Risk Factors for Stillbirths at Universty of Maiduguri Teaching Hospital, Maiduguri, Nigeria: A Cross-Sectional Retrospective Analysis

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SUMMARY

Background: Stillbirth rate is an important indicator of access to and quality of antenatal and delivery care. Data on birth outcomes are important for planning maternal and child health care services in developing countries. There is little or no literature on the stillbirth rate in north-eastern Nigeria. This may be the first study to serve as the baseline data in Maiduguri.

Objective: This study aimed at determining the prevalence and identifying the risk factors contributing to foetal demise.

Study design: A cross-sectional retrospective analysis of stillbirth among women delivering in UMTH over a-4 year period, from January 2001 to December 2004.

Method: The Case records of 7996 women that delivered in UMTH over the study period were retrieved and the trend of the stillbirth experiences followed up retrospectively, and relevant information with special reference to socio-demographic characteristics, clinical risk factors for stillbirth and type of stillbirth obtained and analyzed.

Results: There was a total of 179 stillbirths among the 7996 deliveries giving the institutional prevalence of 22/1000 deliveries. Macerated stillbirths with no obvious congenital malformation predominated (OR: 10.89; CI: 6.51-31.80), accounting for 52.5%, while fresh stillbirths (OR: 5.81; CI: 3.77–11.87), accounted for 47.5%. Most of the risk factors (63.7%) for stillbirths were present ante partum such as multiparity (OR: 2.88; CI: 1.47-6.09), lack of antenatal care (OR: 1.91; CI: 0.92-2.05), maternal literacy level (OR: 2.82; CI: 1.44-5.41), hypertension, pre-eclampsia and eclampsia disease complex (χ^2=15.12; P-value =0.006); while intra partum risk factors contributed 36.3% with SVD as a mode of delivery, the leading risk factor (χ^2= 23.79; & P-value 0.000).

Conclusion: The prevalence of stillbirth is high and is predominantly associated with ante partum risk factors. In our setting, antenatal care should be considered as the cornerstone in the prevention of stillbirth. With adequate antenatal care and good understanding of the determinants of stillbirth, women with clinical risk factors to stillbirth could be identified and measures to avoid or substantially decrease the occurrence of stillbirth instituted.

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Key words: stillbirth, prevalence, aetiologic determinants

INTRODUCTION

Stillbirth is a profound experience for child bearing families. It engenders a unique kind of mourning since the child is so much a part of parental identity. The World Health Organization's (WHO) International Classification of Diseases (ICD-10)[1] defines stillbirth (fetal death) as death before the complete expulsion or extraction from its mother of a product of conception, weighing at least 1000 g occurring after 28 completed weeks of gestation or at having at least 35 cm body length, which is indicated by the fact that after such separation, the fetus does not show any evidence of life. WHO estimates that worldwide 3.3 million stillbirths occur each year, accounting for over half of all perinatal deaths.[2, 3] The vast majorities (98%) of these deaths take place in low- and middle-income countries[3]. In West Africa the observed stillbirth rate was 26/1000 deliveries[2]. In Zimbabwe, East Africa, the annual rate of stillbirth was 61/1000 live births[4]. The Nigerian perinatal mortality rate for the 1999-2003 period was 48 deaths per 1000 live births[5], and a study in Ibadan, Nigeria, reported a prevalence rate of stillbirths of 63/1000 total births[6]. While countries in South-East Asia report a high overall numbers of stillbirths, countries in Africa have the highest incidence rates per 1000 live births.[2] In high-income countries stillbirth rates are as low as 6 per 1000 live births, whereas in less developed countries they can be as high as 26 per 1000 live births.[2] Rates of stillbirth during pregnancy closely track the use and quality of maternal health care services, being generally higher in economically poorer communities with poor access and/or low utilization of periconceptual and antenatal care (ANC) services, compared with economically well-off populations with good access and high utilization of quality ANC services, including monitoring and treatment of risk factors that arise during pregnancy[7, 8].

Globally, two-thirds to three-quarters of stillbirths may occur antenatally (macerated), before labour begins[2, 8, 9], which are often associated with insults that occur in-utero during the antenatal period. These stillbirths are due to a variety of factors including severe maternal, placental or foetal abnormalities including pre-eclampsia, intra uterine growth restriction, abruption placentae, infections, umbilical cord complications

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and environmental hazards which may affect maternal health during pregnancy and fetal development and survival. Maternal smoking, advanced maternal age, high parity and obesity are also widely recognized risk factors for ante partum stillbirth[2, 9, 10]. Intra partum (fresh) stillbirths are usually the result of foetal distress and or obstructed labour and often reflect poor access or poor quality of clinical care during labour and at delivery. Some stillbirths are however due to causes that cannot be readily explained[2, 10]. Hence, stillbirth rate, particularly rates of stillbirths that occur before labour begins, can be considered a proxy for access to and quality of reproductive health and ANC services[11]. The potential contribution of antenatal care and good partographic monitoring during labour will largely help in detecting these risk factors and prevent stillbirth. There has not been any form of review of aetiological determinants contributing to foetal demise in Maiduguri, a large referral centre in the North-Eastern Nigeria. This study will hopefully serve as baseline for further research in our environment regarding this topic.

