

# Knowledge and attitude changes of pregnant women regarding prenatal screening and diagnostic tests after counselling

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## Summary

**Objectives:** This study aimed to reveal the knowledge level of pregnant women about prenatal diagnostic tests, Down syndrome (DS) and amniocentesis, their attitudes toward uptaking these tests, undergoing amniocentesis, and the termination of pregnancy. It also aimed to evaluate the effects of providing information, as well as a written information brochure about all the issues concerning women's knowledge and attitudes. **Materials and Methods:** The gynecologists provided verbal and written information on prenatal screening tests (PSTs) and invasive prenatal diagnostic tests. Data were collected using an anonymous questionnaire, which was designed by the researchers on the basis of the literature. **Results:** Knowledge of both DS and amniocentesis was found to be significantly higher after the education ( $p = 0.000$  and  $p = 0.000$ , respectively). Attitudes toward amniocentesis changed significantly after the education. **Conclusions:** This study has shown that women had an inadequate knowledge about PSTs, DS, and amniocentesis. It has also revealed that education provided by gynecologists along with a written brochure of information tended to increase women's knowledge about PSTs.

**Key words:** Prenatal screening tests; Diagnostic tests; Knowledge; Attitude.

## Introduction

Chromosomal abnormalities are major causes of perinatal mortality and childhood disability [1]. There have been new developments in prenatal screening tests (PSTs) including maternal serum measurements and ultrasound which offer all pregnant women the possibility of undergoing non-invasive screening tests that would provide knowledge about whether the fetus has a high risk of chromosomal abnormalities such as Down syndrome (DS) or physical abnormalities such as neural tube defects. DS is one of the most common chromosomal abnormalities with a prevalence of one in 700 births [2].

PSTs are being performed by many obstetricians/gynecologists worldwide [3]. A combined test is offered as a first trimester screening test for trisomy 21, which uses a combination of fetal nuchal translucency, maternal free beta-human chorionic gonadotropin, and pregnancy-associated plasma protein-A (PAPP-A) measurements at 11-14 weeks of gestation with a detection rate of approximately 90% and a false-positive rate of 5% [4-5]. As a second trimester screening test for chromosomal abnormality and neural tube defects, the triple test uses three maternal serum markers [ $\alpha$ -fetoprotein, human chorionic gonadotropin, and unconjugated estriol] that are measured at 15-20 weeks of gestation with a detection rate of approximately 69% for DS, with a false-positive rate ranging between 5.3% to 6.5% [2]. The quadruple test is offered again as a second trimester screen-

ing test for chromosomal abnormalities and neural tube defects. This test uses inhibin A and it is performed in addition to the triple test that is performed at 15-20 weeks of gestation and has an estimated detection rate of 81% with a 5% false-positive rate [2]. In several studies, it has been shown that women have an inadequate knowledge about PSTs and have few informed choices [6-8]. According to O'Connor and O'Brien-Pallas, "an informed choice is one that is based on relevant knowledge, consistent with the decision maker's values and behaviorally implemented" [9]. In a study by Mareau *et al.*, it was found that women who made an uninformed choice to accept the PSTs did not have the relevant knowledge [10]. When PSTs show a high risk of a chromosomal disorder, an invasive prenatal diagnosis such as amniocentesis or chorionic villus sampling is offered to the couple, which has an approximate 1% [1] risk of miscarriage. Women have to make a decision with their partners about whether or not to undergo amniocentesis. If the result of amniocentesis indicates that the unborn baby has DS, this can lead to ethically difficult questions such as whether or not the pregnancy should continue or be terminated and in this context, therapeutic abortion might be considered. This time, women have to make yet another decision regarding the termination of the pregnancy, acting in accordance with personal values and beliefs [6].

PSTs have also become a part of antenatal care in Turkey and they are routinely offered by gynecologists in their prac-

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tice with health insurance covering all expenses for these tests. Partner consent is not needed. PSTs can be offered by only gynecologists in secondary and tertiary hospitals and among these tests, triple test is more frequently offered.

