The Trend and Characteristics of Stillbirth Delivery in a University Teaching Hospital in Lagos, Nigeria

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Abstract

Background: The burden of stillbirth is so huge in sub-Saharan Africa, especially in Nigeria where many mothers and mothers-to-be are denied the joy of motherhood. Despite the frequent occurrence of this obstetric problem in our environment, little priority is placed on it. Objectives: The study aims to bring to the fore, the burden, trend, and characteristics of stillbirth delivery in Lagos, Nigeria. Subjects and Methods: This was a 5-year descriptive retrospective study of the case records of women who had stillbirth delivery at Lagos University Teaching Hospital from January 2009 to December 2013. Relevant information was obtained using a study pro forma, and data analysis was carried out using SPSS version 20.0. Results: The prevalence of stillbirth was 6.2%, and the rate was 61.8/1000 total births. Women who did not book for antenatal care accounted for 76.2% of the cases, and the antenatal and intrapartum stillbirths accounted for 64.6% and 35.4%, respectively. The mean gestational age was 35.5 ± 1.2 weeks, while the mean birth weight was 2.9 ± 1.0 kg. Majority of the stillbirths were male fetuses (54.5%). Previous history of stillbirth (36.0%), hypertensive disorders in pregnancy (33.0%), placental abruption (28.8%), intrauterine growth restriction (13.0%), and ruptured uterus (11.3%) were the common clinical risk factors identified. Conclusion: The burden of stillbirth is high in our environment, and majority is due to preventable or manageable obstetric conditions. There is a need to encourage early referral of complicated pregnancies and labor to specialized centers that can cater for them, so as to avoid unnecessary and preventable deaths.

Keywords: Characteristics, Nigeria, stillbirth, trend

Résumé

Contexte: Le fardeau de la mortinaissance est si énorme en Afrique subsaharienne, en particulier au Nigéria où de nombreuses mères et futures mères sont privées la joie de la maternité. Malgré l’apparition fréquente de ce problème obstétrical dans notre environnement, peu de priorité y est accordée. Objectifs: L’étude vise à mettre en évidence le fardeau, la tendance et les caractéristiques de l’accouchement mort-né à Lagos, au Nigéria. Sujets et méthodes: Il s’agissait d’une étude rétrospective descriptive de 5 ans des dossiers de femmes qui avaient accouché de mortinaissance à l’hôpital universitaire de Lagos, de janvier 2009 à décembre 2013. Les informations pertinentes ont été obtenues à l’aide d’une étude pro forma, et l’analyse des données a été réalisée à l’aide de SPSS version 20.0. Résultats: La prévalence de la mortinaissance était de 6,2% et le taux était de 61,8 / 1000 naissances totales. Femmes qui n’ont pas réservé pour la prénatale les soins représentaient 76,2% des cas et les mortinaissances prénatales et intrapartum 64,6% et 35,4%, respectivement. La moyenne de l’âge gestationnel était de 35,5 ± 1,2 semaines, tandis que le poids moyen à la naissance était de 2,9 ± 1,0 kg. La majorité des mortinaissances étaient des fètus de sexe masculin (54,5%), précédé d’antécédents de mortinaissance (36,0%), de troubles hypertensifs pendant la grossesse (33,0%), de décollement placentaire (28,8%), de retard de croissance intra-utérin (13,0%), et la rupture de l’utérus (11,3%) étaient les facteurs de risque cliniques courants identifiés. Conclusion: le fardeau de la mortinaissance est élevé dans notre environnement, et la majorité est due à des conditions obstétriques évitables ou gérables. Il est nécessaire d’encourager l’orientation précoce des grossesses compliquées et le travail dans des centres spécialisés qui peuvent les accueillir, afin d’éviter des décès inutiles et évitables.

Mots clés: Caractéristiques, Nigéria, mortinaissance, tendance

INTRODUCTION

Stillbirth is a major obstetric problem of global public health significance which causes deep traumatic and devastating...
emotional experience for the bereaved mother and her family. The definition of stillbirth varies from country to country, especially between the developed countries and their developing counterparts. For international comparability, the World Health Organization (WHO) defines stillbirth as a baby born dead at 28 weeks of gestation or more, with a birth weight of ≥1000 g, or a body length of ≥35 cm.[1]

It is estimated that 2.6 million babies are born dead worldwide every year, with an estimated global stillbirth rate of 18.4/1000 total births in 2015. Approximately 98% of these stillbirths occur in low- and middle-income countries with sub-Saharan Africa accounting for the highest stillbirth rate of 28.7/1000 total births, and most of them (61.8%) occur in the rural areas.[3] Ten countries account for two-thirds of the world’s total number of stillbirths, and among these, Nigeria ranks second after India with 314,000 stillbirths in 2015 and is the leading contributor to stillbirths in the sub-Saharan African region.[1,4] According to the WHO statistics for 2015, Nigeria has the second highest stillbirth rate in the world after Pakistan, with a rate of 42.9/1000 total births.[4] These statistics show the high burden of stillbirth in Nigeria and the magnitude of its impact on the global stage.

