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# A review of socio-demographic and clinical correlates of stillbirth at a teaching hospital with limited advanced fetal surveillance

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**Abstract**
**Background:** Stillbirth has a heavy burden of psychosocial and economic cost on women, families and nations. The study aimed at determining the rate of stillbirth and identifying the factors contributing to stillbirths in Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti over the study period.

**Materials and Methods:** The study was a retrospective descriptive one carried out at the Obstetric Unit of Obstetrics, Gynaecology and Perinatology Department of Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti from 1st of January, 2012 to 31st of December, 2016. The data obtained were processed using Statistical Package for Social Sciences (SPSS) computer software version 20. Descriptive statistics was utilized to analyze the data; continuous variables were summarized with mean and discrete variables were summarized using numbers and percentages.

**Results:** There were 532 stillbirths out of a total of 9,364 deliveries during the study period. This gave a stillbirth rate of 56.8/1000 total births. Macerated stillbirths accounted for 232 (43.6%) while fresh stillbirths accounted for 300 (56.4%) of the cases; with majority of the bereaved mothers (86.8%) being unbooked. Stillbirth rate was highest among women aged 15 to 19 years followed by those aged 40 years and above. Infections (chorioamnionitis), 69 (13.0%), obstructed labour. 59 (11.1.%) and antepartum haemorrhage 38 (7.1%) were the leading maternal causes of stillbirth. Prematurity 81 (15.2%) and multiple gestation 38 (7.1%) were the leading fetal causes. In 43 cases (8.1%), there were unexplained causes of stillbirth.

**Conclusion:** as stillbirth remains a largely preventable condition, more aggressive measures should be instituted to ensure comprehensive maternity care for pregnant women; with more emphasis on advanced fetal surveillance arm of antenatal/intrapartum care. Appropriate evidence based post-delivery management, especially in the areas of conduct of baby autopsy and handling of bereavement, should be given to the mothers of the deceased.

**Keywords:** Socio-demographic, clinical correlates, stillbirth

## Introduction
Stillbirth has a heavy burden of psychosocial and economic cost on women, families and nations. It affects women, families, caregivers and communities alike. Parents experience various forms of negative emotions and grief that often persist long after the death of their babies. At country level, high stillbirth rates add to perinatal mortality rate and most of the contributing factors to stillbirth are however preventable.

In order to allow for international comparison, World Health Organization (WHO) defines stillbirth as a baby born with no sign of life at or after 28 weeks' gestation [1]. In 2015, WHO estimated that 2.6 million stillbirths occurred annually globally, with more than 7,178 deaths a day [1, 2]; the appreciation of this huge burden partly informed the policy of WHO Maternal and Perinatal Death Surveillance Response (MPD-SR) which is essentially a way of achieving part of the Sustainable Development Goals (SDG) [3, 4, 5]. The majority of these deaths occur in developing countries especially in the rural areas where skilled birth attendants, in particular midwives and physicians, are not always available to offer essential care during child birth and obstetric emergencies. Ninety eight percent (98%) of the deaths occur in low and middle-income countries [1, 2]; with about 75% of these stillbirths occurring in south Asia and sub-Saharan Africa and 60% occurring in rural families from these areas. The stillbirth rate in Sub-Saharan Africa is approximately 10 times that of developed countries (29 vs. 3 per 1000 birth) [1, 6, 7].

It is estimated that only ten countries carry the burden of over 65% of total stillbirths in the world; Nigeria ranked in the second position with an estimated 313,700 stillbirths in 2015 [8]. Stillbirth rates vary from country to country and from the lowest rate of 2 per 1000 births in Finland and Singapore to as high rates as 47/1000 births in Pakistan and 42/1000 births in Nigeria. [1, 9, 10].

In most African countries, stillbirth rates are institution-based but most deliveries occur outside health institutions, thus, these rates do not reflect the actual incidence in the population [7]. However, in developed countries, almost all the women deliver in health institutions hence, the rates reflect closely the actual incidence of stillbirths in the population [11, 12].

