

Brief Report

Anaemia and Stillbirth in Kassala Hospital, Eastern Sudan

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Summary

Background: Globally, the reduction of stillbirths is a high priority, especially in view of the targets set by the Millennium Development Goals. It is crucial that health policy-makers and programme managers are aware of the epidemiology of stillbirths. **Objectives:** This was a case-control study conducted in Kassala hospital in Eastern Sudan to investigate the prevalence and risk factors for stillbirth. Cases were women who delivered stillbirths; two consecutive women who delivered a live-born neonate per case were used as controls. **Results:** Among 1342 singleton deliveries, there were 44 stillbirths (33 per 1000 deliveries). Over half (54.5%) of these stillbirths were macerated stillbirths. While maternal socio-demographic characteristics were not associated with stillbirth, maternal anaemia was the main risk factor for stillbirth (Odds ratio = 8.4, 95% CI = 2.5–29.4; $P = 0.001$). **Conclusion:** Thus, greater focus on maternal nutrition and prevention of anaemia may prevent stillbirth in this setting.

Key words: anaemia, pregnancy, stillbirth, neonates, Sudan.

Introduction

It has been estimated that, each year, 7 million neonates are stillborn or die within the first 7 days of life [1]. The vast majority of these events occur in low-income countries, including those in Sub-Saharan Africa [2]. Lack of antenatal care, lack of a skilled attendant at delivery, poor nutrition and infection are the major risk factors for stillbirths in low-income countries. Globally, the reduction of stillbirths is a high priority, especially in view of the targets set by the Millennium Development Goals [3]. Thus, it is crucial that health policy-makers and programme managers are aware of the epidemiology of stillbirths, particularly in low-income countries where the vast majority occur. Sudan, the largest country in Africa, has a high rate of stillbirth [4, 5]. The aim of the present study was to investigate the prevalence

and the risk factors for stillbirth, including anaemia at Kassala Hospital in Eastern Sudan.

Materials and Methods

This case-control study was conducted in the labour ward of Kassala Maternity Hospital in Eastern Sudan, from August to November 2009. Parturient women with singleton fetuses were invited to participate in the study. Cases were women who delivered stillbirths, defined as the delivery of a neonate after 28 weeks of gestation with no signs of life. Stillbirths were categorized as fresh (normal in appearance and with intact skin) or macerated (skin not intact), which implies that death occurred more than 24 h before delivery. The stillbirth rate was calculated as the number of stillbirths per 1000 births in the time period of the study. Two consecutive women who delivered a live-born singleton neonate at term (37–42 weeks) per case acted as controls. After taking informed consent, basic socio-demographic, medical, and obstetric histories were gathered using standardized questionnaires from all women including cases and controls. These histories included history of miscarriage and stillbirth and chronic medical conditions and obstetric complications including diabetes, hypertension and vaginal bleeding. Body mass index (BMI) was calculated as weight in kilograms

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divided by the square of the height in meters. Maternal haemoglobin was measured using a HemoCue haemoglobinometer (HemoCue AB, Angelholm, Sweden). The sex of the neonate was recorded. Maternal, placental and cord blood smears were prepared and stained with Giemsa, and $\times 100$ oil immersion fields were examined for detection of malaria parasites. All of the slides were double-checked blindly and only considered negative if no parasites were detected in 100 oil immersion fields.

Statistics

Data were entered into a computer database and were double-checked before analysis using SPSS version 13.0 (SPSS, Chicago, IL, USA). Means and proportions for the socio-demographic characteristics were compared between the two groups of the study using the *t*-test and χ^2 test, respectively. Univariate and multivariate analyses were performed. Stillbirth was the dependent variable, while socio-demographic characteristics and medical and obstetrics events were independent variables. $P < 0.05$ was considered significant. When there was discrepancy between the results of the *t*-test, χ^2 test and the results of multivariate, the results of the multivariate analysis were taken as final.

Ethics

The study received ethical clearance from the Research Board at the Faculty of Medicine, University of Khartoum, Sudan.

