

Original Research Article

The Accuracy of Sonographic Determination of Fetal Gender

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ABSTRACT

Background: The improvement of high-resolution ultrasound equipment has provided the possibility of determination of the fetal gender during pregnancy. However, because of the way in which the genitalia develop, the accuracy of gender identification is different among gestational age.

Objective: To assess the accuracy fetal gender determination during prenatal screening and to find in which week of the gestational age is more accurate.

Methods: A questionnaire had been distributed to a group of sonographers working in king Abdulaziz University, Jeddah and Khobar hospitals .another questionnaire prepared for a group of women who delivered their babies in those hospitals. Data collected, analyzed by using Microsoft Excel software.

Result: 13 (76%) of the responses indicated that fetal gender determination by ultrasound has a high precision in second trimester (13-27 weeks of gestational age), while the remaining 4(24%) found the gender can identified in the first trimester.

Of the of the total 52 women with ultrasound scan, 50 (96%) knew about the fetal gender during the pregnancy, while only two (4%) answered by no. 46 (92%) of women the gender was the same as determined by ultrasound, while only 4(8%) of women was not. The overall accuracy to correctly determine the fetal gender was 92%.

Conclusion: From this research work we can conclude that prenatal gender assignment by ultrasound has a high degree of accuracy rate at 14 to 21 weeks.

Keywords: Ultrasonography, Fetal gender; Fetal sex.

INTRODUCTION

Ultrasound imaging has become a very useful diagnostic tool in obstetrics, to scan a woman's abdomen and pelvic cavity, creating a sonogram of the baby, uterus and placenta. It is widely used for the prenatal assessing of fetal growth, detecting multiple pregnancies, and determining placental location. Depending on the age of fetus at time of ultrasound scan, many pathological conditions can be screened for. The ultrasound is a noninvasive procedure which, when used properly, has not demonstrated fetal harm.

Adequate visualization of the fetal gender is feasible by high-resolution real-

time ultrasonography during the prenatal examination. Technical difficulties that were reported relate to fetal presentation, number of fetuses, fetal activity, amniotic fluid volume, and maternal obesity or bowel gas. In the current study, the fetal position, particularly breech presentation and oligohydramnios were the major factors obscuring sex determination. ⁽¹⁾

First to early second trimester of pregnancy prenatal sex determination can be done from 11 weeks gestation using the direction of the genital tubercle and the "sagittal sign." The downward direction of the tubercle is considered a female while the upward direction a male. ⁽²⁻⁴⁾ in sagittal sign,

examination of the genital region in the midline sagittal plane demonstrates a caudal notch in females and a cranial notch in males. (5,6)

Usually, prenatal determination of fetal sex on ultrasound during the second and third trimesters is based on the visualization of a penis and scrotum in boys and of the labia majora and minora in girls. However there is no difference in size between the penis and the clitoris until after 14 weeks of pregnancy. (7)

The aim and objectives

The aim of this study to determine the accuracy of sex determination by ultrasound and during which trimester the accuracy will be relatively high.

MATERIALS AND METHODS

The data and statistical information of this study was based on the questionnaire that was explained to the participants and the consent was obtained.

Two different types of questionnaires were delivered to two groups of the following populations who were included in the study:

Group 1- All obstetric sonographers in King Abdulaziz University Hospital in Jeddah and a group of sonographers working in King Fahad University Hospital in Khobar. The questionnaire was distributed directly to the sonographers participated in the study. The total sample size was 17 male and female sonographers with their experiences were ranged from 5-15 years.

Group 2- Other questionnaire was delivered to 52 women from the general populations, who were scanned with ultrasound and delivered their babies in the same two hospitals mentioned above.

The data was collected during the time from 4-3-2012 to 16-5-2012.

The data was extracted and processed via (Microsoft Excel) software.

