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Stillbirths at the National Referral Hospital in Bhutan: a historical description of the rate and related factors, 2006-2008

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ABSTRACT

Introduction: A fetal death or stillbirth is a baby born weighing >500 grams and with no signs of life at or after 28 weeks of gestation. **Methods:** This was a cross-sectional survey to estimate the rate of stillbirths and a case series study to describe all stillbirths occurring at Bhutan's national referral centre, Jigme Dorji Wangchuck National Referral Hospital (JDWNRH), from June 2006 to July 2008. Ethical approval was granted by the Ministry of Health. All pregnant women who had stillbirths with fetuses weighing >500 grams were included. Antenatal and socio-demographic details and examination of the newborn were abstracted from records. **Results:** There were 96 stillbirths among 5,417 births at JDWNRH, for a rate of 17.72 per 1,000 births. The mean age of women with stillbirths was 26.5 years (range 15 to 44 years). The majority of stillbirths occurred in women aged between 20 to 34 years and in primipara. The majority (87.5%) of the women had at least one antenatal visit, 69.8% had at least two visits while 12.5% had zero antenatal visits. At birth, there were 39 fresh stillbirths and 57 macerated. Seventy-six stillborn babies (79.2%) had weight lesser than 2500 grams. The most common cause was congenital infections, severe pregnancy induced hypertension, pre-labour premature rupture of membranes, chorioamnionitis, and prolonged rupture of membranes. Congenital anomalies causing death was relatively lower in rank. The proportion of unexplained stillbirths was 15.6%. **Conclusions:** The rate of stillbirth was substantially high in our population. Many of the causes of stillbirth were preventable and measures can be reinforced to improve birth outcomes.

Keywords: Antenatal care; Stillbirths.

INTRODUCTION

An estimated 2.6 million stillbirths occur annually worldwide. Ninety eight per cent of this occurs in low and middle-income countries (Bhutan included) and 75% in sub-Saharan Africa and South Asia[1,2]. A fetal death or stillbirth is a baby born weighing more than 500 grams and with no signs of life at or after 28 weeks of gestation[3]. We present results of the first study that attempted to measure the rate and identify risk factors for stillbirth at Jigme Dorji Wangchuck National Referral Hospital (JDWNRH), the largest hospital in Bhutan.

METHODS

This was a descriptive cross-sectional study done at the Department of Obstetrics and Gynaecology of JDWNRH, Thimphu from June 2006 to July 2008. Every woman who delivered at the JDWNRH during the study period was included to measure the rate of stillbirths per 1,000 births. Stillbirth was defined as confirmed intrauterine fetal death or infants born with no signs of life and with birth weight more than 500 grams[3].

A case series study was done to describe all cases of stillbirths. Inclusion criteria: infant born with no sign of life, namely, breathing, crying, and heartbeat at birth. Both singleton and twin pregnancies were included.

The antenatal clinic cards of the mothers were reviewed for antenatal risk factors. The bodies of all stillbirths were examined clinically by a trained professional after obtaining informed consent from the parents. Imaging and laboratory studies were not done due to limited resources. The sex and birth weight of the baby, socio-demographic details of the mother, and other risk factors associated with the event of stillbirth were abstracted from the mother's hospital file and recorded on a standardized form. No autopsy was performed due to cultural sentiments. Gestational age was not measured due to lack of proper menstrual history and unavailability of reliable dating ultrasonography.

The dataset was analysed using a trial version of SPSS 20.0 with descriptive statistics. Mothers were counselled and debriefed about the event. Ethical approval was granted by the Ministry of Health, Thimphu, Bhutan.

RESULTS

There were 96 stillbirths among 5,417 births at the Department of Obstetrics and Gynaecology, JDWNRH, Thimphu from June 2006 to July 2008. The rate of stillbirth was 17.7 per 1,000 births.

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Socio-demographic details of mothers

The mean age of women who suffered stillbirth was 26.5 years, mean gravidity 2 and the mean parity was 1 (Table 1). The youngest mother was 15 years and oldest was 44 years. The majority of stillbirths (85.5%) occurred in women aged between 20 to 34 years; only 4 (4.1%) women were teenagers and 10 (10.4%) were in advanced maternal age (35 years and above).

The frequencies of parity among the women studied are shown in Table 1. Half (50.0%) of the women experiencing stillbirth had no formal education while a quarter had secondary education (25.0%); 16.7% had non-formal or primary education and 8.3% had tertiary education.

Table 1. Characteristics of women and pregnancies experiencing stillbirths at JDWNRH, Thimphu, Bhutan, 2006-2008 (*n*=96)

Characteristics	N or mean	% or range
Mean age (range)	26.5 years	(15 – 44)
Age group in years		
<20	4	4.2
20 – 34	82	85.4
35 and above	10	10.4
Gravity		
Mean gravity	2	
Parity		
0	41	42.7
1	27	28.1
2	15	15.6
3	7	7.3
4	3	3.1
5	3	3.1
Education		
No formal education	48	50.0
Primary or non-formal	16	16.7
Secondary	24	25.0
Tertiary	8	8.3
Antenatal visits		
Unbooked (0)	12	12.5
1	17	17.7
2 to 4	56	58.3
More than 4	11	11.5
Past obstetric history		
Past miscarriage	11	11.5
Previous intrauterine foetal death	16	16.6
Prior neonatal death	4	4.2
Substance use		
Any	54	56.2
Doma	32	33.3
Chewing tobacco	12	12.5
Alcohol	7	7.3
Smoking	2	2.1
Smoking and alcohol	1	1.0

Antenatal events

In this sample, 87.5% of the women had at least one antenatal visit at various primary health care centres including the JDWNRH, and 69.8% had at least two visits. However, 12.5% had zero recorded antenatal visits (Table 1).

