

# A Tale of Stillbirths at a Tertiary Care Center in Northeast India

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## ABSTRACT

**Aims and objectives:** To evaluate socioeconomic, demographic, and fetomaternal factors associated with stillbirths.

**Materials and methods:** An observational study conducted in Assam Medical College, India, over 1 year, included 542 stillbirths between 24 and 42 weeks of gestation. Continuous variables were studied using Mann-Whitney *U*/Independent *t*-test, other variables using Chi-square/Fisher's exact test as appropriate.

**Results:** Stillbirth rate (SBR) at our institution was 52.41/1000 births. Antepartum stillbirths were 67%. Mean age of mothers was 24.75 ± 4.78 years ( $p > 0.05$ ). Most belonged to rural place of residence (62.36%,  $p = 0.0013$ ), lower socioeconomic status (31%,  $p = 0.046$ ), lacked regular antenatal checkups (65.31% unbooked,  $p = 0.0142$ ), and traveled long distances to reach our center (47.97% traveled >20 km). Obstetrical (28%) and hypertensive (26%) complications were commonest causes ( $p < 0.05$ ). Most were multigravida (55.34%,  $p > 0.05$ ). Singleton pregnancies dominated at 92.62%, with mostly preterm (49.45%,  $p = 0.009$ ), mean birth weight of 2015 gm ( $p = 0.0023$ ), and 56.46% male fetuses ( $p > 0.05$ ). Maceration noted in 15.87% ( $p = 0.0002$ ).

**Conclusion:** Sociodemographic factors play an important role in stillbirths. Health education, strengthening peripheral health services, and proper care for reproductive age women can go a long way in prevention. To tackle stillbirths, one needs to detect and manage risk factors right from preconceptional period. The patient should be counseled regarding the importance of regular antenatal checkups and need for immediate care in case of appearance of red flag signs.

**Clinical significance:** Most of the stillbirths may have a common pathology behind their development. Hence, detailed evaluation, classification, and regular review of the causes will help better management and prevention of stillbirths in at-risk patients.

**Keywords:** Demographic factor, Hypertensive disorders of pregnancy, Observational study, Socioeconomic factor, Stillbirths, Stillbirth rate.

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## INTRODUCTION

Maternal health and neonatal outcome are two most important indicators of health care and development of a country. A stillbirth makes a negative impact on these statistics.

Global stillbirth rate (SBR) was estimated to be 18.4 per 1000 births, or around 2.6 million stillbirths each year.<sup>1</sup> One of the biggest problems in detecting and preventing stillbirths is the lack of information about why they happen, and not enough emphasis is given on their reporting at national level. Another hindrance to their statistics is the difference in definition of stillbirths used by different countries.

According to International Classification of Diseases (ICD)-11 by WHO, fetal death refers to sudden intrauterine death of fetus at any point in time during the pregnancy. Fetal death in the last half of pregnancy can also be called stillbirth. Further, ICD-11 classifies fetal death into antepartum and intrapartum: antepartum fetal death (stillbirth) refers to fetus having suffered intrauterine death after the 24th week of gestation and before onset of labor. An intrapartum fetal death (stillbirth), also known as a fresh stillbirth, refers to a baby having died during labor.<sup>2</sup>

The Perinatal Mortality Surveillance Report by CMACE defined stillbirth as "A baby delivered without signs of life after 23<sup>+</sup>6 weeks of pregnancy".<sup>3</sup>

The World Health Organization's (WHO) Every Newborn: An Action Plan to End Preventable Deaths aims to reach target SBR of 10 or less per 1000 total births by 2035 and to continue to close equity gaps.<sup>4</sup>

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This high rate of stillbirths warranted a detailed investigation of the causes leading to it, in order to predict and prevent them. A detailed evaluation of all the cases was done to study various sociodemographic and fetomaternal factors playing a role in stillbirths and the results were used to help identify at-risk patients and aid better management of such patients.

## MATERIALS AND METHODS

An observational study was conducted in Assam Medical College and Hospital, Dibrugarh, Assam, India, over a period of

1 year, among all cases that presented to and were treated at the Department of Obstetrics and Gynaecology.

All cases of stillbirth with gestational age >24 and <42 weeks period of gestation who consented to the study were included, which was a total of 542 cases of stillbirths. They were divided into antepartum stillbirths (intrauterine fetal demise prior to onset of labor – 67%) and intrapartum stillbirths (intrauterine fetal demise after onset of labor, prior to delivery – 33%). Detailed clinical history, general physical, systemic, obstetric examination, labor characteristics, baby details, and relevant investigations were recorded in a working pro forma, and finally, probable complications leading to stillbirth in those pregnancies were determined based on the above details.