On the other hand, it is not known whether pregnant women make informed choices about PSTs. Women's values and beliefs play an important role in their choices [6]. Participation in PSTs should be based on informed consent [7] and women should be encouraged in making informed choices and provided with relevant knowledge and appropriate counseling beforehand. Then they can make their decisions based on their own personal values and beliefs [6]. Evidence from research suggests that acquired information reduces anxiety during PSTs [11-13] and knowledge about the tests and attitudes taken toward the termination of a pregnancy are related to the uptake of testing [14].

### Objectives

This study aimed to reveal the knowledge level of pregnant women about PSTs, DS and amniocentesis, and their attitudes toward uptaking these tests, undergoing amniocentesis, and the termination of pregnancy. It also aimed to evaluate the effects of providing information as well as a written information brochure about all the issues concerning women's knowledge and attitudes. There are limited studies in Turkey which measured women's knowledge level of PSTs and the other aspects mentioned above, but no study was found on this issue performed in Mugla province.

## Materials and Methods

### Study design and participants

This study was carried out in an Obstetrics and Gynecology outpatient clinic at the present Training and Research Hospital between April 2014 and October 2014 in accordance with the principles of the Helsinki Declaration after the approval of the local Institutional Review Board. Pregnant women with singleton pregnancies at  $\leq 13$  weeks of gestation were included in the study.

Verbal information was provided by gynecologists and included information on PSTs which offered explanations for various issues concerning false positive detection rates, the tests indicating only high risks, test results that are not an absolute indication of the existence of a chromosomal defect in an unborn child, and giving birth to children with DS despite negative test results. Information was also provided to the patients who were offered invasive prenatal diagnostic tests such as amniocentesis and chorionic villus sampling despite test results indicated high risk and explanations were given about the hazards of these procedures and what would be encountered if the result of amniocentesis showed that the unborn baby had DS. A written information brochure was also given to the pregnant women. Four gynecologists provided the verbal information and a standardized checklist of information was prepared. Verbal information was obtained from the patients within 20 minutes.

### Data collection

Data were collected using an anonymous questionnaire, which was designed by the researchers on the basis of the literature information. Women's demographic and reproductive features, their knowledge of PSTs, DS, and amniocentesis were inquired in the

Table 1. — Sociodemographic features of the participants.

Variables		n (%)
Education	Under university degree	48 (47.5%)
	University degree	53 (52.5%)
Partner Education	Under university degree	34 (33.7%)
	University degree	67 (66.3%)
Income	Minimum wage and under	49 (48.5%)
	More than minimum wage	52 (51.5%)
Occupation	Housewife	65 (64.4%)
	Working	36 (35.6%)
Social security	Yes	96 (95.0%)
	No	5 (5.0%)
Consanguinity	Yes	8 (7.9%)
	No	93 (92.1%)
Marital status	Married	101 (100%)
	Single	0 (0.0%)
Parity	Nulliparous	23 (22.8%)
	One child	70 (69.3%)
	Two children	7 (6.9%)
	Three children	1 (1.0%)

questionnaire. The items concerning the attitudes of pregnant women toward both undergoing amniocentesis in case their PST test results showed high risk and toward termination of pregnancy if the amniocentesis indicated the baby had DS were also included in the questionnaire. The participants completed the questionnaire before the gynecologist applied PSTs. This questionnaire was performed to the same women after they received the counselling about PSTs, DS, and amniocentesis, along with a written information brochure. The questionnaire forms were filled by 108 responders, while seven questionnaire forms were not completed adequately. Six pregnant women were offered a pilot questionnaire form to determine whether the questions were clear, understandable, and in a logical order and four gynecologists were asked to criticize the content of the questionnaire.

### Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences 20.0. Parametric tests were applied to data of normal distribution and non-parametric tests were used for data of questionably normal distribution. Chi-square tests were used and frequency calculations were performed on all variables. All differences associated with a chance probability of 0.05 or less were considered statistically significant.

