



RESEARCH ARTICLE

RISK FACTORS ASSOCIATED WITH STILLBIRTHS IN TERTIARY CARE HOSPITAL OF BUNDELKH AND REGION

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ARTICLE INFO

Article History:

Received 14th November, 2023

Received in revised form

16th December, 2023

Accepted 02nd January, 2024

Published online 29th February, 2024

Key words:

Stillbirth, Socioeconomic Status,
Risk factor.

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ABSTRACT

Background & Objective: Stillbirth is the most prevalent adverse outcome of pregnancy and devastating experience for parents as well as obstetricians. Due to India's highest contribution to the global burden of stillbirth, identifying and preventing modifiable risk factors of stillbirth is crucial. The objective of the study was to assess the various risk factors associated with stillbirths in tertiary hospital of Bundelkhand region. **Material and Methods:** A retrospective cohort study conducted in M.L.B. Medical College, Jhansi. All the deliveries conducted from Jan 2023 to Dec 2023 were included and assessed. For identification of cases, WHO definition of stillbirth is considered. Risk factors were derived from maternal characteristics, past medical history, pregnancy complications, intrapartum details and fetal characteristics. **Result:** A total of 3721 births in the tertiary care hospital, out of them 159 were stillbirths. The stillbirth rate accounts 42.73 per 1000 total births. The mean age of cases is 26.4±4.4 years. From 159 stillbirths, 125 (78.59%) were unbooked cases and 91(56.92%) were delivered by cesarean delivery. Half of these stillbirths (50.0%) occurred at 28- <37 weeks of gestation. 21.38% of stillbirths are due to small for gestational age followed by congenital anomaly and anemia which counts 20.75% and 20.13% respectively. 42.18% stillbirths were extremely low birth weight (ELVW), 30(18.57%) stillbirths were very low birth weight (VLBW). **Conclusion:** Preterm labor, anemia, congenital anomaly hypertensive disorder of pregnancy were highly associated with stillbirths in this study. All the risk factors can be minimized by early and timely screening for prompt detection and timely intervention will be barrier in stillbirths.

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Citation: Hema J. Shobhane, Suman and Vidya Chaudhary. 2024. "Risk Factors associated with Stillbirths in Tertiary Care Hospital of Bundelkhand Region". International Journal of Current Research, 16, (02), 27338-27342.

INTRODUCTION

The definitions of Stillbirth vary between country to country. The American College of Obstetricians and Gynecologists define it, when the fetus dies after week 20 of pregnancy and or weight of 500 gms and above (1). In India, a fetus ≥ 20 weeks of gestation with no signs of life is considered stillborn (2). Stillbirth is the most prevalent adverse outcome of pregnancy. Stillbirth is a major obstetrical complication and devastating experience for parents as well as obstetricians also a significant contributor to perinatal mortality among developed and developing countries. In 2015 the stillbirth rate (SBR) was 18.4/1000 total births worldwide (3). The rates vary within countries. In India, it is vary from 20 to 66 per 1,000 births in states. (4) In 2014 Every Newborn Action Plan (ENAP) develop a plan to reduce stillbirth <10 per 1000 births by year 2030. ENAP progress report 2019 reports more than 50% reporting countries fails to attain a target of 14/1000 or less stillbirth by 2020(5), so it is very essential to identify the causes of stillbirths so that possible preventive measures can

be suggested to decrease the rate of stillbirth(5). In India, the action plan saves thousands of life. Several medical and non-medical risk factors of stillbirth have been examined and documented by previous research (6). Multiple factors including lack of quality intranatal care, inadequate ANC services, maternal malnutrition and prevalent endemic infections could lead to perinatal death. Almost half of the stillbirth and early neonatal deaths occur during labour and delivery; with maternal factors including obstructed labour, pregnancy complications, most important hypertensive disorder of pregnancy (HDP) and infections. Foetal factors like prematurity, low birth weight were identified as the leading causes for stillbirth. The rate of stillbirth in many Indian states such as Uttar Pradesh (1.48%), Assam (1.28%), Bihar (1.13%), Odisha (1.09%), Jharkhand (1.06%) (7), Chandigarh (1.4%), Lakshadweep (1.4%), Jharkhand (1%), and Chhattisgarh (1%) was equal or more than 10 per 1000 births (8). The variations in definition of stillbirth always a barrier to the accurate assessment of stillbirth risk factors.

