

Epidemiology of stillbirth: A cross-sectional study in a tertiary care center located in central India

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Abstract

To measure regional stillbirth rate, to classify according to CODAC and to determine the sociodemographic, maternal, fetal, and intrapartum factors of stillbirths. This was a cross-sectional, cohort study conducted over a year between April 2016 to March 2017 in a teaching hospital, Government Medical college and hospital, Nagpur, which is a tertiary care center located centrally in India. All the deliveries occurring during study period were evaluated, and stillbirths at ≥ 28 weeks of gestation (antepartum or intrapartum) or birth weight ≥ 1000 grams studied. Risk factors were identified and cause of stillbirth was classified according to Cause of death and associated conditions (CODAC) classification. Stillbirth rate was 34.9/1000. 316 (84.49%) were antepartum and 58(15.5%) were intrapartum deaths. Total 48.6% stillbirths occurred to the women in the age group of 21-25 years. Most of the stillbirths were preterm (65%). 41.42% babies had low birth weight. More than half of the stillbirths were associated

with factors like hypertension, antepartum haemorrhage and intrauterine growth restriction. 5.6% stillbirths were idiopathic. Providing quality health care services at grass root level, proper antenatal care, and prompt referral can reduce the magnitude of stillbirths.

Keywords

Stillbirths; regional stillbirth rate; risk factors; CODAC classification; hypertension

I. Introduction

In 2015 WHO reported that there were 2.6 million stillbirths globally, with more than 7178 deaths a day [1]. Majority of these deaths (98%) occur in low and middle income countries with three fourths in South Asia and sub-Saharan Africa. India has the highest number of stillbirths in the world; the rate ranges from 20-66 per 1000 births in different states [2]. In high income countries, the third trimester stillbirth rate is less than 4 per 1000 total births [2].

Perinatal mortality has always been a concern for the policy makers but stillbirths, have not received due attention. Still-births are ignored and not counted in many societies on policy, program, and investment and often also at the national level [3,4]. Inconsistent use of terminology has contributed to confusion about stillbirths [4]. The terminology has changed over time and, despite clear worldwide guidelines, there is much variation between countries, with great variability in high and low income countries [5].

The low policy attention despite high burden is probably because of data deficits, absence of consensus for programme priorities, absence of uniformity in

classification of stillbirths and variable etiological factors worldwide in low and high income group countries [2].

Classifying fetal deaths helps in identifying the probable etiology and helps in formulating prevention policies and protocols. There are many classifications to ascertain etiology of perinatal deaths. Tulip, extended Wigglesworth, modified Aberdeen, Re Co De, PSANZ-PDC, CODAC are some classifications in current use [6,7,8].

Although world's two third stillbirths occur in low and middle income countries like India, there is paucity of research work and publication regarding this subject [9]. There are regional variations for causal factors for stillbirths. An understanding of the causative factor would enable to develop the interventions that could prevent stillbirth in that region.

The present study was done with the objective to measure regional stillbirth rate, to classify according to CODAC and to determine the sociodemographic, maternal, fetal, intrapartum factors of stillbirths.

II. Material and Methods

Study setting

This cross-sectional cohort study was conducted between April 2016 to March 2017 in a teaching hospital, Government Medical college and hospital, Nagpur, which is a tertiary care centre located centrally in the country. The hospital has a busy obstetrics department with about 10,000 deliveries annually. More than half of these women are referred from surrounding regions with a radius of 100-150kms. All pregnancies with the outcome of 'stillbirth' were included in the study.

'Stillbirth' was defined according to the 10th edition of the International Classification of Diseases (ICD-10), fetal death at a birth weight of 1000 g or more, or a gestational age of 28 weeks or more [10].

Data collection

An approval from the Institutional ethics committee was obtained before initiating this study. All the women (after 28 weeks of gestation) who were referred as cases with intra-uterine fetal death, or women in whom the fetal heart sounds were not audible in the antenatal OPD or wards, intrauterine death was confirmed by ultrasound. On ultrasound; gestational age, location of placenta, any retroplacental hematomas, volume of liquor and presence of anomalies were also noted. A detailed history was taken including the age, parity, booking status, socioeconomic status,

obstetric history, history of present illness and personal history regarding any drug intake or any medical and surgical illness or trauma. All their medical records were scrutinised and findings were noted. Gestational age was assessed from first or second trimester ultrasound if available and menstrual history. Following a general, systemic and obstetric examination, the women were subjected to the routine investigations and additional investigations according to the relevant condition.