RESULTS

We distributed a questionnaire to 17 sonographers who are working in obstetric

clinics in King Abdulaziz University Hospital in Jeddah and King Fahad University Hospital in Khobar. It was obvious that 13 (76%) of sonographers said that fetal gender can be determined by using ultrasound in the second trimester, whereas 4 (24%) said that it can be determined in the first trimester as presented in figure 1.

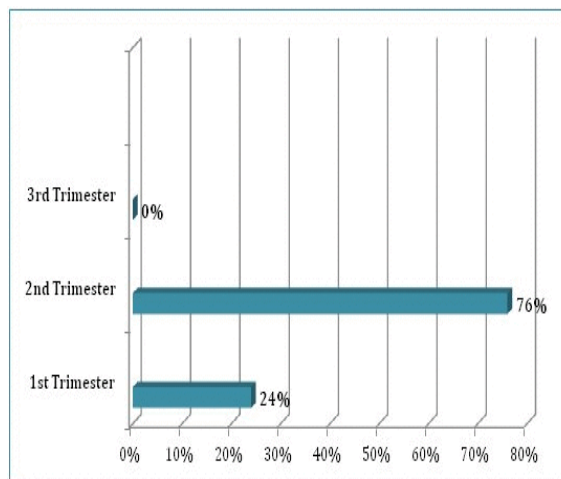


Figure 1: Fetal Gender Determination by Ultrasound

From the figure 2: below, It was obvious that about 13 (76%) of sonographers said that there is a strong relation between the fetal position and gender determination, while the remaining 4 (24%) said there is no relation between the two.

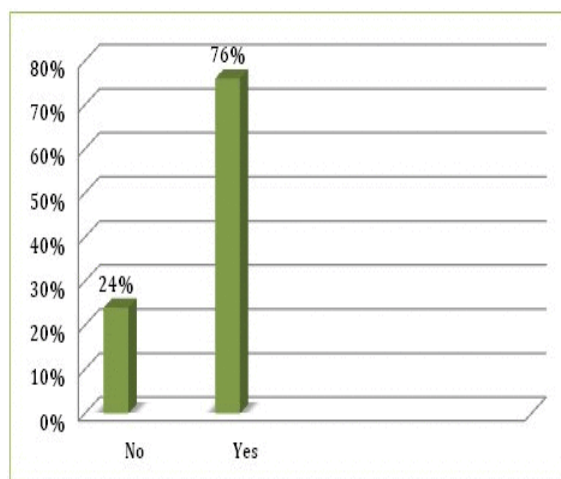


Figure 2: Relation between the fetal position and gender determination

In figure 3, it was demonstrated that 13 (76%) of respondents participated in this study said that the fetal position was the main obstacle in identifying the fetal

gender, whereas two (12%) said that the inexperience of the sonographer was the reason behind that, where only one (6%) believe that the amount of amniotic fluid is the reason, while one (6%) saw that there are other reasons for non-identifying the fetal gender.

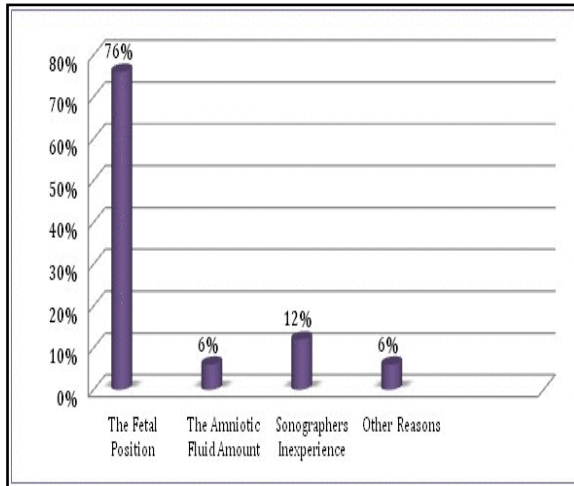


Figure 3: Difficulties in Fetal Gender Identification

From figure 4, given below it appeared that 15 (88%) of sonographers said that the problem could be solved, while two (12%) said that there is no way to solve it.

