



Original Article

Incidence and Risk Factors of Stillbirth at a Nigerian Tertiary Health Care Centre

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Abstract

Background: Stillbirths are often unregistered and are not seen as a major public health problem. It is an important indicator of the quality of antepartum and intrapartum care of any given obstetric unit. We therefore sought to determine the incidence and risk factors associated with stillbirth at a tertiary health care centre. **Material and methods:** A cross-sectional study of women who had a stillbirth at the Obstetric unit of Federal Medical Centre, Bida, North-central Nigeria. A consecutive sampling of cases of stillbirths from 28 weeks' gestation or birth weight of at least 1000g was carried out from 1st July, 2021 to 31st December, 2022. Data collection was conducted using a pro forma. Data were analysed using the Statistical Package for the Social Sciences version 22, and the level of significance was set at $p < 0.05$. **Results:** The stillbirth rate was 55 per 1000 deliveries during the period under review. Risk factors for stillbirths were identified in 76.5% of cases, while the rest were unexplained. Unbooked women contributed 70.6% to the cases of stillbirth. The common risk factors of stillbirth from this study were abruptio placenta (29.1%), hypertensive disorders of pregnancy (12.4%), placenta previa (7.4%) and ruptured uterus (5.4%). **Conclusions:** Stillbirth rate is high in our environment and is mainly associated with unbooked status. The commonest cause was abruptio placentae, and some of the cases were unexplained. The provision of quality and affordable obstetric care could go a long way toward reducing the menace.

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INTRODUCTION

Stillbirth has been defined using gestational age or birth weight by various climes. In the United Kingdom (UK), it is defined as the delivery of a baby with no signs of life after 24 weeks of gestation, while in the United States of America (USA), it is fetal death after 20 weeks of pregnancy.^{1,2} However, the definition recommended by the World Health Organisation (WHO) for

international comparison – the death of the fetus before complete expulsion or extraction from its mother, weighing at least 1000grams and occurring after 28 completed weeks of gestation or having at least 35cm body length – is the most practical in low-income settings like Nigeria.[1,] The inclusion of fetal weight at birth and crown-heel length in addition to gestational age, in WHO's definition, makes it applicable to low-income

countries where the majority of women are unsure of their last menstrual period.

Stillbirths are often unregistered and are not seen as a major public health problem.^{Error! Bookmark not defined.} The stillbirth rate, which contributes significantly to the perinatal mortality rate, is an important indicator of the quality of antenatal care and intrapartum care of any given obstetric unit.^[1,Error! Bookmark not defined.] It is generally higher in economically disadvantaged communities where access and utilisation of maternal health care services are poor.^{1,Error! Bookmark not defined.} It is an important source of medical litigation in high-income countries.^{1,3,4}

Stillbirth is a major source of grief for the couple and of concern for the clinician. Annually, about 2.6 million stillbirths occur worldwide, with the vast majority (98%) in low-income countries.^{Error! Bookmark not defined.,5,6,7} Half of these deaths occur during childbirth, particularly in developing economies with paucity of skilled birth attendants.^[5] In Finland, Singapore, Denmark and Norway, the stillbirth rate is as low as between 2 and 2.2 per 1000 births; while in Nigeria, Zimbabwe and Pakistan, the rate is as high as 22.4 to 127 per 1000 births.^{1,Error! Bookmark not defined.,Error! Bookmark not defined.}

A community survey in Gombe, North-East Nigeria, showed a stillbirth rate of 38.5 per 1000 births;⁸ a similar rate of 40.5 per 1000 births was reported in Jos, North-Central Nigeria.⁹ A study conducted in Imo State University Teaching Hospital, south-East Nigeria, reported a stillbirth rate of 180 per 1000 births.¹ However, a lower rate of 10.8 per 1000 births was reported from a study conducted among booked mothers in South-West Nigeria⁵, suggesting a very pertinent role antenatal care plays in reducing the incidence of stillbirth. Counting and reviewing every birth and death is the key to preventing future tragedies.

Understanding the distribution of fresh and macerated stillbirths may help us identify the quality of obstetric care available to pregnant women and prioritise appropriate intervention strategies; bearing in mind that macerated stillbirths are often associated with insults occurring in-utero during the antenatal period, while fresh stillbirths may suggest problems with the care available during childbirth.^{10,11}