## Results

The mean age of the participants was  $28.86 \pm 4.95$  (range, 18 to 40) years. The mean gestational age was  $10.85 \pm 2.37$  (range, 6 to 13) weeks, and the mean gestational age at first pregnancy was determined to be  $6.09 \pm 0.09$  (range, 5 to 9) weeks. Demographic data are reported in Table 1.

### Education

A significant correlation was found between education and knowledge of DS and amniocentesis, and why it is performed. A significant correlation was found between higher education (participants with a high school or university ed-

Table 2. Knowledge of prenatal screening tests.

	Combined test (before education) (n=101) n (%)	Combined test (after education) (n=97) n (%)	p value
I do not have knowledge of how a combined test is performed	55 (54.5%)	1 (1.0%)	0.000
Combined test is performed together with blood test and USG*	23 (22.8%)	88 (90.7%)	
I do not have knowledge of when a combined test is performed	49 (48.5%)	1 (1.0%)	0.000
The combined test is performed at the 11-14 <sup>th</sup> week of pregnancy	48 (47.5%)	96 (99.0%)	
I do not have knowledge about whether the combined test is obligatory or not	38 (37.6%)	4 (4.1%)	0.000
The combined test is not obligatory	16 (15.8%)	45 (46.4%)	
I do not know whether the combined test has false negative/false positive rates	65 (64.4%)	10 (10.3%)	0.000
The combined test has false negative/false positive rates	29 (28.7%)	82 (84.5%)	

  

	Triple test (before education) (n=101) n (%)	Triple test (after education) (n=97) n (%)	p value
I do not have knowledge of how the triple test is performed	57 (56.4%)	4 (4.1%)	0.000
The triple test is performed together with a blood test and USG	22 (21.8%)	89 (91.8%)	
I do not have knowledge of when the triple test is performed	47 (46.5%)	3 (3.1%)	0.000
The triple test is performed at the 15-20 <sup>th</sup> week of pregnancy	52 (51.5%)	92 (94.8%)	
I do not have knowledge about whether or not the triple test is obligatory	33 (32.7%)	7 (7.2%)	0.000
The triple test is not obligatory	7 (6.9%)	34 (35.1%)	
I do not know whether the triple test has false negative/false positive rates	66 (65.3%)	10 (10.3%)	0.000
The triple test has false negative/false positive rates	27 (26.7%)	81 (83.5%)	

  

	Quadruple test (before education) (n=101) n (%)	Quadruple test (after education) (n=97) n (%)	p value
I do not have knowledge of how the quadruple test is performed	84 (84.0%)	13 (13.4%)	0.000
The quadruple test is performed together with a blood test and USG	8 (8.0%)	33 (34.0%)	
I do not have knowledge of when the quadruple test is performed	85 (84.2%)	15 (15.5%)	0.000
The quadruple test is performed at the 15-20 <sup>th</sup> week of pregnancy	14 (13.9%)	53 (54.6%)	
I do not have knowledge of whether or not the quadruple test is obligatory	59 (58.4%)	21 (21.6%)	0.049
The quadruple test is not obligatory	10 (9.9%)	39 (40.2%)	
I do not know whether the quadruple test has false negative/false positive rates	76 (75.2%)	20 (20.6%)	0.000
The quadruple test has false negative/false positive rates	17 (16.8%)	72 (74.2%)	

USG = ultrasonography.

education) and knowledge of DS and amniocentesis ( $p = 0.000$ ), higher income ( $p = 0.001$ ,  $p = 0.004$ ), and occupation ( $p = 0.000$ ,  $p = 0.000$ ). Compared to those participants with an education less than high school, the respondents that had a high school or university level education were more likely to state that amniocentesis would be recommended when PST results showed high risk and that only some of the anomalies could be diagnosed by amniocentesis ( $p = 0.000$ ). Participants with a high school or university education were more likely to state they would like to have amniocentesis when PST results show high risk ( $p = 0.028$ ). All of the participants stated that they would like to terminate their pregnancies if amniocentesis showed that the fetus had DS. Participants with high school and university education had a higher level of knowledge regarding when the combined ( $p = 0.000$ ) and triple ( $p = 0.036$ ) tests should be performed. There was no significant difference as for the quadruple test ( $p > 0.05$ ). Participants with high school and university level education had a better knowledge of false positive detection

rates of the combined ( $p = 0.001$ ), triple test ( $p = 0.001$ ), and quadruple tests ( $p = 0.038$ ).