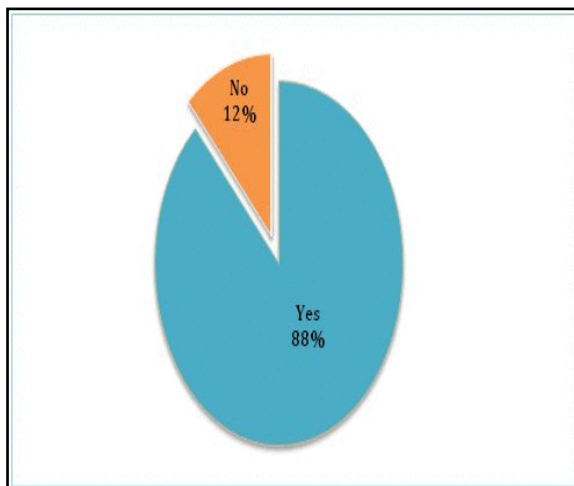


Figure 4: Solution of visualization if possible

It was clearly observed in figure 5: below that about 11 (65%) of respondents said that the problem can be solved in the second trimester, where three (18%) said that it can be solved in the third trimester.

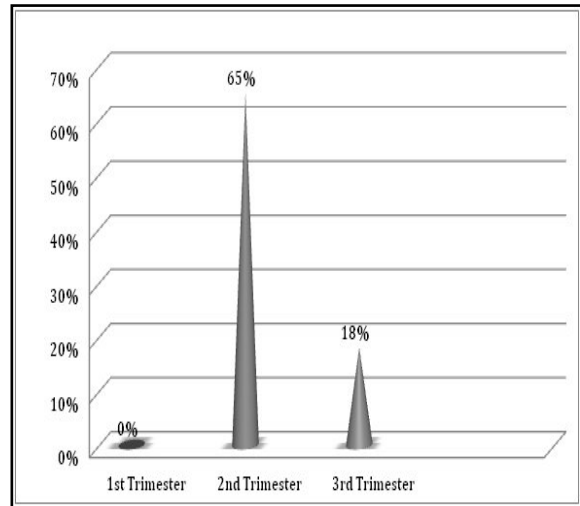


Figure 5: Solution of visualization if possible

It is generally observed that the majority of sonographers 14 (82%) said that the transducer manipulation and changing patient position is the ways to solve the problem, whereas two (12%) said that changing the patient position is enough, while one (6%) saw that the transducer manipulation is the solution as shown in Figure 6.

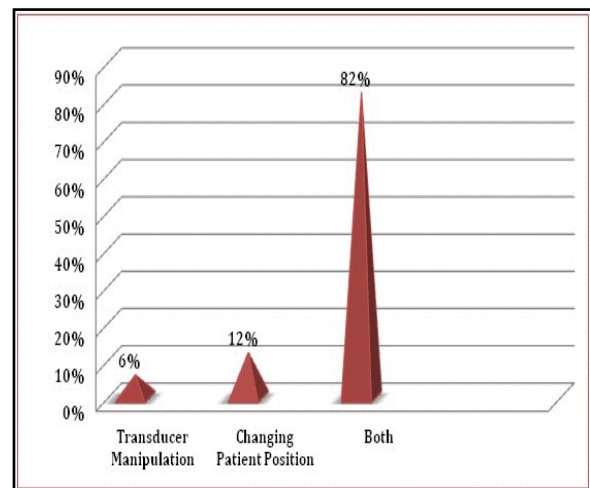


Figure 6: The problem solution

The second questionnaire was distributed to 52 women from the general population in Jeddah and al-khobar who were scanned by ultrasound and delivered their babies in our study areas. Figure 7: below, demonstrated that 50 (96%) of women said that they knew about the fetal gender during the pregnancy, while only two (4%) answered by no.