All the antenatal obstetric and medical complications, mode of induction of labour, duration of labour, intrapartum events and mode of delivery were noted. After delivery:

1. Fetus was examined for any external obvious congenital malformations, signs of maceration and weight was recorded on electronic weighing machine.
2. Cord was examined for any loops around body and neck, number of vessels and if prolapse was present it was noted.
3. Placenta was examined for size, weight, retroplacental hematomas, calcifications and infarcts. Placenta was sent for histopathological examination in possible cases.
4. Amniotic fluid was seen for colour and volume. Signs of any chorioamnionitis, if present, were noted.

Similar procedure was followed for women having intrapartum stillbirths. The risk factors present were grouped as socio-demographic, pre-natal, intrapartum and fetal. Lastly the most appropriate single cause found for each still birth was classified according to

Cause of fetal death and associated conditions (Modified from CODAC SIMPLIFIED) given in Standard Operating Protocols for stillbirths by WHO [11]. For the stillbirths for whom any cause could not be ascertained was classified as unexplained.

All the collected data was entered, analysed using Microsoft Excel 2010. Descriptive analysis which includes frequency distribution showing number and percentages were generated for each identified variable.

III. Results

During the study period, there were total 10,689 deliveries conducted in the Obstetrics and Gynaecology department of our hospital, out of these 374 were stillbirth. The stillbirth rate was 34.9/1000 births. Out of 374 stillbirths, 316 (84.4%) were antepartum and 58(15.5%) were intrapartum. Data were extracted and various risk factors were categorized into socio-demographic, pre-natal, intra-partum and fetal factors.

Socio-demographic factors associated with stillbirths

Six socio-demographic factors (Table 1) were reviewed as determinants of stillbirths. Mean age of mothers who delivered stillborn was 26.16±4.39 years. Mean parity was 1.8±0.93. Majority belonged to rural area, and booked at secondary level of care. Maximum patients 327 (87.4%) were referrals and remaining were booked patients of our hospital. There were no women with smoking or alcohol addiction, one woman was tobacco chewer.

Pre natal factors

Table 2. summarizes the antenatal complications. More than one factor may be present in one patient. Hypertension, anemia, abruption, various acute infections were significantly associated with stillbirths. There were three cases of sickle cell disease, five cases of HIV, thirteen cases of acute viral hepatitis, one case of dengue fever, and few other febrile illnesses. No case of syphilis and malaria was detected in our study.

Intrapartum factors

Few women who delivered stillborn came in a state of prolonged labour, or had signs of obstructed labour or uterine rupture. (Table 3) Most of the women with antepartum IUD had to be induced according to their Bishops score. Out of 374 stillbirths 75.4% delivered vaginally, 22.4% had caesarean delivery. The most common indication for caesarean being abruptio placentae, eclampsia, severe pre-eclampsia, previous one, two or more caesarean scars.

Fetal factors

Majority of stillborn babies belonged to very low birth weight (mean weight 1.79 ± 0.61 kgs) and were preterm (Mean gestational age 35.15 ± 3.50). IUGR babies were present in 22.4% of cases. Congenital malformations were in 5.88% cases. Two cases were of transverse lie with hand prolapse, remaining were breech, associated with prematurity. Out of 18 cases of multiple pregnancies, five cases of twin pregnancies both babies were stillborn, in remaining cases one was stillborn. (Table 4). 242 (64.7%) were macerated, remaining 132 (35.29%) were fresh stillborn.

Analysis of intrapartum deaths

Out of the 132 babies who were fresh stillborn, 58 were intrapartum deaths. Out of these 34 (58.62%) cases were of eclampsia, severe pre-eclampsia or abruption who were induced due to severe morbid condition and had stillbirth. The method of induction in these cases was Foley's catheter insertion, misoprostol tablet or oxytocin, depending on Bishop's score. Mean duration of labour was 16.08 ± 5.85 hours. Out of these 26 (44.82%) cases had very low birth weight and gestation was more than 32 weeks and all these had severe IUGR. Remaining cases were of cord prolapse (4), congenital anomalies (5), severe IUGR (4), acute viral hepatitis (4) severe fetal bradycardia on admission (2), others (5).

