International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Abbey M et al. Int J Reprod Contracept Obstet Gynecol. 2022 Apr;11(4):1016-1024
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20220746

Original Research Article

Audit on the first obstetric ultrasound in a tertiary health facility in the Niger Delta and its implications for maternal foetal care

Mkpe Abbey*, Paul Kua

Department of Obstetrics and Gynaecology, Rivers State University Teaching Hospital, Port Harcourt, Nigeria

Received: 24 February 2022
Accepted: 14 March 2022

***Correspondence:**
Dr. Mkpe Abbey,
E-mail: Mkpeabbey@aol.com

ABSTRACT

Background: The study was prompted by the heterogeneity in the content and the performance of dating or first obstetric ultrasound) scans in Nigeria. The primary aim of the study therefore was to determine whether the conduct of the scans conform to international norms. The secondary goal was to access the implications of the scans for maternal and foetal care.
Methods: The study was of mixed design-observational, cross-sectional with audit component, carried out at the Rivers State university teaching hospital (RSUTH), Nigeria from November, 2020 to February 2021. A literature search was carried out on the subject and standards were deduced from the review. 417 consecutive patients were recruited from the antenatal clinic and data on their history and the conduct of the scans were collected. The content of individual scan report was compared with international norms. Data were analysed using Epi. Info 2018 software.
Results: There were no guidelines nor uniformity in the conduct of dating or first obstetric ultrasound scans at the RSUTH. Out of the total 408 scan reports, 108 (26.47%) and 300 (73.53) took place inside and outside the RSUTH respectively. The gestational ages at the scans ranged from 8 to 41 weeks. Appropriate biometric parameters were used in 115 (28.19%) reports while in the rest, inappropriate or incomplete parameters were used. Furthermore, the following were not on the menu for the first obstetric scans: determination of chorionicity/amnionicity in multiple pregnancies, anomaly scan, screening for chromosomal abnormalities, foetal growth restriction (FGR), preeclampsia, preterm labour and for morbid adherence of the placenta. The deficiencies in the first obstetric ultrasound would likely lead to wrong dating and inaccurate growth assessment with associated adverse maternal and foetal outcomes, including wrong timing for obstetric interventions and also increased prevalence of those conditions that were not screened for.
Conclusions: Absence of guidelines, inaccurate dating and foetal growth assessment and non-performance of important obstetric screening procedures were likely to lead to adverse maternal foetal outcomes. There was therefore urgent need to formulate national guidelines on the subject, adopt effective referral cascade for scans and to introduce practical approach to training in maternal foetal medicine in tertiary institutions in Nigeria.

Keywords: Audit, First obstetric ultrasound, Tertiary health facility, Niger Delta, Maternal foetal care

INTRODUCTION

Normally, in advanced foetal medicine units, the aim of doing the first obstetric scan were as follows: to confirm foetal viability and date pregnancy, to determine chorionicity/amnionicity in multiple pregnancies, to examine foetal anatomy with a view of diagnosing abnormalities, to screen for chromosomal abnormalities, to screen for foetal growth restriction (FGR), preeclampsia (PET), preterm labour (PTL); furthermore, to screen for morbid adherence of the placenta.[1-17]

In general, the main goal of the first obstetric ultrasound scan was to provide accurate information which will facilitate the delivery of optimized antenatal care with the best possible outcomes for both mother and foetus. In Nigeria, it was not clear whether the outlined goals and indications for the scan have been adopted; there was also

no data on the content of the first trimester obstetric ultrasound scan.

Regarding the assessment of gestational age, except in pregnancies arising following assisted reproductive technology, the exact day of conception cannot be determined reliably and, therefore, dating a pregnancy by ultrasound appears to be the most reliable method with which to establish true gestational age.[18] It has been recommended, therefore, that all pregnant women be offered an early ultrasound scan between 8 and 13+6 weeks to determine gestational age and to detect multiple pregnancies.[19,20]

The uterus is said to be harbouring the embryo before 10 weeks of pregnancy and after that, the foetus; that reflects the fact that after 10 weeks of gestation organogenesis is essentially complete and further development involves foetal growth and organ maturation. Furthermore, the physiological herniation of the bowel does not occur after 11 weeks of pregnancy. It is therefore reasonable to offer the first obstetric ultrasound scan when the gestational age is thought to be between 11 weeks when the crown-rump length (CRL) is 45 mm and 13 + 6 weeks' gestation, as this provides an opportunity to achieve the aims outlined above.[13] The CRL and bi-parietal diameter (BPD) are the two most commonly measured parameters for pregnancy dating at that gestational age. The CRL appears to be the more precise, allowing accurate determination of the day of conception, to within 5 days either way in 95% of cases.[21,22]

Measurement of CRL and BPD can be done trans-abdominally or trans-vaginally. Singleton nomograms remain valid and can be applied in the case of multiple pregnancy.[23,24] It is recommended that CRL measurement should be used to determine gestational age unless it is above 84 mm; after this stage, Head circumference (HC) can be used, as it becomes slightly more precise than is BPD.[19,21,35] Unfortunately, in Nigeria the conduct of first obstetric ultrasound is saddled with diverse differences and it is not clear when it is normally done.