SUBJECTS AND METHODS

Study design: Hospital based cross-sectional retrospective analysis of stillbirths.

Study area: The study was carried out in the department of Obstetrics and Gynaecology of the UMTH, Maiduguri. The UMTH Maiduguri was established in 1983, and is a 520 bed modern Federal health institution, out of which 70 beds are obstetrics. The hospital has 12 consultant obstetricians and gynaecologists, 25 resident doctors in training and 33 nurse/midwives in the department of Obstetrics and Gynaecology. Annual delivery rate in the maternity section of the hospital averaged 3000. The UMTH serves as a referral centre for the North-Eastern sub region of Nigeria, and quite a number of patients are also seen from the neighboring countries of Niger, Chad and Cameroon Republics.

Methodology: The study population included 7996 women who delivered singleton babies at UMTH over a 4-year period, from January 2001 to December 2004. In this study, stillbirths were considered as foetal death after 28 weeks of gestation. Thus only pregnancies from 28 weeks and onwards were included. A fresh stillbirth was defined as the intrauterine death of a fetus during labor or delivery, and a macerated stillbirth was defined as the intrauterine death of a fetus sometime before the onset of labor, where the fetus showed degenerative changes[12], as reported in the obstetric records by the attending physician/midwife. All stillbirths occurring during medical termination of pregnancy and cases with incomplete data files were excluded. Case-records of 7996 women that delivered in UMTH and met the inclusion criteria over the study period were retrieved from the central records library (records and statistics unit of the hospital) responsible for the collection and documentation of data on hospital admissions, diagnoses, discharges and including deliveries. Cases were identified through labour ward, obstetric theatre, obstetric ward, ICU and accident and emergency records. Data collected included the booking status, age, gravidity, parity, educational status, ethnic group, presence of any medical or obstetrics complication, previous history of stillbirth, types of stillbirth, and mode of delivery as recorded in the patient's folder.

Statistical analysis: Findings were recorded on a pre-formed format sheet designed for the study, data were coded and transferred into an IBM compatible PC and analyzed using SPSS statistical package version 14 (SPSS.14 Inc, Illinois). Where appropriate, risk was estimated using odd ratio and Chi-square was used to test for significance between the variables concerned at 95% confidence interval. A P-value of <0.05 was considered significant. The results were presented by simple statistical tables. The study was approved by the local research and ethical committee of the hospital.

RESULTS

There were a total of 179 stillbirths among the 7996 deliveries during the study period, giving an institutional prevalence of 22.4/1000 deliveries, of which 11.8/1000 were macerated stillbirths and 10.6/1000 were fresh stillbirths. Table 1 shows the socio-demographic characteristics of the patient studied. The age range was 15-42 years and the mean age was 27.5±5.8 years. Most mothers were 20-34years old. The peak age-specific stillbirth rate was 29.1% (52/179) occurring in the age group 25-29 years while those in the age range =40years and teenagers (15-19years) had the lowest prevalence of 7.3%(13/179) and 15.1% (27/179) respectively and the difference was statistically significant (χ^2 =24.97, P-value =0.000). Significantly more stillbirths (57.5%) occurred in the unbooked mothers compared to those who were booked (42.5%) with an odd ratio of 1.91; CI =0.92-2.05. Parity ranged from 0-12. Multiparous mothers were almost 2 times more likely to deliver stillbirths (138) than the primigravidas (51) with odd ratio of 2.88 CI=1.47-6.09 and the difference was statistically significant (χ^2 =15.03; df = 3; P-value 0.000).