Stillbirths can either occur in the antenatal or intrapartum period. Antenatal stillbirth is a fetal death that occurred during the antenatal period before the onset of labor, and it usually presents with signs of skin maceration, as macerated stillbirth. Intrapartum stillbirth, on the other hand, is fetal death that occurs during the intrapartum period and usually presents as fresh stillbirth, without signs of skin maceration.[1]

There is a gross disparity in the pattern of stillbirth observed in developed high-income countries and developing low- and middle-income countries. Majority (90%) of the stillbirths in developed countries occur in the antenatal period, while majority of the stillbirths in developing countries occur intrapartum, and these account for 51.1% and 59.3% of the stillbirths in sub-Saharan African and southern Asia countries, respectively.[1] The reason for this is not far-fetched. The lack of access to and utilization of skilled birth attendants, poor emergency obstetric care services, the generally poor quality of health-care services in these regions, in addition to other socioeconomic health determinants are responsible for this problem.[5] Factors identified with stillbirth in most low- and middle-income countries are extremes of maternal age, parity, birth weight, and gestational age at birth. Others include lack of adequate obstetric care, presence of multiple gestation and maternal disease.[4] The common risk factors for stillbirth in Nigeria include low socioeconomic status, not utilizing antenatal care (ANC) services, prolonged obstructed labor, intrauterine growth restriction (IUGR), placental abruption, preeclampsia/eclampsia, preterm birth, and extremes of parity.[7,8]

Several hospital-based studies in Nigeria have reported different stillbirth rates ranging from 22 to 170/1000 births in northern Nigeria,[7-10] 45–48.4/1000 births in southern Nigeria,[11,12] 41.4–180/1000 births in Southeast Nigeria,[13-15] to 51–69.7/1000 births in the southwest region of the country.[16,17] However, there are currently no recent data available on the incidence, pattern, causes, and predisposing factors to stillbirth at Lagos University Teaching Hospital (LUTH) in Lagos, Nigeria. It is against this background that this study was conceptualized.

The purpose of this study was to determine the trend and characteristics of stillbirth delivery at LUTH, which serves as the largest and main referral tertiary hospital in Lagos, Nigeria. This will serve as a platform for larger multicenter hospital and population-based studies that will assess the true burden of stillbirth and its predisposing factors in Lagos, Nigeria.

**Subjects and Methods**

**Study design and population**

This was a hospital-based descriptive retrospective study of women who had stillbirths in LUTH over a 5-year period from January 1, 2009, to December 31, 2013.

LUTH is one of the largest federal tertiary hospitals in Nigeria. It is situated in Lagos State, southwestern part of Nigeria. It is the main and largest referral hospital for all government and private hospitals in the state and the neighboring states in the southwest region. The hospital provides antenatal, delivery, and postnatal services among others to pregnant women.

**Study participants and eligibility criteria**

The study population comprised all pregnant women who had stillbirth delivery during the 5-year study period. In this study, stillbirth was defined as fetal death occurring at 28 weeks of gestation or more, before birth. Fetal death was confirmed by the absence of breathing and other evidence of life such as heartbeat, pulsation of the umbilical cord, or definite movement of voluntary muscles.[18] An intrapartum stillbirth was defined as intrauterine fetal death that occurred during labor or delivery, resulting in the birth of a dead newborn usually without signs of degenerative skin changes. This is also referred to as fresh stillbirth. An antenatal stillbirth was defined as the intrauterine fetal death that occurred before the onset of labor, resulting in the birth of a dead newborn with degenerative skin and soft-tissue changes called maceration. Such degenerative changes include skin discoloration and redness or sloughing of the skin. This is also referred to as macerated stillbirth.[15,19]

Based on these criteria, stillbirths were categorized as either antenatal or intrapartum according to the findings documented in the patient’s case note record by the attending clinician and/or midwife.