About half of all stillbirths occur during labour and birth. Intrapartum stillbirths are usually the result of fetal distress and/ or obstructed labour and often reflect poor access or poor quality of clinical care during labour and at delivery [1]. Globally, two-thirds to three-quarters of stillbirths may occur before labour begins [13, 14], which are often associated with insults that occur in-utero during the antenatal period. These stillbirths are due to a variety of factors arising from severe maternal, placental or fetal abnormalities including pre-eclampsia, abruption placentae, infections, umbilical cord complications and environmental hazards which may affect maternal health during pregnancy and fetal development/survival. Advanced maternal age, high parity and obesity are also widely recognized risk factors for antepartum stillbirth [14, 15]. Some stillbirths are however due to causes that cannot be readily explained [15].

Stillbirths contribute approximately 50% of total perinatal mortalities [7]. The rate of stillbirths has declined over the past five decades and also the causes have changed appreciably in most developed countries [12]. Unfortunately, studies have shown that the perinatal mortality rates, and by extension stillbirth rates, in most developing countries including Nigeria have remained high or even rising [1, 6, 16].

The study aimed at determining the rate of stillbirth and identifying the factors contributing to stillbirths in Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti over the study period. As there is paucity data on stillbirth in the environment of study, the study will go a long way to add to the existing body of knowledge on the burden of stillbirth in the environment and strategies for its prevention.

**Materials and Methods**
The study was a retrospective descriptive one carried out at the Obstetric Unit of Obstetrics, Gynaecology and Perinatology Department of Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti from 1st of January, 2012 to 31st of December, 2016. Data were obtained from the Health Information Management (HIM) Unit of the Obstetrics, Gynaecology and Perinatolgy Department. The study population comprised all documented cases of stillbirth during the study period. The case files of all patients with the diagnosis of stillbirth during the period were identified and retrieved by personnel of the HIM. Ethical approval for the retrieval and use of case notes was obtained from Research and Ethics Committee of Ekiti State University Teaching Hospital. All information

about history, physical findings and results obtained from patients' files was kept strictly confidential. Each of the files was strictly examined to extract information about patient's age, parity, clinical presentation and complications of stillbirth. All the findings were recorded in a proforma designed specifically for the study.

The data obtained were processed using Statistical Package for Social Sciences (SPSS) computer software version 20. Descriptive statistics was utilized to analyze the data; continuous variables were summarized with mean and discrete variables were summarized using numbers and percentages.

**Results**
During the period of study, there were a total of 9,364 deliveries and 532 cases of stillbirths giving a stillbirth rate of 56.8 per 1,000 total deliveries. There were more fresh stillbirths, 300 (56.4%) than macerated stillbirths, 232 (43.6%).

Table 1 below shows the socio-demographic characteristics of the women with stillbirths. The mean age of the women was 29.5 years. Stillbirth rate was highest among women aged 15-19 years, 186 (35.0%), followed by those aged 40 years and above, 159 (29.9%). Women with no formal education had the highest rate of stillbirth, 236 (44.4%).

Primiparity, 235 (44.2%) and grandmultiparity, 105 (19.7%) were associated with higher still birth rates. Unbooked women accounted for majority of the women with stillbirths, 462 (86.8%) while the booked ones accounted for only, 70 (13.2%) of the total number of the cases.

Table 2 shows the influence of fetal weight and mode of delivery on stillbirth. Babies with birth weight within normal range (2.5-3.9kg) accounted for 226 (42.5%) of the cases thus giving the highest stillbirth rate of 24.1 per 1000 births. The stillbirth rates of low birth weight and macrosomic babies were 20.6/1000 births and 12.1/1000 births respectively.