Table 1: Socio-demographic Characteristics

Characteristics	Number	Percentage
Age group		
15–19	27	15.1
20–24	42	23.4
25–29	52	29.1
30–34	45	25.1
≥40	13	7.3
χ^2=24.97; df = 1; P-value 0.000		
Parity		
0	51	28.5
1-4	71	39.7
=5	57	31.8
OR = 2.88 CI=1.47-6.09 (χ^2 =15.03; df = 3; P-value 0.000)		
Booking status		
Booked	76	42.5
Unbooked	103	57.5
OR = 1.91; CI =0.92-2.05		
Educational status		
None	62	34.6
Primary	48	26.8
Secondary	39	21.8
Post secondary	30	16.8
OR = 2.82; CI=1.44-5.41 (χ^2 = 15.35; df =3; P-value 0.002)		

Mothers with no formal education were 2 times more likely to deliver stillbirth baby compared to those with formal education with an odd ratio of 2.82; CI=1.44-5.41; and the prevalence rate significantly decreased with increasing formal educational status (χ^2 = 15.35; df = 3; P-value 0.002).

Table 2 shows risk factors associated with stillbirths. Multiple maternal risk factors were responsible for the stillbirths. Hypertension, pre-eclampsia and eclampsia disease complex was the leading risk factor (50.3%). Obstetric haemorrhage, previous history of stillbirth, diabetes and anaemia contributed 16.7%, 12.4%, 11.2% and 9.4% respectively. The Presence of risk factors related to obstetric history and status was significantly associated with stillbirth (χ^2=15.12; P-value =0.006). A total of 102 (56.9%) of the deliveries were via SVD, while 30 (16.7%) were by caesarean section. Additional 26 (14.4%) required some form of instrumentations during delivery, while 21 (11.6%) were assisted breech delivery. Compared to other mode of deliveries, SVD were 3-4 times more likely to be stillbirth. The Presence of risk factors related to mode of delivery was significantly associated with occurrence of stillbirth (χ^2= 23.79; & P-value 0.000).

The types of stillbirth are shown in table 3. Of the 179 stillbirths, 94 (52.5%) were macerated stillbirths and mostly related to the risk factors detectable antenatally with an odd ratio of 10.89 CI=6.51-31.80. Fresh stillbirth was evident in 85 (47.5%) of the cases and mostly attributed to the risk factors detectable in the late antenatal and intra partum period with an odd ratio of 5.81 CI=3.77–11.87.

Table 2: Risk factors for stillbirths

Risk factors	Number	Percentage
Medical/Obstetrics		
Eclampsia	52	29.1
Hypertension	38	21.2
Haemorrhage	30	16.7
Previous stillbirths	22	12.4
Diabetes	20	11.2
Anaemia	17	9.4
χ^2 =15.12; df = 1; P-value 0.000		
Mode of delivery		
SVD	102	56.9
C/S	30	16.7
Vacuum	15	8.3
Forceps	11	6.1
Assisted breech	21	11.6
χ^2 =23.79; df = 1; P-value 0.000		

Table 3: Types of stillbirths

Type of stillbirth	Number	Percentage	Odd Ratio
Macerated	94	52.5	CI = 6.51-31.80
	10.89		
Fresh	85	47.5	CI= 3.77–11.87
	5.81		

DISCUSSION

Stillbirth remains a distressing enigma to parents and clinicians alike as the cause often remains elusive. This paper evaluates the distribution of and risk factors for fresh and macerated stillbirth among mothers with singleton birth at UMTH, the largest referral hospital serving the North-eastern part of Nigeria. The prevalence of stillbirths was 22/1000 deliveries in this study, which was comparable with the observed stillbirth rate of 26/1000 deliveries reported in a series from West Africa[2] and lies within the global observed range[2]. Our findings was however lower than 63/1000 deliveries at Ibadan[6], another pioneer and largest referral centre in Nigeria, and thus, would be expected to have higher mortality rates than other hospitals because of influx of high risks and most complicated cases. It is also lower than other series from Zimbabwe[4], East Africa. The proportion of macerated stillbirths in this series (52.5%) is higher than in more developed countries[2,7,8], suggesting the presence of insults[8,9], to the developing fetus and the need for timely screening and management of chronic conditions and infections. Many factors could be responsible for the differences in the study results. One of the most important factors is the difference in ante partum and intra partum care in the different settings. Early detection of severe pathologies is more frequent in developed countries, where foetal death can be diagnosed before 20weeks of gestation; in developing countries these cases are rarely diagnosed before the first foetal movements are felt[4,8].

Considerable proportions (47.5%) of the stillbirths were fresh stillbirths. Similar observations were reported from other series[4,8,10,11,13]. This finding suggests the need for improved obstetric care and availability of emergency services during labour and delivery period. Maternal age and parity effects were common in stillbirths in this study, consistent with other studies[2,4,8,9,10,13]. But the effects of maternal age and parity were more prominent on older mothers who are mostly multiparas, strengthening the possibility that maternal chronic disease conditions in later years of life and high parity may play significant roles. Mothers with no formal education were 2 times more likely to deliver stillbirth baby compared to those with formal education (OR: 2.82; CI: 1.44-5.41; P-value 0.002). Though it is possible that this factor may not be the actual risk factor for stillbirth, as reported in other series[8], it could serve a useful indicator in a socio-economic disadvantage population like Nigeria.