**Methodology and data collection**

The study was carried out after obtaining approval from the Committee on Ethics and Research of the institution. It was a retrospective review of the case records of all the stillbirths in the hospital over a 5-year period. Delivery registers in the labor ward, labor ward theater, postnatal ward, and in the accident and emergency unit were reviewed, and all cases of
stillbirth deliveries during the study period were identified. Their case records were subsequently retrieved from the medical records library for data collection. Women who had singleton pregnancies and complete data were included in the study, while those who had multiple births or incomplete data were excluded. Using a structured study pro forma, information on the women’s sociodemographic characteristics such as age, marital status, ethnicity, religion, educational status, and occupation were retrieved. Information on parity, booking status, medical history, previous history of stillbirth, and presence of antenatal and/or intrapartum complication(s) was also retrieved. Gestational age at delivery, mode of delivery, time of stillbirth, type of stillbirth, birth weight, and the sex of baby were extracted. Data on the total births during the period of study was obtained from the records.

**Data analysis**

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented in frequencies, proportions, and rates for categorical variables and in means, standard deviation, and median for numerical variables. Categorical variables were compared using the Pearson Chi-square test or Fisher’s exact test as appropriate. \( P < 0.05 \) was considered statistically significant.

**Results**

There was a total of 9283 births within the 5-year study period, with an average birth rate of 1857 births/year (range, 1039–2329). A total of 574 stillbirths occurred during the study period (range, 92–146/year); 203 were intrapartum stillbirths, while 371 were antenatal stillbirths. Out of the 574 cases of stillbirths, only 400 case notes (69.7%) with complete data were retrieved and used for further data analysis. The data was incomplete if the case note could not be retrieved or if a portion of the information required for data analysis was absent or missing in the case note.

Table 1 shows the sociodemographic characteristics of women with stillbirth deliveries. The mean age of the women was 34.7 ± 1.1 years (range, 15–44 years), and majority (265/400 [66.3%]) were within the age range of 26–35 years. Intrapartum stillbirth was significantly more common in women aged between 31 and 35 years, while antenatal stillbirth occurred more within the age group of 26–30 years (\( P = 0.006 \)). Majority of the stillbirth deliveries occurred in women who were of the Christian faith (312/400 [78.0%]) and belonged to the Ibo (183/400 [45.8%]) and Yoruba (183/400 [45.8%]) ethnic groups (\( P = 0.006 \) and 0.001, respectively). A great proportion of the women with stillbirths were married (394/400 [98.5%]), not gainfully employed (181/400 [45.3%]), and attained tertiary level of education (164/400 [41.0%]), but this was not statistically significant (\( P = 0.629, 0.228, \) and 0.573, respectively).

Figure 1 shows the annual trend in the stillbirth rates during the study period. The institutional total stillbirth rate was 61.8/1000 total births. The highest total stillbirth rate was observed in 2012 (88.5/1000 total births), while the lowest rate was seen in 2009 (43.6/1000 total births). The institutional intrapartum stillbirth and antenatal stillbirth rates were 21.9/1000 total births (range, 10.0–38.5/1000 total births) and 40.0/1000 total births (range, 33.1–50.0/1000 total births), respectively. The 5-year prevalence of stillbirth delivery was 6.2% (range, 4.4%–8.9%), with antenatal stillbirth accounting for majority (64.6%) of the stillbirth deliveries (range, 52.7%–77.2%).

Majority (7442/9283 [80.2%]) of the women that delivered during the study period were booked parturients, while 1841/9283 (19.8%) were not booked for ANC. The total stillbirth rate among the booked parturients was 12.8/1000 total births compared with that of 165.7/1000 total births among those that did not book their pregnancies. Similarly, the intrapartum and antenatal stillbirth rates were higher among the women who did not book for ANC (55.4 and 110.3/1000 total births, respectively) compared to their booked counterparts (3.6 and 9.1/1000 total births, respectively).

Table 2 shows that the prevalence of stillbirth was higher among those that did not book for ANC compared to their booked counterparts. More than three-quarter (305/400 [76.2%]) of the stillbirths were delivered by the women who did not have ANC in the hospital, and this group of women accounted for just one-fifth (1841/9283 [19.8%]) of the total births that occurred during the study period. Booking status did not significantly influence the type of stillbirth, though not being registered for ANC was associated with an increase in both intrapartum and antenatal stillbirth deliveries (\( P = 0.361 \)). Most of the women that did not book in the hospital had their ANC at private hospitals (136/305 [44.5%]) and primary health centers (46/305 [15.1%]) before their referral to our hospital. Only 90/305 (29.5%) of the women that did not book in the hospital had no form of ANC. The largest contributor of stillbirths among the women that did not have ANC were those that booked at private hospitals, followed by the women that did not receive any form of care (\( P = 0.022 \)).