#### Income

Participants with a high income had a higher level of knowledge about how the quadruple test is performed ( $p = 0.004$ ), when the combined test is performed ( $p = 0.003$ ), and concerning the false positive detection rates of the combined test ( $p = 0.007$ ). Participants with high income were more likely to state that a high risk in test results would mean the possibility that the baby would be born with DS ( $p = 0.001$ ). A significant correlation was found between income and knowledge of DS and amniocentesis. Participants with a high level of income had a higher level of knowledge ( $p = 0.001$ ). Participants with a high level of income were more likely to state that amniocentesis would be recommended if PST results showed high risk ( $p = 0.003$ ) and that only some of the anomalies could be diagnosed by amniocentesis ( $p = 0.026$ ), compared to those at lower levels of income.

Table 3. — Knowledge about DS, amniocentesis, and attitudes toward amniocentesis and termination of pregnancy.

Knowledge about DS	Before education n (%)	After education n (%)	p value
I know what DS is	60 (59.4%)	95 (97.9%)	0.000
DS is a chromosomal abnormality	38 (63.3%)	80 (84.21%)	0.000
DS affects physical functions	29 (48.3%)	47 (49.4%)	0.000
Mental retardation exists in patients with DS	38 (63.3%)	81 (85.2%)	0.000
DS increases with maternal ageing	14 (23.3%)	55 (57.8%)	0.000
DS can cause cardiac disease, vision, and hearing disorders	22 (36.6%)	49 (51.5%)	0.000
Knowledge about amniocentesis (n=100)			
Knowledge about amniocentesis (n=100)	Before education n (%)	After education n (%)	p value
I know what amniocentesis is	38 (38.0%)	94 (96.9%)	0.000
Amniocentesis is tested from amnion fluid	38 (38%)	93 (95.8%)	0.018
Amniocentesis has a one percent chance of causing abortion	9 (9.0%)	22 (22.6%)	0.000
Amniocentesis could be offered when PSTs show high risk	24 (24.0%)	80 (82.4%)	0.000
Chorionic villus sampling could be offered when PSTs show high risk	3 (3.0%)	21 (21.6%)	0.000
I know the reason why amniocentesis is performed	36 (36.0%)	92 (94.8%)	0.000
Amniocentesis is performed to see whether the fetus has a chromosomal anomaly	33 (33.0%)	93 (95.8%)	0.000
Only some of the anomalies can be diagnosed by amniocentesis	18 (18.0%)	79 (81.4%)	0.000
Attitudes towards amniocentesis			
Attitudes towards amniocentesis	Before education n (%)	After education n (%)	p value
I would like to have amniocentesis when PSTs show high risk	15 (16.4%)	18 (18.5%)	0.000
I would not like to have amniocentesis when PSTs show high risk	2 (2.1%)	45 (46.3%)	0.000
I am uncertain	9 (9.8%)	1 (1.0%)	0.000
I would do what my doctor recommends	39 (42.8%)	3 (3.0%)	0.000
Attitudes towards termination of pregnancy in case the fetus has DS			
Attitudes towards termination of pregnancy in case the fetus has DS	Before education n (%)	After education n (%)	p value
I would like to terminate my pregnancy when amniocentesis shows that the fetus is DS	6 (6.4%)	7 (7.2%)	0.05
I would not like to terminate my pregnancy when amniocentesis shows that the fetus is DS	17 (18.2%)	22 (22.6%)	
I am uncertain	35 (37.6%)	32 (33.6%)	
I would do what my doctor recommends	35 (37.6%)	34 (35.7%)	

DS = Down Syndrome.