Results

Among 1342 singleton deliveries, there were 44 stillbirths, yielding a stillbirth rate of 33 per 1000 deliveries during the 4 months of the study. Over half

(24, 54.5%) of these stillbirths were macerated stillbirths. There was no significant difference in the mean (SD) age [29.2 (6.0) vs. 27.3 (6.4) years, $P = 0.1$], parity [3.3 (2.5) vs. 3.5 (2.4), $P = 0.6$] and BMI [24.4 (3.5) vs. 24.7 (4.0), $P = 0.7$] between the women in the two groups. In comparison with control, out of the women who delivered stillbirth, 37 (84.1%) vs. 60 (68.2%); $P = 0.05$ had received less than secondary level education (<8 years), 4 (9.1%) vs. 3 (3.4); $P = 0.1$ had a history of stillbirth and 23 (52.3%) vs. 30 (34.1%); $P = 0.04$ had not attended antenatal care. In the case group, 4 (9.1%) vs. 3 (3.4%) women had hypertension; 3 (6.8%) vs. 2 (2.3%) women had diabetes mellitus and 6 (13.6%) vs. 9 (10.2%) had placental malaria. Significantly, more women in the case group had anaemia compared with the control group [38 (86.4%) vs. 41 (46.6%); $P < 0.001$].

Predictors for stillbirth

While maternal socio-demographic characteristics were not associated with stillbirth, anaemia was the main risk factor for stillbirth (odds ratio = 8.4, 95% confidence interval = 2.5–29.4; $P = 0.001$), Table 1.

Discussion

There was a high prevalence of stillbirth in Sudan as shown in this study (33 per 1000 births), as well as our recent observation of similar high rates of stillbirth in western and central Sudan [4–7]. Sudan is the largest African country with varied socio-demographic characteristics. Unlike the previous reports from other settings [8], history of stillbirth and other maternal characteristics were not associated with stillbirth in the present study. Although, diabetes mellitus and hypertension are known risk

TABLE 1
Risk factors for stillbirth using univariate and multivariate analyses

Variable	Univariate analyses			Multivariate analyses		
	OR	95% CI	<i>p</i> value	OR	95% CI	<i>p</i> value
Maternal age	0.9	0.8–1.0	0.1	0.9	0.8–1.0	0.05
Primiparous status	0.6	0.2–1.3	0.2	0.3	0.09–1.0	0.05
Rural residence	0.5	0.2–1.0	0.08	0.5	0.2–1.5	0.2
Education < secondary level	1.4	1.0–2.1	0.04	0.8	0.5–1.5	0.6
History of miscarriage	2.0	0.4–10.7	0.3	3.1	0.3–28.3	0.3
History of stillbirth	2.8	0.6–13.2	0.1	1.3	0.2–7.4	0.7
Lack of antenatal care	2.1	1.0–4.4	0.04	0.7	0.4–1.3	0.3
Hypertension	2.8	0.6–13.2	0.1	1.3	0.2–7.5	0.7
Diabetes mellitus	3.1	0.5–19.5	0.2	1.3	0.7–79.1	0.7
Male neonates	0.4	0.5–1.3	0.8	0.8	0.4–1.6	0.6
Anaemia	7.2	2.7–18.9	<0.001	8.4	2.5–29.4	0.001
Malaria	0.5	0.4–4.1	0.4	3.0	0.4–7.8	0.3
BMI ^a	1.0	0.9–1.1	0.7	0.9	0.3–2.7	0.9

^aBMI calculated as weight in kilograms divided by the square of height in meters. OR, odds ratio; CI, confidence intervals.

factors for stillbirth in low-income countries [9], both of them were not associated with stillbirth in this study. Perhaps this could be explained by vigorous management of these diseases, including detection, close follow-up and possibly the termination of pregnancy.

Anaemic women had an eight times higher risk for stillbirth. In Sudan, anaemia during pregnancy is a considerable burden; pregnant women are more susceptible to malaria regardless of their age and parity [10], and anaemic women have been reported to have poor perinatal outcomes [11]. In neighbouring Tanzania, anaemia was reported to be associated with stillbirth [8]. However, this is small sample size hospital-based study and may not present what is going on in the community. Thus, a greater focus on maternal nutrition and prevention of anaemia may prevent stillbirth in this setting.

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