Table 3 shows the maternal and fetal clinical characteristics of stillbirth delivery during the study period. The median parity was 1 (range, 0–8). Majority (116/400 [29.0%]) of the stillbirths occurred in nulliparous women, followed by those of para 1 and 2 (111/400 [27.8%] and 80/400 [20.0%, respectively), while grand multiparous women had the least prevalence of stillbirth (15/400 [3.8%]). In general, parous women (284/400 [71.0%]) had higher stillbirth deliveries compared with nulliparous women (116/400 [29.0%]) (\( P = 0.001 \)). However, the prevalence of antenatal stillbirth was higher among the nulliparous women, while intrapartum stillbirth occurred more commonly in the parous women (\( P = 0.001 \)). Antenatal stillbirth delivery was observed to be significantly associated with previous history of stillbirth delivery compared with
## Table 1: Sociodemographic characteristics of mothers with stillbirth deliveries

| Characteristics                          | Intrapartum stillbirth, n (%) | Antenatal stillbirth, n (%) | Total stillbirth, n (%) | P     |
|------------------------------------------|-------------------------------|-----------------------------|-------------------------|-------|
| Age group (years)                        |                               |                             |                         |       |
| ≤20                                      | 5 (3.9)                       | 11 (4.1)                    | 16 (4.0)                | 0.006 |
| 21-25                                    | 14 (10.9)                     | 37 (13.7)                   | 51 (12.7)               |       |
| 26-30                                    | 38 (29.4)                     | 101 (37.2)                  | 139 (34.8)              |       |
| 31-35                                    | 54 (41.6)                     | 72 (26.6)                   | 126 (31.5)              |       |
| 36-40                                    | 17 (13.2)                     | 44 (16.2)                   | 61 (15.2)               |       |
| >40                                      | 1 (0.8)                       | 6 (2.2)                     | 7 (1.8)                 |       |
| Total                                    | 129 (100.0)                   | 271 (100.0)                 | 400 (100.0)             |       |
| Marital status                           |                               |                             |                         |       |
| Married                                  | 127 (98.4)                    | 267 (98.5)                  | 394 (98.5)              | 0.629 |
| Single                                   | 2 (1.6)                       | 4 (1.5)                     | 6 (1.5)                 |       |
| Total                                    | 129 (100.0)                   | 271 (100.0)                 | 400 (100.0)             |       |
| Religion                                 |                               |                             |                         |       |
| Christianity                             | 90 (69.8)                     | 222 (81.9)                  | 312 (78.0)              | 0.006 |
| Islam                                    | 39 (30.2)                     | 49 (18.1)                   | 88 (22.0)               |       |
| Total                                    | 129 (100.0)                   | 271 (100.0)                 | 400 (100.0)             |       |
| Ethnicity                                |                               |                             |                         |       |
| Ibo                                      | 57 (44.2)                     | 126 (46.5)                  | 183 (45.8)              | 0.001 |
| Yoruba                                   | 60 (46.5)                     | 123 (45.4)                  | 183 (45.8)              |       |
| Hausa/Fulani                             | 12 (9.3)                      | 6 (2.2)                     | 18 (4.4)                | 0.40  |
| Others *                                 | 0 (0.0)                       | 16 (5.9)                    | 16 (4.0)                |       |
| Total                                    | 129 (100.0)                   | 271 (100.0)                 | 400 (100.0)             |       |
| Educational status                       |                               |                             |                         |       |
| Primary                                  | 24 (18.6)                     | 61 (22.5)                   | 85 (21.3)               | 0.573 |
| Secondary                                | 48 (37.2)                     | 103 (38.0)                  | 151 (37.7)              |       |
| Tertiary                                 | 57 (44.2)                     | 107 (39.5)                  | 164 (41.0)              |       |
| Total                                    | 129 (100.0)                   | 271 (100.0)                 | 400 (100.0)             |       |
| Occupation                               |                               |                             |                         |       |
| Skilled                                  | 21 (16.3)                     | 61 (22.5)                   | 82 (20.5)               | 0.228 |
| Semi-skilled                             | 39 (30.2)                     | 80 (29.5)                   | 119 (29.7)              |       |
| Unskilled                                | 9 (7.0)                       | 9 (3.3)                     | 18 (4.5)                |       |
| Unemployed ‡                             | 60 (46.5)                     | 121 (44.7)                  | 181 (45.3)              |       |
| Total                                    | 129 (100.0)                   | 271 (100.0)                 | 400 (100.0)             |       |

*Others include Ijaw, Itsekiri, Kalabari, and Tiv; ‡Includes house wives

Delivery of intrapartum stillbirth ($P = 0.001$). The most common mode of delivery was spontaneous vaginal delivery (SVD); however, the incidence of cesarean section was higher among women with intrapartum stillbirth (57/129 [44.1%]), while SVD was higher among women with antenatal stillbirth (142/271 [52.4%]) ($P = 0.024$). Most of the stillborn were preterm and were between the gestational ages of 28 and 36 weeks (209/400 [52.3%]). However, a significant proportion (176/400 [44.0%]) was delivered at term with majority (65/129 [50.4%]) of the intrapartum stillbirths occurring in term fetuses, while majority of the antepartum stillbirths was preterm (148/271 [54.6%]) ($P = 0.003$). The mean gestational age of stillbirth delivery was $35.5 \pm 1.2$ weeks (range, 28–44 weeks), and the mean birth weight was $2.93 \pm 1.04$ kg (range, 0.75–6.26 kg). More than half of the stillbirths (206/400 [51.5%]) had a birth weight of 2.5 kg or more ($P < 0.001$).