### Occupation

There was a significant correlation between knowledge of DS and amniocentesis and occupation, and participants who were working had a higher level of knowledge ( $p = 0.000$ ). Among the 100 participants, 82 (82.0%) stated that they had a planned pregnancy whereas 18 (18.0%) had unplanned pregnancies. Out of the 100, 99.0% of the pregnancies occurred spontaneously and 1.0% occurred via in vitro fertilization. Among the participants, two (2.0%) stated that they had a disabled child. Among 100 participants, 32 (32.0%) stated that they visited a gynecologist in the private office, and among 95 participants, 23 (24.2%) stated that they wanted to visit a gynecologist in the private sector during their pregnancies.

### Knowledge of PSTs

Among the participants, 60 (59.4%) stated that they were aware of tests that might be offered during pregnancy to help detect abnormalities in the fetus. There was a significant increase in this rate to 96% after education was pro-

vided about prenatal screening and diagnostic tests. Respondents were asked about the methods, the types of sample (maternal blood, ultrasonography), and when the tests are performed, whether the tests are obligatory or not, and whether the tests have false negative/false positive rates. Knowledge of the respondents about PSTs are shown in Table 2.

### Knowledge of the meaning of the test results

The respondents were asked about the meaning of the test results. Among the participants, 59 (58.4%) stated that they did not have any knowledge about this issue, but this rate was eight (8.2%) after the education ( $p = 0.000$ ). Another five (5.0%) stated that a test indicating high risk definitely showed that the baby had DS, while 37 (36.6%) stated that there was only a probability that the baby would be born with DS. There was a significant difference in the response rates of those who stated that there was a possibility that the baby would be born with DS after the education ( $p = 0.000$ ).

Table 4. Reasons why women would not like to perform amniocentesis.

	Before education n (%)	After education n (%)	<i>p</i> value
Possibility of harming the unborn baby	23 (71.9%)	18 (69.2%)	0.312
Risk of miscarriage	1 (3.1%)	3 (11.5%)	
Fear of presenting for amniocentesis	3 (9.4%)	1 (3.8%)	
Accept the baby as it is born	5 (15.6%)	4 (15.4%)	
Total	32 (100.0%)	26 (100.0%)	

#### *Knowledge about DS and amniocentesis and attitudes toward amniocentesis and termination of pregnancy*

The respondents were asked if they knew what DS and amniocentesis are. Among the participants, 60 (59.4%) knew what DS is and among 100 participants, 38 (38.0%) knew what amniocentesis is. Knowledge of both DS and amniocentesis was found to be significantly higher after the education ( $p = 0.000$  and  $p = 0.000$ , respectively). Attitudes toward amniocentesis changed significantly after the education. Among the participants, two (2.2%) stated that they would not like to have amniocentesis performed if it were recommended; this rate increased to 45 (46.3%) after the education ( $p = 0.000$ ). Participants were asked what they would do if their babies were diagnosed with DS. Among 93 participants, 17 (18.3%) stated that they would not like to terminate their pregnancies in any case; this rate rose to 22 (22.6%) out of 95 participants after the education ( $p = 0.05$ ). The change in knowledge about DS and amniocentesis and attitudes toward amniocentesis and termination of pregnancy are shown in Table 3. Among all the participants, 95 (94.1%) and 91 (93.8%) after the education stated that they wanted to have PSTs but no significance was found.

#### *Reasons why women did not want to have amniocentesis performed*

The most common reasons women did not want to have amniocentesis performed were: the possibility that the unborn baby would be harmed, risk of miscarriage, fear of presenting for amniocentesis, and the wish to accept the baby as it is born. Table 4 shows the reasons women did not want to have amniocentesis performed.

## **Discussion**

This study has shown that women have inadequate knowledge about PSTs, DS, and amniocentesis. In the study, approximately two-thirds of the responders stated that they were aware of the PSTs that might be offered during pregnancy, but awareness increased following counselling. In a study conducted in Turkey, only 42.8% of the pregnant women knew what the triple test was [15]. There

was also a significant difference in the rate of awareness after counselling about the knowledge of the significance of test results. In the present study, more than one-third of the responders knew that the test results indicating high risk would mean that there is a probability that the baby would be born with DS. In a study by Bilgin *et al.*, 27.7% of the participants knew the meaning of the test results [16]. Several studies have pointed to the inadequate knowledge of pregnant women regarding PSTs [6, 7, 17]. PSTs provide women the opportunity to make choices about their pregnancies. At the same time, these tests oblige women to make some difficult decisions and placed them in a decisional conflict. Decisional conflict is influenced by inadequate knowledge [18] and educating pregnant women about PSTs has been shown to be associated with a significant decrease in the level of decisional conflict [19].

