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Singleton stillbirths in a tertiary public hospital offering free maternity services in southwest Nigeria: A one-year review

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Stillbirths are major components of perinatal mortalities in Nigeria. The study objectives are to determine the feto-maternal factors associated with antepartum intrauterine fetal deaths (IUFDs) leading to stillbirths as well as compare selected clinical characteristics with normal live births. This prospective observational study was conducted in a free service public hospital in south-western Nigeria. Parturients with antepartum IUFDs had midwives conduct anthropometric measurements and physical examinations on the stillborn babies. Clinical details of two subsequent live births were recorded for comparison. Data was analysed using SPSS v. 23. During the study, there were 3,342 births out of which 243 were stillbirths (72.7 per 1000 births). Antepartum IUFDs resulting in stillbirths were 74 out of which 35 (47%) had identifiable causative factors, mainly placental abruption and hypertensive disorders in pregnancy (HDPs) while the rest were unexplained. Analyses also revealed that lack of antenatal care and intrauterine growth restriction were associated with stillbirths. Placental abruption and HDPs were the commonest known causes of antepartum IUFDs. Therefore, the promotion of universal access to qualitative antenatal care is advocated. In addition, use of customised fetal growth charts should be institutionalised for early identification of growth restriction.

Key words: Antepartum, fetal death, stillbirth, free maternity services, south-western Nigeria.

INTRODUCTION

Perinatal and maternal mortality rates are useful indicators of the quality of obstetric care, especially in low-resource countries (Goldenberg et al., 2007). Stillbirths are the main components of perinatal mortalities in developing countries (Blencowe et al., 2000). Efforts to reduce perinatal death must involve the study of the types and aetiological factors surrounding stillbirths. Babies delivered without signs of life are stillborn. However, fetal demise may occur before the onset of labour (antepartum) or during the labor process (intrapartum). Such a clinical distinction is important because there are different causative factors operational in the two classifications. The interventional strategies required to prevent fetal deaths would therefore differ depending on the timing of the labour process. Globally, about three million stillbirths occur every year most of which are in low and middle income countries (Blencowe et al., 2016; Reinebrant et al., 2018; Lawn et al., 2011).

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There have been calls to action to end preventable deaths though efforts in this direction have been slow in sub-Saharan Africa (WHO, UNICEF, 2014; Mullan, 2016). With a global stillbirth (≥28 completed weeks' gestation) rate of 18.4 per 1000 births, the target is to reduce this figure to less than or equal to 12 per 1000 births by year 2030 (Lawn et al., 2011). Every Newborn Action Plan is spearheading efforts to make stillbirths visible as well as remind governments of the imperative to prioritize stillbirths for national intervention (WHO, UNICEF, 2014). In addition, the Sustainable Development Goals among other international initiatives, have succeeded in drawing attention to the issue of maternal and newborn health (UN, 2016).

In 2015, Nigeria had about 313,700 recorded stillbirths with a rate of over 40 per 1000 total births (Dahiru and Aliyu, 2016). This translated to about twice the global figure, and hence one of the highest in the world. Despite an estimated average annual rate of reduction of 1.3%, stillbirths remain a public health challenge in Nigeria (Blencowe et al., 2000; Mullan, 2016). Within the country, researchers have demonstrated wide variations in stillbirth rates between the northern and the southern parts, as well as between rural and urban centres (Fawole et al., 2011; Ugwa and Ashimi, 2015; Okuedo et al., 2012; Kuti et al., 2017). Interestingly, the preventability of stillbirths have also been reported by same researchers. What appears to be lacking is the political will on the part of national and most state governments to implement recommended strategies.

In Ondo state, south-western Nigeria, the launching of the "Abiye" (safe motherhood) initiative in 2009, establishment of free service Mother and Child Hospitals in Akure and Ondo cities (in 2010 and 2012, respectively) as well as domestication of a committee on confidential enquiry into maternal deaths, impacted positively on maternal health. These resulted in a significant reduction in maternal mortality ratio between 2010 and 2015 (Oyeneyin et al., 2017, 2019). Though perinatal deaths were also meant to be reported, there was no commensurate attention to this aspect resulting in scarcity of published data. Conducting such a study in a tertiary facility offering free maternity services provides a unique opportunity to investigate the actual circumstances surrounding the perinatal mortality scourge having removed all financial impediments militating against access to care. This study's objectives, therefore, are to determine the feto-maternal causative factors for antepartum intrauterine fetal deaths leading to stillbirths in a free service health facility as well as compare selected clinical characteristics with normal live births.

