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A 5-year cross-sectional study of stillbirths in JOS university teaching hospital, JOS Nigeria

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Abstract

Context: Nigeria is a major contributor to the estimated stillbirth rate of 32.2 per 1000 deliveries in sub-Saharan Africa.

Objective: To study the incidence and contributory factors to stillbirths in Jos University Teaching Hospital (JUTH).

Method: A cross sectional study of stillbirths in JUTH from 1st of January, 2003 to 31st December, 2007 using delivery records and patient case notes.

Results: During the study period there were 13799 deliveries and 598 stillbirths giving an incidence of 44/1000 births. Macerated stillbirths accounted for 40.1% while fresh stillbirth account for 59.9% of these deaths. Case files of 516 (86.3%) were retrieved. Many of the women 86(16.7%) were either unbooked or had their antenatal care outside JUTH 237(45.9%). Stillbirth rates were higher in extremes of ages, <20 years and women aged 45 years and above and lowest in women aged 20 to 24 years. Stillbirth rate was also highest in uneducated and housewives that were not gainfully employed and farmers. Stillbirths were commoner in extremes of parity, 36.7/1000 births in para 1 and 56.9/1000 births in para 5 and above. Women that had assisted breech deliveries and forceps deliveries have the highest stillbirth rates of 113.0 and 162.3 per 1000 births respectively. Common causes of stillbirth were abruptio placentae (24.2%), hypertensive diseases (22.3%) and infections (10.4%). In 13.6% of the cases, there were no known obvious causes of stillbirth.

Conclusion: Stillbirth is high in our center as is obtain from other centers in Nigeria. The causes are from preventable factors. Therefore urgent measures are needed to address these high fetal wastages.

Keywords: 5-year cross-sectional study, stillbirths, JOS University, teaching hospital

Introduction

Stillbirth is the delivery of any fetus with no sign of life after the age of viability ^[1]. In Nigeria and most other developing countries, the age of viability is from 28 weeks of gestation or any fetus weighing 1000gm and above ^[2-4]. Stillbirth is of concern both to the parents and the obstetricians and the rate can be used to assess the quality of obstetric and antenatal care (ANC). The incidence of stillbirths in most developing countries are about ten-fold that of the developed countries ^[1, 2]. The world's stillbirth rate is 24/1000 births with rates of 32, 27, 8 and 3 per 1000 births for Africa, Asia, Europe and Northern America respectively ^[3-7]. The rate for more developed region of the world is 6/1000 births and 26 per 1000 births and 31 per 1000 births for less developed and least developed regions of the world respectively ⁷. The incidence rates of stillbirths in some West African countries ranges from 52.1 to 69.3 per 1000 birth ^[2, 6]. Stillbirth rate for some African countries are; Egypt 22, Cameroon 13, South Africa 32, Ethiopia 46, Kenya 30, Senegal 120, Zambia 43, Ghana 19, and Nigeria 32.2 per 1000 total births ^[3, 7, 8]. Nearly 3 million third-trimester stillbirths occur worldwide each year, with 98% arising in low-income and middle-income countries ^[9]. Yet this pregnancy outcome is largely invisible in health monitoring reports worldwide. Unlike other adverse outcomes, such as maternal and neonatal mortality, stillbirth is not formally included in any of the major global disease campaigns ^[9, 10]. If a pregnancy outcome is not counted, it will almost certainly be ignored by funding agencies, policy makers, and local communities ^[11, 12]. Although stillbirth is frequently ignored from a policy and public health perspective, many advances in modern obstetric care have been made to reduce the rate of this outcome ^[13]. Despite 30 years of attention to child survival interventions, more than 20 years of attention to safe motherhood, and increasing recent attention to survival of newborn babies, the focus worldwide has remained on survival after

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Livebirth [14-20]. A major reason for stillbirths not being included in the worldwide policy agenda is the notion that little can be done at scale in developing countries. Paradoxically, the predisposing factors, causes and management of these causes are known, thereby making most cases of stillbirths preventable. While significant progress was made during the millennium era in reducing child and maternal mortality. The progress made in reducing stillbirths is the slowest. An annual average rate of reduction ARR of 2.0% in comparison to ARR of 3.0% for maternal death or 3.1% for neonatal death livebirth [14-20]. A major [21].