Causes of stillbirths are numerous and attempts to accurately determine them are only feasible in developed economies where sophisticated diagnostic facilities are available, and postmortem examinations are performed routinely. The aetiology is unknown in about 25 to 60% of fetal deaths.^{3,5} Antepartum stillbirths are associated with diabetes mellitus, hypertensive disorders of pregnancy, rhesus isoimmunization, congenital anomalies, fetal growth restriction, and maternal and fetal infections.^{1,3} Most intrapartum stillbirths are usually the result of obstetric emergencies like abruptio placentae, umbilical cord accident, obstructed labour, fetal distress,

and often reflect poor quality of clinical care during labour and delivery.^{3,11} The potential risk factors of stillbirth may be of maternal, fetal or placental origin. The risk factors include advanced maternal age, nulliparity or grandmultiparity, obesity, smoking, chronic alcohol consumption, environmental hazards, low socioeconomic status, poor maternal education, previous stillbirth, and maternal anaemia.^{1,3,11} Stillbirth has become a visible maternal and child health agenda in the era of the Sustainable Development Goals (SDGs). The WHO Global Action Plan recommended cost-effective intervention packages across the continuum of care, from Antenatal identification and subsequent management of pregnancy complications to the provision of skilled birth attendants.^[14] The SDG strategy aims to achieve the Every Newborn Action Plan target of ≤ 12 stillbirths per 1,000 births by 2030.

Knowledge of the causes and risk factors of this tragic public health challenge will help in designing preventive measures to reduce its incidence. Most of the identifiable causes have changed over the years, even in the same centre.¹² It is therefore necessary for each centre to determine the aetiology of stillbirth in their setting to improve the standard of care. It is against this backdrop that this study aims to determine the incidence and risk factors for stillbirth at the Federal Medical Centre (FMC), Bida, North-Central Nigeria.

MATERIAL AND METHODS

This was a cross-sectional study of all stillbirths delivered at the Obstetric unit of FMC, Bida, from 1st July, 2021 to 31st December, 2022. A consecutive sampling of all cases of stillbirths from 28 weeks' gestation or with a birth weight of at least 1000g was undertaken during the study period. Consented mothers who had a stillbirth were interviewed by the investigator or trained assistant(s), using a pre-designed and pre-tested proforma, for socio-demographic characteristics, history of index pregnancy, previous history of stillbirth, and maternal medical history. Patients' case notes were also used as sources of some information. In view of the parents' refusal to allow the dead babies to be subjected to autopsy and lack of facilities for some laboratory tests necessary for detailed evaluation of the causes of fetal demise, the clinico-pathological system designed by Baird-Pattinson^[9] was used to assign primary obstetric causes of fetal death.

Ethical approval was obtained from the hospital's Health Research Ethics Committee, No. 1/60. Informed written consent was obtained from each patient, and confidentiality was maintained by not using names during data collection.

Data were entered into Statistical Package for Social Sciences (SPSS) version 22 and analysed.

Observed differences were subjected to Chi-square test, and the level of significance was set at $P < 0.05$.

RESULTS

During the period under review, there were 2,782 total deliveries of which 153 were stillborn, giving a stillbirth rate of 55 per 1,000 births. The mean maternal age was 28 years ($SD \pm 1.2$).

Table 1: Sociodemographic characteristics of study participants

Characteristics	No (%)
Age group (years)	
≤ 20	20(13.5)
21 - 25	39(26.4)
26 - 30	49(33.1)
31 - 35	22(14.9)
36 - 40	16(10.8)
> 40	7(4.6)
$X^2 = 57.378$, $P = 0.000$	
Level of education	
Primary	12(7.8)
Secondary	28(18.9)
Tertiary	18(12.2)
Informal	17(11.5)
None	78(52.7)
$X^2 = 133.270$, $P = 0.001$	
Body Mass Index (kg/m^2)	
≤ 18.9	4(2.6)
19 - 24.9	99(66.9)
25 - 29.9	43(29.1)
≥ 30	7(4.6)
$X^2 = 167.405$, $P = 0.001$	

The highest stillbirth rate of 49(33.1%) occurred among women within the age group of 26 – 30 years. The majority of the stillborn were seen among women without any form of education (52.7%), followed by those with secondary level of education (18.9%). About two-thirds (66.9%) of cases had a normal body mass index of 19 to 24.9 kg/m^2 [Table 1]. None of the women drank alcohol or smoked cigarettes. Unbooked women significantly contributed 108(70.6%) to the cases of stillbirths ($X^2 = 31.243$, $p = 0.001$) [Table 2]. Approximately a third of cases were multiparous women (31.8%), and about a half of the cases occurred at term (47.3%), while 61.5% of the stillbirths were of normal weight. Only 13.0% of the women had a previous history of stillbirth ($X^2 = 94.081$, $P = 0.001$). (Details in Table 2).