MATERIALS AND METHODS

Study setting

This study was conducted in a tertiary facility offering free maternity services in south-western Nigeria.

Study instrument and data collection

This was a prospective observational study of women with antepartum fetal deaths who delivered stillborn babies at the facility within a one-year period from January to December 2015. The inclusion criteria were a diagnosis of intrauterine fetal death before the onset of labor occurring on or after 28 completed weeks of gestation as recommended by the International Classification of Diseases (ICD-10) (W.H.O. 1993). Their gestational ages were calculated from the first day of the last menstrual period. When the latter was uncertain the ages were derived from the earliest ultrasound scan findings. The patients were recruited at the emergency room and antenatal clinic. Relevant biodata including maternal age, pregnancy details, obstetric and medical history was collected using a customised data collection form. The absence of fetal heart beats was ascertained by ultrasound scan evaluation. Labour features, primarily uterine contractions and cervical dilatation less than 4 cm, were ruled out on clinical examination. These women were subsequently admitted for planned deliveries following which trained midwives conducted physical examinations (to detect congenital anomalies) and anthropometric measurements (weight, head circumference and crown-heel length) of the stillborn babies. A dedicated weighing scale and measuring tape were provided for the latter purpose. A baby was categorised at birth as either "fresh" or "macerated" depending on whether the skin was intact or peeling, respectively. Following each stillbirth, clinical details of two subsequent live births, were recorded for comparison. A total of 148 live births were selected by generation of random numbers for this purpose.

Exclusion criteria

All stillborn babies delivered before 28 completed weeks, weighing less than 1000 g and by-products of multiple pregnancies, were excluded from this study.

Data analysis

All data was analysed using Statistical Package for Social Sciences version 23. The data was cleaned for missing data before commencement of the analysis.

Ethical consideration

This study has a minimal risk status thus obtained an approval from the hospital ethics committee.

RESULTS

In the period of study, there were 3,342 births at the study site out of which 243 were stillbirths, giving a rate of 72.7 per 1000 births. Seventy-four (30%) singletons were antepartum fetal deaths leading to stillbirths out of which 56 (76%) complete data were fit for comparative analysis with 124 normal live births. These are better summarized in Figure 1. Unspecified overlapping data in the variables of age (4 of 74), parity (10 of 74), baby's sex (6 of 74), gestational age (8 of 74), and birthweight (8 of 74) were responsible for this reduction in number. Table 1 shows the distribution of causes of death according to Aberdeen classification (Goldenberg et al., 2007). Out of the total
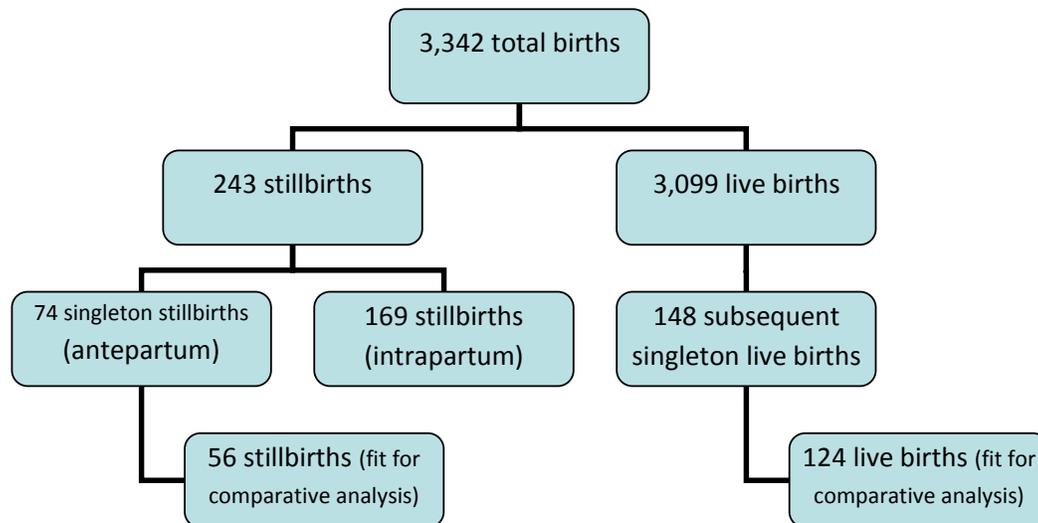
Figure 1. Consort diagram for data collection flow.