Stillbirth is still a mystery due to many undetermined causes. Pregnancy complications are the main cause of stillbirth. Intrauterine infection, birth asphyxia, hypertension, eclampsia, preterm labor, and insufficient prenatal care are significant contributors to stillbirth (9). The most common causes of stillbirth include bleeding before or during labor, placental abruption, infections, birth defects, poor lifestyle choices, lupus, clotting disorders, trauma, intrahepatic cholestasis of pregnancy (ICP), or obstetric cholestasis (10). There are some modifiable risk factors such as socioeconomic, place of residence, lifestyle related and comorbidities for stillbirth but knowledge about them is limited (11). Stillbirths represent a devastating pregnancy outcome. Early infection detection, place of residence, maternal age, education, employment status, birth order, birth interval, antenatal care visit, place of delivery, and mode of delivery are the factors which potentially reduce stillbirth. The study conducted to assess the various risk factors associated with stillbirths in tertiary hospital of Bundelkhand region.

MATERIALS AND METHODS

A retrospective study conducted in Obstetrics & Gynecology Department of M.L.B. Medical College, Jhansi which is also a tertiary care centre for bundelkhand region. The region consists of lower backward area and illiteracy.

Sampling technique and sample size: All the deliveries conducted from Jan 2023 to Dec 2023 were included and assessed. Total 3257 deliveries occurred during the study period. After taking approval from institutional ethical committee, the study design was conducted. The case records of all institutional deliveries were assessed to find out the number of stillbirths. Detail evaluation of records of stillbirth deliveries were done to identify the factors associated with it and note down in the predesigned proforma.

Identification of cases: By World Health Organization (WHO) definition of stillbirth as a "fetal death late in pregnancy"; in India fetus death weighing 1000 gms or >28 weeks of gestation (12,13). Risk factors were derived from maternal characteristics, past medical history, pregnancy complications, intrapartum details and fetal characteristics. The information regarding age, parity, body mass index (BMI), booking status, hypertension, preexisting diabetes, renal, cardiac, connective tissue disease and epilepsy were noted in predesigned proforma. Pregnancy related complications such as hypertensive disorders of pregnancy, gestational diabetes, maternal infections, antepartum haemorrhage or acute fatty liver of pregnancy were also be noted. Fetal characteristics were collected were gender, gestational age, birth weight, growth centile at birth and congenital anomaly.

Cause of death assignment was made in accordance with a modified version of the classification system proposed by Baird *et al.* and Pattinson *et al.* who adapted the system for use in developing country settings allowing for the identification of the following primary obstetrics causes of death: Spontaneous preterm labor (<37 weeks), infections, antepartum hemorrhage, intrauterine growth restriction, hypertension, fetal abnormality, trauma and intrapartum asphyxia, maternal disease, other unexplained intrauterine death and multiple pregnancy. (14,15) Statistical analysis

All the categorical variables were reported as frequency (percentage) and continuous variables as mean (SD). The contribution of demographic, medical risk factors that can be ascertained at the booking visit together with those that becomes apparent as pregnancy advances were analyzed. Data were tabulated and analyzed as percentages and proportions. Chi-square test was used as a test of significance to test the association.

RESULTS

During study period there were a total of 3721 births in the tertiary care hospital, out of them 159 were stillbirths. The stillbirth rate was 42.73 per 1000 total births. Most of still birth (82.13%) occurred in mothers of age 20-30 years. The mean age of cases is 26.4±4.4 years.

Table 1. Demographic characteristics of stillbirths

Variable	No. of cases	Percentage
Total births	3257	
Still birth	159	
Stillbirth rate per 1000	42.73	
Age		
<20	15	9.27
20-30	131	82.13
>30	13	8.18
Mean age	26.4±4.4	
Sex of stillbirth		
Male	81	50.90
Female	78	49.10
Parity		
Primi	54	34.26
Multi	105	65.74
Residence		
Rural	99	62.51
Urban	60	37.49
Literacy		
Illiterate	101	63.56
Literate	58	36.44
Antenatal care		
Booked	34	21.42
Unbooked	125	78.59
Mode of delivery		
Vaginal	68	43.08
Cesarean	91	56.92
Term/preterm		
Preterm	120	75.71
Term	39	24.29
Referred cases		
Yes	91	57.23
No	68	42.77

There is very small disparity in sex of stillbirth, it was 50.90% in male and in females it was 49.10. 65.74% of stillbirths from multiparas while only 34.26% are primiparas. Ninety nine (62.51%) stillbirths belongs to rural areas because of our tertiary centre is covered from rural areas and 37.49% stillbirths from illiterate mothers. Out of 159 stillbirths, 125 (78.59%) were unbooked cases and 34 (21.42%) were delivered by cesarean delivery. In this study 75.71% stillbirths are preterms and only 24.29% stillbirths are referred cases. The demographic characteristics are shown in Table 1. Half of these stillbirths (50.0%) occurred at 28- <37 weeks of gestation (Figure-1). In this study 21.38% of stillbirths are due to small for gestational age followed by congenital anomaly and anemia which counts 20.75% and 20.13% respectively. 14.47% stillbirths due to hypertensive disorder of pregnancy and in 10.69% cases cause of stillbirth is unknown.