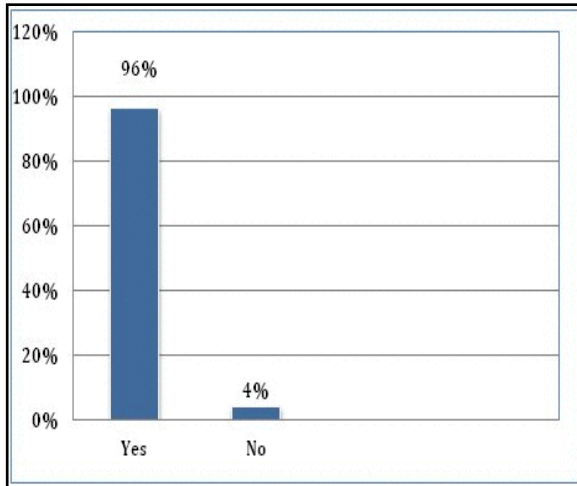


Figure 7: Prenatal Recognition of Fetal Gender

Figure 8 below, it's obvious that all 50 women (100%) knew the gender by the prenatal ultrasound examination.

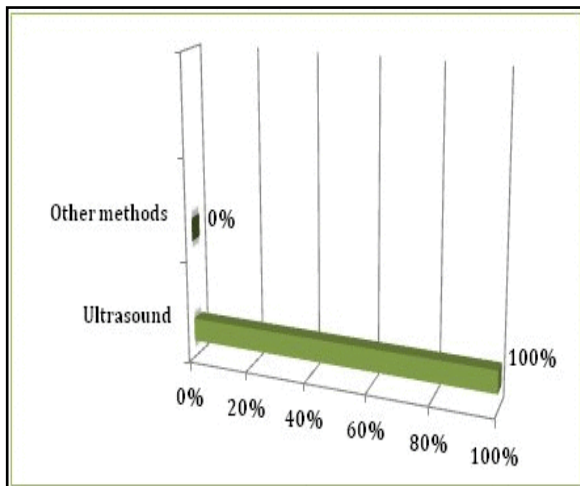


Figure 8: Ultrasound and other methods in gender determination

From figure 9: given below, it showed that 18 (39%) of women knew about the fetal gender during [14-17 week] of the pregnancy, whereas 14 (26%) during [18-21 week] , while 9 (15%), 6 (13%), two (5%), one (2%) knew respectively during [22-26 week, 27-30 week, 9-13 week and 31-35 week] of the pregnancy .

From figure 10: below, it was generally seen that 46 (92%) of women said that the gender was the same as determined by ultrasound, while only 4 (8%) of women said it was not.