Babies delivered by spontaneous vaginal deliveries accounted for 246 (46.2%) of the stillbirths with a stillbirth rate of 26.3 per 1000 deliveries; which was slightly higher than abdominal deliveries of stillbirths, 227 (42.7%) with a stillbirth rate of 24.2 per 1000 deliveries. On the other hand, stillbirth rates of babies who had assisted vaginal breech and instrumental vaginal deliveries were 1.6 and 2.0 per 1000 deliveries respectively; while the stillbirth rate among babies who had twin vaginal delivery was 2.7/1000 births.

Table 3 reveals the other identified associated obstetric and medical conditions for stillbirths. Prematurity was the commonest fetal factor associated with stillbirths, accounting for 81(15.2%) of the cases with a stillbirth rate of 8.7/1000 births, followed by infections (chorioamnionitis), 69(13.%), with a stillbirth rate of 7.4/1000 births. These were closely followed by obstructed labour which accounted for 59 (11.1%) of the cases with a stillbirth rate of 6.3/1000 births. Other maternal factors were hypertensive diseases in pregnancy 36 (6.8%), antepartum haemorrhage 38 (7.1%), diabetes mellitus in pregnancy 37 (7.0%) and uterine rupture 40 (7.5%). Others included gross congenital anomalies 16 (3.0%), multiple gestations 38 (7.1%), fetal distress, 25 (4.7%), shoulder dystocia 11 (2.1%) and cord prolapse 39 (7.3%). 8.1% of cases could not be explained.

**Table 1:** Socio-demographic characteristics of women with stillbirths

| Parameters | Stillbirths | | | Percentage (%) |
|---|---|---|---|---|
| Age range (years) | FSB | MSB | Total | |
| 15-19 | 84 | 102 | 186 | 35.0 |
| 20-24 | 14 | 7 | 21 | 3.9 |
| 25-29 | 20 | 25 | 45 | 8.5 |

| | | | | |
|---|---|---|---|---|
| 30-34 | 32 | 24 | 56 | 10.5 |
| 35-39 | 35 | 30 | 65 | 12.2 |
| ≥ 40 | 115 | 44 | 159 | 29.9 |
| **Total** | **300** | **232** | **532** | **100** |
| **level of education** | | | | |
| Primary | 61 | 70 | 131 | 24.6 |
| Secondary | 73 | 37 | 110 | 20.7 |
| Tertiary | 8 | 14 | 22 | 4.1 |
| no formal education | 135 | 101 | 236 | 44.4 |
| not stated | 23 | 10 | 33 | 6.2 |
| **Total** | **300** | **232** | **532** | **100** |
| **Parity** | | | | |
| 1 | 101 | 134 | 235 | 44.2 |
| 2 | 40 | 13 | 53 | 10.0 |
| 3 | 42 | 31 | 73 | 13.7 |
| 4 | 37 | 29 | 66 | 12.4 |
| ≥5 | 80 | 25 | 105 | 19.7 |
| **Total** | **300** | **232** | **532** | **100** |
| **booking status** | | | | |
| Booked | 44 | 26 | 70 | 13.2 |
| Unbooked | 256 | 206 | 462 | 86.8 |
| **Total** | **300** | **232** | **532** | **100** |

FSB: Fresh stillbirth. MSB: Macerated stillbirth.

**Table 2:** Influence of fetal weight and mode of delivery on stillbirth

| Factors | Stillbirths | | | (%) | Total births | BR/1000 |
|---|---|---|---|---|---|---|
| | **FSB** | **MSB** | **Total** | | | |
| **Birth weight (kg)** | | | | | | |
| < 2.5 | 89 | 104 | 193 | 36.3 | 2341 | 20.6 |
| 2.5-3.9 | 172 | 54 | 226 | 42.5 | 5617 | 24.1 |
| ≥ 4 | 39 | 74 | 113 | 21.2 | 1406 | 12.1 |
| **Total** | **300** | **232** | **532** | **100** | **9364** | **56.8** |
| **Mode of delivery** | | | | | | |
| SVD | 83 | 163 | 246 | 46.2 | 5431 | 26.3 |
| C/S | 175 | 52 | 227 | 42.7 | 3277 | 24.2 |
| Assisted Breech Delivery | 11 | 4 | 15 | 2.8 | 152 | 1.6 |
| Instrumental Vaginal Delivery | 12 | 7 | 19 | 3.6 | 126 | 2.0 |
| Twin Delivery (Vaginal) | 19 | 6 | 25 | 4.7 | 378 | 2.7 |
| **Total** | **300** | **232** | **532** | **100** | **9364** | **56.8** |