Co-relation of placental histopathology

Out of 374 stillbirths we could obtain the histopathological results of 213 placentae. In patients of hypertension and abruption prominent findings were of extensive syncytial

knotting, chorangiosis, calcifications, hemorrhages and infarction. IUGR placentas had syncytial knotting, fibrinoid necrosis, calcification and areas of haemorrhage. In infective pathology we found focal areas of inflammatory infiltrate, areas of increased vascularity. In one patient of unexplained fetal death there was two vessel cord; in remaining patients with unexplained fetal deaths and cord accidents the pathology was unremarkable.

Classification of cause stillbirths by modified CODAC

Table 5. summarises the cause of deaths as identified. Each stillbirth was attributed to a single most appropriate cause. The commonest cause was hypertension, abruption, and IUGR. In 5.6% cases no cause was found.

IV. Discussion

Studies from India reveal no particular pattern with significant variations depending on geographic regions and socioeconomic conditions. This is due to marked regional variations in healthcare indices between regions. It also varies from the hospital settings, time duration of the studies and study designs. The stillbirth rate in our study is lower than the studies in Bengal state, Sujata et al [12] had (110.69), Bhattacharya et al [13] had (59.76) while it is almost same in the studies in Maharashtra region like Avachat et al [14] had (40), Korde-Nayak [15] had (35.2) but Ghumre et al [16] had higher rate (51) in their study carried out in western Maharashtra. The rate is less (20) in southern states like

Kerala [2]. Developed countries have rate as low as 4.5/1000 [2].

In our study, maximum stillbirths occurred in the age group of 21-25yrs and 5 % of stillbirths were contributed by 16-20 yrs of age group. 47.5% were primigravidae which correlates with the findings of one study [16], while in other studies [14, 15] maximum were multigravidas. Most of our patients (67.9%) belonged to rural area, belonged to low socio economic strata, and had low literacy levels contributing to poor access to quality healthcare services. Other authors [13, 15] have reported similar observations in their studies.

Most of the cases (84.4%) were antepartum of stillbirths. This is because the patients were referred to our facility with diagnosed intrauterine death. Intrapartum stillbirths (15.5%) usually occurred in those patients who had severe morbid conditions like hypertension, severe IUGR, congenital anomalies and they were induced or delivered spontaneously and intrapartum stillbirth occurred. This is in contrast to the other studies [15, 17] that had 41.7% and 49% intrapartum stillbirths. Our hospital rate of intrapartum stillbirth is similar to developed countries (14%) [2].

Preterm pregnancies accounted for 65% stillbirths, out of which 25% were early preterm. These findings similar to other studies [14, 15, 16] which found preterm births associated with stillbirths. Remaining 35% were term deliveries suggesting that these

stillbirths could be prevented by proper antenatal care, meticulous intrapartum care and timely transportation. Suboptimal antenatal care, delay in identifying the high risk factors and reaching the higher facility are mainly responsible for majority of still births.

More than half of stillborn foetuses weighed more than 1.5 kilogrammes, which could have been saved by good neonatal care if born alive. Other studies [14, 16] have also shown similar findings.

Routine screening and selective termination of pregnancy can reduce deaths caused by congenital malformations and chromosomal abnormalities. In our study 5.8% cases were due to congenital malformations. Other studies [15, 16] have reported higher rate of malformations.

The relationship between fetal sex and pregnancy outcomes is unclear. But studies have shown that male sex is an independent risk factor for adverse pregnancy outcome [18]. In our study 56.9% were male foetuses. Some studies [17, 19] have also recorded male preponderance.

Most common cause of stillbirth in our study was pre-eclampsia, eclampsia and its complications (29.4%). It results in chronic placental insufficiency and intra uterine growth restriction. Hypertensive disorders of pregnancy have been identified by previous workers as an important determinant of stillbirth [14, 16, 20]. Majority of the cases of severe hypertension were undetected during antenatal period and detected first time after intra uterine death.

