

Women's Awareness Towards Prenatal Down Syndrome Tests in Bulgaria

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Abstract

Objective: For the past several years the screening and diagnostic tests for Down syndrome have evolved rapidly with the introduction of the non-invasive prenatal testing. However, not all of the women are aware of new test options. That is why the aim of our survey is to investigate the women's awareness towards prenatal Down syndrome tests in Bulgaria.

Methods: A survey was conducted among 500 randomly selected females from 18 to 47. It was designed as a prospective study carried out both online and at the genetic counseling office in the Laboratory of Medical Genetics, Varna. All the information was collected between January 2018 and June 2018.

Results: 384 (76.3%) of the women received information about the different tests option from their obstetrician. The rest 116 (23.7%) were self-educated. In total 345 (68.5%) of the females were satisfied with the Down syndrome tests information provided by their obstetrician. They had better knowledge of what biochemical screening is - 128 (25.4%) marked very good and 207 (41.2%) - good. When asked about the NIPT test, 202 (40.2%) did not know what NIPT was. 222 (44.4%) defined their knowledge about the amniocentesis as very good or good. However, only 65 (13.0%) would definitely undergo this procedure, if indicated. According to the results, for 346 (68.8%) women the accuracy of the test is most important when choosing a method for Down syndrome testing. Although the price was placed third as a factor for preferring a prenatal Down syndrome test, almost 80% of the questioned women said that they are willing to pay no more than 150 euros.

Conclusion: The results from the survey demonstrate the lack of knowledge about the offered screening and diagnostic tests for Down syndrome, especially NIPT. Better education and counseling of women during their pregnancy consultations are recommended.

Keywords: Down syndrome; Women; Awareness; Bulgaria

Introduction

Down syndrome or Trisomy 21 is the most common chromosomal abnormality with a frequency of 23.02 per 10000 based on last EUROCAT report [1]. Its clinical manifestations are well known-intellectual disability, typical facial features, cardiac defects and others.

Historically the amniocentesis is the first method for prenatal diagnosis of Down syndrome since 1968, when Nadler reported one of the first diagnoses of Trisomy 21 from cultured amniocytes [2]. In the 1984 Merkatz and colleagues reported an association between decreased levels of betha-horiongonadotropin and a high risk for Down syndrome [3]. That marked the establishment of the maternal screening for Down syndrome by using biochemical markers in the blood of pregnant women to calculate the risk for Down syndrome. Since then the prenatal testing for Down syndrome has evolved rapidly with the introduction of Non-invasive Prenatal Tests (NIPT), which were first released in Hong Kong and USA in August 2011 [4].

Today prenatal screening and diagnostic tests for Down syndrome are commonly used and implemented in the routine care for the pregnant woman. Because of their high sensitivity NIPT's, which are aggressively offered by private companies, are supposed to replace routinely performed biochemical first and second trimester screening tests. Nevertheless, the question remains-do women at reproductive age understand the possibilities and the limitations of the available Down syndrome tests, offered by the health care providers or by direct-to consumer companies.

In Bulgaria maternal biochemical screening test is implemented into the practice since 1996 and NIPT has been available since 2014. NIPT has higher sensitivity and specificity compared to the biochemical

screening. It is still used as a screening method and after a positive result from it a Chorionic Villus Sampling (CVS) or Amniocentesis (AC) should be offered to validate the result. However, NIPT could select the high risk pregnancies and help avoid other more invasive procedures with a risk for complications. During the prenatal genetic counseling sessions the pros and cons of every test are explained, but unfortunately not every woman in Bulgaria has access to such consultations with a specialist, trained in Medical genetics.

The medical societies are aware of the different limitations of certain tests, but are women at reproductive age also educated about them and do they make an informed choice. That is why the aim of our survey is to investigate the women's awareness towards prenatal Down syndrome tests in Bulgaria.

Materials and Methods

A survey was conducted among 500 randomly selected females with mean age 30.86 (from 18 to 47) and the majority of them living in the big cities of Bulgaria. It was designed as a prospective study carried out

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both online and at the genetic counseling office in the Laboratory of Medical Genetics, Varna.

All the information was collected between January 2018 and June 2018. A questionnaire was developed to assess women's awareness of different screening and diagnostic tests for Down syndrome. It consisted of demographic data and 12 multiple choice questions.