SBR: Stillbirth rate

SVD: Spontaneous vaginal delivery

C/S: Caesarean section (emergencies/elective)

**Table 3:** Other identified associated obstetric and medical conditions for stillbirth

| Factors | No. of stillbirths | | | (%) | SBR/ 1000 |
|---|---|---|---|---|---|
| | **FSB** | **MSB** | **Total** | | |
| Hypertensive diseases | 22 | 14 | 36 | 6.8 | 3.84 |
| Infections | 21 | 48 | 69 | 13.0 | 7.37 |
| APH | 25 | 13 | 38 | 7.1 | 4.06 |
| Obstructed labour | 20 | 39 | 59 | 11.1 | 6.30 |
| DM | 17 | 20 | 37 | 7.0 | 3.95 |
| Uterine rupture | 35 | 5 | 40 | 7.5 | 4.27 |
| Congenital anomalies | 6 | 10 | 16 | 3.0 | 1.71 |
| Multiple gestations | 28 | 10 | 38 | 7.1 | 4.06 |
| Fetal distress | 25 | 0 | 25 | 4.7 | 2.67 |
| Prematurity | 45 | 36 | 81 | 15.2 | 8.65 |
| Cord prolapse | 33 | 6 | 39 | 7.3 | 4.16 |
| Shoulder dystocia | 8 | 3 | 11 | 2.1 | 1.17 |
| Unexplained | 15 | 28 | 43 | 8.1 | 4.59 |
| **Total** | **300** | **232** | **532** | **100** | **56.80** |

APH: Antepartum haemorrhage

DM: Diabetes mellitus

Infections: Includes mainly chorioamnionitis & HIV infections.

**Discussion**

The crude stillbirth rate recorded in this study was 56.8 per 1000 total births. This is much higher than those of developed countries such as the UK, 2.9/1000 births, Germany 2.4/1000 and Sweden 2.8/1000 [13]. The rate is also higher than those of other African countries such as Ghana 24/1000[9], Namibia

15/1000 and Senegal 34/1000 [17]. It is also higher than the average for Sub-Saharan Africa, 29/1000 births and for Nigeria of 42/1000 births [1]. Compared to other centers in Nigeria, this rate is higher than the 22, 32 and 41/1000 births from Maiduguri [18], Ilorin [16] and Uyo [19] respectively. The figure is significantly lower than earlier values of 170 per 1000 in Birnin Kudu, northwest Nigeria [6] and 74 per 1000 births in Enugu, Southeastern Nigeria [20]. This relatively high stillbirth rate is probably due to the fact that EKSUTH, Ado-Ekiti is a major referral centre around Ekiti environs with high influx of high-risk and complicated obstetric cases and it is situated in basically agrarian community where there is a poor health seeking attitude among the pregnant women, poor transportation system, poor usage of antenatal care and delay in presentation when complications arise. Delays in seeking and/or accessing care were major contributing factors to stillbirth in the earlier study conducted by Awoleke and Adanikin at the same centre of study [21].

The larger proportions (56.4%) of the stillbirths were fresh stillbirths. Similar observations were noted in earlier related studies [8, 9, 12, 22, 23]; thus supporting the fact that most of the events that led to stillbirth occur during labour. This also reflects sustained sub-optimal level of intrapartum care in the sub-region. However, the achieved low level of intrapartum stillbirths in high-income countries confirms that intrapartum stillbirths are largely preventable with a quality care which includes prompt recognition and management of intrapartum complications [24]. The percentage of macerated stillbirths was also significant (43.6%). This suggests pre-existing antenatal insults to the developing fetus. Therefore, the need for timely screening and management of chronic conditions and infections is crucial.