The objective of the study was to determine the incidence and predisposing factors of stillbirth in JUTH and recommend ways for their reduction.

Methods and Materials

A 5-year cross sectional study of stillbirths that occurred between 1st January 2003 and 31st December, 2007 was carried out using data obtained from labour ward and Obstetrics Theatre delivery records and record files of the affected women. Data on the booking status, age, occupation, educational status, tribe, parity and antenatal illness of the affected mothers were obtained from the records. In addition, gestational ages of the affected fetuses and mode of deliveries were obtained. Other data/variables obtained included duration of stay in labour ward or hospital before delivery, fetal weight and the sexes.

The data were analyzed using simple frequency distribution tables. Frequency tables were generated and test of associations between variables were carried out using the chi-square test and a P value of 0.05 was taken as significant. The sample size was adequate for analysis based on current stillbirth rate in Nigeria using the formula given below;

$$N = \frac{2(Z_i - a)^2(P)(1-P)}{D^2}$$

Results

Burden

During the period under review there were 13799 deliveries and a total of 598 reported cases of stillbirths giving crude stillbirth rate of 43 per 1000 total deliveries. However, 82 folders were not seen hence the Stillbirth rates calculated from the 516 folders retrieved was 38 per 1,000 total deliveries. Majority of these deaths were Fresh stillbirths 305 (59.1%) while 211 (40.9%) were macerated stillbirths.

Socio-Demographic Characteristics

From table 1 stillbirth occurred more commonly among women aged 20 – 35 years but these women have the lowest stillbirth rate. Women at the extremes of life have the highest stillbirth rate but low absolute numbers of stillbirths. Illiteracy, primiparity and grand multiparity were more associated with stillbirths. Stillbirths were commoner in unbooked women and women of Low socioeconomic status. The Hausa/Fulani ethnic group accounted for majority (40.9%) of cases.

Gestational age, birth weight and mode of delivery

Stillbirth rates were higher at extremes of gestational ages and low birth weight babies. Assisted breech delivery and forceps delivery were associated with higher stillbirth rate.

Factors responsible for stillbirths

From table 9a to 9c, maternal causes were responsible for 52.1% of cases of stillbirths while fetal and placental factors were responsible for about 38.4% and 42.8% of cases respectively (some women/fetuses had more than one risk factors). The singular most important cause of stillbirth was abruptio placentae accounting for 24.2% of cases. The maternal causes were hypertensive diseases in pregnancy 22.3%, (eclampsia accounting for 3.9%) and infections/infestations 10.4%. In 70 (13.6%) of cases, the Cause of stillbirth was unexplained.

Table 1: Age Distribution of women with stillbirths

Age (Years)	Number of stillbirths	Number of Deliveries	% of deliveries	Stillbirths rate per 1000 deliveries	Relative risk
15-19	41	800	5.5	51.3	1.4
20-24	100	2962	22.0	33.8	0.8
25-29	163	4964	34.0	32.8	0.9
30-34	113	3293	24.0	34.3	0.9
35-39	71	1661	12.0	42.7	1.1
40-44	21	324	2.0	64.8	1.7
≥ 45	7	65	0.5	107.7	2.9
Total	516	13799	100	37.4	

Table 2: Distribution by Educational status of women with stillbirths

Level of Education	Number of Stillbirths	Total Deliveries	% of deliveries	Stillbirth rates Per 1000 births	Relative risk
None	151	2505	18.2	60.3	1.6
1 ^o level	141	2485	18.0	56.7	1.7
2 ^o level	114	5247	38.0	21.7	0.6
3 ^o level	70	3288	23.8	21.3	0.6
Arabic	14	167	1.2	83.8	2.2
Not started	26	107	0.8	243	6.4
Total	516	13799	100	37.4	

