Original Article

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Attitude of Reproductive Healthcare Providers to Prenatal Diagnosis in a Low Resource Nigerian Setting

Obstetrics and Gynaecology Section

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ABSTRACT

Introduction: Prenatal diagnosis comprises all diagnostic modalities aimed at gaining information about the embryo or fetal wellbeing. It enables antenatal care tailored to the individual need(s) of the fetus.

Aim: To determine the knowledge, practice and prospect of prenatal diagnosis among reproductive health care providers in Abakaliki, Nigeria.

Materials and Methods: This was a cross-sectional descriptive study in which completely filled self-administered semi-structured questionnaires were retrieved from 182 reproductive healthcare providers at Federal Teaching Hospital, Abakaliki (FETHA). The questionnaires contained 17 items covering the socio-demographic data, knowledge, practice and prospects of prenatal diagnosis among the respondents.

Result: A total of 179 respondents (98.4%) were aware of the prenatal diagnosis. One hundred and sixty four (90.1%) of the respondents agreed that, prenatal diagnostic services is offered in the study centre and 97% of these respondents cited ultrasound scan as the prenatal diagnostic investigation. While 133 respondents (73.1%) would allow parents to decide the next line of action after due counseling for the diagnosis of a condition not compatible with extrauterine life was made, 23(12.6%) of the respondents would offer termination of the pregnancy. Among the respondents, 173(95.1%) would encourage prenatal diagnosis at the study centre and 153(88.4%) of the 173 respondents would do so by educating the populace on the benefits of the procedure. However, 2(1.1%) of the respondent would not encourage the practice of prenatal diagnosis in FETHA citing adverse effects on the woman and her fetus.

Conclusion: Reproductive healthcare providers in Abakaliki have a high level of awareness and favorable disposition to prenatal diagnosis. However, prenatal diagnosis is still rudimentary in this environment.

Keywords: Fetal congenital abnormalities, Nigeria, Prenatal testing

INTRODUCTION

Prenatal diagnosis is a subspecialty of clinical genetics in Obstetrics and Gynaecology that exemplifies the effective integration of theoretical and clinical medicine [1]. The term, 'prenatal diagnosis' consists of all diagnostic modalities aimed at gaining information about the embryo or fetal wellbeing. However, in its narrower usage, it refers to the prenatal identification of genetically determined diseases and their disposition [1]. Every pregnancy has about 3-4% risk of major congenital anomalies [2,3]. Many genetic disorders can be detected early in pregnancy using various non-invasive, minimally invasive and invasive techniques [4].

Non-invasive techniques comprise ultrasound scan, fetal echocardiography, Magnetic Resonance Imaging (MRI) and radiography. Minimally invasive procedures include Maternal Serum Alpha-Fetoprotein (MSAFP), maternal unconjugated estriol, maternal serum beta-Human Chorionic Gonadotropin (HCG), maternal serum inhibin and more recently separation of fetal cells from the mother's blood for analysis [4] as well as the use of cell-free fetal Deoxyribonucleic Acid (DNA) in maternal circulation [5,6]. More so, the invasive procedures include embryoscopy, fetoscopy, amniocentesis, Chorionic Villus Sampling (CVS), Percutaneous Umbilical Blood Sampling (PUBS), percutaneous fetal skin biopsy and Pre-implantation biopsy of blastocysts obtained by in vitro fertilization [4]. The invasive procedures can cause varying risks of miscarriage and preterm delivery [7].

Because fetal DNA comprises 3–20% of circulating cell-free DNA (CCF DNA) in maternal plasma, the utilization of CCF DNA as a tool for diagnosis has been increasingly recognized as a powerful non-invasive alternative during pregnancy [5,6,8]. Significantly, this CCF DNA was detectable in the maternal circulation within a few weeks of pregnancy and completely cleared from the maternal circulation within 2 hours of delivery [5]. However, this test is still in the research phase and is too expensive and time consuming for population screening but represents the future for prenatal diagnosis [5]. The prenatal diagnosis allows the parents to make informed decisions about their pregnancy, healthcare professionals to optimize the antenatal care and families to prepare for the birth of the baby [3].