In this study, participants with educational levels of high school and university had a higher level of knowledge about the timing of the combined and triple tests. Women with a higher degree of education have been reported to be more aware of PSTs in Greece [20]. A study from Australia (2005) consisting of older and better-educated women showed that 68% of the women made an informed choice when they were educated before screening [21].

In this study, participants with an education level of high school or university had a higher level of knowledge about the procedures and indications of DS and amniocentesis. Approximately two-thirds of the responders knew what DS was and that DS was caused by chromosomal abnormality. High school and university graduates were more knowledgeable. Similarly, in a study conducted in Turkey, 46.7% of the pregnant women with a university level of education stated that DS was a genetic disease [16]. In several other studies, it was found that pregnant women with an advanced level of education were significantly more knowledgeable [6, 22, 23].

Approximately one-third of the participants knew the purpose of amniocentesis and this finding was in accordance with previous literature that showed that 31.7% of the pregnant women did not know the purpose of amniocentesis [17]. Studies have indicated that women had insufficient knowledge about amniocentesis [24, 25].

This study has shown that counselling provided by gynecologists and accompanied by a written information brochure, tends to increase women's knowledge about PSTs and the number of women who make informed choices about PSTs. After counselling, women were more knowledgeable about PSTs, how, and when PSTs are performed and whether these tests are obligatory and yield false positive results. Audiovisual information provided as a complement to verbal and written information was found to increase the number of women who made an informed choice about DS screening in Sweden [26]. A systematic review, which aimed to identify and evaluate the effect of materials helping patients to make their own decisions in

obstetrics, such as a touch-screen information system and video and booklet, suggested that anxiety could be reduced and knowledge and satisfaction could be improved by using decision aids for prenatal screening for DS and women's perception of having made an informed choice could be increased [27].

In Turkey, amniocentesis is provided free of charge in pregnant with a positive PST result. In the present study, the percentage of the responders who stated that they would not like to undergo amniocentesis when PSTs indicate high risk, increased more than 20 times after counselling (n=45). If one considers that amniocentesis poses a risk of miscarriage and there is a possibility of having a positive PST result together with a fear of experiencing pain during the procedure, the process may therefore be distressing [11, 12, 28] and so the majority of pregnant women reported difficulties in making a decision about undergoing amniocentesis [25]. Studies have shown that providing adequate information and appropriate counselling about amniocentesis can reduce pain and anxiety in women [29, 30]. In the present study, women who knew what amniocentesis was, were more likely to carry out the procedure, but after the counselling, although there was an increase in the number of women knowing what the procedure was, there was no significant increase in the number of women who wished to undergo it. In fact, the number of women who did not want to undergo the procedure significantly increased. Contrary to the present findings, however, Brajenovic-Millic *et al.* found an increase in the number of women wishing to have amniocentesis performed after receiving counselling [31]. When the attitudes toward terminating pregnancy of the women in this study who did not wish to have amniocentesis performed after the education were considered, it was observed that 17.7% of these women were against terminating their pregnancies no matter what the consequences would be and 20.2% of them were undecided about terminating the pregnancy, and 50.7% of them wished to do whatever the doctor recommended. If we consider that a portion of the undecided group and those who wanted to do whatever the doctor recommended did not really wish to terminate their pregnancies, we can understand the reason for the higher number of pregnant women who did not want to have amniocentesis performed. These reasons might stem from their increased knowledge of the risks of amniocentesis and the fear that the procedure would harm their babies. In fact, when the pregnant women were asked why they did not wish to have amniocentesis, most of them noted that they did not want to harm their babies. In this study, the women were asked about their attitudes toward amniocentesis before the PSTs were performed. It is believed that there is a need for more detailed studies on attitudes of women after results are learned and also on the reasons for these attitudes.