Table 3: Distribution by occupation of women with stillbirth

Occupation	No. of Women	Number of Deliveries	% of deliveries	Stillbirth rates per1000 deliveries	Relative risk
Unemployed	305	6141	59.1	49.7	1.3
Civil servant	50	2208	9.7	22.6	0.6
Trader	51	1967	9.9	25.9	0.7
Seamstress	27	568	5.2	47.5	1.3
Student	30	1324	5.8	22.7	0.6
Teacher	17	551	3.3	30.9	0.8
Farmer	15	300	2.9	50	1.3
Nurse	6	640	1.1	9.4	0.3
Others	15	100	2.9	150	3.9
Total	516	13799	100	37.4	

Others: Hairdressers 10, house help 3, not stated 2

Table 4: Distribution by parity of women with stillbirth

Parity	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
Primipara	91	62	153	29.7	4173	36.7	1.0
Para 2	46	38	84	16.3	2718	30.9	0.8
Para 3	35	18	53	10.3	2286	23.2	0.6
Para 4	33	23	56	10.9	1635	34.3	0.9
≥ Para 5	100	70	170	32.9	2987	56.9	1.5
Total	305	211	516	100	13799	37.4	

FSB-Fresh Stillbirth, MSB-Macerated Stillbirth, SBR-Stillbirth Rates.

Table 5: Booking status of women with stillbirth in JUTH

Booking status	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
Unbooked	49	37	86	16.7	484	177.7	4.8
Booked in JUTH	113	80	193	37.4	9749	19.8	0.5
Booked elsewhere (total)	143	94	237	45.9	3566	66.5	1.8
- PHC	61	34	95	18.4			
- Private hospital	35	27	62	12.0			
- Other hospitals	47	33	80	15.5			
Total	305	211	516	100	13799	37.4	

PHC-Primary Health Center

Table 6: Distribution of stillbirths by gestational age at which they occurred

Gestational age (weeks)	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
28 – 30	36	36	72	14.0	626	115.0	3.1
31 – 33	34	35	69	13.4	606	113.9	3.0
34 – 36	68	59	127	24.6	2354	54.0	1.4
37 – 39	96	25	121	23.4	5981	20.2	0.5
40 – 41	52	35	87	16.9	4044	21.5	0.6
≥ 42	19	21	40	7.7	188	212.8	5.7
Total	305	211	516	100	13799	37.4	

FSB-Fresh Stillbirth, MSB-Macerated Stillbirth

Table 7: Distribution of stillbirths by the birth weight at which they occurred

Birth weight (kg)	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
< 1.00	17	30	47	9.1			
1.00 – 1.49	26	25	51	9.9			
1.50 – 1.99	35	30	65	12.6	1666	150.1	4.0
2.00 – 2.49	45	42	87	16.9			
2.50 – 2.99	67	30	97	18.8			
3.00 – 3.49	70	25	95	18.4	11523	20.2	0.5
3.50 – 3.99	30	11	41	7.9			
≥ 4.00	15	18	33	6.4	610	54.1	1.4
Total	305	211	516	100	13799	37.4	

Table 8: Distribution of stillbirths by the mode of deliveries

Type of delivery	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
SVD	184	171	355	68.7	10101	35.1	0.9
Caesarean sections							
- Emergency	65	8	73	14.1			
- Elective	25	3	8	1.6	2854	37.9	1.0
- Laparotomy	36	0	6	1.2			
Assisted breech	19	7	26	5.0	230	113.0	3.0
Instrumental							
- Vacuum	12	8	20	3.9	283	70.7	1.9
- Forceps	4	2	6	1.2	37	162.3	4.3
Twin vaginal delivery	18	10	18	3.5	290	62.1	1.7
Destructive delivery	2	2	4	0.8	4	-	
Total	305	211	516	100	13799	37.4	

Table 9(9a-9c): Distribution of factors responsible for stillbirths**Table 9a:** Maternal factors