At very early gestations, when the foetus is relatively small, measurement errors will have a more significant effect on gestational age assessment; the optimal time for assessment appears, therefore, to be somewhere between 8 and 13+6 weeks.[21] At 11 to 13+6 weeks, the CRL and BPD are the two most commonly measured parameters for pregnancy dating.

The second indication for the first obstetric ultrasound is determination of chorionicity / amnionicity in multiple pregnancies; it is most reliable in the first trimester.[5,6] In Nigeria, it is unclear whether those items are looked for or not when doing the first obstetric ultrasound.

The third indication for the first obstetric ultrasound is to examine foetal anatomy with a view of diagnosing abnormalities, including those of the brain stem. That indication is particularly important in the Niger Delta because of high prevalence (20.73 cases per 1,000 live births) of major birth defects in the region.[26] It is however acknowledged that many gross malformations may develop later in pregnancy or may not be detected even with appropriate equipment and in the most experienced of hands.

Fourthly, another indication for the first trimester scan is screening for chromosomal abnormalities. That is done either by cell-free DNA, by combination of biochemical tests and ultrasound features. The ultrasound features are foetal heart rate, nuchal translucency, assessment of the nasal bone, ductus venosus and tricuspid blood flow.[8,27,28] The biochemical tests are for pregnancy-associated plasma protein-A (PAPP-A) and placenta growth factor (PLGF).[29] In the fifth place is a group of screening tests, namely screen for foetal growth restriction (FGR), preeclampsia (PET), preterm labour (PTL), and placenta accrete spectrum.[9-17]

Furthermore, to achieve optimal results from routine ultrasound examinations it is suggested that scans should be performed by individuals who fulfil the following criteria: have completed training in the use of diagnostic ultrasonography and related safety issues, participate in continuing medical education activities, have established appropriate care pathways for suspicious or abnormal findings and participate in established quality assurance programs.[30]

Generally, it is not known to what extent the first obstetric ultrasound in Nigeria complies with international norm in terms of the content of the scans, conduct of the scans, timing, engagement of the Sonographers in continuous professional development, the biometric parameters measured and the report given to patients. There are also questions about the guidelines that are used.

Aim

The primary aim of the study was therefore to determine whether the content, conduct and timing of the first obstetric ultrasound scan conform to international norms or not. The secondary goal was to determine the implication of the scans for maternal and foetal care.

METHODS

The study was of mixed design–observational, cross-sectional with audit component. It was carried out at the Rivers State University Teaching Hospital (RSUTH) from November, 2020 to February 2021. RSUTH is one of the two main obstetric referral centres in Rivers State, Nigeria.

Firstly, a literature search was carried out on the availability of obstetric guideline on first trimester ultrasound scan. The search phrases that were used were as follows: 'Guideline on dating scan in Nigeria,' 'first obstetric scan in Nigeria,' 'growth scan in Nigeria.' The

websites of the Nigerian national postgraduate medical college and the West African college of surgeons were assessed in our quest to look for the guidelines. Guidelines on the first trimester scan of the foetal medicine foundation (FMF), Royal college of obstetricians and gynaecologists (RCOG), American college of obstetricians and gynaecologists (ACOG), International Society of Ultrasound in Obstetrics and Gynaecology (ISUOG), Australian, Canadian and many other colleges of obstetrics and gynaecology were assessed. Much reference was made to the ISUOG and FMF guidelines which form the basis for formulation of the review criteria for the study.

Secondly, certain standards for first trimester scan were deduced from the review of current practice in RSUTH and from the literature review. They were as follows: individuals performing ultrasound scans and foetal biometric measurements on a routine basis should have specialized training in the practice of diagnostic obstetric ultrasound, including training in ultrasound safety; the optimal time for assessment of gestational age appears to be somewhere between 8 and 13 + 6 weeks. At 11 to 13 + 6 weeks, the CRL and the BPD are the two most commonly measured parameters for pregnancy dating; CRL measurements should be used to determine gestational age unless it is above 84 mm and after that stage, HC can be used, as it becomes slightly more precise than is BPD; after the 14th week of pregnancy, the usual measurements include BPD, Abdominal circumference (AC), HC, and femur length (FL).[13]

Biometric parameters or group of parameters that did not conform to the above standards were assessed as 'incorrect'; they were not applicable to the gestational age that they were used. The parameters were assessed as 'incomplete' if correct but incomplete number of parameters was used. The biometric parameters that were in concord with the above standards were labelled 'correct.' If a group of biometric parameters was documented and one or more of the parameters could be correctly used for dating and assessment of foetal growth at a specific gestational age, then that group was labelled 'correct.'