Table 1. Causes of (antepartum) stillbirths over one year (N = 74).

Cause of stillbirth	n	%
Unexplained	39	52.7
Abruption	11	15.0
Severe HDPs	10	13.5
Diabetes mellitus	4	5.4
Placental insufficiency/ severe IUGR	4	5.4
PPROM/Chorioamnionitis	3	4.1
Congenital anomaly	1	1.3
Major placenta praevia	1	1.3
Human Immuno-deficiency Virus/Acquired Immuno-deficiency Syndrome	1	1.3

HDPs – hypertensive disorders in pregnancy, PPROM- preterm pre-labour rupture of membranes, IUGR - intrauterine growth restriction.

number of stillbirths studied, 39 (53%) were classified as unexplained, while the remaining 35 were attributable to mainly placental abruptions and severe hypertensive disorders in pregnancy (HDPs).

Patients with stillbirths who did not receive antenatal care at the study site accounted for 89% of the total number. Fifty-three (71.6%) women out of 74 had fresh stillborn babies while 19 (25.6%) delivered macerated ones. The statuses of two stillborn babies were unspecified. One woman delivered a baby with encephalocoele by caesarean section. The contribution of congenital anomalies to antepartum stillbirth in this series was therefore, just 1.3%.

The comparison of socio-demographic and clinical characteristics of 56 cases of stillbirths with those of 124 live births (that had complete comparable data) are shown on Table 2. While maternal age and sex ratios were not significantly different between the two groups,

birth weight less than 2.5 kg when corrected for gestational age was significantly associated with stillbirths. In addition to this, primiparous women were significantly less likely to have delivered stillborn babies. Thirty-two (57%) stillborn babies delivered at 37 weeks of gestation and above while five were indeterminable. Table 3 gives a breakdown of the distribution of gestational ages. Figure 2 illustrates the plotting of birthweights and gestational ages of the 56 stillborn babies on Hadlock chart (Hadlock et al., 1991). It shows eighteen (32%) stillborn babies had birthweights below the 10th percentile.

DISCUSSION

The stillbirth rate of 72.7 per 1000 births in this study site is almost four times the global figure of 18.4 (Blencowe et

Table 2. Comparison of feto-maternal characteristics among still- and live-births. (P= Pearson chi-square).

	Stillbirth (N = 56)		Live birth (N = 124)		P value
	n	**%**	**n**	**%**	
Maternal age (years)					
<25	10	17.8	32	25.8	0.124
25-34	30	53.6	72	58.1	0.132
≥35	16	28.6	20	16.1	0.055
Parity					
Primiparous	13	23.2	56	45.2	<0.005
Multiparous	43	76.8	68	54.8	
Baby's sex					
Male	26	46.4	73	58.9	0.120
Female	30	53.6	51	41.1	
Birth weight (kg)					
<2.5	20	35.7	12	9.7	<0.001
>/=2.5	36	64.3	112	90.3	

Table 3. Distribution of gestational ages among stillborn babies (N = 56).

Gestational age (completed weeks)	n	%
28 - 30	4	7.2
31 - 33	8	14.3
34 - 36	7	12.5
37 - 39	20	35.7
40 - 42	7	12.5
>42	5	8.9
Indeterminable	5	8.9

al., 2000). This finding is comparable to the rate of 71 per 1000 births by Fawole et al. (2011) in a Nigerian nationwide study but higher than 51 per 1000 births reported in southwest Nigeria by Kuti et al. (2017). The study site's free service delivery in the care of patients lends credence to the proximation of the recorded rate when compared to that of the general populace. Stillbirth rates reported in Nigeria are higher than the worldwide target set by Every Newborn Action Plan for a national stillbirth rate of less than 12 per 1000 births (Blencowe et al., 2016; Reinebrant et al., 2018). There is therefore the need for urgent government intervention to lower these figures to mitigate the physical, financial and emotional toll on bereaved families and their care-givers.