Maternal complications	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
Hypertensive diseases	45	70	115	20.4	853	134.8	0.7
Eclampsia	19	1	20	3.9	9.8	204.1	1.0
Infections	16	38	54	10.4	-	-	
Prolonged pregnancy	12	15	27	5.2	180	150	0.7
Anaemia + SCD	5	7	12	2.3	-	-	
Obstructed labour	10	2	12	2.3	92	130.4	0.7
Diabetes	5	7	12	2.3	45	266.7	1.3
Uterine rupture	6	-	6	1.2	14	428.6	2.1

Others	6	5	11	2.1	60	183.3	0.9
Total	124	145	269	52.1	1342	200.4	

Others Rh negative 5 trauma – 3, poor labour management-3. Note- Some women had more than one risk factors.

Table 9b: Fetal factors

Fetal complications	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
Congenital anomalies	18	20	38	7.4	105	361.9	5.4
Multiple gestations	15	20	35	6.8	450	77.8	1.2
Unexplained fetal distress	10	-	10	1.9	100	100	1.5
Unexplained causes	15	55	70	13.6	-	-	
Prematurity	11	-	11	2.1	1000	11.0	0.2
Others	34	-	34	6.6	1300	26.2	0.4
Total	103	95	198	38.4	2955	67.0	

Others (Assisted Breech Delivery -14, Macrosomia shoulder dystocia 7, Instrumental 13).Note-Some fetuses had more than one risk factors.

Table 9c: Placental factors

Placental factors	No. of stillbirths			% of deliveries	Total deliveries	SBR per 1000	Relative risk
	FSB	MSB	Total				
APH							
- Abruptio placenta	110	15	125	24.2	150	833.3	3.1
- Placenta praevia	15	5	20	3.9	107	186.9	0.7
- Incidental	1	1	2	0.4	20	100.0	0.4
Cord accidents							
- prolapsed	30	9	39	7.6	60	650.0	2.4
- Entanglement	6	14	20	3.9	461	43.3	0.2
PROM + Chorioamnionitis	8	7	15	2.9	30	500.0	1.9
Total	170	51	221	42.8	828	266.9	

Note: Some fetuses had more than one risk factors.

Discussion

From this study, the actual crude stillbirth rate in JUTH was 43 per 1000 total births. This is much higher than those of developed countries such as the UK, 5.6, the USA and Sweden, 5.8 to 6.6 [2, 7, 13]. The rate is also higher than those of other African countries such as Ghana 19, Cameroon 13, Egypt 22, and Botswana 36 [3, 7]. The rate is also higher than the average for African 32 and West African sub-region 41 [7]. The rate is however lower than for some African countries such as: Burkina Faso 59 and Senegal 120 [3]. Compare to other centers in Nigeria this rate is higher than the 24, 32 and 34 from Benin City, Ilorin and Lagos respectively and also lower than 12.5 per 1000 pregnancies obtained from the 2013 Demographic Health Survey [3, 7, 21]. But lower than the 51, 180 and 54 obtained from Ibadan, Orlu, Imo state and Zaria respectively [3, 22, 23]. The rate is similar to the estimated rate of 43/1000birth in Nigeria for 2015 [7, 24]. The high stillbirth rate from this study may be because it is a Hospital based study where most complicated pregnancies and delivery occur.

The higher stillbirth rates in women at extremes of ages, eg. Teenager (aged 15-19 years) of 51.3/1000 births is lower than the 34.0 in an earlier study done in Jos (2003) [16]. The rate of 72.0/1000births among women aged 40 years and above is higher than the 39.0 reported from Ilorin (1996) [17]. The higher incidences of stillbirths in these extremes of ages compared to women aged 20-29 is similar to those obtained from other researchers the world over [2-4, 14]. Rates of 19/1000 births and 22/1000births among women under 15 years and over 40 years respectively compare to average of 7.5/1000 in other age group was noticed from the USA [14]. In the UK a rate of 6.5 was noticed in women aged < 20 years and 8.0 in women aged ≥ 40 years with rates of 5.5 and 5.0 in age groups 20-24 years and 25-29 years respectively [5]. Teenagers/underage women are more likely to develop obstetric complications such as pre-eclampsia/eclampsia and obstructed labour while women aged

40 years and above are more likely to develop medical complications and also carry fetuses with chromosomal anomaly hence the higher stillbirth rates among these age groups.