The data collected were tabulated in Microsoft Excel Worksheet, and computer-based analysis was performed using the Statistical product and service solutions (SPSS) 20.0 software (SPSS, Chicago, Illinois, USA) and Microsoft Excel 2010. The categorical variables were summarized as proportions and percentages. Continuous variables were studied using Mann–Whitney *U*/Independent *t*-test, other variables were studied using Chi-square/Fisher’s exact test as appropriate.

**RESULTS**

During the study period, there were a total of 10,912 deliveries in our department, with a total of 572 stillbirths, out of which, 542 were considered for the study after applying inclusion and exclusion criteria. The SBR was 52.41/1000 births.

The total number of cases were divided into antepartum (367, 67.71%) and intrapartum (175, 32.29%) stillbirths, based on the timing of stillbirth.

Age of the mothers ranged from 18 years to 39 years (mean 24.75 ± 4.48 years). Most were unbooked cases, including those referred from outside (65.31%), only one-third were booked in our department (34.69%) (*p* = 0.0142). Illiteracy was very common, with almost one-third mothers (168) being illiterate. While the majority of the cases, 340 (62.73%), belonged to Lower (V) and Upper Lower (IV) socioeconomic classes, distribution was similar in both groups. The majority of the mothers included in the study were from a rural place of residence (62.36%), and only a third of the mothers were from urban place of residence. On comparing two groups, percentage of mothers from rural residence was significantly higher among the intrapartum group (70.86%). Most of the mothers traveled 21–50 kms to reach our maternity facility (40.22%) and took 1–3 hours (45.20%). Number of mothers traveling a longer distance (21–50 kms) was significantly higher in the intrapartum group (44%) (Table 1).

Table 2 describes the results of various maternal factors studied. Most of the patients conceived spontaneously (98.71%), 2 (0.37%) had conceived with ovulation induction. About 5 (0.92%) had conceived after ART (two cases belonging to a twin pregnancy and one from a triplet pregnancy). A total of 198 (36.54%) women had an existing medical disorder. Anemia was the most common disorder (23.62%), 14 (2.58%) were chronic hypertensives, 13 (2.39%) hypothyroidism, and 10 (1.84%) were diabetic. Medical disorders were higher in the antepartum group (41.69%). A previous history of stillbirth was present in 40 (7.38%) mothers. About 23.62% of the mothers had anemia, among them, 15.31% had mild-to-moderate anemia, while the remaining 8.3% had severe anemia. The percentage of mothers with severe anemia was more (10.63%) among antepartum stillbirth group. There was a significant

**Table 1: Sociodemographic factors in stillbirths**

Sociodemographic factors	Intrapartum stillbirth	Antepartum stillbirth	<i>p</i> -value
Mean maternal age (years)	24.48 ± 4.47	23.28 ± 18.27	0.3313
<b>Booking status</b>			
Booked in our department	48 (34.69%)	140 (38.15%)	0.0142
Unbooked in our department (includes referred cases)	127 (72.57%)	227 (61.85%)	
<b>Educational status</b>			
Illiterate	65 (37.14%)	103 (28.07%)	0.1277
Primary school certificate	25 (14.29%)	45 (12.26%)	
Middle school certificate	33 (18.86%)	75 (20.44%)	
High school certificate	32 (18.29%)	74 (20.16%)	
Intermediate or post high-school diploma	14 (8%)	55 (14.99%)	
Graduate	6 (3.43%)	15 (4.09%)	
Profession or honors	0 (0%)	0 (0%)	
<b>Socioeconomic status</b>			
Upper	0 (0%)	1 (0.27%)	0.0460
Upper middle	14 (8%)	39 (10.63%)	
Lower middle	36 (20.57%)	112 (30.52%)	
Upper middle	59 (33.71%)	113 (30.79%)	
Lower	66 (37.71%)	102 (27.79%)	
<b>Place of residence</b>			
Rural	124 (70.86%)	214 (58.31%)	0.0013
Urban	51 (29.14%)	153 (41.69%)	
<b>Distance to our maternity facility</b>			
<2 km	2 (1.14%)	5 (1.36%)	0.0285
2–5 km	16 (9.14%)	51 (13.90%)	
6–20 km	61 (34.86%)	147 (40.05%)	
21–50 km	77 (44%)	141 (38.42%)	
>50 km	19 (10.86%)	23 (6.27%)	
<b>Time taken to reach our maternity facility</b>			
<30 minutes	13 (7.43%)	42 (11.44%)	0.0095
30–1 hours	70 (40.0%)	117 (31.88%)	
>1–3 hours	67 (38.29%)	178 (48.50%)	
>3–6 hours	20 (11.43%)	28 (7.63%)	
>6–24 hours	5 (2.86%)	2 (0.54%)	