In the absence of post-mortem evaluation, maternal and obstetric indications were relied on to categorise the causes of stillbirths in this series in line with the Aberdeen classification (Cole et al., 1986). More than half of antepartum fetal deaths leading to stillbirths in this series

were categorised as unexplained, a figure higher than 38.8% recorded by Kuti et al. (2017), but lower than the figure of 65% recorded by Gardosi et al. (1998) in England. A global survey on stillbirths found unexplained and antepartum haemorrhage as leading causes from many countries (Reinebrant et al., 2018).

The lack of specific causes of death in this stillbirth category does not help the development of strategies to prevent them. The high percentage of unexplained antepartum fetal deaths, therefore, highlights the necessity to improve their investigations and reporting. The adoption of a standardised reporting system as suggested by Reinebrant et al. (2018) should be discussed. Such a system should be simple, cost-efficient, culturally relevant and user-friendly.

Data from this study showed that most of the stillborn babies with an unknown cause did not receive any antenatal care. Therefore, the underlying medical condition and the deteriorating fetal wellbeing were not
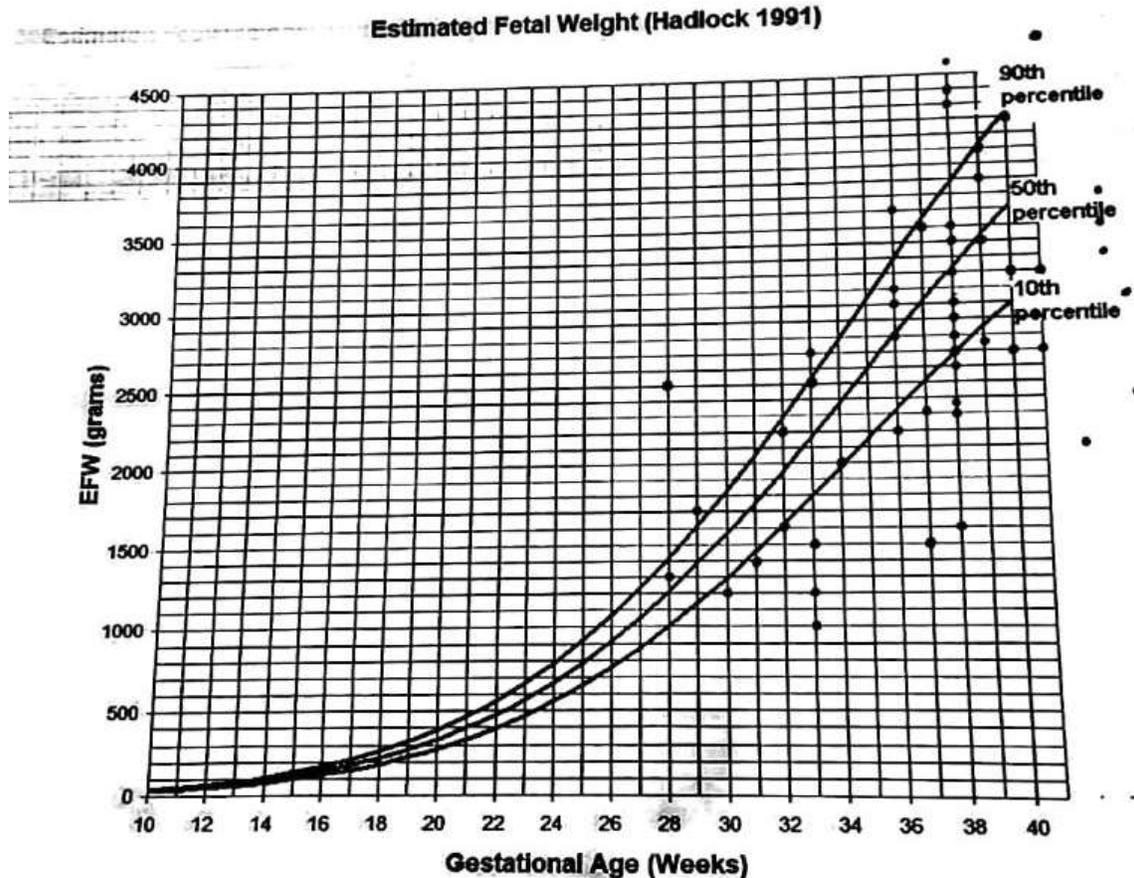
Figure 2. Scatter-plot of birth weights and gestational ages of 56 stillborn babies on Hadlock chart. (Note: one data point may represent more than one baby).

