

Gender Determinations by Ultrasound in a Nigerian Health Facility: How Accurate Are Sonologists?

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ABSTRACT

Background: With the widespread use of ultrasound scan in pregnancy, there is a growing concern about the ability and accuracy of sonographic determination of the fetal gender. **Aim:** This study aims to find out how accurate this is in a health facility in Port Harcourt, South Nigeria. **Materials and Methods:** A retrospective cohort study was carried out over a 2-year period. The birth gender of 750 women who were scanned during the index pregnancy and the fetal sex noted on routine ultrasound were compared to find out how accurate the gender was determined by ultrasound. The data obtained were subjected to statistical analysis. **Results:** During the study period out of the 945 women who attended the antenatal clinic of the health facility during the study period, 750 (79%) had relevant scan reports from various imaging centers in Port Harcourt. The study showed that all sonographic sex determinations were made later than 19 weeks gestation and overall accuracy throughout pregnancy was 98.4%. **Conclusions:** Gender determination by ultrasound which has a high accuracy in this environment also has a degree of failure. Thus the expectant mother and referring physician should be aware of its limitations and accuracy in our environment.

Key words: Accuracy; gender; Port Harcourt; ultrasound

Introduction

With the advent of prenatal ultrasound techniques, prenatal identification of the fetal gender has been possible over the years. Stocker *et al.*,^[1] in 1977 were among the first researchers to document the use of ultrasound in prenatal gender determination. Since then gender determination by ultrasound scan has become very common. With the introduction of ultrasound in Nigeria in the early eighties^[2] and its increasing availability, gender determination has become common place. With this comes the ethical problem of what the information obtained is used for. Due to the high sex-selective abortions practiced in some countries such as India and China, sex determination has been banned by the governments of these countries; however,^[3-6] Nigeria as in most countries of the world^[4] has no such policy on this. Thus, gender determination is very popular and in high demand.

Ultrasound used during pregnancy is very common in this environment with most women having at least two scans during the index pregnancy. Various studies done in Western Nigeria and other countries of the world have shown that most mothers want to know the gender of their unborn child with their reasons ranging from “curiosity” to “knowing what to buy” and preference for a particular sex.^[3] Medically,^[7] it is important when the identification of a particular gender is required for the diagnosis of various genetically sex-linked conditions like hemophilia and muscular dystrophy.

Inaccurate gender assignment can lead to litigation, marital conflict, domestic violence, desire to reverse tubal ligation, and a negative perception of ultrasound.^[8]

Due to the fact that most mothers want to know the gender of their unborn child, this study aims to determine the accuracy in Port Harcourt, South Nigeria.

Materials and Methods

A retrospective cohort study was done. The medical records of 945 women who delivered in a Port Harcourt health facility over a 2-year period were analyzed to compare the sex determined by ultrasound during the index pregnancy with the phenotype at birth.

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The assigned gender was obtained from the ultrasound reports from routine obstetric scan for fetal well-being across the three trimesters. The first scan where a report on gender was given was used for this study. Data analysis was done and simple frequency tables were obtained.

Results

During the study period out of the 945 women who attended the antenatal clinic of the health facility during the study period, 750 (79.3%) had relevant scan reports and phenotypic sex at birth could be verified from the records, 105 (11.1%) did not have an ultrasonographically assigned gender, while 29 (3.1%) had miscarriages. The rest 61 (6.5%) were lost to follow-up.

Gender determinations were made at a mean gestational age of 32 weeks with a range of 19-41 weeks. The study showed that all sonographic sex determinations were made later than 19 weeks gestation. The earliest gender identified was the female sex with an accuracy of 98.8%, while this was also the gender that had the least misses (1.2%) [Table 1].

Accuracy increased with increase in gestational age for males ($P < 0.05$), but not females. Over all there was an increase in accuracy rate as the gestational age increased. Accuracy was found to be 97.8% throughout pregnancy for males and 98.8% for females. Overall accuracy throughout pregnancy was 98.4%, second trimester: 97.4%, and third trimester: 99.2% [Table 1].

Discussion

The use of ultrasonography is widespread globally as it is cheap and readily available however, it is highly operator-dependent. Accuracy of gender determination depends on the experience and expertise of the sonologist, quality of the machine used, the presenting fetal part, and position as well as the liquor volume.^[9,10] Malformed external genitalia are also a source of error such as hypospadias in males.^[11]

Gender estimation by ultrasound done by various researchers in the advanced world have reported an accuracy of 79.1% at 11th gestational weeks, 46-80% by the 12th-13th gestational week, and 85.7% at 14 weeks gestation.^[10,12,13] This was not seen in this study as there was no sex determination made so early in pregnancy. All noted determinations started in the second trimester precisely from the 19th gestational week. This

could be explained by the fact that the expertise to perform early gender identification may be lacking as most times there is no pressure by the referring obstetrician/mother to identify the sex so early. In addition, most women are satisfied with the view that at that gestational age, it is too early to determine if the fetus is a boy or girl.