The other items on the menu for the first maternal foetal medicine scans were as follows: determination of chorionicity/amnionicity in multiple pregnancies, anomaly scan, screening for chromosomal abnormalities, foetal growth restriction (FGR), preeclampsia, preterm labour and also, screening for morbid adherence of the placenta.

Thirdly, 417 consecutive patients attending the antenatal clinic were recruited for the study. The inclusion criteria for the recruitment were that the patient presented for booking and she had had her first obstetric ultrasound scan in the index pregnancy. Data was collected on a structured pretested validated proforma by the research fellow and then fed onto Epi Info 2018 for analysis. The following data were collected: demographic, obstetric and general characteristics of the patients, the diagnostic or health facilities where the scans were done, the sonographer, the aim of the scan, gestational age at first scan and the ultrasound foetal biometric parameters that were used for dating the pregnancies. Scan report were reviewed for all the components of a first trimester foetal medicine scan

Generally, the content and the conduct of the individual scan report were compared with the international norms and conclusions were deduced, taking into consideration the peculiarities and the burden of maternal foetal medicine problem in Nigeria.

Determination of the sample size

The outcome measures in the study were the percentages of different assessed review criteria that conform to international norm. Therefore, the sample size was calculated using the sample size formula for a cross-sectional study with a categorical outcome.

$N = Z_{\alpha/2}^2 P (1-P) / d^2$ where

$Z_{\alpha/2}^2$ = Standard normal deviate at 95% confidence interval=1.96.

P-Expected proportion in population based on previous studies. Since there were no figures in the past for the assessed parameters in the study, 50% was used in the calculation of the sample size.

d=Absolute error or precision=0.05.

Therefore,

$n=1.96^2x0.5(1-0.5)/0.05^2$
$=3.8416x0.5x0.5/0.0025=384.16$

The required number of patients for the study was therefore 384.16. Giving allowance for attrition rate of 10%, the final power for the study was 10/100×384+384=422.56. Therefore, the number of patients to be recruited for the study was 423. We were however able to recruit 417 patients and the number is not significantly different from the required power.

Statistical analysis

Data was collected on a proforma and then transferred into an excel file where they were cleaned and fed into Epi. Info 2018 software for analysis. Simple proportions were used in the descriptive analysis. Quantitative data were summarized and presented as mean and standard deviation while qualitative data were presented as numbers and percentages.

Ethical consideration

The study was carried out in compliance with the international ethical guidelines for biomedical research involving human subjects. Ethical approval was obtained

from the RSUTH ethics committee. Written informed consents were obtained from all women enrolled in the study. All the information that was collected from individual patients was available for clinical use and for the research purposes. Privacy rules were maintained and confidentiality was observed at all levels of dealing with patients' data.

RESULTS

Demographic, obstetric and general characteristics

Four hundred and twenty-five (425) pregnant women were recruited for the study. Demographic, obstetric and data on the diagnostic facilities were the scans were done were available for 417 patients. Out of that figure, almost complete results were available for 408 patients but biometric parameters for pregnancy dating and foetal growth analysis during the first obstetric scan were available for 366 patients. In 42 of the scan reports, gestational ages were assigned and growth assessed without reporting the biometric parameters that were used.

The mean age of the participants in the study was 32.94±5.22 years. Majority of the patients were in the age category 30-34 years, followed by 35-39 years, indicating that the women had their children in later age of life (Table 1). Other parameters were as shown in Table 1.

Availability of guidelines for 1st trimester obstetric scans

The results of the study were multifaceted. Regarding availability of guidelines on first trimester obstetric ultrasound, it was confirmed that there was no guideline at all. Individual practices prevailed. There was no uniformity on the indications, timing, presentation of reports and the parameters that were used for dating pregnancy.

Diagnostic facilities

Out of the total 408 scans that were done, 108 (26.47%) were performed in the RSUTH while the majority of the scans 300 (73.53%) took place outside RSUTH in private diagnostic centres where patients were scanned by imaging scientists (Table 2).

Reports on the first obstetric scans

All the reports were on pregnancy dating and foetal growth. There was no report on other components of first trimester foetal medicine ultrasound as practised in the developed world of Europe and North America.

Table 1: Demographic, obstetric and general characteristics, n= 417.

