis of DM, lifestyle modification, the targets of treatment, precautions of hypoglycemia, complications of diabetes and safety of medication. Patients with higher educational attainment had a better understanding of these themes; however, lower educational attainment is related to a paternalistic attitude toward diabetes care. The authors concluded that, the themes of outpatient diabetes consultation reflects the extent of diabetes care influenced by socio-cultural factors, patient-doctor relationships and adaptability to resource limitations.<sup>11</sup> In our study, it is noteworthy that the education and employment status were similar among the groups reporting the decision to have GCT. This suggests that pregnant women, from all socio-cultural levels in our study population experience similar anxiety and lack of knowledge about GCT.

It has been reported that maternal risk factors such as age and BMI are insufficient in diagnosing the majority of women with GDM.<sup>12</sup> In our study, BMI and carbohydrate consumption were similar among groups that made different decisions about having the test. This finding suggests that women who consume an excessive amount of carbohydrates and are obese are not aware that their situation may increase their risk of developing diabetes. Structured studies on the perception of illness and health improvement are required.

Chen et al. reported that the frequency, quality and duration of primary care visits increased between 1997-2005. Modest relationships were noted between visit duration and quality of care. Providing counseling or screening required additional physician time

but ensuring that patients were taking appropriate medications seemed to be independent of visit duration.<sup>13</sup> Similarly, sufficient visit duration is required to provide adequate information about GDM screening in pregnant women and postnatal care and follow-up are also important. In our country, the duration of the visit in healthcare services is limited to a maximum of 10 minutes per patient. In our survey, the rate of decision to have the test was high among pregnant women who had knowledge about diabetes screening and diagnostic tests at the beginning and about the benefits of diagnosis and treatment if the test were performed. However, the rate of pregnant women who did not have the test and who were undecided was 55%. Therefore, it can be thought that making the time allocated to patients sufficient and of good quality may have an impact on test acceptance rates.

The importance of being informed by an experienced health professional has been reported. The need for information of pregnant women emerges most intensely right after the diagnosis of GDM. Women who applied to the secondary health facility, stated that they were better informed about diet and blood sugar monitoring than women who were informed in the primary health facility.<sup>14</sup> In Türkiye, antenatal diabetes screening is recommended in the primary care and if it has not been performed during this period, in the secondary care. There is no research on screening rejection in primary care. Our study was conducted in the tertiary center and the test recommendation was made by the obstetrician. Despite this, the test rejection rate was high. This may be due to the prejudice of the patient, which was formed before the application, rather than the inadequacy of the person providing the service. The positive aspect of the present study is that it reports the rejection rates and information status about the test in a tertiary center. The detection rates may be different in primary and secondary centers. This is a limitation of our study.

The importance of adequate information of patients and individualized shared decision-making was emphasized in determining the duration of treatment after unprovoked venous thromboembolism.<sup>15</sup> In our study, similarly, the significantly high rate of having the GCT performed by pregnant women who stated

that they were aware of the test at the start of the study and believed that it would be beneficial when the test was performed.

Women's experiences with a GDM diagnosis were investigated in a qualitative study which included 19 women from different cultural backgrounds. The diagnostic criteria were viewed as "confusing" by some women and they believe that the treatment for this "borderline" condition was unnecessary.<sup>16</sup> In our study, those who thought that there were safer tests other than GCT for screening GDM had a significantly higher rate of test rejection. This suggests that patients' knowledge on this subject is in confusion.

In our study, following the brief information paragraph about the carbohydrate consumption in our questionnaire, the decisions of the participants were re-evaluated. There was statistically significant change in the direction of having the test of the participants who are unstable. Although the purpose of the study was not an informational intervention, this brief information resulted in a statistically significant decision change.

Dickens and Cook emphasized that there is a question in both law and ethics about nature of information when patients need information to decide to accept recommended treatments. Refusal of recommended treatment may pose increased risks to patients' well-being and may require more emphatic disclosure without pressure.<sup>17</sup>

The present study has some strengths and limitations. It was conducted in a tertiary referral center. Although the sample size is relatively enough for a single center, it would be better to conduct a nationwide study, so that the results can be generalized to the entire pregnant population.

## CONCLUSION

The healthcare decision-making is a collaborative process between healthcare professionals and patients. The individual and cultural influences of the

patients and their thoughts and feelings about the diseases, diagnosis and treatment methods should be taken into consideration by the healthcare professionals. Clear, evidence-based and sympathetic patient information can contribute to the correct decision-making of the patients and to the provision of an appropriate diagnosis and treatment process. Informing patients about the planned tests for screening and treatment of the gestational diabetes which might result in a significant increase in maternal and fetal mortality and morbidity during pregnancy and organizing well-planned trainings for both healthcare professionals and patients and using public institutions and media, which may be effective in reducing the burden of diabetes on social health and the economic indicators.

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*During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.*

### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### Authorship Contributions

**Idea/Concept:** Nazan Usal Tarhan, Habibe Ayvaci Taşan; **Design:** Nazan Usal Tarhan, Habibe Ayvaci Taşan, Gülnaz Nural Bekiroğlu; **Control/Supervision:** Nazan Usal Tarhan, Habibe Ayvaci Taşan, Erbil Çakar; **Data Collection and/or Processing:** Nazan Usal Tarhan, Habibe Ayvaci Taşan, Erbil Çakar; **Analysis and/or Interpretation:** Nazan Usal Tarhan, Habibe Ayvaci Taşan, Erbil Çakar, Gülnaz Nural Bekiroğlu; **Literature Review:** Nazan Usal Tarhan, Habibe Ayvaci Taşan; **Writing the Article:** Nazan Usal Tarhan, Habibe Ayvaci Taşan, Gülnaz Nural Bekiroğlu; **Critical Review:** Nazan Usal Tarhan, Habibe Ayvaci Taşan, Erbil Çakar, Gülnaz Nural Bekiroğlu; **References and Fundings:** Nazan Usal Tarhan, Habibe Ayvaci Taşan.

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