Prenatal diagnosis and treatment in Nigeria is still rudimentary. An incidence of 0.5% congenital malformation on ultrasound study has been reported in Nigeria with hydrocephalus being the most common abnormality detected [9]. There are also ethical issues in prenatal diagnosis involving the limitations of genetic testing; obtaining information when no treatment or intervention exists and the issue of undesired options. Even when major congenital fetal abnormalities which are not amenable to treatment are detected in Nigeria, restrictive abortion laws will not allow for termination of such pregnancies. There are also potential adverse personal or societal consequences especially when there is no available treatment for the condition [10]. Despite these challenges, prenatal diagnosis is very important in this environment. This is because prenatal diagnosis will encourage intrauterine correction of certain fetal congenital abnormalities and also help obstetricians decide on the mode and centre of delivery of such babies. Prenatal diagnosis will further help in multidisciplinary management involving the obstetricians, paediatricians, paediatric surgery team, neurosurgery team and so on. There is a paucity of studies on this subject matter in Nigeria. It is in view of this that the study, attitude of healthcare providers to prenatal diagnosis in a low resource Nigerian setting, was embarked upon. It was aimed at determining the knowledge, practice and prospect of prenatal diagnosis among reproductive healthcare providers in Abakaliki, Nigeria.

MATERIALS AND METHODS

This was a cross-sectional study conducted at the Federal Teaching Hospital, Abakaliki (FETHA) from January to March, 2015. FETHA is a tertiary hospital located in Abakaliki metropolis. Ethical approval for this study was obtained from the Research and Ethics Committee of the FETHA. The study population fell into two natural clusters of nurses/midwives and doctors. There were 99 doctors and 201 nurses/midwives providing reproductive health care services in FETHA with doctors: nurses/midwives ratio of 1:2. The questionnaires were consecutively administered to 126 nurses/midwives and 62 doctors. The survey was conducted using a 17 item self-administered semi-structured questionnaire that was pre-tested for validation among 10 reproductive healthcare providers. The questionnaires were administered to consecutive consenting nurses/midwives and doctors at the clinics and the wards until the required number were filled. All the respondents who consented to participate in the study and completely filled the questionnaires were included in the study. However, the reproductive healthcare providers who despite adequate counseling, did not give consent to participate in the study and those who did not completely fill the questionnaires were excluded from the study.

Sample size determination: The minimum sample size for this study was calculated using the formula: $N_o=N/(1+N(e)^2)$, a simplified formula for finite study population [11]. Here N_o was the sample size, N: the study population=300, e: precision taken as 0.05. After adding a 10% attrition rate, N_o was 188.

DATA ANALYSIS

The data collected was analysed using Epi Info 7 (7.2.1). The results were presented in frequency tables and percentages.

RESULTS

Out of 188 administered questionnaires, it was only 182 completely filled questionnaires that were retrieved from the respondents and therefore, the retrieval rate was 96.8%. There were 60 and 122 doctors and nurses/midwives respectively. [Table/Fig-1] shows the demographic status of the respondents. Majority of the respondents were aged between 30 and 39 years (55.0%), single (68.1%), Roman Catholics (50%) and have been in practice for 5 years or less (36.26%). [Table/Fig-2] shows the knowledge of prenatal diagnosis among reproductive health care providers. Among the respondents, 179(98.4%) had heard of prenatal diagnosis. Also 161(88.5%) and 122(67.0%) of the respondents agreed that the benefits of prenatal diagnosis includes enabling better antenatal care and preparing parents for the delivery of the abnormal baby respectively.