Demographic obstetric and general characteristics		Frequency	Percentage (%)
Maternal age groups (years)	15-19	3	0.72
	20-24	27	6.47
	25-29	66	15.83
	30-34	144	34.53
	35-39	132	31.65
	40-44	45	10.79
	Total	417	100.00
Education	Primary	9	2.16
	Secondary	111	26.62
	Tertiary	297	71.22
	Total	417	100.00
Employment	Employed	333	79.86
	Unemployed	84	20.14
	Total	417	100
Marital status	Married	411	98.56
	Single, never married	6	1.44
	Total	417	100
Parity group	Para 1-2	237	56.83
	Para 3 and more	117	28.06
	Primigravida	63	15.11
	Total	417	100.00

Table 2: Diagnostic Facility where ultrasound scans were done.

Diagnostic facilities	Frequency (%)
In RSUTH	108 (26.47)
Outside RSUTH	300 (73.53)
Total	408 (100)

Table 3: Gestational age at first scan.

Gestational age (Weeks)	Frequency	Percentage (%)
8-10 $^{+6}$	38	9.11
11-13 $^{+6}$	40	9.52
14-23 $^{+6}$	137	32.85
24-27 $^{+6}$	58	13.91
28-36 $^{+6}$	101	24.22
37 to less than 41 weeks	34	8.15
Nil scan report	9	2.16
Total	417	100

Table 4: Scan parameters and gestational age at the first scan.

Parameters	GA at first scan (weeks)				Total
	8-10^{+6}	**11-3^{+6}**	**14-23^{+6}**	**24-42**	
AC, FL,	0 (0)/ (0)	0 (0)/ (0)	0 (0)/ (0)	3 (100)/ (1.55)	3 (100)
BPD	0 (0)/ (0)	6 (13.64) (15)	19 (43.18)/ (13.87)	19 (43.18)/ (9.84)	44 (100)/ (10.78)
BPD, FL, AC	3 (2.33)	0 (0)/ (0)	45 (34.88) / (32.85)	81 (62.79)/ (41.97)	129 (100)/ (31.62)
BPD, FL	0 (0)/ (0)	0 (0)/ (0)	33 (84.62) (24.09)	6 (15.38)/ (3.11)	39 (100)/ (9.56)
BPD, HC, AC	0 (0)/ (0)	0 (0)/ (0)	3 (100)/ (2.19)	0 (0)/ (0)	3 (100)/ (0.74)
CRL	32	25 (41.67)/ (62.5)	3 (3)/ (2.18)	0 (0)/ (0)	60 (100)/ (14.71)
CRL, FL, BPD	0 (0)/ (0)	6 (100)/ (15)	0 (0)/ (0)	0 (0)/ (0)	6 (100)/ (1.47)
FL	0 (0)/ (0)	0 (0)/ (0)	8 (19.05)/ (5.84)	34 (80.95)/ (17.62)	42 (100)/ (10.29)
BPD, FL, AC, HC	0 (0)/ (0)	0 (0)/ (0)	12 (30.77)/ (8.76)	27 (69.23)/ (13.99)	39 (100)/ (9.56)
HC, BPD, FL	0 (0)/ (0)	0 (0)/ (0)	1 (100)/ (0.73)	0 (0)/ (0)	1 (100)/ (0.25)
Nil parameters	3 (7,14)/ (12.5)	3 (7.14)/ (7.5)	13 (30.95)/ (9.49)	23 (54.76)/ (11.92)	42 (100)/ (10.29)
Total	38 (5.89)/ (100)	40 (9.80)/ (100)	137 (33.58)/ (100)	193 (47.30)/ (100)	408 (100)/ (100)

Table 5: The appropriateness of ultrasound parameters used during the first scans for dating and growth assessment.

Gestational age (Weeks)	Parameters measured	Appropriateness		
		Appropriate, n (%)	**Inappropriate incomplete, n (%)**	**No parameters**
8-13^{+6}	BPD, FL, AC	3		3
	CRL	32		
	BPD	6		3
	CRL	25		
	CRL, FL, BPD	6		
	Subtotal	72 (62.61)		6
14-23^{+6}	BPD, [BPD, FL, AC], [BPD, FL], CRL, [CRL, FL, BPD], FL		108 (43.03)	13
	[BPD, HC, AC],	3		
	BPD, FL, AC, HC	12		
	HC, BPD, FL	1		
	Subtotal	16 (13.91)		
24 to 42	[AC, FL], BPD, [BPD, FL, AC]. FL, [BPD, FL].		143 (56.97)	23
	BPD, FL, AC, HC	27 (23.48)		
Total		115 (100)	251 (100)	42 (100)
Percentage of 408		28.19%	61.52%	10.29%

Gestational age at first scan

Another important finding is the gestational age at the first obstetric ultrasound. It ranged from 8 weeks of pregnancy to 41 weeks (Table 3). The highest number of the scans 137 (32.85%) were performed at 14-23^{+6} weeks while the second highest number 101 (24.22%) was performed at 28-36^{+6} weeks.