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Table 4 depicts the clinical risk factors associated with stillbirth delivery. Placental abruption ($P = 0.020$), IUGR ($P = 0.021$), obstructed labor ($P = 0.030$), placenta previa ($P = 0.024$), uterine rupture ($P = 0.004$), and shoulder dystocia ($P = 0.022$) were significantly associated with stillbirth delivery during the study period. Majority (344/400 [86.0%]) of the stillbirths had one or more identifiable clinical risk factors associated with it, while only 56/400 (14.0%) had no identifiable clinical risk factor. The presence of more than one clinical risk factor was observed in majority (269/400 [67.3%]) of the women with stillbirths in our study.

### Discussion

This study describes the trend and characteristics of stillbirth delivery in one of the largest tertiary hospitals in Nigeria, which coincidentally is the most populous country in Africa. The study found a relatively high stillbirth rate of...
61.8/1000 total births in the hospital, which is probably a reflection of the burden of stillbirths in Lagos State and in the country at large. A similarly high rate of stillbirth ranging from 22 to 180/1000 deliveries is seen in several studies in different parts of the country.\[7-13,15,16,20\] It is, therefore, not surprising that Nigeria has the second highest stillbirth rate in the world, and it is the major contributor to stillbirths in sub-Saharan Africa.\[3,4\] The stillbirth rate observed in the study is also comparable to the rate seen in other studies in African countries such as Ethiopia (80/1000 births),\[21\] Zimbabwe (56/1000 births),\[22\] South Africa (38.4/1000 births),\[23\] and Guinea-Bissau (99/1000 births).\[24\] This is in keeping with global statistics that suggest that Africa contributes significantly to the huge burden of stillbirths in the world.\[3\]

Compared to previous studies, there was an initial decline in the stillbirth rate in the hospital, from a 5-year prevalence rate of 69.7/1000 total births in 2000\[17\] to 51.7/1000 total births in 2006,\[25\] followed by an increase to the current 5-year prevalence rate of 61.8/1000 total births in 2013. This gives an 11.3% reduction in the stillbirth rate over a 13-year period and an estimated crude percentage reduction rate of 0.9% per year. This is probably as a result of inconsistent improvement in the obstetric health-care delivery services during the period.\[7,8,12,13,15\]

There was no appreciable decrease in the trend of stillbirths in the hospital over the current 5-year study period; rather, the annual stillbirth rate increased from the year 2009 to 2012 where it peaked at 88.5/1000 births and before it declined to 67.3/1000 births in 2013. This may be a reflection of poor obstetric health-care services in the environment, as more than three-quarter (76.2%) of all the stillbirths observed during the study period occurred in women who did not receive ANC in the hospital but who were referred from outside facilities to the hospital for management of their complications. This calls for the need for early recognition and referral of patients with complications of pregnancy and abnormal labor by peripheral health centers. There is an urgent need for collaboration and more concerted efforts by all stakeholders in the region, country, and Africa in general to tackle the huge burden of stillbirths and attain the stillbirth rate target of 12/1000 births or less set by the Every Newborn Action Plan for 2030.\[3\]

There was a progressive increase in the rate of antenatal stillbirth during the study period. Antenatal stillbirth accounted for approximately two-thirds of the total stillbirths that occurred throughout the 5-year period. This is congruent to findings observed in previous studies,\[17,26\] where it accounted for the largest proportion of stillbirths. This highlights the need to improve the quality of ANC services and management of high-risk pregnancies in our environment. The pattern of stillbirth varies from high incidence of antenatal or macerated stillbirth\[7,8,12,13,15\] to that of intrapartum or fresh stillbirth\[9-11,20\] in different parts of the country. This may be a reflection of the generally poor state of maternal health services in the country where majority of the women are either victims of poor quality of obstetric services during pregnancy and childbirth or underutilize the available health-care services. More than three-quarter of the stillborn were born to mothers that did not book in the hospital, who barely accounted for less than one-fifth of the total deliveries during the study period. This group accounted for an alarming stillbirth rate of 165.7/1000 total births compared to their booked counterpart, who made up to more than 80% of all the deliveries and a stillbirth rate of 23.8/1000 total births.