difference between severity of anemia and type of stillbirth (*p* = 0.0293). Most mothers were multigravida (51.29%), 44.65% being primigravida, and only <5% were grand multigravida. Among patients, 18.63% of the women had a history of prior abortions, about 10% were spontaneous abortions, and 8.63% were induced. The percentage of mothers with prior abortions was significantly higher in antepartum stillbirth group (22.34%). A large percentage of the stillbirths were preterm (49.45%), with a higher incidence in the antepartum group (55.86%) when compared with the intrapartum group (36%). The period of gestation was statistically significant between both groups (*p* = 0.0090).

The commonest presentation was cephalic (79.52%), 12.55% were breech, and 7.93% were transverse/others. Breech presentation significantly higher in the intrapartum stillbirths (17.71%) when compared with antepartum stillbirths (10.08%). Almost as much as



**Table 2: Maternal factors in stillbirths**

Maternal factors	Intrapartum stillbirth	Antepartum stillbirth	p-value
Mode of conception			
Spontaneous	171 (97.71%)	364 (99.18%)	0.3553
Ovulation induction	1 (0.57%)	1 (0.27%)	
Assisted reproductive techniques	3 (1.71%)	2 (0.54%)	
Medical disorders			
Anemia	35 (20%)	93 (25.34%)	-
Hypertension	0 (0%)	11 (2.99%)	
Hypothyroidism	1 (0.57%)	12 (3.26%)	
Hyperthyroidism	0 (0%)	3 (0.81%)	
Diabetes mellitus	5 (2.85%)	5 (1.36%)	
Others	11 (6.28%)	29 (7.86%)	
None	123 (70.28%)	214 (58.31%)	
Severity of anemia			
Mild (10–10.9 g/dL)	11 (6.29%)	18 (4.90%)	0.0293
Moderate (7–9.9 g/dL)	18 (10.29%)	36 (9.81%)	
Severe (<7 g/dL)	6 (3.43%)	39 (10.63%)	
Previous stillbirth			
Yes	15 (8.57%)	25 (6.81%)	0.4638
No	160 (91.43%)	342 (93.19%)	
Gravida			
Primigravida	83 (47.43%)	159 (43.32%)	0.6272
Multigravida	86 (49.14%)	192 (52.31%)	
Grand multigravida	6 (3.42%)	16 (4.35%)	
Prior abortion			
0 abortion	156 (89.14%)	285 (77.66%)	0.0159
1 abortion	14 (8.00%)	61 (16.62%)	
2 abortions	4 (2.29%)	16 (4.36%)	
3 or more abortions	1 (0.57%)	5 (1.36%)	
Period of gestation			
<28 weeks	18 (10.29%)	37 (10.08%)	0.0090
28 to <36 weeks	45 (25.71%)	168 (45.78%)	
36 to <40 weeks	89 (50.86%)	132 (35.97%)	
40 or more weeks	23 (13.14%)	30 (8.17%)	

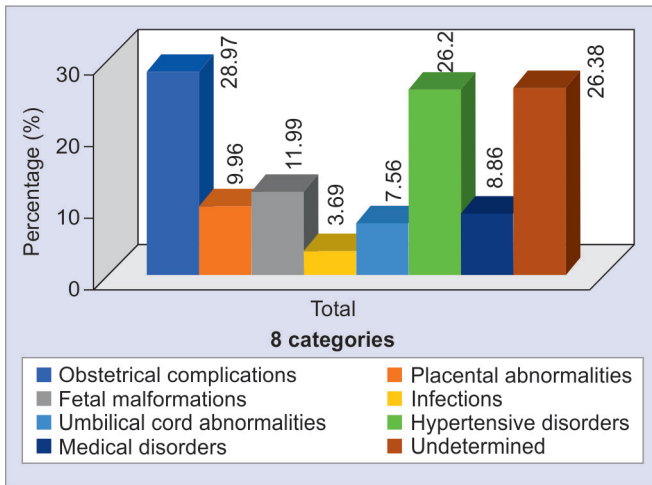
**Table 3: Labor and fetus characteristics**