The appropriateness of the ultrasound parameters that were used during the first scans for dating and growth assessment

The ultrasound parameters that were used for determination of gestational age of the pregnancy and assessment of foetal growth at the first obstetric ultrasound were as shown in Table 4.

Data for analysis was available for 408 patients. The appropriateness of the biometric parameters that were used for dating the pregnancies and for assessing foetal growth were as outlined in Table 5.

Out of the 408 patients that had the first obstetric ultrasound, correct or appropriates biometric parameters were used for dating and foetal growth assessment in 115 (28.19%) cases, inappropriate or incomplete parameters in 251 (61.52%) and in 42 (10.29%) cases, gestational age was assigned and growth assessment was completed without any documented biometric parameters (Table 5).

DISCUSSION

The study was carried out because of the observed heterogeneity in the performance of the first obstetric ultrasound scans in Nigeria and the possible implication of that for maternal and foetal healthcare. The demographic and the obstetric characteristic of the patients showed that 276 (66.19%) out of the 417 recruited patients were pregnant at the age categories of 30-39 year, suggesting that most of the women had children later in life. Most of the patients were parous with para 1-2 patients constituting 237 (56.83%).

Regarding availability of guideline on first trimester obstetric ultrasound, it was confirmed that there was no guideline at all; individual practices prevailed. There was no homogeneity in the indications, timing, presentation of reports and the biometrical parameters that were used for dating pregnancy. That is in contrast to what happens in developed countries where medical practice is guided by protocols e.g., the UK, Australia and the USA.[31-33] It was also contrary to ISUOG recommendations.[2,19,20] Furthermore, out of the total 408 first obstetric scans, 108 (26.47%) were performed in the RSUTH while the majority of the scans 300 (73.53%) took place outside RSUTH in private diagnostic centres where patients were scanned by imaging scientists. The 2 factors (lack of guidelines and scans done by non-obstetric practitioners) might have had adverse impact on the quality of the content of the report. There was also massive loss of earnings from scans by the RSUTH since most of the scans were done outside the hospital.

The recommendation by ISUOG is that to achieve optimal results from routine ultrasound examinations, scans should be performed by individuals who fulfil the following criteria: have completed training in the use of diagnostic ultrasonography and related safety issues, participate in continuing medical education activities, have established appropriate care pathways for suspicious or abnormal findings and participate in established quality assurance programs.[19,30] Unfortunately, apart from the first prerequisite, it is likely that none of them would be met by the imaging scientists. The radiographers have however over the years perfected their practice and have being offering the service

Another important finding was the gestational age at which the scans were performed. They ranged from 8 to 41 weeks with the highest number of the scans 137 (32.85%) been performed at 14-23^{+6} weeks while the second highest 101 (24.22%) were done at 28 to 36^{+6} weeks. Only 78 (18.71%) out of the total 417 first scans were performed at 8-13^{+6} weeks as recommended by ISUOG.[19,21,25] The implication of that was that even if the routine screening for different obstetric problem were to be done in the first trimester, it would not have been possible to do that for the majority of the patients 339 (81.29%) who had their first scans outside the recommended window for that.

The appropriateness of the use of the biometric parameters was assessed. Out of the 408 patients that had the first obstetric ultrasound, appropriate biometric parameters were used for dating and foetal growth assessment in 115 (28.19%) cases, inappropriate or incomplete parameters in 251 (61.52%) and in 42 (10.29%) cases, gestational age was assigned and growth assessment completed without any documented biometric parameters. The gestational ages of the 72 patients (62.81% of 115) who had their scans at 8-13^{+6} weeks might have been assessed correctly since appropriate parameters were used.

In other scans where appropriate parameters were used for dating and growth assessment-16 (13.91%) at 14-23^{+6} weeks and 27 (23.48%) at 24-42 weeks, although the gestational age and growth would have been assessed appropriately, interval scans were not performed, not to recalculate the EDD, but to confirm normal foetal growth.[31] Dating scans and growth assessment were likely to be wrongly done in those cases where inappropriate or incomplete parameters were used-251 (61.52%) and also in 42 cases (10.29%) were gestational ages were assigned and growth assessment was completed without any documented biometric parameters. The inappropriate dating of pregnancies and assessment of growth would have had adverse impact on maternal foetal care.

Appropriately performed obstetric ultrasonography has been shown to accurately determine gestational age.[34] On

the other hand, inappropriate dating of pregnancy in the first trimester or during the first obstetric scan as in the present study due to usage of wrong biometric parameters will have enormous implication on the pregnancy outcome. Accurate estimation of gestation age is vital for timing of appropriate obstetric care; scheduling and interpretation of certain antepartum tests; determining the appropriateness of foetal growth; and designing interventions to prevent preterm births, post-term births, and related morbidities.[35] So if it is not done accurately the above itemised obstetric care will not be achieved.