The majority of cases were fresh stillborn (59.5%) [$\chi^2 = 5.297$, $P = 0.02$], as shown in Table 3. The identifiable risk factors were present in 76.5% of cases

($X^2 = 147.743$, $P = 0.001$), and unexplained stillbirth occurred in about 23.5% of cases. The most common risk factor was abruptio placentae (21.1%), followed by hypertensive disorders of pregnancy (12.4%), placenta previa (7.4%), ruptured uterus (5.4%) and prolonged obstructed labour (4.1%) [$X^2 = 295.432$, $P = 0.001$]. (Details in Table 4).

Table 2: Obstetric history of study participants

Characteristics	No (%)
Booking status	
Booked	45(29.4)
Unbooked	108(70.6)
$X^2 = 31.243$, $P = 0.001$	
Parity	
Nullipara	27(17.6)
Primipara	24(15.7)
Multipara	55(37.2)
Grandmultipara	47(31.8)
$X^2 = 22.270$, $P = 0.001$	
Gestational age at diagnosis of fetal death (weeks)	
28–32 (Remote from term)	19(12.8)
33 – 36 (Borderline prematurity)	56(37.8)
37 – 40 (term)	70(47.3)
40 ⁺¹ – 41 ⁺⁶ (Postdatism)	3(2.0)
≥ 42 (post-term).	5(3.3)
$X^2 = 135.851$, $P = 0.001$	
Birth weight (kg)	
< 2.5	49(33.1)
2.5 – 3.9	91(61.5)
≥ 4.0	8(5.4)
$X^2 = 39.500$, $P = 0.001$	
Previous stillbirth	
Yes	20(13.0)
No	133(87.0)
$X^2 = 94.081$, $P = 0.001$	
Fetal sex	
Male	83(54.2)
Female	70(45.8)
$X^2 = 2.189$, $P = 0.14$	
Mode of delivery	
Spontaneous vertex delivery	90(60.8)
Abdominal	54(36.5)
Instrumental	3(2.0)
Assisted breech delivery	6(3.9)
$X^2 = 150.000$, $P = 0.001$	

Table 3: Types of stillbirths

Types	No (%)	X ²	P-value
Fresh stillbirths	91(59.5)	5.297	0.02
Macerated stillbirths	62(40.5)		
Time of fetal death			
Antepartum fetal death	93(62.8)		
Intrapartum fetal death	60(39.2)	143.7	0.001

Table 4: Risk factors

Variables (%)	No
Presence of risk factors/associated conditions	
Yes	117(76.5)
No	36(23.5)
X ² = 147.743, P = 0.001	
Identified risk factors/associated conditions	
Hypertensive disorders of pregnancy	
19(12.4)	
Diabetes mellitus	3(2.0)
Rhesus isoimmunization	2(1.3)
Malaria	3(2.0)
Chorioamnionitis	3(2.0)
Urinary tract infection	3(2.0)
Acquired Immune Deficiency Syndrome	2(1.3)
Prolonged obstructed labour	6(4.1)
Abruptio placentae	43(29.1)
Placenta previa	11(7.4)
Cord prolapse	4(2.7)
Prolonged rupture of membranes	5(3.4)
Congenital anomaly	3(2.0)
Sickle cell diseases	2(1.3)
Ruptured uterus	8(5.4)
Unknown	36(23.5)
X ² = 295.432, P = 0.001	

DISCUSSION

In this series, the stillbirth rate is high, 55 per 1000 births, which is similar to findings from other centres.^{Error! Bookmark not defined.,⁹}

This finding is typical of developing countries as against developed countries where the stillbirth rate is as low as 2 to 2.2 per 1,000 births as seen in Finland, Denmark and Norway.^{1,Error! Bookmark not defined.,Error! Bookmark not defined.}

Developing countries such as Nigeria are economically disadvantaged and have poor utilisation of maternal health care services, as seen in this study, where the majority of the women (70.6%) did not receive antenatal care, thus could not access early detection and treatment of pregnancy complications that

can result in stillbirths. Similarly, higher risk of stillbirths among mothers who did not receive antenatal care has been clearly established in studies from India and Nepal.¹⁴ Many of the cases of stillbirths are preventable with quality antenatal and intrapartum care.⁴

The majority of cases were seen in the 26–30-year age group. This is similar to the findings in Owerri^{Error! Bookmark not defined.} and may reflect that this age group contributes the largest number of deliveries. However, another study showed that the stillbirth rate was higher at the extremes of age.⁹ Unlike the study in Jos⁹, which showed that the level of education was indirectly proportional to the stillbirth rate, this series revealed that women who were not educated and those with informal education had a higher rate of stillbirth. According to Harrison et al, illiterate women are more likely to go through childhood deprivation with malnutrition, more likely to have early marriage and become pregnant while still young, and whose pregnancy is likely to be managed by unskilled attendants; when serious complications arise, professional help will be sought late, if at all.³ Those with some form of education have a relatively low stillbirth rate since they are more likely to access good-quality prenatal care services. This is because education reduces the twin problems of low socioeconomic status and ignorance, thereby creating women's empowerment.