Second largest cause was antepartum haemorrhage (26.4%), majority being accidental haemorrhage. Most of them were associated with hypertension. Similar observations were reported by other studies [14,15]. Maximum patients presented with severe vaginal bleeding with more than 50% placental separation. Even if they had mild bleeding with marginal separation, it became severe till they reached our facility resulting in fetal mortality and maternal morbidity. The mortality figures reported from developed countries are several fold less than those reported from low and middle income countries [2, 20]

Fetal growth restriction is the cause present in 9.09% cases directly. It was also associated indirectly with hypertension, severe anemia, maternal infections and chronic maternal illness. Multiple pregnancies directly leading to stillbirth was present in 5 cases.

Intrapartum cause of stillbirth was present in 6.4% of cases. Most of the cases of prolonged labour obstructed labour, rupture uterus presented late at our facility. The poor outcome experienced in these cases is a consequence of failure to identify the condition at referring level and delayed presentation to the higher health facility by patients, resulting in poor outcome, as in other studies [14,15,19]

Surprisingly we could attribute only 4.54% cases of stillbirth to maternal anemia in contrast to one study [16] although 90% of our antenatal patients have anemia of varying degrees. This might be because of availability of iron and folic acid tablets free of cost by government supply and hypertension

taking over anemia. Severe anemia causes foetal hypoxia and growth restriction.

In many of the patients with stillbirth more than one risk factor was present but we assigned single cause which was most relevant in the particular case. In 5.6% cases we could not assign any cause and labelled as unclassified or unknown. Most of the authors reported a higher idiopathic cause [14,15,16,19]. None of them had used CODAC system of classification. This method of classification yielded a fairly less number of idiopathic cases.

There was no case of syphilis and malaria in our study, which is common in some African countries [2]. Instead we had cases of acute fulminant hepatitis (E and A) leading to foetal mortality.

In case of difficult labor, the transport is fraught with logistic problems and by the time they reach tertiary centre, may suffer from complications like eclampsia, obstructed labour, cord accident, antepartum haemorrhage, and rupture uterus thus saving the fetus becomes difficult.

V. CONCLUSION

Major factors associated with stillbirths were hypertension, antepartum haemorrhage, IUGR in our study although these are not preventable but the related complications, that may lead to stillbirths, can be averted by strengthening the antenatal services, identifying the high risk cases, early referral to tertiary centre and timely delivery. Sensitisation and training is essential for managing hypertension along with skills like proteinuria measurement and monitoring at grass root level, as maximum

patients are referrals from periphery. Screening methods and predictors of pre-eclampsia, studies for detailed placental pathological etiology are the areas for research. Early detection of fetal hypoxia and timely caesarean delivery in cases, where fetal survival ex utero is possible, are important steps of management.

India New born Action Plan 2014 aims at reducing the stillbirth rate of India to less than 10 from present 22/1000 live births by 2030 and has launched various programmes to address maternal and child health issues [21, 22]. At the healthcare facility, all stillbirths must be scrutinised by institutional audit committee of stillborn to find out the cause and delays based on guidelines given by WHO so that the delays should be traced at each level and rectification measures could be taken accordingly [23].

LIMITATIONS OF THE STUDY

One of the limitations was lack of control group for comparison that would have identified the risk factors with more accuracy. A large case-control, multicentric, population based study could be done to ascertain the causes in the entire population. Other limitation of the study was the failure to conduct perinatal autopsies, genetic and molecular studies on the stillborn babies due to poor resources and funding.

Contribution to authorship:

Moushmi Parpillewar has conceived and designed the study. Collected and recorded all the data, analysed and prepared the

manuscript. Suchita Mundle and Juzar Fidvi were contributory in designing and analysis of the study.

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Details of ethics approval:

The study was approved by Institutional Ethics Committee, Department of Pharmacology, Government Medical College, Nagpur. Letter no 795 EC/Pharmac/GMC/NGP dated 9th March 2016.