Labor and fetus characteristics	Intrapartum stillbirth	Antepartum stillbirth	p-value
Presentation of fetus			
Cephalic	122 (69.71%)	309 (84.20%)	0.0004
Breech	31 (17.71%)	37 (10.08%)	
Others	22 (12.57%)	21 (5.72%)	
Initiation of labor			
Spontaneous	168 (96%)	179 (48.77%)	0.0000
Induced	5 (2.86%)	133 (36.24%)	
Not in labor	2 (1.14%)	55 (14.99%)	
Route of delivery			
Vaginal	123 (70.29%)	277 (75.48%)	0.5664
Vaginal birth after cesarean	9 (5.14%)	19 (5.18%)	
Lower segment cesarean section	35 (20.00%)	59 (16.08%)	
Laparotomy	8 (4.57%)	12 (3.27%)	
Liquor quantity			
Normal	107 (61.14%)	241 (65.67%)	0.0004
Reduced (AFI <5 cm)	52 (29.71%)	119 (32.43%)	
Polyhydramnios (AFI >25 cm)	16 (9.14%)	7 (1.91%)	
Liquor color			
Clear	131 (74.86%)	288 (78.47%)	0.0449
Meconium stained	33 (18.86%)	43 (11.72%)	
Blood stained	11 (6.29%)	36 (9.81%)	
Number of fetus			
Singleton	163 (93.14%)	338 (92.10%)	0.2344
Twins	10 (5.71%)	29 (7.90%)	
Triplets	1 (0.57%)	0 (0%)	
Baby weight at birth			
<1000 gm	18 (10.29%)	49 (13.35%)	0.0023
1000–1500 gm	19 (10.86%)	74 (20.16%)	
1501–2000 gm	21 (12.00%)	69 (18.80%)	
2001–2500 gm	54 (30.86%)	74 (20.16%)	
2501–3000 gm	44 (25.14%)	72 (19.62%)	
>3000 gm	19 (10.86%)	29 (7.90%)	
Sex of the fetus			
Male	90 (51.43%)	216 (58.86%)	0.1029
Female	85 (48.57%)	151 (41.14%)	
Gross appearance of fetus at birth			
Macerated stillbirth	13 (7.43%)	73 (19.89%)	0.0002
Fresh stillbirth	162 (92.57%)	294 (80.11%)	

two-third of the mothers went into labor spontaneously (64.02%). About 10.52% of the cases were taken up for LSCS/laparotomy before onset of labor. About 2.86% of cases of intrapartum stillbirth group were induced labor. About 36.24% patients among antepartum stillbirths needed induction. Most delivered vaginally (73.80%), vaginal birth after cesarean section was conducted among 5.17% of the patients. The two groups were compared similarly. Previous LSCS and placenta previa were the two most common indications for LSCS/laparotomy. Laparotomy was done in 19 women for uterine rupture. Abruptio was the indication for LSCS in 14 cases, while 2 were operated for induction failure. Liquor quantity was found to be within normal limits for 64.21% of the pregnancies. Polyhydramnios was significantly higher in the intrapartum group (9.14%) ( $p = 0.0004$ ). Liquor was clear in most of the cases (77.31%), 14.02% had meconium-stained liquor, and 8.67% of the cases had blood-stained liquor. Meconium-stained liquor was significantly higher in intrapartum stillbirths (18.86%). About 23.62% of the babies weighed between 2001 and 2500 gm.

The percentage of babies less than 2000 gm was significantly higher in the antepartum group. Among the 542 cases, 502 were from singleton pregnancies, 39 cases were twins (17 mothers with one stillbirth, 11 mothers with 2 stillbirths), and 1 was triplet pregnancy. Though, majority of stillbirths did not show maceration at birth (84.13%), it was significantly higher among antepartum stillbirths (19.89%) (Table 3).

The causes were grouped under the eight categories mentioned by the Stillbirth Collaborative Research Network Study (SCRN)<sup>5</sup> (Fig. 1). When the eight groups were compared, obstetrical



**Fig. 1:** Distribution of cases of stillbirth, based on the 8 categories under Stillbirth Collaborative Research Network (SCRN)

complications (28.97%) and hypertensive disorders (26.20%) were the commonest. In 26.38% of cases, the cause of stillbirth remained undetermined.