In this health facility, there was no in-house ultrasound unit so the ultrasound scans were done in different scanning centers around the city with the women undergoing an average of three scans during the index pregnancy and more in high-risk pregnancies. Thus, the scanning was done by multiple sonologists. Gender was not specifically requested for, but was recorded on the scan report.

There was no statistically significant difference between accuracy in determination of the male and female sex gender. This observation was different from the findings by Adeyinka *et al.*,^[14] in Western Nigeria where the accuracy was female: 90.6% and male: 83.2%. This may be attributed to the fact that identification of the female fetus may be easier than the male as the absence of the penis and scrotal sac/testes are judged to be a female, although this subjective assessment could also lead to errors. The accuracy throughout pregnancy was higher in this study compared to a study done in Ibadan^[14] (98.3% and 86.5%, respectively) but lower to other studies done in the developed world, where the accuracy was seen to be 99.9-100% in the third trimester and 97-99% in the second trimester.^[10,11] This large difference could be explained by the fact that in the developed world, newer and better ultrasound machines are used with a lot of time spent with each patient. Also the threat of litigation/black listing adds to the carefulness of the sonologist.

Gestational age was seen to correlate positively with increase in accuracy for both gender as the higher the gestational age the more accurate the results obtained. This was seen in most studies done elsewhere^[8,9,14] and could be attributed to the fact that the sex organs are larger and better defined with increase in gestational age.

In conclusion, there is a high accuracy rate in Port Harcourt. However, mothers should be informed of possible errors associated with gender determination as the technique of prenatal gender determination by ultrasound is not 100% accurate with accuracy increasing with increase in gestational age.

Table 1: Accuracy of sonographic determination of fetal gender in Port Harcourt

Gestational age	Sonographically assigned male n=405		Sonographically assigned female n=345		
	Male at birth n=397 (%)	Female at birth n=8 (%)	Female at birth n=341 (%)	Male at birth n=4 (%)	
0-13 weeks first, trimester	0	0	0	0	
13-28 weeks, second trimester	159/165 (96.4)	6/165 (3.6)	123/125 (98.4)	2/125 (1.6)	290
>28 weeks, third trimester	238/240 (99.2)	2/240 (0.8)	218/220 (99.1)	2/220 (0.9)	460
Total	397/405 (97.8)	8/405 (2.2)	341/345 (98.8)	4/345 (1.2)	750 (98.3%)

References

1. Stocker J, Evens L. Fetal sex determination by ultrasound. *Obstet Gynecol* 1977;50:462-6.
2. Chukudebelu WO, Osefo NJ. Preliminary experiences with the ultrasound at the University Teaching Hospital Enugu. *Trop J Obstet Gynecol* 1980;1:83-8.
3. Maaji SM Ekele BA, Bello SO, Morhason-Bello IO. Do women want disclosure of fetal gender during prenatal ultrasound scan? *Ann Afr Med* 2010;9:11-4.
4. Chervenak FA, McCullough LB. Sex determination by ultrasound: Ethical challenges of sex ratio imbalances and invidious discrimination. *Ultrasound Obstet Gynecol* 2009;34:245-6.
5. Loblay V. Everyday ethics: Sex determination and ultrasound in Australia. *Indian J Med Ethics* 2009;6:188-93.
6. Strange H, Chadwick R. The ethics of nonmedical sex selection. *Health Care Anal.* 2010;18:252-66.
7. Pinhas-Hamiel O, Zalel Y, Smith E, Mazkereth R, Aviram A, Lipitz S, *et al.* Prenatal diagnosis of sex differentiation disorders: The role of fetal ultrasound. *J Clin Endocrinol Metab* 2002;87:4547-53.
8. Chigbu CO, Odugu B, Okezie O. Implications of incorrect determination of fetal sex by ultrasound. *Int J Gynecol Obstet* 2008;100:287-90.
9. Odeh M, Granin V, Kais M, Ophir E, Bornstein J. Sonographic fetal sex determination. *Obstet Gynecol Surv* 2009;64:50-7.
10. Elejalde BR, de Elejalde MM, Heitman T. Visualization of the fetal genitalia by ultrasonography: A review of the literature and analysis of its accuracy and ethical implications. *J Ultrasound Med* 1985;4:633-9.
11. Odeh M, Ophir E, Bornstein J. Hypospadias mimicking female genitalia on early second trimester sonographic examination. *J Clin Ultrasound* 2008;36:581-3.
12. Hsiao CH, Wang HC, Hsieh CF, Hsu JJ. Fetal gender screening by ultrasound at 11 to 13(+6) weeks. *Acta Obstet Gynecol Scand* 2008;87:8-13.
13. Efrat Z, Perri T, Ramati E, Tugendreich D, Meizner I. Fetal gender assignment by first-trimester ultrasound. *Ultrasound Obstet Gynecol* 2006;27:619-21.
14. Adeyinka AO, Agunloye AM, Idris S. Ultrasonographic assessment of fetal gender. *Afr J Med Med Sci* 2005;34:345-8.

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