Another important finding in the study was that apart from dating and foetal growth, no other first trimester assessment was done. The other assessments that are normally carried out in foetal medicine units in the first trimester are determination of chorionicity/amnionicity in multiple pregnancies, anomaly scans, screening for chromosomal abnormalities, foetal growth restriction (FGR), preeclampsia (PET), preterm labour (PTL) and morbid adherence of the placenta.[5,6,9-15]

In the Niger Delta and in Nigeria in general, performing the first obstetric ultrasound in the first trimester or in any other trimester without taking into consideration the topography of obstetric diseases will be tantamount to a substandard care. The prevalence of major birth defects in the Niger Delta was 20.73 cases per 1,000 live births.[36] It is therefore imperative that anomaly scan, including assessment for major and minor markers of chromosomal abnormalities should be performed during the first obstetric ultrasound in the Niger Delta. Another important issue was the fact that there is high prevalence of twin pregnancies in Nigeria-19.5 per 1000 live births in the RSUTH.[37] Unfortunately, in the available reports, where multiple pregnancy was present, there was no report on chorionicity and amnionicity and that does not conform with international norm.[3,4,6]

Furthermore, Preeclampsia /Eclampsia is responsible for 23.4% of significant maternal outcome (SMO) which includes near-misses and maternal death.[38] In Nigeria, preterm births account for 40-60% of all perinatal deaths.[39] Therefore, the first obstetric ultrasound scan will not be complete without screening for preeclampsia and preterm births in the first and the second trimesters of pregnancy. The screening is necessary because measures can be put in place to prevent their occurrence.

Another obstetric pathology of interest is morbid adherence of placenta. This is particularly so because of the increasing prevalence of elective and emergency caesarean section in Nigeria. It will therefore be a welcome idea to include screening for placenta accrete spectrum in the general menu for first trimester or first obstetric ultrasound in the Nigeria. The screen-positive cases will be followed up in pregnancy and when confirmed adequate plan will be put in for the method and place of delivery. The limitation of the study lies in the fact that the patients were not followed up till delivery and postpartum. Therefore, the specific impact of wrong dating and non-performance of necessary foeto-maternal scans on maternal and perinatal morbidity and mortality was not assessed

CONCLUSION

The study exposed the heterogeneity in the ways that dating and first obstetric ultrasound scans were done due to lack of practising guidelines in Nigeria, the fact that majority of obstetric ultrasound were done outside tertiary centres by imaging Scientists, late presentation for first obstetric ultrasound and omission of standard maternal foetal medicine items on the menu, like screening for chromosomal abnormalities, preterm birth, preeclampsia, placenta accrete spectrum and foetal abnormalities from the scans.

In the majority of the scans, inappropriate biometric parameters were used for dating pregnancies and assessing foetal growth. Consequently, accurate assessment for timing of obstetric interventions might not be possible. There was therefore urgent need for formulation of Nigerian national guidelines on the first trimester maternal foetal medicine scans, engagement in CPD, adoptions of practical approach to training in maternal foetal medicine, advocacy in primary health centres and adoption of appropriate risk assessment and referral guidelines which will enhance early booking for antenatal care and therefore early attendance for first trimester scan.

Recommendation

Firstly, another similar study could be designed whereby patients would be followed up in labour and postpartum with a view of determining the actual impact of wrong pregnancy dating and non-performance of necessary foeto-maternal medicine scans on maternal and perinatal morbidity and mortality.

Secondly, there was urgent need for formulating Nigerian national or local guidelines on dating and first trimester obstetric ultrasound scan or better still, adopting the ISUOG guideline with specific modifications taking into consideration the peculiarities of obstetric disease pattern and the economic development in Nigeria.

Thirdly, the quality of the scans could be largely enhanced if practical approach to training in maternal foetal medicine was adopted and the scans were mostly done in maternal foetal medicine units. That would enable resident trainees in maternal foetal medicine to do the scans. It would reduce the number of patients that go for scans outside the hospital and consequently reduce flight of financial resources. The imaging scientists could also be retrained in obstetric ultrasound, engage in CPD and work in accordance with a given protocol.

