

Stillbirths at the Jos University Teaching Hospital: Incidence, risk, and etiological factors

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Abstract

Introduction: Death of a fetus in-utero or intrapartum is both devastating to the couple and of concern to the clinician. Identifying the etiological and risk factors of stillbirths will help in the prevention or reduction of its occurrence.

Materials and Methods: This was a prospective observational study of all stillbirths over a 16-month period (from January 2006 to April 2007) at the maternity Unit of Jos University Teaching Hospital. Information on maternal socio-demographic details, history of antenatal complications of the index pregnancy, and maternal medical history were obtained by personal interview of all mothers who had a stillbirth. For each stillbirth, information was obtained on the type of stillbirth, estimated gestational age at delivery, sex of baby, and the mode of delivery. These characteristics were subjected to analysis. Etiological causes were assessed using the clinico-pathological approach advocated by Baird-Pattinson.

Results: There were a total of 3,904 deliveries with 158 stillbirths during the study period, giving a stillbirth rate of 40.5 per 1,000 total births. There were 84 (53.2%) macerated and 74 (46.8%) fresh stillbirths. Of the 3,904 total deliveries, there were 2,022 (51.8%) males and 1,882 (48.2%) females. There were 84 male and 74 female stillbirths, giving stillbirth rates of 41.5 per 1,000 and 39.3 per 1,000 total deliveries for male and female deliveries, respectively, which was not statistically significant ($X^2 = 4.6865$, $P < 0.3564$). The major causes were abruptio placentae (17.7%), hypertensive disorders of pregnancy (12.7%) and maternal HIV infection 10.7% of stillbirths. Other causes were cord accidents (7.0%), placenta praevia (3.8%), and anemia in pregnancy (3.8%). Forty-six (29.1%) of the stillbirths were unexplained. The main risk factors identified were lack of antenatal care, poor antenatal clinic attendance, home delivery, and late presentation of complicated labor to the facility.

Conclusion: The stillbirth rate in our centre is high, major causes being abruptio placenta and maternal medical conditions. Maternal HIV infection has emerged as a major contributor to stillbirths in this study.

Key words: Stillbirth, incidence, risks, aetiological factors, Jos

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Introduction

The phenomenon of stillbirth has been known to mankind from time immemorial.^[1] A stillbirth refers to the delivery of a fetus, after the age of viability, showing no signs of life such as breathing, heartbeats, pulsation of the umbilical cord or definite movements of voluntary muscles. The threshold for defining a stillborn in our environment is 28 weeks of gestation and above as opposed to the 20 weeks of gestation

adopted by the World Health Organization and the United States National Center for Health Statistics.^[2]

A stillbirth is a devastating experience for the couple and of concern to the clinician. In developed countries, about one third (1/3) have been shown to be of unexplained origin; in developing countries, stillbirths are a major contributor

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of over 50% of perinatal mortality.^[3,4] Some authors have reported that the incidence of stillbirths in developing countries is about 10 times than that in the developed world.^[5,6] The stillbirth rate, as the perinatal mortality rate, is an important indicator of the quality of antenatal care and obstetric care during labor and delivery.^[7-9] Knowledge of the causes and risk factors of this unfortunate problem will help in designing preventive measures to reduce its incidence.^[10] Understanding the distribution of fresh and macerated stillbirths may help us identify the quality of antenatal and obstetric care available to pregnant women and prioritize 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 labor and delivery.^[8,11,12]

The objective of the study was therefore to determine the incidence and types of stillbirths, associated etiological and risk factors and propose recommendations for reducing and/or preventing its occurrence.

Materials and Methods

This was a prospective observational study of all stillbirths delivered at the Maternity Unit of the Jos University Teaching Hospital (JUTH), Jos between January 2006 and April 2007. The Labor Ward registers were scrutinized on daily basis. The mothers who had stillbirths were personally interviewed, using a pre-designed and pre-tested proforma, for maternal socio-demographic details, history of index pregnancy, and maternal medical history. For each stillbirth, information was obtained on the type of stillbirth, estimated gestational age, sex of stillborn, and mode of delivery. In view of the parents' refusal to allow the dead babies to be subjected to autopsy and lack of facilities for some laboratory tests needed for detailed evaluation of the causes of fetal demise, the clinico-pathological system designed by Baird – Pattinson^[13] was used to assign primary obstetric causes of fetal death. Data was entered into Epi-Info 2002^R statistical software and analyzed. Observed differences were subjected to Chi-square test and the level of significance set at $P < 0.05$.

Results

The total number of births during the 16-month study period was 3,904, with 158 stillbirths, giving a stillbirth rate of 40.5 per 1,000 total births. Seventy four (46.8%) of the stillbirths were fresh, while 84 (53.2%) were macerated stillbirths. Of the 3,904 total deliveries, 2,022 (51.8%) were male babies and 1,882 (48.2%) were female babies. There were 84 male stillbirths and 74 female stillbirths, giving stillbirth rates of 41.5 per 1,000 for males and 39.3 per 1,000 for female babies. This was not statistically significant, ($X^2 = 4.686; P = 0.3564$).