Demographic data included age, place of residence and level of education. The others included: the main source of information for Down syndrome tests, the women's satisfaction with the care quality of the obstetrician, self-assessment for the essence of the biochemical screening, NIPT, amniocentesis plus willingness to undergo such a procedure. Possible answers were scaled-very good, good, satisfactory, and unsatisfactory. The answer "very good" had the highest value of knowledge. "Good" meant that the women were familiar with it, but still had some questions about the nature of the test. "Satisfactory" was defined as superficial knowledge about the test – the women had only heard about it, but do not know any details. "Unsatisfactory" meant that the women had never heard of the test. The women were also asked if they had done a biochemical screening, ultrasound examination for fetal morphology or another screening and diagnostic test for Down syndrome during their previous pregnancy. We did not specify if the question was about first or second trimester screening. Three of the questions evaluated the key factors for choosing a certain test over another with an accent on the role of the financial factor.

Ethical approval was obtained from the Ethics committee at Medical University Varna (№73/29.03.2018).

Results

Of all 402 women, who answered the question about their education, 321 (79.7%) had a bachelor or masters degree from a university and the rest 81 (20.3%) had only a highschool diploma.

Currently pregnant were 398 (79.6%) and 102 (20.4%) have been pregnant before. For 193 (48.5%) of them this was their first pregnancy, 150 (37.8%) were pregnant with their second child, 40 (10%) with their third and 15 (3.7%) with their fourth one.

208 (67.3%) of the women had performed biochemical screening during their previous pregnancies as a part of the mass genetic prevention strategy, funded by the government. 25 (8.1%) had only a fetal morphology examination and 76 (24.6%) chose not to do any screening or diagnostic test for Down syndrome.

384 (76.3%) of the women received information from the obstetrician. The rest 116 (23.7%) were self-educated and they gathered their information from the Internet or from recommendations of a friend.

In total 345 (68.5%) of the females were satisfied with the Down syndrome tests information provided by their obstetrician (they marked very good and well understanding). 83 (17.2%) defined it as satisfactory and 72 (14.3%) as unsatisfactory.

As very good 128 (25.4%) and good 207 (41.2%) women have assessed their knowledge for what biochemical screening is. 118 (23.4%) described it as satisfactory and 47 (10%) said they do not know what first and second trimester screening is.

When asked about the NIPT test, 202 (40.2%) did not know what NIPT is. Only 68 (13.5%) said their awareness for this test was very good. 145 women (28.8%) chose an answer good and 85 women (17.5%) – satisfactory.

Concerning their information about the amniocentesis-222 (44.4%) defined their knowledge about this test as very good or good. The other answers were-119 (23.8%) satisfactory, 159 (31.8%) - unsatisfactory.

Only 65 (13.0%) would definitely undergo amniocentesis if indicated, 153 (30.5%) chose rather yes, 68 (13.6%) – rather not, 18 (3.6%) – definitely not, and 196 (39.3%) said they cannot decide what they will do.

Only 60 (12%) said that their choice about the type of screening test depended greatly on the money value. For 170 (34.1%) the price influences their choice only partially and for 270 (53.9%) the price is not a factor when deciding.

From the listed answers about the price (from 50 to 500 euro) of a safety test for Trisomy 21 with the highest sensitivity, the majority 394 (79.8%) are willing to pay no more than 150 euros, 47 (9.5%) – up to 250 euros, 38 (7.6%) – up to 500 euros, and 23 (4.6%) – above 500 euros.

Comparing the main factors when choosing a method for Down syndrome testing shows prevalence of the accuracy of the test-346 (68.8%), followed by the safety 148 (30%) and the price 6 (1.2%). Surprisingly, no one pointed the turnaround time as a key factor when choosing the method for testing.

Age-stratified analysis was done to compare the awareness of the women under 35 years old and 35 years old or above that age (Figure 1). 9.7% of women under 35 years old and 10.8% of the women above or 35 years old answered "unsatisfactory" level of awareness for Biochemical Screening (BS) and for the NIPT-40.3% and 39.6% relatively. For AC-23.7% of the women from the second group answered that they are very good informed about the test, compared to 14.4 from the first group.