From the study, stillbirth rates decreases with increasing level of education. This is consistence with the findings of other researchers [2, 3, 14]. The more educated a woman the more likely she will have better medical seeking attitude and more economically empowered. Housewives that are not gainfully employed contributed to 59.1% and with a high stillbirth rate of 49.7/1000 births. On the other hand, civil servants and health workers have percentages of 9.7% and 1.1% with rates of 22.6/1000 births and 9.4/1000 births respectively. This is the situation in most developing countries where poverty is common [2, 3, 7, 12]. Poverty and illiteracy is associated with poor pregnancy outcome.

From the study, unbooked women and women that booked elsewhere had higher stillbirth rates. This is in contrast with those that had antenatal care in JUTH who accounted for 37.4% of cases but with lower stillbirth rate of 19.8/1000 birth. This finding is similar to other researchers who demonstrated higher stillbirths and perinatal mortalities among unbooked than booked women [2, 3, 20, 23]. We need to educate our women about the importance of antenatal care and encourage them to book.

This study has also demonstrated relationship between parity and fetal outcome ($p < 0.05$). Primiparous women contributed to 29.7% of cases with high stillbirth rate of 36.7/1000 births while para 2 and 3 contributed 16.3% 10.3% with stillbirth rates of 30.9 and 23.2 respectively. This result is similar to those of other researchers in the US who demonstrated best fetal out comes in 2nd and 3rd baby¹². In addition, women of parity ≥ 5 accounted for 32.9% of cases with high stillbirth rate of 56.9/1000 birth. This is similar to results by other Nigerian researchers who demonstrated higher perinatal mortalities among grandmultiparous women [2, 22]. A rate of 73.4/1000 birth in grandmultiparous women was reported from Enugu²³.

Primigravida and grandmultiparous women tend to have more obstetric complications.

From the study, stillbirths tend to occur more at lower gestational ages (114.4/1000 births at gestational age < 34 weeks), and prolonged pregnancy (212.8/1000 births). This is similar to findings of Copper *et al.* (1994) in the US where stillbirths were much more common with decreasing gestational age, with 80% occurring before term and more than half occurring before 28 weeks^[13]. Also from this study babies weighing < 2.5kg have SBR of 150.1/1000 births while those weighing 4.0kg and above have SBR of 54.1/1000. Normal weight babies accounted for 45.2% of cases but with SBR of 20.2 per 1000 births. This result is similar to that obtained from UK where babies weighing < 2.5kg comprises 65% of perinatal deaths and those weighing between 1.5kg and 2.4kg had stillbirth rate of 20.0/1000 births, and those weighing \geq 4.5 had rate of 3.2/1000 births while babies weighing 2.5-4.4kg had a rate of 1.7/1000 birth^[5]. Low birth weight babies are likely to be from IUGR or pre-term deliveries while macrosomic babies may be from pregnancies complicated with diabetes and difficult delivery hence the high SBR in them.

From the study, stillbirth rate from singleton cephalic vaginal deliveries was 35.1/1000 birth lower than the 38.0/1000 for abdominal delivery. There was high stillbirth rate among fetuses presenting breech (113.3 /1000 birth) and instrumental deliveries (81.3/1000 birth) higher with forceps deliveries (162.3/1000 births). The high rates in breech and twin deliveries are similar to those obtained by other researchers the world over^[2, 25]. The high rate in instrumental deliveries and caesarean section was because most of the indications are from complicated pregnancies while vaginal breech delivery is associated with birth trauma both to mother and baby.