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of 12.8/1000 total births. These observations are similar to findings seen in several studies across the country.\[^{7-17,20,25}\] There is a need for a public health approach to determine the reasons why these pregnant women do not utilize the ANC services of public health facilities which probably has a relatively more efficient referral system to manage complications. This will allow for appropriate evidence-based public health interventions that will lead to increase uptake of public health services among these women. On the other hand, our study, like most other studies across the country, is a hospital-based study in a tertiary institution which serves as referral centers for high-risk cases from other peripheral hospitals. It is usual that women with high-risk pregnancies and complications are seen in these hospitals. The high rate of stillbirths observed in our study and other studies is probably a reflection of the complicated high-risk maternity cases referred to these hospitals. Timely and appropriate referral of these high-risk cases from the peripheral hospitals is usually lacking. Most of the cases are referred late at critical stages when fetal death is imminent or has already occurred. This may

### Table 3: Maternal and fetal clinical characteristics of stillbirth delivery

| Characteristics | Stillbirth | Total stillbirth, n (%) | P |
|-----------------|------------|-------------------------|---|
|                 | Intrapartum stillbirth, n (%) | Antenatal stillbirth, n (%) |
| Maternal characteristics | | | |
| Parity          | | | |
| 0               | 25 (19.4) | 91 (33.6) | 116 (29.0) | 0.001 |
| 1               | 41 (31.8) | 70 (25.8) | 111 (27.8) | |
| 2               | 26 (20.2) | 54 (19.9) | 80 (20.0) | |
| 3               | 16 (12.3) | 36 (13.3) | 52 (13.0) | |
| 4               | 9 (7.0)   | 17 (6.3)  | 26 (6.4)  | |
| ≥5              | 12 (9.3)  | 3 (1.1)   | 15 (3.8)  | |
| Total           | 129 (100.0) | 271 (100.0) | 400 (100.0) | |
| Previous history of stillbirths | | | 0.001 |
| 0               | 91 (70.5) | 165 (60.9) | 256 (64.0) | |
| 1               | 27 (20.9) | 50 (18.5) | 77 (19.2) | |
| 2               | 4 (3.1)   | 34 (12.5) | 38 (9.5)  | |
| ≥3              | 7 (5.5)   | 22 (8.1)  | 29 (7.3)  | |
| Total           | 129 (100.0) | 271 (100.0) | 400 (100.0) | |
| Mode of delivery | | | 0.024 |
| Spontaneous vaginal delivery | 64 (49.6) | 142 (52.4) | 206 (51.5) | |
| Assisted breech delivery | 6 (4.7) | 35 (12.9) | 41 (10.3) | |
| Instrumental delivery | 2 (1.6) | 4 (1.5) | 6 (1.5) | |
| Emergency cesarean section\[^{#}\] | 57 (44.1) | 90 (33.2) | 147 (36.7) | |
| Total           | 129 (100.0) | 271 (100.0) | 400 (100.0) | |
| Fetal sex       | | | 0.563 |
| Male            | 73 (56.6) | 145 (53.5) | 218 (54.5) | |
| Female          | 56 (43.4) | 126 (46.5) | 182 (45.5) | |
| Total           | 129 (100.0) | 271 (100.0) | 400 (100.0) | |
| Birth weight (kg) | | | <0.001 |
| <1.00           | 4 (3.1)   | 13 (4.8)  | 17 (4.3)  | |
| 1.00-1.49       | 16 (12.4) | 42 (15.5) | 58 (14.5) | |
| 1.50-1.99       | 25 (19.4) | 50 (18.5) | 75 (18.7) | |
| 2.00-2.49       | 8 (6.2)   | 36 (13.3) | 44 (11.0) | |
| 2.50-2.99       | 28 (21.7) | 36 (13.3) | 64 (16.0) | |
| 3.00-3.49       | 27 (20.9) | 48 (17.6) | 75 (18.7) | |
| 3.50-3.99       | 19 (14.7) | 27 (10.0) | 46 (11.5) | |
| ≥4.00           | 2 (1.6)   | 19 (7.0)  | 21 (5.3)  | |
| Total           | 129 (100.0) | 271 (100.0) | 400 (100.0) | |
| Gestational age (weeks) | | | 0.003 |
| 28-36           | 61 (47.3) | 148 (54.6) | 209 (52.3) | |
| 37-41           | 65 (50.4) | 111 (41.0) | 176 (44.0) | |
| ≥42             | 3 (2.3)   | 12 (4.4)  | 15 (3.7)  | |
| Total           | 129 (100.0) | 271 (100.0) | 400 (100.0) | |