Fourthly, there is urgent need for advocacy at the level of primary health centres to educate and sensitise patients on

the need for early booking for obstetric care and scan from 8 weeks of pregnancy, preferably from 11 weeks. There was also the need for adoption of a good guide to obstetric risk assessment and referral cascade in Nigeria. That will go a long way, reducing the number of late attendances for antenatal care and scans and consequently the associated poor maternal and perinatal outcomes.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Chalouhi GE, Bernard JP, Benoist G, Nasr B, Ville Y, Salomon LJ. A comparison of first trimester measurements for prediction of delivery date. J Matern Fetal Neonatal Med. 2011;24:51-7.
2. Salomon LJ, Pizzi C, Gasparrini A, Bernard J-P, Ville Y. Prediction of the date of delivery based on first trimester ultrasound measurements: an independent method from estimated date of conception. J Matern Fetal Neonatal Med. 2010;23:1-9.
3. Litwinska E, Syngelaki A, Cimpoca B, Sapantzoglou I, Nicolaides KH. Intertwin discordance in fetal size at 11-13 weeks' gestation and pregnancy outcome. Ultrasound Obstet Gynecol. 2020;55:189-19.
4. Litwinska E, Syngelaki A, Cimpoca B, Frei L, Nicolaides KH. Outcome of twin pregnancy with two live fetuses at 11-13 weeks' gestation. Ultrasound Obstet Gynecol. 2020;55:32-8.
5. Arcangeli T, Bhide A, Napolitano R, Mahsud-Dornan S, Thilaganathan B. First-trimester ultrasound determination of chorionicity in twin pregnancy. Ultrasound Obstet Gynecol. 2011;38:530-32.
6. Syngelaki A, Cimpoca B, Litwinska E, Akolekar R, Nicolaides KH. Diagnosis of fetal defects in twin pregnancies at routine 11-13-week ultrasound examination. Ultrasound Obstet Gynecol. 2020;55:474-81.
7. Pili G, Nicolaides KH, Ximenes R, Jeanty P. Diploma in Fetal medicine and ISUOG educational series. The 19-23 weeks scan. 2002.
8. Snijders RJ, Johnson S, Sebire NJ, Noble PL, Nicolaides KH. First-trimester ultrasound screening for chromosomal defects. Ultrasound Obstet Gynecol. 1996;7:216-26.
9. Papastefanou I, Wright D, Lolos M, Anampousi K, Mamalis M, Nicolaides KH. Competing-risks model for prediction of small-for-gestational-age neonates from maternal characteristics, serum PAPP-A and PlGF at 11-13 weeks' gestation. Ultrasound Obstet Gynecol. 2021;57(3):392-400.
10. Papastefanou I, Wright D, Nicolaides KH. Competing-risks model for prediction of small-for-gestational-age neonate from maternal characteristics and medical history. Ultrasound Obstet Gynecol. 2020;56(2):196-205.
11. Tan MY, Poon LC, Rolnik DL, Syngelaki A, de Paco Matallana C, Akolekar R et al. Prediction and prevention of small-for-gestational-age neonates: evidence from SPREE and ASPRE. Ultrasound Obstet Gynecol. 2018;52:52-9.
12. FIGO Working Group on Good Clinical Practice in Maternal-Fetal Medicine. Good clinical practice advice: First trimester screening and prevention of pre-eclampsia in singleton pregnancy. Int J Gynaecol Obstet. 2019;144:325-9.
13. Fetal Medicine Foundation. Available at: https://fetalmedicine.org/education/preeclampsia screening. Last Accessed on 02 May, 2021.
14. Nzelu D, Biris D, Karampitsakos T, Nicolaides KN, Kametas NA. First trimester serum angiogenic and anti-angiogenic factors in women with chronic hypertension for the prediction of preeclampsia. Am J Obstet Gynecol. 2020;222:374.e1-e9.
15. Wright A, Wright D, Syngelaki A, Georgantis A, Nicolaides KH. Two-stage screening for preterm preeclampsia at 11-13 weeks' gestation. Am J Obstet Gynecol. 2019;220:197.e1-11.
16. Beta J, Akolekar R, Ventura W, Syngelaki A, Nicolaides KH. Prediction of spontaneous preterm delivery from maternal factors, obstetric history and placental perfusion and function at 11-13 weeks. Prenat Diagn. 2011;31:75-83.
17. FMF Courses. Available at: https://courses.fetalmedicine.com/fmf/show/1037?locale=en. Last Assessed 12 Feb, 2022.
18. Hoffman CS, Messer LC, Mendola P, Savitz DA, Herring AH, Hartmann KE. Comparison of gestational age at birth based on last menstrual period and ultrasound during the first trimester. Paediatr Perinat Epidemiol. 2008;22:587-96.
19. ISUOG Practice Guidelines: performance of first-trimester fetal ultrasound scan. Ultrasound Obstet Gynecol. 2013;41:102-13.
20. Salomon LJ, Alfirevic Z, da Silva Costa F, Deter RL, Figueras F, Ghi T et al. ISUOG Practice Guidelines: ultrasound assessment of fetal biometry and growth. Ultrasound Obstet Gynecol. 2019;53:715-23.
21. Savitz DA, Terry JW, Dole N, Thorp JM, Siega-Riz AM, Herring AH. Comparison of pregnancy dating by last menstrual period, ultrasound scanning, and their combination. Am J Obstet Gynecol. 2002;187:1660-6.
22. Grisolia G, Milano K, Pilu G, Banzi C, David C, Gabrielli S, Rizzo N, Morandi R, Bovicelli L. Biometry of early pregnancy with transvaginal sonography. Ultrasound Obstet Gynecol. 1993;3:403-11.
23. Dias T, Arcangeli T, Bhide A, Napolitano R, Mahsud-Dornan S, Thilaganathan B. First-trimester ultrasound determination of chorionicity in twin pregnancy. Ultrasound Obstet Gynecol. 2011;38:530-2.
24. Dias T, Mahsud-Dornan S, Thilaganathan B, Papageorghiou A, Bhide A. First-trimester ultrasound dating of twin pregnancy: are singleton charts reliable? BJOG. 2010;117:979-84.