VI. References

- [1]. World Health Organization. Maternal, new born, child and adolescent health. http://www.who.int/maternal_child_adolescent/epidemiology/stillbirth/en/ (accessed June 2015).
- [2]. Joy E Lawn, Hannah Blencowe, Robert Pattinson, Simon Cousens, Rajesh Kumar, Ibinabo Ibiebele, et al Stillbirths: Where? When? Why? How to make the data count? Lancet 2011; 377: 1448–63
- [3]. Immpact Population Reference Bureau Fact-sheet. Evaluating Stillbirths: Improving stillbirth data could help make stillbirths a visible public health policy. University of Aberdeen, Population Reference Bureau (PRB), United Kingdom, 2007.
- [4]. Froen JF, Cacciatore J, McClure EM, Kuti O, Jokhio AH, Islam M, et al. Stillbirths: why they matter. Lancet 2011; 377:1353-66.
- [5]. Woods R. Long-term trends in fetal mortality: implications for developing countries. Bulletin of World Health Organisation 2008; 86: 460–66.
- [6]. Woods R. Death before birth: Fetal Health and Mortality in Historical Perspective. New York: Oxford University Press, 2009.
- [7]. Vicki Flenady, Frederik Froen, Adrian Charles, Halit Pinar et al: An evaluation of classification systems for stillbirth BMC Pregnancy Childbirth. 2009; 9: 24. Published online 2009 June 19. doi:10.1186/1471-2393-9-24
- [8]. Gardosi J, Kady S, McGeown, et al. Classification of stillbirth by relevant conditions at death (Re Co De): population based cohort study. British Medical Journal 2005; 331:1113–7.
- [9]. Joy E Lawn, Hannah Blencowe, Peter Waiswa, Agbessi Amouzou, Colin Mathers, Dan Hogan, et al Ending preventable stillbirths : rates, risk factors, and acceleration towards 2030 Lancet 2016; 387: 587–603
- [10]. WHO. International Classification of Diseases 10th revision (ICD-10). <http://www.who.int/classifications/icd/en/> (accessed Dec 9, 2015).
- [11]. SOPs –Stillbirth WHO apps.searo.who.int/npn/Documents/StillBirth.pdf
- [12]. Sujata, Das V, Agrawal A. A study of perinatal deaths at a tertiary care hospital. Journal of Obstetrics and Gynecology India. May/June 2008;58(3):235-238.
- [13]. Bhattacharya S, Mukhopadhyay G, Mistry PK, Pati S, Saha SP. Stillbirth in a Tertiary Care Referral Hospital in North Bengal - A Review of Causes, Risk Factors and Prevention Strategies. Online Journal of Health Allied Sciences. 2010;9(4):4.

- [14]. Shubhada Sunil Avachat, Deepak B. Phalke, Vaishali D. Phalke. Risk factors associated with stillbirths in the rural area of Western Maharashtra, India Archives of Medicine and Health Sciences / Jan-Jun 2015 / Vol 3 | Issue 1
- [15]. Korde-Nayak VN, Gaikward PR. Causes of Stillbirth. Journal of Obstetrics and Gynecology India. July/Aug2008;58(4):314-318.
- [16]. Jitendra P. Ghumare, Morey et al Epidemiology of Stillbirth: A study in a tertiary care hospital located at a rural area of Northern Maharashtra, India, Indian Journal of Obstetrics and Gynecology Research 2016;3(4):326-329
- [17]. Goswami Bivarani. A retrospective study of intra-uterine fetal deaths at a tertiary care centre IJHRMLP, Vol: 02 No: 01 January, 2016 pages 68-72
- [18]. Di Renzo GC, Rosati A, Sarti RD, Cruciani L, Cutuli AM. Does fetal sex affect pregnancy outcome? Gender Medicine 2007 Mar;4(1):19-30.
- [19]. Patel S, Shirpurkar M et al A retrospective study to evaluate etiological factors associated with intrauterine fetal death at tertiary referral centre. Indian Journal of Obstetrics and Gynecology Research 2016 Apr;5(4):970-975.
- [20]. Cande V, Ananth and Olga Basso: Impact of Pregnancy-Induced Hypertension on Stillbirth and Neonatal Mortality in First and Higher Order Births: A Population-Based Study Epidemiology. 2010 Jan; 21(1): 118–123.
- [21]. India Newborn Action Plan. Ministry of health and Family Welfare, September 2014.
- [22]. Kumar S, Bhatnagar S, Saxena M. Mother and Child Tracking System. Lead Story. Informatics 2012;20(4):4-8.
- [23]. Making Every Baby Count: Audit and Review of Stillbirths and Neonatal Deaths , World Health Organization 2016 Audit Guide