The practice of prenatal diagnosis is shown in [Table/Fig-3]. Majority, 164(90.1%) of the respondents agreed that prenatal diagnosis is offered in this facility. However, 159(97.0%) of these respondents who agreed that prenatal diagnosis was offered at the study centre cited ultrasound scan as the prenatal investigation, and 17(10.4%) cited serum markers. Among the 10 respondents that do not agree that prenatal diagnosis is offered in FETHA, 8 (80%) cited lack of appropriate equipment and 5 (50%) cited lack of appropriate manpower as some of the reasons for non-existent of prenatal diagnosis. [Table/Fig-4] shows issues with prenatal diagnosis. One hundred and thirty three respondents (73.1%) would allow parents to decide on the next line of action after due counselling when the

Parameters	Frequency	Percentage (%)
Age (years)		
20 – 29	34	18.7
30 – 39	100	55.0
40 – 49	32	17.5
≥ 50	16	8.8
Total	182	100%
Marital Status		
Single	124	68.1
Married	52	28.6
Widow(er)	6	3.3
Total	182	100%
Religion		
Roman Catholic	91	50
Anglican	22	12.1
Pentecostal	33	18.1
Others	34	18.7
Islam	2	1.1
Total	182	100%
Occupation		
Doctors	60	33.0
Nurses/Midwives	122	67.0
Total	182	100%
Number of years in practice		
1 – 5	66	36.2
6 – 10	60	33.0
>10	56	30.8
Total	182	100%

[Table/Fig-1]: Socio-demographic features of the respondents.

Parameters	Doctors (%)	Nurses/Midwives (%)	Total (%)
Have you heard of prenatal diagnosis?			
Yes	60(100)	119(97.5)	179(98.4)
No	0(0)	3(1.6)	3(1.6)
What are the benefits of prenatal diagnosis?*			
Enable better antenatal care	55(91.7)	106(86.9)	161(88.5)
Prepares parents for the birth of abnormal baby	58(96.7)	64(52.5)	122(67.0)
Generates more income for the facility	9(15)	3(2.4)	12(6.6)
Undue interference with the pregnancy	3(5)	6(4.9)	9(4.9)

[Table/Fig-2]: Knowledge of prenatal diagnosis among reproductive health care providers in Abakaliki.
*Multiple answers were allowed.

Parameters	Doctors (%)	Nurses/Midwives (%)	Total (%)
Is prenatal diagnosis offered in this facility?			
Yes	55(91.7)	109(89.3)	164(90.1)
No	2(3.3)	8(6.6)	10(5.5)
No idea	3(5)	5(4.1)	8(4.4)
If yes, which form(s) of prenatal investigation (s) do they offer?* (n = 164)			
Ultrasound scan	55(100)	104(85.2)	159(97.0)
Serum markers	3(5.5)	14(12.8)	17(10.4)
Amniocentesis	0(0)	14(12.8)	14(8.5)
Chorionic villous sampling	0(0)	5(4.6)	5(3.0)
Cell free fetal DNA	0(0)	3(2.8)	3(1.8)
If no prenatal diagnosis exist, why?* (n = 10)			
No appropriate manpower	3(60)	2(15.4)	5(50)
Lack of appropriate equipment(s)	5(100)	3(23.1)	8(80)
Lack of interest of care providers	0(0)	3(23.1)	3(30)
Lack of known benefits	0(0)	1(7.7)	1(10)
Our patients do not require it	0(0)	1(7.7)	1(10)
When the patient requires prenatal diagnosis what is done in this facility?(n=182)			
Carry out prenatal investigation(s)	55(91.7)	91(74.6)	146(80.2)
Refer patient appropriately	5(8.3)	26(14.3)	31(17.0)
Do nothing	0(0)	5(4.1)	5(2.8)

[Table/Fig-3]: Practice of prenatal diagnosis in Abakaliki.
*Multiple answers were allowed.

diagnosis of a condition that is not compatible with extrauterine life is made. [Table/Fig-5] shows prospects for prenatal diagnosis in Abakaliki. Among the 182 respondents, 173 (95.1%) would encourage the practice of prenatal diagnosis in FETHA while 2(1.1%) of the respondents would not.