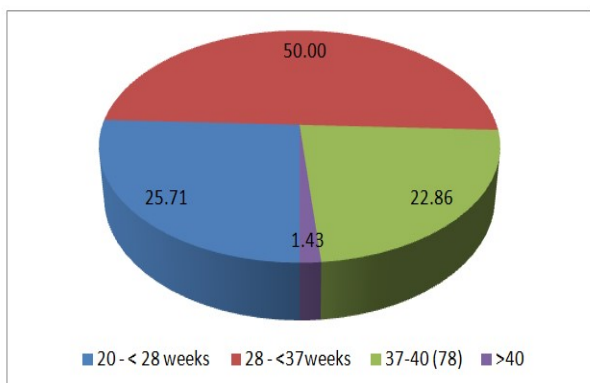


Figure 1. Gestational age at the time of stillbirth

There were 3.77% cases attributed to each intrapartum hemorrhage and preeclampsia/eclampsia; while cord prolapsed and maternal infection is the cause of infection in 1.89% cases each. There were 2 (1.26%) stillbirths due to cord prolapsed (Table 2).

Table no. 2. Risk factors for stillbirth

Variable	No.	%
Maternal Infection	3	1.89
Anemia	32	20.13
Eclampsia /peeclampsia	6	3.77
Hypertensive disorder of pregnancy	23	14.47
Intrapartum hemorrhage	6	3.77
Obstructed labour	2	1.26
Cord prolapse	3	1.89
Small for gestation age	34	21.38
Congenital anomaly	33	20.75
Unknown	17	10.69

Low birth weight was identified as a risk factor for stillbirth. Out of 159 stillbirths, 42.18% stillbirths were extremely low birth weight (ELVW), 30(18.57%) stillbirths were very low birth weight (VLBW) and 24.28% stillbirths were attributed by low birth weights. In this study 20/159 (12.57%) stillbirth are having normal birth weight (Table 3).

Table no. 3. Distribution of stillbirth cases by birth weight

Birth weight	No.	Percentage
500-999	67	42.18
1000-1499	30	18.87
1500-1999	22	13.84
2000-2499	17	10.69
2500-2999	18	11.32
3000-3499	5	3.14
3500-4000	1	0.63

DISCUSSION

The study findings revealed that the most important clinical factors for perinatal mortality in India include maternal anemia, age at parity, birth order of more than three, complications during pregnancy including preeclampsia, obstructed labor and intrapartum hemorrhage in particular and fetal factors primarily low birth weight and preterm birth. Among 3721 total births, 159 stillbirths (4.27%) were observed. The SBR was calculated to be 42.73/1000 births. According to a report in year 2018, the national range of SBR in India is 22 to 66/1000 births (16). It has decreased from 31.3/1000 births in year 2010 to 23.8/1000 births in year 2016(17).

Given the current rate of annual decline in Indian stillbirths of 4.5%, a higher diminution of 5.8%, in the current rates, is vital to achieve the ENAP goal (17). Most of still birth (82.13%) occurred in mothers of age 20-30 years. The mean age of cases is 26.4±4.4 years. Our study suggests that advanced maternal age is a known risk factor for both increased perinatal morbidity and mortality, the majority of the stillbirths. The study results by Rajshekher V. Mali *et al*(18) in which, 82% stillbirths were seen in the women between the age group of 20 and 30 years which is similar to the results of our study. Similar results were also seen in a study conducted by Rajagopal *et al.* (71.4%) (19). A higher prevalence of early marriage in India and completion of family before 30 years of life in women contribute the higher number of births and stillbirths in this age group. The significant contribution of this problem is also due to lack of awareness about pregnancy-related complications and poor access to obstetric care facilities. There is very low disparity in sex of stillbirth, it was 50.90% in males and 49.10% in females. Out of 159 stillbirths, 65.74% of stillbirths were from multiparas. Most of the stillbirths (62.57%) belongs to rural areas because of our tertiary centre is covered from rural areas and 63.56% stillbirths from illiterate mothers. This is because of, our tertiary care centre located at bundelkhand area in which total literacy rate and female literacy rates both are lowest in comparison with all the regions (20). According to census 2011, 77.9 percent of the population of Bundelkhand region living in rural areas which is slightly lower from 2001 (77.6 percent) (21). Our results were tie to the study by Rajshekher V. Mali *et al* (18) in which majority of the stillbirths 88 (51.46%), were found in women from the rural population. Dandona *et al.* also found higher stillbirths of 62.4% in the rural population (22). The quality care of pregnant women in peripheral health facilities is usually low, and women of high risks are referred late to tertiary care centers. The higher prevalence of stillbirths in the rural area suggests that there is still need of improvement in obstetric care as well as availability of emergency services in health centres at rural areas.