From the study, maternal factors were implicated in 20% to 52.1% of cases while placental and fetal factors were implicated in 38.4% and 42.8% of cases respectively. This is in contrast to what is obtainable in the USA and Canada where fetal factors accounted for 25-40%, placental factors 25-35%, and maternal factors were responsible for only 5-10% of cases¹³. Base on probable causes of death, the most common causes of death were abruptio placentae (24.2%), Hypertensive diseases (22.3%), unexplained (13.6%) and maternal/fetal infections (10.4%). These findings are higher than those obtained from the US where abruptio placentae accounted for 10% of stillbirth and but still the most common singular cause of stillbirth in the USA¹³. Also in the US maternal hypertension and diabetes was responsible for 5-8% of stillbirths lower than seen in this study of 2.2-22.3%. Infections were responsible for 10.4% from this study higher than the 5.6% seen in the US and Canada (1995)^[13]. The stillbirth rate among women with hypertension and pre-eclampsia was 134.8/1000 birth is higher than the 37.7 obtained from Benin City and 11.2/1000 birth from the USA^[14, 26]. The stillbirth rate among diabetic mothers and those with placental abruption from this study was 266.7/1000 and 833.3/1000 births respective. These are higher than findings of 9.9/1000 births and 96.9/1000 births in diabetics and abruption placental respectively from the US^[14]. This is due to poor diabetic control in pregnancy and the late presentations and diagnosis of placental abruption in our environment. Also from the study, stillbirth rate from placental praevia was unacceptably high (186.9/1000 births) unlike in the USA (21.4/1000 births)^[14]. This high maternal factor is a reflection of poor antenatal care in our environment.

Other important preventable causes of fetal deaths from the study included: Obstructed labour (2.3%), Anaemia in

pregnancy (2.3%) Cord prolapse (7.6%) and uterine rupture 1.2% of cases. These findings are in contrast with that in developed countries such as the USA where obstructed labour has been eliminated^[13, 14]. Fetal death rate from obstructed labour, cord prolapse and uterine rupture from the study were 130.4/1000, 650.0/1000 and 428.6/1000 births respectively. Stillbirth rate in a study from the USA showed 58.2/1000 in cord prolapse^[14]. The occurrences' of fetal deaths from these preventable factors is still a reflection of poor feto-maternal surveillance during pregnancy and labour in our our health facilities and lack of care for the Unbooked. Congenital anomalies were seen in 7.4% of cases with stillbirth rate of 361.9/1000 birth. This is similar to studies in the USA where gross congenital anomalies are seen in 5.6% of cases of stillbirths¹³. In 13.6% of cases, there were no identifiable causes of death. This is lower than the 25-35% experienced in the USA^[13].

The study showed that, of the 305 cases of fresh stillbirth, 34.8% presented to JUTH with presence of fetal heart tone and 17.4% of them spent less than 1 hour in labour ward before fetal demise and 55.1% spent between 1 and 12 hours in labour ward, while 5.8% spent 13 to 24 hours in the wards before fetal demise. Only 15% of these women had electronic fetal monitoring in labour and 17.4% had fetal demise while on admission in the antenatal ward for more than 24 hours. The average decision delivery interval for emergency caesarean section was 1000 minutes. Most of the women that presented and had fresh stillbirth had delay in arriving at the hospital. Even though this study showed lower incidence of stillbirths among women that had antenatal care in JUTH (19.8/1000 births) compared to those who booked elsewhere (66.5/1000 births) and unbooked (177.7/1000 births), the figures above show delay in intervention and poor fetal monitoring in our facility which need to be addressed.

Limitations of the study include unavailable case notes in 82 (13.7%) of cases for analysis, deficient case records in few instances (<10%) in certain specific vital information and inability to assess the actual economic status of the women (which influence stillbirths) because in many instances the women husband's occupations were not stated.

Conclusion

This study has demonstrated a high stillbirth rate from preventable maternal and fetal factors. There is a need to facilitate the reduction of stillbirths in our centre in line with the sustainable development goal strategies.

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