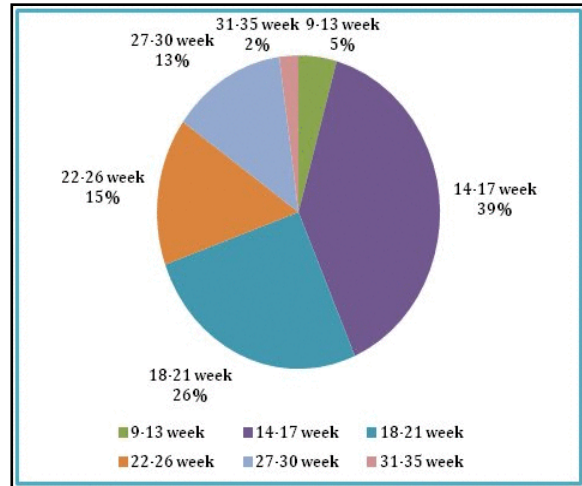


Figure 9: Gestational period of gender determination

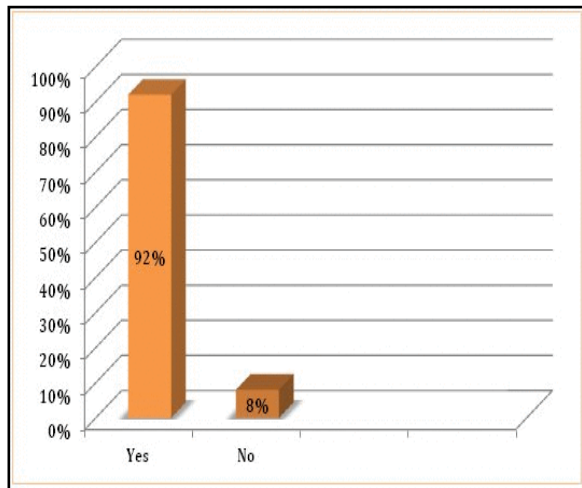


Figure 10: Ultrasound accuracy

DISCUSSION

From the data collected and the results presented earlier. It was concluded that (76%) of sonographers found that fetal determination by using ultrasound has a high precision in the second trimester (13-27 weeks of gestational age) in comparison with the 1st and 3rd trimester.

Same percentage of sonographers (76%) agreed regarding the strong relation between the fetal position and the ability to visualize the fetal genitalia, assuming that the fetal position is the main obstacle in identifying the gender. This finding agrees with previous studies. (1)

While the remainder percentages of sonographers have some other reasons like the sonographer's varying experiences and skills and the amniotic fluid amount.

However the vast majority of sonographers about (88%) agreed that this problem can be solved, and (65%) of those who agreed that there is a solution, believe that the proper time for solving this problem is the 2nd trimester whereas only (18%) think that it can be easily solved in the 3rd trimester.

The suggestions that were raised by (82%) of the sonographers to overcome this issue is to manipulate the transducer and change the patient's position, while the remainders thought that *one way or the other* would be enough .

From the data gathered from women in the general population in Jeddah.

Most of the women (96%) in this study knew about the fetal gender during the pregnancy. And an absolute percentage (100%) among these women recognized the fetal gender by the antenatal ultrasound scan.

The ladies who found out about the gender during the pregnancy (39%) of them knew about it during [14-17 weeks], whereas (26%) during [18-21 weeks], while the rest knew during the period between 22 to 35 weeks of the pregnancy. However the vast majority (90%) of women who were scanned prenatally for the fetal gender said that the gender was the same as determined by ultrasound, while only a small percentage about (8%) of women said it was not, most probably as a result of the previously mentioned reasons for non-identifying the fetal gender.

These findings may indicate that ultrasound has a high accuracy in prenatal gender assessment in 14-17 weeks of gestational age. This is largely consistent with the findings of S. Meagher and G. Davison (January 1996) which found that the reported rates of (91.3%) for gender assessment in 14-19 weeks of gestational age was correctly determined by using ultrasound. (8)

For 13 weeks of pregnancy, most authors found a sensitivity of 100%. (9-12) In most studies, regardless of the gestational age, and it was an agreement for males is

not as good as for females, and therefore there was a greater risk that the male female error would be classified.

Although we used other method of determining fetal gender used in our study, there was no difference in our results compared with the results of previous studies that have been using ultrasound directly with patients in the study methodology.

From this research work we can conclude that prenatal gender assignment by ultrasound has a high degree accuracy rate at 14 to 21 weeks. The current result suggests that to increase the accuracy rate, the assessment of fetal gender should be done after 14 weeks of pregnancy when the prenatal diagnosis is performed.

Limitations and Recommendations

We would like to address the points of limitation in our study where the sample sizes (number of patients and sonographers) were limited to a small sample, due to the lack of direct contact with a large number of sonographers and obstetric patients due to short time available and some of the sonographers' vacation time.

A larger study would be required to confirm the accuracy rates of this study.

In addition to that, the questionnaire was supposed to be handled in the obstetric outpatient department where the routine antenatal ultrasound takes place and thus was not applied due to the shortage of time because of the lateness in receiving the ethical profile.

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