Out of 159 stillbirths, 125 (78.59%) were unbooked cases and 91(56.92%) were delivered by cesarean delivery, our results were well correlate with the study of Rajshekher V. Mali *et al*(18) in which stillbirths were more in unregistered women as compared to registered women, that is, 94 (54.97%) and 77 (45.03%) stillbirths, respectively. Our study also concurrence to a study conducted by Rajagopal *et al.*(19) who found unregistered stillbirths 54.4% vs. registered stillbirths 45.5%. This is due to the surveillance of high-risk pregnancies by professional health personnel and timely management in registered women results the low stillbirths in the registered women. In this study 75.71% stillbirths are preterms and 57.23% stillbirths are referred cases. Half of stillbirths (50.0%) occurred at 28- <37 weeks of gestation in our study which is concordance with the study of Rajshekher V. Mali *et al*(18) in which 52.63% were late stillbirths (28 weeks–36weeks and 6 days), whereas one-fourth of stillbirths 26.31% were early stillbirths (20–27 weeks and 6 days). In this study 21.38% of stillbirths are due to small for gestational age followed by congenital anomaly and anemia which counts 20.75% and 20.13 respectively. 14.47% stillbirths due to hypertensive disorder of pregnancy and in 10.69% cases cause of stillbirth is unknown. There were 3.77% cases attributed to each intrapartum hemorrhage and preeclampsia/eclampsia; while cord prolapsed and maternal infection is the cause of infection

in 1.89% cases each. There were 2 (1.26%) stillbirths due to obstructed labour. The prevalence of preterm delivery, hypertensive disorders of pregnancy, abruption, and congenital malformations with stillbirths was estimated to be 135 (78.94%), 33 (19.29%), 27 (15.79%), and 25 (14.62%) in the study by Rajshekher V. Mali *et al.* (18). In a study conducted by Sharma *et al.*, maternal conditions were 39.12% and unknown causes were 19.87% and ranked the highest in the causes of stillbirths in a tertiary care center in North India (23). Significant association of the stillbirth with maternal hypertension was also noticed in many studies conducted in India and other countries (24, 25-27). Antepartum hemorrhage was reported as one of the top five causes of stillbirths in all income setting countries (low, middle, and high) (28). Altijani *et al.* also observed 35% higher odds of stillbirths with anemia compared with women who did not have anemia (24). Low birth weight was identified as a risk factor for stillbirth. Out of 159 stillbirths, 42.18% stillbirths were extremely low birth weight (ELVW), 30(18.57%) stillbirths were very low birth weight (VLBW) and 24.28% stillbirths were attributed by low birth weights. In this study 20/159 (12.57%) stillbirth are having normal birth weight. Neogi *et al.* also declared that the possibility of mothers with preterm delivery was 4.5 times higher of having stillbirth compared to full-term delivery (29). The timely ultrasound scans at or before 20 weeks of gestation are highly recommended to detect lethal congenital anomalies early in pregnancy so that these are terminated within time, though burden of stillbirths due to congenital anomalies is reduced.

CONCLUSION

Small for gestational age i.e. Preterm labor, anemia, congenital anomaly hypertensive disorder of pregnancy were highly associated with stillbirths in this study. All the risk factors can be minimized by early and timely screening for prompt detection and timely intervention will be barrier in stillbirths. There is also need of implementation in health system in rural health peripheries to reduce the stillbirths. A unique regularize implementation of antenatal and intranatal care protocol is needed in both urban and rural settings for a better neonatal outcome. And last there is a need to increase literacy rate and awareness of maternal complications among women, which plays a significant role in better maternal and neonatal outcome.

Conflict of Interest: **None**

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