Majority of the mothers (96.8%) were married; 65.8% were unemployed housewives and 80.4% of them were of secondary education and below, Table 1.

Table 2 shows that the stillbirth rate was 81.6 per 1,000 births among mothers below 20 years of age, followed by those 40 years and above (73.3 per 1,000 births). The lowest stillbirth rate of 32.1 per 1,000 births was found among mothers in the age group 20–29 years. This trend across the different maternal age groups was found to be statistically significant ($X^2 = 29.468; P < 0.0003$).

Mothers of parity of 4 and above had a stillbirth rate of 77.8 per 1,000 total births; those of parity 3 had a rate of 40.6 per 1,000 births; while a rate of 16.2 per 1,000 births was found among those with parity of 2 ($X^2 = 48.286; P < 0.0000$).

The stillbirth rate tended to decrease with increasing educational status, with a rate of 97.6 per 1,000 births among mothers with no formal education as opposed to a rate of 23.7 per 1,000 births among those who had tertiary

Table 1: Socio-demographic characteristics of mothers with stillbirths

Characteristic	Frequency	Percentage
Age (in years)		
< 20	4	2.5
20 – 29	77	48.8
30 – 39	66	41.9
≥ 40	11	7.0
Ethnicity of mothers		
Hausa/Fulani	58	36.7
Igbo	10	6.3
Yoruba	10	6.3
Others	80	50.6
Educational status		
No formal education	20	12.7
Primary	50	31.6
Secondary	57	36.1
Tertiary	31	19.6
Religion of mothers		
Christianity	88	55.7
Islam	70	44.3
Occupation of mothers		
House wife	104	65.8
Business woman	19	12.0
Civil servant	14	8.9
Seamstress	8	5.1
Teacher	8	5.1
Hair dresser	3	1.9
Farmer	2	1.3
Marital status of mothers		
Married	153	96.8
Separated	2	1.3
Single	3	1.9

Table 2: Distribution of stillbirths according to maternal age, parity educational status, booking status, gestational age at delivery, and mode of delivery

	No. of stillbirths	No. of deliveries	Stillbirth rate (Per 1,000 deliveries)
Maternal age in years			
< 20	4	49	81.6
20-29	77	2,398	32.1
30-39	66	1,307	50.5
40	11	150	73.3
X ² = 29.468; P < 0.0003			
Maternal parity			
1	17	606	28.1
2	20	1,236	16.2
3	43	1060	40.6
≥ 4	78	1002	77.8
X ² = 48.286 P < 0.0000			
Educational status			
No formal education	20	205	97.6
Primary education	50	598	83.6
Secondary education	57	1,802	31.6
Tertiary education	31	1,299	23.7
X ² = 54.286; P < 0.0000			
Booking status			
Booked in JUTH	93	2,404	38.7
Booked elsewhere	45	1,107	40.7
Un-booked	20	393	50.9
X ² = 40.628; P < 0.0003			
Gestational age in weeks at delivery			
28 – 36	94	602	153.0
37 – 42	62	3,256	19.0
42 and above	2	46	43.5
X ² = 42.684; P < 0.0000			
Mode of delivery			
Spontaneous vaginal delivery	110	2,832	38.8
Caesarean section	30	870	34.5
Assisted vaginal delivery	9	92	97.8
Instrumental delivery	5	70	71.4
Laparotomy	4	40	100.0
X ² = 34.476; P < 0.0015			

education (X² = 54.2863; P = 0.0000)

Patients who booked in JUTH had a stillbirth rate of 38.7 per 1,000 births; those booked elsewhere had a rate of 40.7 per 1,000 births; and mothers who had no antenatal care at all had a rate of 50.9 per 1000 births (X² = 40.628; P < 0.0003).

The stillbirth rates among mothers that had preterm delivery (28–36 weeks of gestation), and post term delivery (>42 weeks of gestation) were 153 per 1,000 and 43.5 per 1,000 births, respectively. The lowest stillbirth rate of 19 per 1,000 births was seen among mothers that delivered at term (37–42 weeks of gestation) (X² = 42.684; P = 0.0000).

Of the 3,904 total deliveries, 2,785 were mothers of the Christian faith and 1,119 were those of the Islamic faith. The former accounted for 88 stillbirths and the latter for 70 stillbirths, giving stillbirth rates of 31.6 per 1,000 and 62.6 per 1,000 births, respectively. This difference was statistically significant (X² = 26.564; P = 0.0000).

Caesarean section was associated with the lowest stillbirth rate of 34.5 per 1,000 births, followed by spontaneous vaginal delivery with a rate of 38.8 per 1,000 births. Instrumental delivery, assisted breech delivery and laparotomy for ruptured uterus had higher stillbirth rates of 71.4 per 1,000, 97.8 per 1,000, and 100 per 1,000 births, respectively.