\[^{#}\]Includes emergency laparotomy
Table 4: Distribution of clinical risk factors associated with stillbirth delivery

| *Risk factors associated with stillbirths | Intrapartum stillbirth (n=129), n (%) | Antenatal stillbirth (n=271), n (%) | Total stillbirth (n=400), n (%) | P |
|----------------------------------------|--------------------------------------|-------------------------------------|---------------------------------|---|
| No identifiable risk factor            | 3 (2.3)                              | 53 (19.6)                           | 56 (14.0)                       | <0.001 |
| History of previous stillbirth         | 38 (29.5)                            | 106 (39.1)                          | 144 (36.0)                      | 0.062 |
| Placental abruption                    | 47 (36.4)                            | 68 (25.1)                           | 115 (28.8)                      | 0.020 |
| Anemia                                 | 1 (0.8)                              | 8 (3.0)                             | 9 (2.3)                         | 0.170 |
| Hypertensive disorders in pregnancy*   | 45 (34.9)                            | 87 (32.1)                           | 132 (33.0)                      | 0.578 |
| Fetal congenital anomaly               | 2 (1.6)                              | 15 (5.5)                            | 17 (4.3)                        | 0.071 |
| Complications of malpresentation*      | 1 (0.8)                              | 2 (0.7)                             | 3 (0.8)                         | 0.913 |
| Cord prolapse                          | 3 (2.3)                              | 4 (1.5)                             | 7 (1.8)                         | 0.570 |
| Diabetes in pregnancy/GDM              | 8 (6.2)                              | 16 (5.9)                            | 24 (6.0)                        | 0.906 |
| IUGR                                   | 24 (18.6)                            | 28 (10.3)                           | 52 (13.0)                       | 0.021 |
| Prolonged labor                        | 17 (13.2)                            | 22 (8.1)                            | 39 (9.8)                        | 0.108 |
| Obstructed labor                       | 15 (11.6)                            | 15 (5.5)                            | 30 (7.5)                        | 0.030 |
| Placenta previa                        | 4 (3.1)                              | 1 (0.4)                             | 5 (1.3)                         | 0.024 |
| Prolonged pregnancy                    | 4 (3.1)                              | 8 (3.0)                             | 12 (3.0)                        | 0.957 |
| Prolonged rupture of membranes with chorioamnionitis | 17 (13.2) | 23 (8.5) | 40 (10.0) | 0.144 |
| Uterine rupture                        | 23 (17.8)                            | 22 (8.1)                            | 45 (11.3)                       | 0.004 |
| Rhesus isoinmunization                 | 0 (0.0)                              | 2 (0.7)                             | 2 (0.5)                         | 0.430 |
| HIV infection                          | 8 (6.2)                              | 13 (4.8)                            | 21 (5.3)                        | 0.558 |
| Shoulder dystocia                      | 3 (2.3)                              | 0 (0.0)                             | 3 (0.8)                         | 0.022 |
| Hemoglobinopathies*                    | 3 (2.3)                              | 7 (2.6)                             | 10 (2.5)                        | 0.858 |

*Multiple responses observed, *Includes chronic hypertension, gestational hypertension, preeclampsia, and eclampsia, *Includes breech delivery and hand prolapse, *Includes HbSS, HbSC, HbCC, and thalassemias. GDM=Gestational diabetes mellitus, IUGR=Intrauterine growth restriction

be due to several factors such as lack of adequate knowledge on the management of high-risk pregnancy by the attending physician, poor anticipation of pregnancy complication before they arise, lack of available skilled expertise to take appropriate decision on management, and referral of patients. Some patient-related factors may include illiteracy, poverty, lack of adequate social support, and poor awareness about the severity of the medical condition. There is the need for clinicians and midwives involved in the care of these pregnant women, to be well educated on early recognition and management of pregnancy-related conditions, including prompt referral when indicated. This is very important for health-care providers in a private hospital setting and primary health centers, where majority of these women with stillbirths were initially managed.

Reports from the recent National Demographic and Health Survey[27] showed that only 36% of the births in the country were delivered in a health facility, while about 38% of the deliveries were supervised by a skilled birth attendant. These statistics were derived from the women who had live births during the survey period and as a result may not be a true reflection of the actual rate of deliveries supervised by skilled birth attendants or that occur in the health facilities. This is probably one of the reasons why majority of the stillbirths in the population go unreported and unaccounted for, making the available statistics grossly inadequate and unreliable.