In the past obstetric history, 11 women (11.5%) had suffered at least one previous miscarriage, 16 (16.6%) had suffered previous intrauterine fetal death or stillbirth, and four (4.2%) reported neonatal deaths.

The proportion using any substance during pregnancy was 56.2%. The most commonly used substance was doma in 33.3%, chewing tobacco in 12.5%, use of alcohol in 7.3%, smoking in 2.1%, and both smoking and alcohol in 1.0%.

Fetuses at birth

At birth, there were 39 fresh stillbirths (40.6%) and 57 macerated stillbirths (59.4%). Seventy-six stillborn babies (79.2%) weighed less than 2500 grams. Forty-seven (49%) were identified as male, 46 (47.9%) as female, and sex was ambiguous in 3 cases.

On physical examination, 87 stillbirths (90.6%) did not bear any gross abnormalities; 4 stillbirths (4.2%) had abnormalities of the central nervous system, 3 (3.1%) had ambiguous external genitalia and 2 (2.1%) had fetal hydrops. No abnormalities of the cardiovascular, genitourinary, skeletal systems, or the abdominal walls were detected on antenatal screening or on gross physical examination.

Conditions associated with stillbirths

The putative causes or conditions associated with stillbirths are presented in Table 2. The most common cause of stillbirth reported at the JDWNRH was congenital infections in 19 women (19.8%). Toxoplasmosis was reported in 5 (5.2%) women, herpes simplex virus in 3 (3.1%), rubella, syphilis and cytomegalovirus in 2 (2.1%) each. There were 2 instances of co-infection of herpes simplex with cytomegalovirus (2.1%), and 1 instance of toxoplasmosis with and rubella (1.1%).

The other putative causes of stillbirth were severe pregnancy induced hypertension in 12 (12.5%), with eclampsia in one case (1.1%). Eight stillbirths (8.3%) were attributed to cord accidents. Cord accidents were attributed to 8 (8.3%) stillbirths. Pre-labour prolonged rupture of membrane and prolonged rupture of membrane were contributed to 7 (7.3%) and 3 (3.1%) stillbirths, respectively. Antepartum haemorrhage (APH) was seen in 4 (4.2%) cases. Congenital anomalies were found in 9.4% of stillbirths; however whether they caused the death could not be established. The cause of stillbirth was unexplained in 15 (15.6%) cases. The other causes are listed in Table 2.

Table 2. Conditions among stillbirths at JDWNRH, Thimphu, Bhutan, 2006-2008 (*n*=96)

Condition	N	%
Congenital infections		
Any	19	19.8
Toxoplasmosis	5	5.2
Herpes simplex	3	3.1
Rubella	2	2.1
Syphilis	2	2.1
Cytomegalovirus	2	2.1
Herpes simplex and cytomegalovirus	2	2.1
Toxoplasmosis and herpes simplex	2	2.1
Toxoplasmosis and rubella	1	1.1
Severe pregnancy induced hypertension	12	12.5
Congenital anomaly	9	9.4
Cord accidents	8	8.3
Pre-labour prolonged rupture of membrane	7	7.3
Chorioamnionitis	5	5.2
Trauma and domestic violence	5	5.2
Antepartum haemorrhage	4	4.2
Twin to twin transfusion syndrome	4	4.2
Prolonged rupture of membrane	3	3.1
Oligohydramnios	2	2.1
Foetal hydrops	2	2.1
Preterm labour	1	1.0
Uterine structure anomaly	1	1.0
Major burn	1	1.0
Connective tissue disease	1	1.0
Eclampsia	1	1.0
Rhesus isoimmunisation	1	1.0
Un-explained	15	15.6

DISCUSSION

For the first time, we report on the rate of stillbirths and associated factors in the main referral hospital of Bhutan. The rate was 17.2 per 1,000 births at JDWNRH during 2006-2008. The rate of stillbirths can be a marker of the quality of obstetric care in a country. Rates of stillbirth vary among developing and developed countries and also among countries in South Asia. Notably, India has the highest number of stillbirths for any country in the world, with rates ranging from 20 to 66 per 1,000 births in different states[4]. The rates of stillbirth in Nepal, Pakistan, Bangladesh, and Sri Lanka are 35.4, 33.6, 26.0, and 8.8 per 1,000 births, respectively[5-8]. Our data found that the stillbirth rate at the National Referral Hospital in Bhutan was lower than other countries in the region, however this study did not account for stillbirth at homes or at all other healthcare facilities in the country.