The common causes of stillbirth in this study were abruptio

placenta (17.7%); hypertensive disorders of pregnancy (12.7%); cord accidents (7.0%), maternal medical conditions such as HIV (10.7%), anemia in pregnancy (3.8%), diabetes mellitus (1.9%), and sickle cell anemia (1.3%). The cause of stillbirth could not be ascertained in up to 29.1% of cases.

Discussion

The stillbirth rate of 40.5 per 1,000 births in this study was lower than values quoted by several authors from similar studies in other tertiary health facilities in sub-Saharan Africa. Series from Zimbabwe and Nigeria reported stillbirth rates of 56 and 52.7 per 1,000 births, respectively.^[3,10,14] This might be a reflection of improved obstetric care in our centre. However, this rate was much higher in comparison to rates reported from developed countries, where mothers had easy access to quality obstetric care. Stillbirth rates of Sweden and the USA range from 5.8 to 6.6 per 1,000 births.^[5]

The proportion of macerated stillbirths (53.2%) was much higher than in more developed countries, suggesting the presence of undetected insults to the developing fetus during the antenatal period. The high proportion of fresh stillbirths underscores the need for improved obstetric care and availability of emergency care during the labor and delivery period.^[3]

The mothers at the extremes of reproduction age had the highest stillbirth rates: 81.6 per 1,000 births among the age group below 20 years and 73.3 per 1,000 births among the age group 40 years and above. High parity (especially of 4 and above) was also associated with increasing stillbirths. These agreed with studies reported by several authors.^[10-12] This may be attributed to the observation that advanced maternal age (AMA) is possibly associated with the occurrence of chronic medical conditions, which may compromise favorable fetal outcomes.^[15-18] The high stillbirth rate in mothers below 20 years may be attributed to the high frequency of pre-eclampsia and abruptio placenta seen in this group.

The results show that higher educational attainment was associated with low stillbirth rate in comparison to low education status, which had the highest rate. The booking status was a direct correlate of educational attainment. Those with tertiary school education had the lowest stillbirth rate since they were more likely to book for and access available good quality antenatal care services. This is because education reduces the twin problems of low socioeconomic status and ignorance amongst our women, thereby increasing their bargaining power and their awareness. Studies have shown that lack of prenatal care was strongly and consistently associated with increased risk

of stillbirth.^[11,19-21] The statistically significant difference in stillbirth rates between patients of the Christian faith and those of the Islamic faith found in this study may be a reflection of the higher proportion of educated women amongst the former, in addition to greater freedom and right to visit hospital by women of the Christian faith.

The study shows that the stillbirth rate declines with increasing gestational age from 28 weeks until 42 weeks of gestation, followed by a sudden rise at gestational ages above 42 weeks. Such a trend has been reported by other workers.^[22,23] Caesarean section and spontaneous vaginal delivery were associated with the lowest stillbirth rate compared to others modes of delivery such as instrumental delivery, assisted breech delivery and laparotomy (for ruptured uterus). A series from Zimbabwe has reported the protective effect of caesarean section against the occurrence of stillbirth in the study population.^[3]

Abruptio placenta was the most common cause of stillbirths in this study. This was in agreement with the findings of several other authors.^[10,24,25] Other causes include hypertensive disorders of pregnancy, cord accidents and maternal medical conditions, among which maternal HIV infection emerged as a major contributor.

Nearly 30% (29.1%) of the stillbirths had no identifiable cause. This compared favorably with the findings of previous authors, even in centers using more sophisticated laboratory facilities for the identification of the causes of stillbirth.^[10,26,27] The risk factors for stillbirth identified in this study were lack of antenatal care, poor antenatal clinic attendance, home delivery, and late presentation of difficult and complicated labor to our facility.

The incidence of stillbirths in our setting may be reduced to the barest minimum by educating women on the benefits of antenatal care; by improving the lot of our women folk through formal education and socioeconomic empowerment; by improving the attitude of health care providers to their clients, which would promote women's confidence in accessing available obstetric services during the antenatal and intrapartum periods. Such measures will lead to the reduction in the incidence of vertical transmission of Human Immunodeficiency Virus (HIV), through Prevention of Mother to Child Transmission (PMTCT) interventions using antenatal care as an entry point, decrease in hypertension and in turn reduced abruptio placenta incidence. A case may also be made for ensuring folic acid use before and throughout pregnancy to decrease abruptio placenta incidence. The governments at all levels should implement policies that will ensure equitable distribution of health facilities, good roads, communication networks, and power supply.

In conclusion, stillbirth rate is still high in our environment

and mainly attributed to antepartum hemorrhage (placental abruption), hypertensive disorders of pregnancy, and medical conditions of the mothers, of which maternal HIV infection has emerged as a major contributor to stillbirths.

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