Our study found that majority of the mothers who had stillbirth deliveries were between the ages of 26–35 years. This is similar to findings in several studies in the country[6,7,10,15,25] and other countries.[22,23,28] Our study also found a relationship between maternal age and type of stillbirth. Antenatal stillbirth commonly occurred among mothers within the age range of 26–30 years, while intrapartum stillbirth occurred more frequently among women within the age bracket of 31–35 years. Older women have been shown to be at higher risk of having stillbirth delivery.[6,29,30] This is similar to findings in our study where the mean age at stillbirth delivery was approximately 35 years. This is probably due to a higher risk of medical and obstetric complications seen in older women compared to their younger counterparts. Educational status did not significantly affect the distribution of intrapartum and antenatal stillbirths among the women in the study, even though majority of the women who had stillbirth delivery had tertiary education. However, in terms of specific parity, nulliparous women had a higher incidence of stillbirths compared to other parity. The occurrence of antenatal stillbirth was also significantly higher among nulliparous women, while intrapartum stillbirth was significantly more common among parous women. Most of the stillbirths had a normal birth weight of at least 2.5 kg, with a mean birth weight of
2.93 ± 1.0 kg and mean gestational age of 35.5 ± 1.2 weeks. This is comparable to findings in different studies across Nigeria[6,11,16,17,25] and in other developing countries.[3,4,5] This is congruent with findings in developed countries where most of the stillbirths are preterm with low birth weight.[31,36] This may be a reflection of several factors such as poverty, malnutrition, and other social factors, in addition to the poor state of obstetric health-care delivery services in many low- and middle-income countries like Nigeria, where many fetuses that would have had good chances at survival are born dead due to antenatal or intrapartum conditions that are either preventable and/or amendable to early treatment.

Approximately nine out of every ten women who had a stillbirth delivery had at least one identifiable clinical risk factor associated with stillbirth delivery. The most common factors associated with stillbirth delivery in the study were previous history of stillbirth, Placental abruption, hypertensive disorders in pregnancy, IUGR, uterine rupture, and prolonged rupture of membranes with chorioamnionitis. This is comparable to findings in other Nigerian studies. [7,10,12,15] Studies have shown that hypertensive disorders in pregnancy, diabetes, HIV, syphilis, malaria, asphyxia, and infections resulting from prolonged or obstructed labor are common causes of stillbirth in developing countries.[6,35]

On the other hand, placental causes, placental abruption, congenital anomaly, and infections were common causes of stillbirths in developed nations.[6,36,37]

History of prior stillbirth was identified as a relatively common clinical risk factor. While it is correct to state that majority (64.0%) had no prior history of stillbirth, it is worrisome that more than one-third of women are experiencing a recurrent stillbirth. While stillbirth tends to be an invisible problem, recurrent stillbirth may be even more so, and this highlights the need for thorough surveillance during the ANC to detect and treat modifiable causes like prolonged pregnancy, even though some causes are not modifiable like placental abruption.

Majority of the women with stillbirth delivery in our study had more than one identifiable clinical risk factor. Among all these clinical risk factors, only placental abruption, IUGR, obstructed labor, placenta previa, uterine rupture, and shoulder dystocia were significantly associated with occurrence of either intrapartum or antenatal stillbirth. A high index of suspicion, early detection, and prompt management of these clinical conditions by the attending clinicians will go a long way in reducing the high incidence of stillbirth in our environment. However, the absence of any identifiable clinical risk factor was also observed to be significantly associated with stillbirth occurrence, especially antenatal stillbirth. Hence, there is a need for comprehensive evaluation and care of pregnant women during the period of ANC. This will allow for early detection and management of any medical or obstetric complications as they arise before they result in gross fetal morbidity or demise. Furthermore, women with previous history of stillbirth should be well counseled and educated on the possible cause(s) of the stillbirth, need for preconception care where indicated, early antenatal booking, and management of subsequent pregnancies by appropriate specialist(s) in a well-equipped tertiary hospital.

A limitation of the study is the presence of some incomplete data which did not allow for full analysis of all data. This is a limitation of a retrospective study, which the researchers had no control over. Another limitation is the fact that the study is hospital based and may not reflect the true burden of stillbirth in the population. However, the study has brought to the fore the persistently high rate of stillbirth, its associated risk factors, and the need for deliberate evidence-based interventions that will address the problem in our environment. Future multicenter, case–control studies are recommended in order to assess the true burden of the problem and its associated risk factors in the population.

**Conclusion**

The prevalence of stillbirth was high in the hospital during the study period. Majority of these deaths occurred during the antenatal period and were common in those women who did not receive ANC in the hospital. There is an urgent need to improve the quality of our obstetric health-care services and encourage early referral of complicated pregnancies and labor so as to prevent unnecessary fetal deaths due to preventable or manageable obstetric conditions.

**Acknowledgment**

The authors acknowledge all those who contributed directly or indirectly to the success of the study.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

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