We also found that many putative causes of stillbirth described in our study are preventable or mitigatable to improve birth outcomes. For example, congenital infection was the highest cause of stillbirths at JDWNRH from 2006-2008. The highest burden was due to toxoplasmosis followed by herpes simplex virus, rubella, syphilis, and cytomegalovirus infections. Rubella has a safe and effective vaccine and several others of these infections can be treated or managed if detected early. At present, antenatal screening tests for infectious diseases are available at the JDWNRH and clinicians can avail the tests for mothers with recurrent miscarriages or for whom fetal anomalies are detected by antenatal ultrasound.

Pregnancy-induced hypertension and preeclampsia/eclampsia are also important conditions associated with stillbirths. Severe pregnancy induced hypertension occurred in 12.5% and eclampsia in 1.1% of women who experienced stillbirth from 2006-2008[9]. Drugs for the treatment of pregnancy-induced hypertension are available in the referral and district hospitals in Bhutan as part of the National Essential Medicines List 2016[10].

Rhesus isoimmunisation had caused stillbirth in one case and two cases of fetal hydrops were noted in this JDWNRH study group. At present, antenatal ABO Rh blood grouping is done in all women at the antenatal booking.

Both primiparity and parity ≥5 have been associated with stillbirth in developing countries[4]. In our JDWNRH study, 42.7% of stillbirths were among primipara. It is crucial to document accurate obstetric history in the antenatal book that is distributed by the Reproductive Health Program, Ministry of Health.

Depending on the extent of placental separation, placental abruption contributes to as much as 7.5 to 42% of stillbirths[11]. In JDWNRH from 2006-2008, antepartum haemorrhage contributed to 4.2% of stillbirths. Umbilical cord accidents are another set of obstetric emergencies and were the fourth highest cause of stillbirth (8.3%) in JDWNRH from 2006-2008. However, at present many centres in Bhutan lack a specialist obstetrician and operating theatre facilities in such emergencies.

The burden of fetal anomalies is considered to be relatively constant throughout the world[12]. Fetuses with major anomalies that are born dead ranges from 2.1 to 33.3% depending on facilities available for early detection and intervention[13]. With anomaly screening scans available in many centres, cases with major malformations or anomalies are now referred to JDWNRH where a feto-maternal specialist is available. Of note, no autopsy was done during the 2006-2008 study period due to lack of experts. However, even with available experts, autopsy is not done even now due to cultural reasons. Chromosomal studies in this group were not done due to lack of facilities at that time.

Labour and birth is the time of highest risk where half of stillbirths occur[1]. Prolonged labour and obstructed labour are the leading causes of stillbirths especially in settings which lack facilities for early detection of fetal distress[14,15]. Standard guidelines need to be developed and health workers at all levels trained on use of the partograph and fetal monitoring. Cardiotocograph should be made available to all centres that serve as birthing centres across the country.

Intrauterine infection is another major cause of fetal death. In JDWNRH, pre-labour premature rupture of membranes contributed to 7.3% of stillbirths, chorioamnionitis was detected in 5.2% and prolonged rupture of membranes was detected in 3.1%. No standard protocol to manage these cases at different levels of health centres is yet available in the country.

We note that a substantial proportion of stillbirths remained unexplained, the second largest category in our study. As noted in the literature, unexplained stillbirths are dependent on the facilities and expertise available as well as proper documentation[16]. To complete classification of causes, genetic experts and forensic pathologists will be needed.

The risk of stillbirth at term increases with gestational age at term and particularly if the pregnancy is allowed to continue post-term. Use of ultrasound has played a major role in preventing this in centres where reliable dating scans were available[17,18]. However in Bhutan, accurate calculation of gestational age is difficult even at present due to lack of reliable menstrual history and unavailability of reliable dating ultrasound scans. Concerted efforts need to be taken to increase the coverage of antenatal care as well as encourage early booking. Health workers at all levels need to be trained on the use of the Maternal and Child Health Handbook that was introduced by the Ministry of Health, Royal Government of Bhutan in 2014.

We acknowledge that the data describes events several years in the past. However, no similar study has been conducted until now. This paper therefore provides an historical description of the rate and factors of stillbirths in Bhutan, permitting current and future comparisons to be made. It is urgent that an analysis of the current situation on stillbirth needs to be undertaken. We also recognize that in this paper, stillbirths were not studied in relation to period of gestation due to lack of reliable information which is the situation even now.

CONCLUSIONS

The rate of stillbirth was substantial in our population, and was related to many factors that can be potentially addressed. The majority of stillbirths occurred in women aged between 20 to 34 years and in primipara. The most common cause was congenital infections, severe pregnancy-induced hypertension, pre-labour premature rupture of membranes, chorioamnionitis, and prolonged rupture of membranes. Effort must be made to encourage early antenatal booking, follow up, early detection and standard management of antenatal and events during labour to prevent stillbirths.

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AUTHORS CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

PD: Concept, design, literature search, data collection and analysis, manuscript writing and review.

TD: Concept, analysis of data, study design, manuscript drafting and revision

Author agree to be accountable for all respects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

None

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