The stillbirth rate was high among multiparae and grandmultiparae. This agrees with the findings from Calabar,⁵ but in contrast to a Ghanaian series⁴, which reported nulliparity as an independent risk factor for antepartum stillbirth in addition to obesity and advanced maternal age. The different populations studied, and the methods used to select cases might have contributed to these differences. The poorer fetal outcome noted among women of high parity may be due to increased risk of medical conditions associated with pregnancy and labour complications in this group of women. Multivariate analysis was not performed, so we cannot discuss independent risk factors.

There were more male fetuses among stillborn than female fetuses in this study, although the difference was not statistically significant. Fetal sex was not associated with stillbirths, similar to findings by Njoku et al.^[3] The reason for the male preponderance in this study is unclear but may be linked to differences in male and female development, which begin early in life.¹³ Male embryos have faster development and higher metabolic rates than female embryos, and this potentially leaves the male fetuses more vulnerable to distress or death from a range of stressors, including endocrine fluctuation, oxidative stress and faster nutritional depletion when they encounter stressful conditions.¹³

Unlike other studies^{5,9}, the majority of women in this series delivered per vaginam. This is because in every case of fetal death, the patients were allowed to have vaginal delivery in the absence of obstetric

contraindication. We found fresh stillbirths to be predominant, similar to the report by Der et al,^{Error! Bookmark not defined.} but at variance with other researchers who reported macerated stillborn to be the commonest category.^{1,3,9} This suggests that the majority of stillbirths in this study occurred within 24 hours before delivery. Such fetal mortality could be attributed to factors during labour, usually an outcome of poor intrapartum care. However, the majority of the women in this study were unbooked, and abruptio placentae was the commonest risk factor; there is a need for improved obstetric care and availability of adequate emergency services during labour and delivery period.

In this study, risk factors (76.5%) responsible for fetal death were identified in the majority of the cases. This is similar to the report by Okeudo et al.¹ Abruptio placenta was the most common cause of stillbirth in this study. This is similar to the finding by Mutihir et al,⁹ but in contrast with other researchers who found Hypertensive Disorders of Pregnancy (HDP) to be the commonest aetiological factor.^{3,5,^{Error! Bookmark not defined.}} HDP (14.9%) may be related to abruptio placenta in terms of aetiopathogenesis. This vaso-constrictive disorder causes fetal mortality via hypoxia and fetal growth restriction. Its contribution to fetal death can be reduced by early booking, prophylaxis with low-dose aspirin, fetal surveillance and provision of good antepartum care. Fetal mortality from abruptio placenta is usually caused by fetal hypoxia resulting from fetomaternal anaemia occasioned by massive blood loss. Fetal salvageability depends on the degree of blood loss, time of presentation, the referral system, and the availability of emergency obstetric services. This environment is characterised by low socioeconomic status and a poor referral system, causing delayed hospital presentation with abruptio placentae resulting in a high stillbirth rate.

Ruptured uterus (5.4%) and prolonged obstructed labour (4.1%) are the leading intrapartum complications highly associated with fetal mortality. This is similar to the findings by other workers.^{3,9,^{Error! Bookmark not defined.}} The outcome of all the cases of uterine rupture is stillborn. This poor outcome may be due to delayed presentation and poor emergency preparedness.

Congenital anomalies contributed 1.4% to the cases of fetal mortality. This is similar to 1% reported from Owerri.^{Error! Bookmark not defined.} The lack of postmortem examination in any of the cases might have contributed to this low incidence of congenital abnormalities in this study. About 23.5% of cases of stillbirth were unexplained. This compared favourably with the findings of previous authors^{3,9}, even in centres using more sophisticated laboratory facilities for identification of stillbirth. In contrast, Der et al

^{Error! Bookmark not defined.} reported a higher proportion of unexplained stillbirth (47.9%), and the majority of them were fresh and occurred intrapartum.

The failure to conduct an autopsy on the stillborn to determine the cause of death and the lack of chromosomal analysis were the limitations of this study.

CONCLUSION

This study shows a high stillbirth rate, and most of the women did not receive antenatal care. Abruptio placenta, the leading risk factor, is unpredictable and largely preventable. Age, booking status, educational level, body mass index, birth weight, and previous stillbirth were associated with stillbirth. The majority of the identified causes of stillbirth require prompt diagnosis and treatment to salvage the baby. A good referral system is therefore recommended, and pregnant women should receive quality antepartum and intrapartum care to reduce this unacceptably high stillbirth rate.

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