Table 1. Sociodemographic factors

S. No	Variable	Number n=374(%)
1.	Age in years	
	16-20	19 (5%)
	21-25	182 (48.6%)
	26-30	125 (33.4%)
	31-35	36 (5.6%)
	>35	12 (3.2%)
2.	Educational status	
	Illiterate	12 (3.2%)
	Primary	58 (15.5%)
	Middle-higher secondary	288 (77%)
	Graduate and more	16 (4.2%)
3.	Parity	
	Para 1	178(47.5%)
	Para 2	121(32.3%)
	Para 3	75(20.05%)
4.	Type of area	
	Rural	254 (67.9%)
	Urban	94 (25.13%)
	Semi urban/slum	26 (6.9%)
5.	Booking status	
	Primary level	65 (17.3%)
	Secondary level	137 (36.6%)
	Tertiary level	61 (16.3%)
	Private	83 (22.1%)
	Unbooked	28 (7.4%)
6.	Addictions	
	Smoking, alcohol and tobacco	2 (0.53%)

Table 2. Pre natal risk factors

S. no	Risk factor	Number
1.	Medical disorders	
	Hypertension	101(27%)
	Anemia (moderate/severe)	68(18.18%)
	Diabetes mellitus	7(1.87%)
	Heart disease	8(2.13%)
	Cholestasis	5(1.33%)
	Hypothyroidism	10(2.69%)
	Liver parenchymal disease	1(0.26%)
	Renal parenchymal disease	1(0.26%)
	2.	Placental
Abruption		90(24.06%)
Praevia		9(2.4%)
3.	Infections	27(7.21%)
4.	Others	
	Snake bite	1(0.26%)

Table 3. Intrapartum factors

S. no	Risk factor	Number
1.	Prolonged labour	3(0.80%)
2.	Obstructed labour	4(1.06%)
3.	Uterine rupture	6(1.60%)
4.	Fetal hypoxia	9(2.40%)
5.	Malpresentations	35(9.35%)
6.	Cord accidents	
	Loops	27(7.21%)
	Knots	1(0.26%)
	Prolapse	7(1.87%)
7.	Type of labour	
	Induced	148(39.57%)
	Spontaneous	134(35.82%)

Table 4 Fetal factors

S. no	Risk factor	Number
1.	Fetal weight*	
	Very low birth weight	176(46.43%)
	Low birth weight	157(41.42%)
2.	Normal birth weight	46(12.13%)
	Gestational age in weeks	
	28-32	82(21.9%)
	>32-36	162(43.31%)
	>36-40	116(31.01%)
3.	>40	14(3.74%)
	Sex of the fetus*	
	Male	216(56.9%)
4.	Female	163(43%)
	IUGR	81(22.4%)
5.	Congenital malformations	22(5.88%)
6.	Non immune hydrops	4(1.06%)
7.	Multiple gestation	18(4.8%)
8.	History of previous stillbirths	42(11.2%)

*N=379 in five patients of twin pregnancy, both babies were stillborn

Table 5. Cause of death (Modified from CODAC SIMPLIFIED)

Sr.no	Cause of death	Number n=374
1.	Infections	6.1%
	Syphilis	Nil
	Malaria	Nil
	Hepatitis	13(3.4%)
	Others	11(2.9%)
2.	Intrapartum	6.4%
	Malpresentation	2(0.53%)
	Prolonged labour	3(0.80%)
	Obstructed labour	4(1.06%)
	Fetal hypoxia	7(1.87%)
	Rupture uterus	6(1.60%)
	Postdatism	2(0.53%)
3.	Fetal	8.8%
	Birth defects	22(5.88%)
	Isoimmunisation	Nil
	Hydrops	4(1.06%)
	Prematurity	7(1.87%)
	Cong. Rubella	Nil
4.	Cord complications	3.2
	Knots	Nil
	Loops	5(1.33%)
	Abnormal insertion	Nil
	Cord prolapse	7(1.87%)
5.	Placental causes	24.8
	Abruption	87(23.26%)
	Infarction	Nil
	Thrombi /insufficiency	Nil
	Praevia	6(1.60%)

6.	Maternal	29.4
	Hypertension	97(25.93%)
	Diabetes mellitus	7(1.87%)
	Others	5(1.33%)
7.	Unknown	21(5.6%)
	Associated conditions	
8.	Fetal	10.4
	IUGR	34(9.09%)
	Multiple pregnancy	5(1.331%)
9.	Maternal	5.08
	Anemia	17(4.54%)
	Poverty	1(0.26%)
	Smoking /trauma	Nil
	Alcohol	Nil
	Others	1