detectable. Nevertheless, a relatively high share of placental abruption and HDP was comparable with the findings of Fawole et al. (2011) and Ugwa and Ashimi (2015). These findings demonstrate the need for early diagnosis and treatment of such conditions. Only one (1.3%) case of congenital anomaly was found in this study which further confirms its low percentage in stillbirths in south-western Nigeria. This was previously shown in a Lagos-based study (1.4%) (Olusanya and Solanke, 2009).

Despite being a prospective study, information regarding birth records was not available in 24% of cases. This is a recognised limitation acknowledged in other publications (Reinebrant et al., 2018; Lawn et al., 2011). It could be due to the lack of interest of the medical staff in documentation of stillborn babies. Improving clinical documentations should, therefore, be encouraged.

In this study, stillborn babies exhibited intrauterine growth restriction (IUGR) demonstrated by significantly higher proportion of low birthweights when corrected for gestational age. A diagnosis of IUGR (with or without oligohydramnios and adverse placental features) was made using serial ultrasound scan measurements. Low birthweight and growth restriction are both detrimental to fetal survival. The SGA babies have traditionally been considered at increased risk of perinatal morbidity and mortality (Ananth and Platt, 2004). This study's findings that fetal growth restriction is a significant factor in stillbirths are in agreement with Ugwa and Ashimi (2015); Kuti et al. (2003) and Gardosi et al. (1998).

In addition, majority of stillbirths occurred at term and beyond. However, five cases recorded were indeterminable due to uncertainties of last menstrual dates, absence of early ultrasound scans and lack of prior antenatal care at presentation. The screening for and identification of early stages of growth restriction should, therefore, be made essential components of qualitative antenatal care to help prevent antepartum fetal demise.

The quest for prevention of antepartum fetal deaths should include the development of customised, individualised growth charts relevant to the obstetric population (Gardosi et al., 1992). By completing Hadlock charts with gestational age and birthweight, deviations from normal were highlighted. The use of the Hadlock

chart may be criticised in terms of its relevance to this study's local obstetric population having been derived from a Caucasian one where the average weights are likely higher. However, the chart had been used by other investigators in similar studies (Gardosi et al., 1998). It is likely that the finding in this study of a third of stillborn babies having birth weights below the 10th percentile for their gestational ages, might therefore be an over-estimation.

In this study, it is difficult to explain why primiparous women were significantly less likely to deliver stillborn babies compared to multiparous ones. This is bearing in mind the former are prone to pre-eclampsia, a major cause of antepartum intrauterine fetal death. On the other hand, because of their relatively younger age, the primiparous women are less likely to suffer from age-related medical conditions such as chronic hypertension and diabetes mellitus. What is more, reduced utero-placental perfusion is a known association with advanced maternal age (Naeye, 1983). Contrastingly, primiparous women in advanced ages have been associated with increased stillbirth rates, largely as a result of sclerotic changes in placental vessels (Waldenstrom et al., 2015). The study by Froen et al. (2001) did not find any association between primiparity, previous stillbirths or spontaneous abortions and sudden unexplained intrauterine deaths. They concluded that the risk of sudden unexplained intrauterine death increased with high maternal age, cigarette smoking, gestational age and low education.

Conclusion

This study found that the stillbirth rate in south-western Nigeria is almost four times the global average. Placental abruptions and severe HDPs were the commonest known causes of antepartum intrauterine fetal deaths leading to stillbirths. However, most cases were in the unexplained category. Lack of antenatal care and intrauterine growth restriction were also underlying factors in this study.

Therefore, the promotion of universal access to qualitative antenatal care is highly recommended. In addition, use of customised fetal growth charts should be institutionalised for early identification of growth restriction in-utero.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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