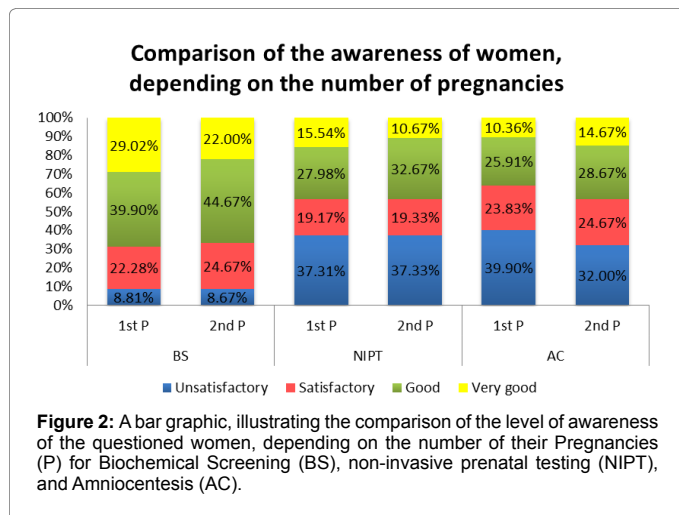
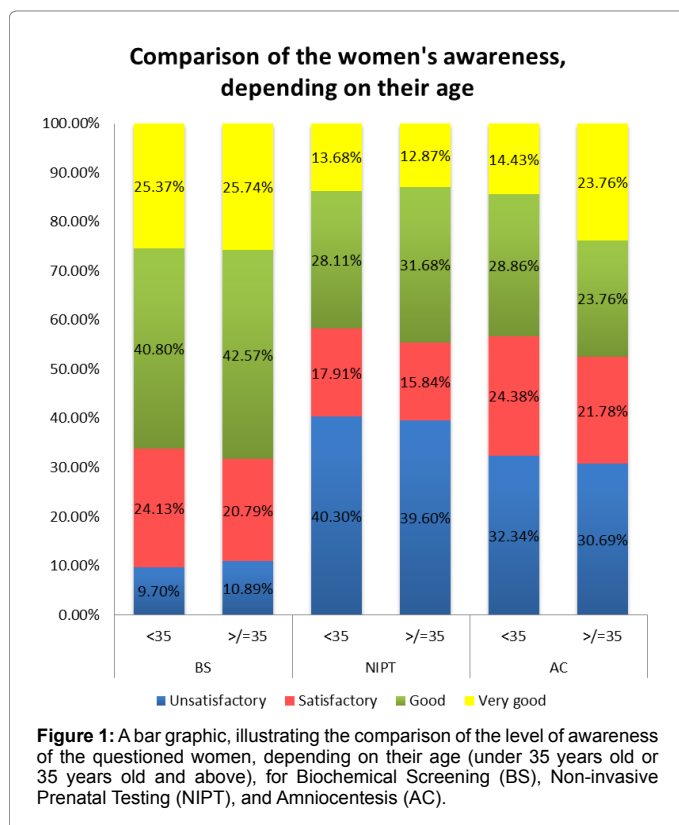
The levels of awareness were also compared based on the number of previous pregnancies (Figure 2). Because the number of women pregnant with their 3rd or 4th child was significantly lower than the number of women pregnant with their 1st or 2nd child, we did not include them in the analysis. The percentage of women with their 1st child, who marked very good understanding for BS, NIPT and AC, was 29.0%, 15.5% and 10.3% relatively compared to 22.0%, 10.6%, 14.6% relatively of the women, carrying their 2nd child (Figure 1,2).

Discussion

The results from the study show that even though the rate of women's awareness for first and second trimester screening is relatively high, their knowledge for NIPT remains rather low. This could be due to the fact that the biochemical screening was implemented into the practice long before NIPT and it is well accepted by the vast majority of pregnant women. Also, because the first and second trimester screening is part of the primary prevention for Down syndrome in Bulgaria, it is free of charge since 2014, though it is optional. That has a big impact on the decision which test would the women prefer, since the NIPT is not reimbursed.

Although the NIPT was introduced in Bulgaria 4 years ago, it was offered only by private companies, which sent the samples abroad. Since June, 2018 the test is done also in Sofia, Bulgaria, which may increase the popularity of the NIPT test, but the release date was outside of time range of our survey. However, the test remains paid by the patients.

That is not the case in other European countries. Switzerland was one first country, which included the NIPT test in its social insurance [5]. For example, in Belgium the NIPT is reimbursed from July 1, 2017 [6]. In the Netherlands before the 1st of April NIPT was available only



for women who had a high risk result from the combined biochemical screening. After that all of the pregnant women could decide if they want the biochemical screening or the NIPT and the price of both tests is the same. The women choose themselves which test they would prefer [7].

The survey showed that around 70% of the women chose to do a biochemical screening during their current or previous pregnancy. A limitation of our survey is that we did not specify the type of biochemical screening—first or second trimester. However, almost one quarter of the women did no screening test at all. The biochemical screening has been free of charge for 3 years and yet not every pregnant woman believes it is necessary to do it or was not advised by her obstetrician to do it. 8%

of the questioned preferred to do only an ultrasound examination. Eventhough the fetal morphology is a useful screening method, its sensitivity increases, when combined with the biochemical screening and it is not recommended as a first and only screening method [8].