In this series, identified aetiologic determinants were mostly related to ante partum stillbirths accounting for up to 63.7%. This agrees with earlier studies[2,8,9,13]. The majority of stillbirths in this study were macerated; suggesting existence of problems linked to the antenatal period, which in most cases was hypertension, pre-eclampsia and eclampsia disease complex (50.3%). Obstetric haemorrhage, previous history of stillbirth, diabetes and anaemia contributed 16.7%, 12.4%, 11.2% and 9.4% respectively. Hypertensive disorders of pregnancy and its complications accounted for 21.2% (50.3% eclampsia & hypertension) in this study. This finding concords well with a review of all stillbirths reported in WHO calcium supplementation trial for the prevention of pre-eclampsia conducted at seven WHO collaborating centre in Argentina, Egypt, India, Peru, South Africa and Viet Nam, which revealed that hypertensive disorders of pregnancy and its complications were the most common obstetric events leading to stillbirths in 23.6% of the cases[14].

Most of the patients in this study did not receive antenatal

care. This is in keeping with the well known fact that non-use of antenatal care facilities is a strong and consistent risk factor for stillbirth[4, 8, 13, 15]. Thus, the risk of mortality was much higher for women who did not receive prenatal care compared to those who did. In developing countries, prenatal care, even if only attended once, remains an important factor in obstetric care, as this may be a critical linkage between the woman with maternity care services[4, 8, 13]. In contrast, research findings in middle-income countries emphasize the importance of the number of prenatal care visits and the adequacy and quality of prenatal care services. WHO recommends using prenatal care as a strategy for improved obstetric care[2, 12]. Our data suggest that prenatal care may help ensure that interventions occur in a timely manner. Other studies in developing countries however, indicated that an important portion of stillbirth do occur during labour. Olusanya in Lagos[15], Kunzel in Mali[16] and Ashley in Jamaica[17] found that 50.2%, 60% and 56% of the stillbirths were intra partum death respectively. In this series, intra partum deaths were evident in 36.3%; and this may be likely to be related to fetal hypoxia, congenital malformations which were not grossly apparent, quality of delivery care given to a woman during labor and delivery, and poor access to emergency obstetric care. Studies that stratified data by ante partum or intra partum foetal death showed a small increase in ante partum stillbirths relating more causes to ante partum death than intra partum death[2, 8, 9, 13,].

The presence of risk factors related to mode of delivery was significantly associated with occurrence of stillbirth. Our study revealed that stillbirths, irrespective of type, were less likely to be delivered by Caesarean section compared to SVD. This is in consonance with a previous report[15] .It is conceivable that factors leading to stillbirth may cause mothers to have a Caesarean section[8], and thereby avoiding vaginal delivery altogether. The contribution of breech delivery to stillbirths in this study was 11.6%. For fresh stillbirths, this finding is consistent with the well known risk associated with vaginal breech delivery [8]. For macerated stillbirths, this finding may be more related to preterm infants and would be consistent with the clinical observation that the infants turn to optimal birth presentation at about 34 weeks of gestation[8]. Similarly, infants delivered by some form of instrumentation were more likely to die within the first hour of life[8]. In this review up to 26 (14.4%) of the infants required some form of instrumentations during delivery. This study has some limitations.

As the study was a retrospective analysis of data obtained from delivery logs, we were unable to examine risk factors due to infections such as syphilis which is an important risk factor for stillbirths in both developed and developing countries[4, 8] Though syphilis is an important risk factor, its contribution to perinatal mortality is likely to be insignificant in our centre[18]. Other chronic and co-morbid conditions were also not examined. Despite these shortcomings, our study was able to characterize socio-demographic and reproductive risk factors for stillbirth in this population. Our ability to distinguish macerated and fresh stillbirths and identify the aetiological determinants has direct implications on quality of antenatal and obstetric care given to pregnant women in UMTH, Maiduguri, and this will help prioritize appropriate intervention strategies.

In conclusion, the prevalence of stillbirths in our setting is high and macerated stillbirths with no obvious congenital malformation predominated. The identified aetiologic determinants were mostly related to ante partum events. As preventive measures, effort should be made to improve antenatal and obstetric services. Regular reviews of stillbirth rates are useful in monitoring the adequacy of prenatal care.

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