The effects of maternal age and parity were most pronounced on mothers at extremes of age, 15-19 years and ≥ 40 years, who were mostly primiparas and grandmultiparas respectively. This suggests the possibility that obstetric complications such as pre-eclampsia/eclampsia, prematurity and obstructed labour which are common in primigravidas and maternal chronic diseases to which elderly women and by extension grandmultiparas are prone to, may play significant roles. This finding is also in consonance with the result of the study of Olofinbiyi et al. also conducted at the same institution [25]. It is documented that grand-multiparous women rarely access prenatal care because they feel overly confident of their past experience of pregnancy and, therefore, assume that no untoward event will occur [21, 26].

Mothers with no or low formal (primary) education were more likely to deliver stillbirth babies (44.4% and 24.6% respectively) when compared to those with tertiary education (04.1%). This reducing trend of stillbirths with level of education was also found in a study done in Maiduguri [18]. From the study, unbooked women who did not receive antenatal care had higher proportion of stillbirths 462 (86.3%). This agrees with the fact that non-use of antenatal care facilities is a major risk factor for stillbirth [9, 12, 22, 27, 28]. WHO recommends using antenatal care as a strategy for improved obstetric care [1, 28].

This study shows that babies weighing less than 2.5kg had stillbirth rate of 20.6/1000 births while those weighing 4.0kg and above had stillbirth rate of 12.1/1000 births. Normal weight babies accounted for 42.5% of the cases and with a stillbirth rate of 24.1/1000 births. The highest rate of stillbirths noted in normal weight babies may be because of the fact that this group had the highest number of deliveries.

In this study, stillbirth rates from spontaneous vaginal deliveries (26.3/1000 births) was slightly higher than that of abdominal deliveries (24.2/1000 births). This rate from caesarean section is lower than the rates reported from Mokwa, Niger state (228.1/1000), Kaduna (162.8/1000) and Ile-Ife (61.4/1000)[16]. The proportion of stillbirths among fetuses delivered via assisted vaginal breech and instrumental vaginal deliveries were 2.8% and 3.6% respectively. These values are lower than that obtained in a study at University of Maiduguri Teaching Hospital, Maiduguri which were 11.6% and 14.4% for assisted breech and instrumental vaginal deliveries respectively [18]. The stillbirth rates obtained for assisted vaginal breech (1.6/1000) and vaginal twin (2.7/1000) deliveries are lower compared to those obtained by other researchers [11, 16]. The commonest factor associated with high rate of stillbirths in this study was prematurity followed by infections (chorioamnionitis) and obstructed labour. This study was partly limited by the fact that sixteen (16) of the case files could not be retrieved. It is also worth noting that none of the affected parturients had a documented result of baby autopsy; even those that were offered declined for myriads of reasons of which socio-cultural ranked highest. There existed a possibility of a combination of causes/pathologies contributing to fetal demise; the design of this study made it impossible to explore this area.

In conclusion, as stillbirth remains a largely preventable condition, more aggressive measures should be instituted to ensure comprehensive maternity care for pregnant women; with more emphasis on advanced fetal surveillance arm of antenatal/intrapartum care. The fact that teenage pregnancy had the highest rate of stillbirth emphasizes the urgent need for prevention of teenage pregnancy primarily through giving appropriate sex education in schools/communities and health education on the dangers in teenage pregnancy; coupled with making family planning/emergency contraception accessible, affordable and socially acceptable for them. Full physical, psychological and financial support should be given to pregnant teenagers and most importantly, education of the girl child is key. In addition, appropriate evidence based post-delivery management, especially in the areas of conduct of autopsy and handling of bereavement, should be given to the mothers of the deceased. There should be institutional policy and actionable plan translated into practice not only on baby autopsy but also on Maternal and Perinatal Death Surveillance Response (MPD-SR) as this will help in further diagnosis, prognosis, prevention of stillbirth and future management of the mother/the general population.

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