## DISCUSSION

Stillbirth rate varied widely based on place of study and definition of stillbirths in different studies. The present study reported SBR of 52.41/1000 births, Kothiyal S et al.<sup>6</sup> (Queen Mary, King George Medical College and University, Lucknow, Uttar Pradesh, 2018) reported 78.30/1000 births, Singh A and Kumar M.<sup>7</sup> (Lady Hardinge Medical College, New Delhi, 2019) reported 29.15/1000 births, and Archibong El et al.<sup>8</sup> (Abha Maternity Hospital (AMH) Assir, Saudi Arabia, 2003) reported a SBR of 10.1/1000 births. We faced a higher number of stillbirths, as ours is a tertiary care center attending to referred cases from peripheries. Most of the high-risk cases from the periphery were referred here and would have severe maternal morbidity, lacked appropriate antenatal care, presented in late stages/obstructed labor, or were referred on diagnosis of IUFD by ultrasonography. Developing and underdeveloped countries have higher incidence of intrapartum stillbirths due to poorer healthcare facilities and access, untimely and lesser cesarean sections, prolonged or obstructed labor (attributed to small maternal pelvis resulting from childhood malnutrition), perinatal infections, and trauma.

A young mean age found in this study was attributable to early age of marriage, pregnancy, illiteracy, and reduced contraceptive usage in Assam.<sup>9</sup> Pregnancies in older age group (>35 years) were uncommon in our institute. Assam is one of the educationally backward states in India, with particularly low literacy rate among the tea garden community. In this study, about one-third of mothers (31%) were illiterate, which was similar to a study done by Kothiyal S et al.<sup>6</sup> (37.1%). In a study by Altijani et al.,<sup>10</sup> illiteracy among mothers with stillbirth was reported to be much higher (51.6%). Most women belonged to lower socioeconomic groups (62.73%). Even Kothiyal S et al.<sup>6</sup> reported a similar percentage of mothers from poor background (56%). The incidence of stillbirths was higher in rural population and this has been reported in multiple studies. The study by Altijani N et al.<sup>10</sup> reported an incidence as high as 87.4% among the rural population. The distance traveled to reach

the maternity center and time-taken findings were analogous to the study by Kothiyal S et al.<sup>6</sup>

The incidence of stillbirths increases with increasing gravidity. This was also seen by Archibong El et al.,<sup>8</sup> who reported 52.35% of stillbirths among grand multigravidae. A study by Silver RM et al.<sup>5</sup> reported a higher percentage of stillbirths among the preterm (83.2%). Preterm live births and preterm stillbirths are interconnected as the pathological process could be the same for both.<sup>11</sup> Low birth weight was significantly higher among antepartum stillbirths. IUGR was another risk factor, which partly explained the low birth weight.<sup>12,13</sup> The incidence of stillbirth is slightly higher among male fetuses. The exact reason behind this is still not fully understood. Maceration was usually higher among antepartum stillbirths, similar to what was seen by Patel S et al.<sup>14</sup> This also helped distinguish between intrapartum and antepartum stillbirths.

In some cases, more than one probable cause was present. In this study, obstetric complications were most common, as was seen in a study by Silver RM et al.<sup>5</sup> Among the obstetrical complications, abruptio was most common. The next most common group was that of hypertensive disorders (26.20%). High incidence of stillbirths with HDPs was attributed to a higher incidence of hypertension among tea garden population, which make up most of our hospital beneficiaries. The cause of almost up to one-fourth of cases remains undetermined. This could partly have been due to the low autopsy rate and lack of other genetic investigations in our study.

## CONCLUSION

Stillbirth and pregnancy losses are not given enough importance despite their high occurrence. With no standard/universal definition for stillbirths, stillbirth data remain incomplete. Stillbirth data should not be kept stale, it should be updated regularly and used for national policy makings. The SBR should be promoted as an important indicator of health care in a country, as it is equally important as neonatal death/maternal death. Stillbirth rate reduction should be included in the millennial development goals. Regular reporting and updating of stillbirth data can prove to be a very helpful measure in the long run.

Sociodemographic factors play an important role in stillbirths. Health education camps, strengthening peripheral health services, and proper care for reproductive age women can go a long way in prevention. To tackle stillbirths, one needs to detect and manage risk factors right from preconceptional period. The patient should be counseled regarding the importance of regular antenatal checkups and need for immediate care in case of appearance of red flag signs.

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