That is why in order to achieve less false negative results, the efforts of an obstetrician, a roentgenologist, specialized in fetal morphology, and a geneticist are necessary. In this way the depth of knowledge of the pregnant women will increase and they would not have to rely on self-education. In 2015 a similar questionnaire was distributed among women from Greek and non-Greek origin referred for prenatal diagnosis [9]. Women of Greek origin with higher education, who were frequent readers of the popular press, were better informed about the prenatal diagnosis testing for Down syndrome. However, 59.7% of the questioned women intended to ask their physician's opinion and another 34.7% would agree to further testing following the advice of their physician. According to our survey the majority of the women (76.3%) gather their information from the health care provider, but yet the results illustrate the lack of knowledge for the newest screening tests, such as NIPT. This again highlights the need of better education programs among women at reproductive age, especially for the NIPT, because of the lower risk and better sensitivity. Also, there should be better media coverage by the media for such new tests in order to reach a wider public.

The results from the survey show the small percentage of women (13.0%) who are willing to undergo an amniocentesis, if necessary. These numbers could be due to the fact that the women are not properly educated what an amniocentesis is, eventhough in cases of high risk result from the screening test, women in Bulgaria are offered CVS and AC for free. Unfortunately, there are certain limitations of the available prenatal diagnostic services in Bulgaria. For example, due to the small number of obstetricians, who are trained to perform chorionic villous sampling and cordocentesis, more often amniocentesis is done. Also, eventhough AC is the most commonly performed type of prenatal diagnosis, the procedure is offered only in three cities across the country. That is why we included questions only about the amniocentesis.

Despite of that the fact that the amniocentesis is free of charge and is a routine procedure, around 32% of the women are not well informed about it and this could be one of the reasons for their unwillingness to undergo such a procedure. Milić-Brajenović and colleagues investigated if there will be an increase of the percentage of women willing to undergo an amniocentesis after they were consulted with trained midwives [10]. The research showed an increase of the percentage of women who were prepared to accept an amniocentesis in the group surveyed after consultation (74%) than before consultation (53%). This could be explained by the invasiveness of the procedure and the fear of women of complications and miscarriage. That is why the NIPT could be applied to select the high risk pregnancies and to avoid unnecessary procedures, which are generally described as safe, but nevertheless carry a certain risk for the pregnant and the fetus.

Although the price was placed third as a factor for choosing a prenatal Down syndrome test, almost 80% of the questioned women said that they are willing to pay no more than 150 euros. At the end that is no surprise, considering the fact that NIPT is not covered by the National health care system and the minimum salary in the country is 235.20 euros [11]. With the advancing technologies and the possibility to do NIPT test by using more available and widely spread qPCR machines than a sequencing technique there is a high chance that the price will drop down and more patients will benefit from the test [12].

Around 70% of the women answered that when choosing a prenatal screening or diagnostic test for Down syndrome, their choice is based on the accuracy of the test and for around 30% the safety of the test is the key factor. The survey shows that the women rely mainly on the precision of the test, which is also one of the greater advantages of the NIPT test, when compared to the biochemical screening. That is why they should be fully educated about the sensitivity and specificity of different tests and that is the only way they can make an informed decision. No one pointed the turn-around time as a reason for preferring a certain test to another one. However, our practice shows that this is not the case, especially if the pregnancy is advanced and each day delay may have a significant impact on their decision.

The results from the age-stratified analysis illustrate that the level of awareness for BS and NIPT is not age-dependent. However, women at the age of 35 years or older were better informed about the amniocentesis. This could be due to the fact that they are aware of the increased risk for Down syndrome in the baby because of their advanced maternal age and search information not only for screening tests, but also for diagnostic tests, such as AC. An inverse association of awareness for BS and NIPT with the number of children was found. Women, carrying their first child, were better informed about these two tests. However, they had a lower level of awareness for AC. One of the possible explanations is that women, who are pregnant for the first time, are more concerned and eager to find more information for new tests (such as NIPT), compared to the other group.

Conclusion

The preventive medicine is the most important part of today's prenatal care. The screening tests for Down syndrome are offered in all countries with good healthcare systems. However, the results from the conducted survey show that there is a lack of knowledge about the possibilities and the limitations of available prenatal Down syndrome tests among pregnant women in Bulgaria. They also highlight the lack of knowledge about NIPT compared to routinely performed tests, but with the advancing technologies and lowering of the price, NIPT is expected to become the first choice test. Better education and counseling of women during their pregnancy consultations are recommended. In order to achieve this qualified obstetricians and medical geneticists should cooperate to create a patients education program.

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