In Turkey, induced abortion for fetal abnormalities is legally permitted. In this study, 18.2% of the responders stated that they would not like to terminate their pregnancies even if amniocentesis showed that the fetus had DS and this rate increased to 23.2% after counselling. Similarly in Bilgin *et al.*'s study, 20.7% of the pregnant women stated that they would not like to terminate their pregnancies but 60.3% stated that they were uncertain [16]. In another study, 34.9% of the women stated that they would not like to terminate their pregnancies [32]. In a qualitative study, results showed that women felt uncertainty about having to face the possibility of terminating pregnancy in case of DS [3]. A survey study by Korenromp *et al.* conducted with 71 women who had terminated their pregnancies revealed that 44% of them were somewhat and 21% were highly doubtful of their decisions. The women indicated the most frequent reasons of their doubts were as follows: conflict between the reason and emotion such as, "My reason was in conflict with my feelings" (49%); guilt about ending their child's life, such as, "I had the feeling of killing a child" (43%) and disagreement with the partner, such as, "My partner and I disagreed about termination of pregnancy" (38%). These responses demonstrated the complex and conflicting aspects of the decision [33]. In the present study, 37.6% of the responders were uncertain about terminating the pregnancy and again 37.6% of them stated that they would do what their physicians suggested, but these rates were not significantly changed after the counselling. The present data have not taken women's uncertainties about terminating pregnancy in consideration. Future research should investigate this issue.

Multiple factors may influence women's decisions when amniocentesis demonstrates the presence of DS. These factors include religion, maternal age, existing children, history of induced abortion, and psychosocial factors [34]. In the present study, there was no significant difference between women who did not want to terminate their pregnancy in terms of maternal age and existing children, but there was a significant difference in terms of induced abortion. In the present study almost all of the women who did not wish to terminate their pregnancies had no history of induced abortion. Similarly, in a study conducted in China, women who had no prior experience of induced abortion were less likely to consider induced abortion after a diagnosis of DS [35]. In the present study, the most common reasons that women indicated for not terminating their pregnancies were the wish to accept the baby as it was born, guilty conscience, and religion. More research aiming at investigating the reasons behind decisional conflict about terminating pregnancy should be performed. Religion has a significant influence on women's attitudes towards termination of pregnancy and the more religious the participants were, the less willing they were to terminate their pregnancies [33]. In Skotkos' study, women who chose to continue their pregnancies after a prenatal diagnosis of DS

stated religious or personal reasons [36]. More research aiming at investigating the reasons behind decision-making process about termination of pregnancy such as psychosocial factors should be performed. In the present study the authors did not investigate psychosocial factors. On the other hand, there are several factors that may influence women's choices regarding termination of pregnancy. Healthcare providers have to be aware of these factors. It has been shown that after a diagnosis of DS, 85-95% of the pregnant women decide to terminate pregnancy [33]. This research investigated the attitudes of women regarding amniocentesis and termination of pregnancy. Further research should be carried out to explore women's decision-making process when their unborn children are diagnosed as DS via amniocentesis. So far, little is known about women's decision-making following a prenatal diagnosis of DS and the factors that influence these decisions.

## Conclusion

Studies have shown that counseling increases patients' knowledge, understanding, and satisfaction [37] and that healthcare providers are among the most important persons for women who will decide to terminate pregnancy because of DS [33]. Since healthcare providers have the responsibility to respect the pregnant woman's autonomy, a shared decision-making should be offered to women in collaboration with their healthcare providers so as to facilitate it and acquire comprehensive and correct information. Besides non-directive counseling should be given to women so as to help them to make more informed choices about PSTs and other interventions. In the present study, it is a surprising finding that the authors found an increase in the number of women not wishing to have amniocentesis performed after counselling sessions. More research is needed for investigating the rationale behind the decisional conflict of women who do not wish to have amniocentesis performed both before and after their learning PST results.

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