Parameters	Doctors (%)	Nurses/Midwives (%)	Total (%)
When the diagnosis of a condition not compatible with extrauterine life is made, what could be done?			
Terminate the pregnancy	3(5)	20(16.7%)	23(12.6%)
Continue monitoring till delivery	1(1.7)	21(35%)	22(12.1)
Allow parents to decide after due counselling	56(93.3)	77(63.1)	133(73.1)
No idea	0(0)	4(3.3)	4(2.2)
Total	60(100)	122(100)	182(100)
When there is no treatment available for a disease Condition, do you go ahead to make the diagnosis?			
Yes	60(100)	78(63.9)	138(75.8)
No	0(0)	29(23.8)	29(15.9)
No idea	0(0)	15(12.3)	15(8.3)
Total	60(100)	122(100)	182(100%)
What are the problems of prenatal diagnosis?*			
Possibility of false positive and negative results	58(96.7)	72(59.0)	130(71.4)
Risk of miscarriage following invasive procedures	50(83.3)	44(36.1)	94(51.6)
Additional cost of prenatal care	45(75)	40(32.8)	85(46.7)
Potential for adverse personal and social consequences	30(50)	43(35.2)	73(40.1)
Ethical and moral dilemma if termination is the option	48(80)	59(48.4)	107(58.8)

[Table/Fig-4]: Issues with prenatal diagnosis.
*Multiple answers were allowed.

Parameters	Doctors (%)	Nurses/Midwives (%)	Total (%)
Would you encourage the practice of prenatal diagnosis in this facility?			
Yes	59(98.3)	114(93.4)	173(95.1)
No	1(1.7)	1(0.8)	2(1.1)
Undecided	0(0)	7(5.7)	7(3.8)
Total	60(100)	122(100)	182(100%)
If yes how?* (n = 173)			
Health education on the benefits of prenatal diagnosis	59(98.3)	94(770)	153(88.4)
Advocacy for stakeholders to provide equipments and train manpower	59(98.3)	88(72.1)	147(85.0)
Discourage patients from taking up prenatal diagnosis	0(0)	3(2.5)	3(1.7)
If no, why?* (n = 2)			
Prenatal diagnosis is of no benefit	0(0)	1(0.8)	1(50)
Has adverse effects on the woman and her fetus	1(1.7)	1(0.8)	2(100)

[Table/Fig-5]: Prospect for prenatal diagnosis in Abakaliki.
*Multiple answers were allowed

DISCUSSION

The 98.4% awareness of prenatal diagnosis among these study respondents was higher than the mean knowledge scores of 83% and 84% among women's health care providers in Western Australia and the United States of America respectively [12,13]. The reason for this difference could be because this study was conducted in a tertiary health centre only. The high proportion of the respondents who believe that prenatal diagnosis enables better antenatal care and prepares parents for the birth of an abnormal child have previously been documented as benefits of prenatal diagnosis [4,5]. Though, a high proportion (90.1%) of the respondents agreed that, prenatal diagnosis is offered with ultrasonography being the major prenatal diagnostic modality offered in the study centre, this is in contrast with the United States of America and other developed countries which have a high technological Non-Invasive Prenatal Testing (NIPT) that made prenatal testing more acceptable to women [10]. Some of the study respondents entertaining fear of the possibility of false positive/negative results and ethical/moral dilemma as some of the problems of prenatal diagnosis are supported by a previous report in which prenatal diagnosis arouse ethical, moral and religious dilemmas [14]. The restrictive abortion law in Nigeria may still be a barrier to prenatal diagnosis as abortion is prohibited even in fetal congenital anomalies that are not compatible with extra-uterine life such as fetal anencephaly [15]. The respondents' favourable disposition (95.1%) to prenatal diagnosis in this study centre is supported by the previous review by Shahhosseini et al., which showed a positive association between the knowledge of prenatal diagnosis among healthcare providers and their attitude to the procedure [16]. This favourable disposition underscores the need for provision of the facilities and training of manpower in this field. This will help improve the level of accuracy of prenatal diagnosis in this environment.