25. Mkpe Abbey, Olufemi A Oloyede, Goddy Bassey, Benjamin M Kejeh et al. Prevalence and pattern of birth defects in a tertiary health facility in the Niger Delta area of Nigeria. Int J Womens Health. 2017;9:115-21.
26. Galeva S, Konstantinidou L, Gil MM, Akolekar R, Nicolaides KH. Routine first-trimester screening for fetal trisomies in twin pregnancy: cell-free DNA test contingent on results from combined test. Ultrasound Obstet Gynecol. 2019;53:208-13.
27. Galeva S, Konstantinidou L, Gil MM, Akolekar R, Nicolaides KH. First-trimester screening for trisomies by cfDNA testing of maternal blood in singleton and twin pregnancies: factors affecting test failure. Ultrasound Obstet Gynecol. 2019;53:804-9.
28. Mazer Zumaeta A, Wright A, Syngelaki A, Maritsa VA, Bardani E, Nicolaides KH. Screening for trisomy at 11-13 weeks' gestation: use of pregnancy-associated plasma protein-A, placental growth factor or both. Ultrasound Obstet Gynecol. 2020;56:408-15.
29. Ville Y. 'Ceci n'est pas une echographie': a plea for quality ´ assessment in prenatal ultrasound. Ultrasound Obstet Gynecol. 2008;31:1-5. 22.
30. Kypros H. Nicolaides. The 11-13+6 weeks scan. Fetal Medicine Foundation, London. 2004.
31. Mizia K, Westerway SC, Robertson M, Parry E, Paoletti D, Perry D et al. Guidelines for the performance of the first trimester ultrasound. AJUM. 2018;21(3).
32. Methods for estimating the due date. Committee Opinion No. 700. American College of Obstetricians and Gynecologists. Obstet Gynecol. 2017;129:e150-4.
33. Reddy UM, Abuhamad AZ, Levine D, Saade GR. Fetal imaging: executive summary of a joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal–Fetal Medicine, American Institute of Ultrasound in Medicine, American College of Obstetricians and Gynecologists, American College of Radiology, Society for Pediatric Radiology, and Society of Radiologists in Ultrasound Fetal Imaging workshop. Fetal Imaging Workshop Invited Participants. Obstet Gynecol. 2014;123:1070-82.
34. Mkpe Abbey, Oloyede OA, Goddy Bassey, Kejeh BM, Otaigbe BE, Opara PI. Prevalence and pattern of birth defects in a tertiary health facility in the Niger Delta area of Nigeria. Int J Women's Health. 2017;9:115-21.
35. Wekere FCC, John DH, Clement-Wekere GAF, Iwo-Amah RS. Prevalence, trend and outcome of twin pregnancy in Rivers State University Teaching Hospital, Southern Nigeria. Int J Reprod Contracept Obstet Gynecol. 2021;10:2571-7.
36. Oladapo OT, Adetoro OO, Ekele BA, Chama C, Etuk SJ, Aboyeji AP et al. Nigeria Near-miss and Maternal Death Surveillance Network. When getting there is not enough: a nationwide cross-sectional study of 998 maternal deaths and 1451 near-misses in public tertiary hospitals in a low-income country. BJOG. 2016;123:928-38.
37. Olugbenga AM, Suleiman BM, Adesiyun OO, Adeniyi A. Prevalence and Determinants of Preterm Deliveries in the University of Ilorin Teaching Hospital, Ilorin Nigeria. Paediatr Rep. 2010;2(1):e18.

Cite this article as: Abbey M, Kua P. Audit on the first obstetric ultrasound in a tertiary health facility in the Niger delta and its implications for maternal foetal care. Int J Reprod Contracept Obstet Gynecol 2022;11:1016-24.