LIMITATION

This was a tertiary hospital-based study thus its findings may not be a true reflection when compared with the reproductive health providers in the secondary and primary healthcare centers.

CONCLUSION

The reproductive healthcare providers in Abakaliki have a high level of awareness and favourable disposition to prenatal diagnosis. However, prenatal diagnosis is still rudimentary in this study centre. Therefore, effort is needed to provide adequate facilities and manpower trained on prenatal diagnosis. The abortion law in Nigeria needs to be liberalized in order to allow for termination of pregnancies with fetal congenital anomalies that are not compatible with extra-uterine life. More studies are needed in this subject matter in this environment.

REFERENCES

[1] Wieacker P, Steinhard J. The prenatal diagnosis of genetic diseases. Dtsch Arztebl Int. 2010;107(48):857–62.
[2] Bansal V, Suresh S, Suresh I, Jagadeesh S, Fazal GJ. Genetic counseling in chromosomal abnormalities. J Prenat Diag Therapy. 2010;1(1):14-19.
[3] Collins SL, Impey L. Prenatal diagnosis: Types and techniques. Early Hum Dev. 2012;88(1):3-8.
[4] Marino T, Ramus RM. Prenatal diagnosis for congenital malformations and genetic disorder. [online 2012] @ emedicine.medscape.com/article/1200683. Assessed from 4th September, 2014.
[5] Ruwan C, Wima L. Antenatal Screening. In: Edmonds DK (ed.). Dewhurst's Textbook of Obstetrics and Gynaecology. 8th Edition. Wiley-Blackwell Ltd. 2012; 185-199.
[6] Hall A, Bostanci A, Wright CF. Non-invasive prenatal diagnosis using cell-free fetal dna technology: Applications and implications. Pub Health Genomics. 2010;13:246–55.
[7] Dastur AE. Changing paradigm in prenatal management. J Prenat Diag Therapy. 2010;1(1):1-2.
[8] Jensen TJ, Zwiefelhofer T, Tim RC, Dz˘akula Z˘, Kim SK, Mazloom AR, et al. High-throughput massively parallel sequencing for fetal aneuploidy detection from maternal plasma. PLoS ONE. 2013;8(3):e57381.
[9] Adesina OAA, Oladapo OO, Adeniran OF. The Knowledge base and acceptability of prenatal diagnosis by pregnant women in ibadan. Afr J Reprod Health. 2014;18(1):127-32.
[10] Chetty S. Garabedian MJ. Norton ME. Uptake of non-invasive prenatal testing (NIPT) in women following positive aneuploidy screening. Prenatal Diagnosis. 2013;33(6)542–46.
[11] Glenn DI. Determining Sample size. UF/IFAS Extension, PEOD6. [online 2013] @ http://edis.ifas.ufl.edu. assessed from 4th December, 2014.
[12] Rostant, K., Steed, L. & O'Leary, P. Prenatal screening and diagnosis: A survey of health care providers' knowledge and attitudes. Genomics Occasional Paper 2.2002. Department of Health, Perth, Western Australia.

[13] Ready K, Haque IS, Srinivasan BS, Marshall JR. Knowledge and attitudes regarding expanded genetic carrier screening among women's healthcare providers. Fertility and Sterility. 2012;97(2):407-13.
[14] Lea DH. Williams J. Donahue P. Ethical issues in genetic testing. J Midwifery Womens Health. 2005;50(3):234-40.
[15] Okagbue I. Pregnancy termination and the law in Nigeria. Stud Fam Plann. 1990;21(4):197-208.
[16] Shahhosseini Z, Arabi H, Salehi A, Hamzehgardeshi Z. Factors affecting improved prenatal screening: A narrative review. Global Journal of Health Science. 2016;8(5):160-65.

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