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Original Research Article

Classification of stillbirth by relative condition at death (Re Co De) at various trimesters of pregnancy: a rural tertiary teaching hospital based study

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ABSTRACT

Background: New global health figures show India to have the highest rates of stillbirth in the world. While maternal and under 5 child mortality rates have halved, stillbirth remains a neglected global endemic. To reduce stillbirths, the prevalence, risk factors and causes must be known. The aim of the present study is to know the prevalence and classify stillbirths by ReCoDe classification system at different trimesters of pregnancy.

Methods: This was a retrospective study done between January 2013 to March 2017 at MediCiti Institute of Medical Sciences, a rural tertiary teaching hospital, Telangana, India. A total of 112 cases of stillbirths were included. Data was obtained on demographic variables, risk factors such as preeclampsia, etc. Data regarding mode of delivery, fetal asphyxia, were recorded.

Results: Stillbirth rate was 12.1/1000 births. Fifty four percent of the women were unbooked. Preterm stillbirths were a majority (67%). The intra-partum still birth rate was low (15.1%) contrary to what is seen in low middle-income countries. Gestational hypertension/Pre-eclampsia, abruptio placenta, fetal growth restriction and oligohydramnios were the leading causes of stillbirths.

Conclusions: Pregnant women from rural background with low socio-economic status are prone for stillbirths. As stillbirths were more among unbooked cases, the study highlights the importance of counselling, creating awareness in the rural areas regarding the importance of regular antenatal checkups. Identifying risk factors like pre-eclampsia, anemia etc., at early weeks will enable us to initiate appropriate strategies to improve pregnancy outcome.

Keywords: Abruptio placenta, Fetal growth restriction, Oligohydramnios, Pre-eclampsia, Preterm birth, Stillbirth

INTRODUCTION

New global health figures show India to have the highest rates of stillbirth in the world.¹ In India, the rate was 22/1000 pregnancies in 2015.¹ It accounted for 592,100 stillbirths out of a total 2.6 million of such births.¹ While the Under -5 Child Mortality has fallen by a significant four points during 2013-14, stillbirths still remain a neglected global endemic.² Globally, the vast majority

(97%) of all stillbirths are in low middle income countries.³ To reduce stillbirth rates, the prevalence, risk factors and causes must be known. Knowing the burden of stillbirth in low resource nations carry resource implications. Stillbirth has multiple risk factors and causes. Various research studies have identified low Socioeconomic status, lack of antenatal and intrapartum care, prior stillbirth as risk factors.^{4,5} Early identification of these risk factors and appropriate antenatal care may prevent stillbirths and improve pregnancy outcomes.

Most of the research studies on stillbirth have been conducted in high income nations, but etiology may differ in low income countries. The conventional pathophysiological Wigglesworth perinatal mortality classification system resulted in majority of stillbirths being classified as unexplained.⁶ In order to assist in counselling bereaved couple and their families about the fetal loss and to assist the healthcare professionals to develop strategies for prevention of stillbirths, the Perinatal Institute has developed a new classification system, which significantly decrease the proportion of births being classified as unexplained".⁷

The aim of the present study was to know the prevalence of stillbirths and classify the stillbirths by Re Co De classification system at different trimesters of pregnancy so that appropriate preventive strategies can be identified and information about the risk of recurrence offered.

METHODS

This is a retrospective study conducted between January 2013 to March 2017 at Medciti Institute of Medical Sciences, a rural tertiary teaching hospital located 40 km from the city of Hyderabad in Telangana State of South India. This Hospital serves as a rural referral center for Medchal District comprising 40 villages. The study was approved by Ethics Committee. Informed consent was not taken given the anonymous, retrospective nature of collection of data on stillbirths. A total of 112 cases of stillbirths were included. All deliveries in the hospital and the pregnancy outcomes are recorded in the birth register. Using each woman's unique medical record number, case files were obtained and data obtained on demographic variables, risk factors such as Pre-eclampsia, anemia, oligohydramnios, polyhydramnios, abruptio placenta, etc., Data regarding mode of delivery, fetal asphyxia, cord complications, congenital anomalies, weight of the baby, sex of the baby, fresh/macerated stillbirth were recorded. Gestational age was obtained by last menstrual period and confirmed by dating scan. First trimester dating ultrasound was used where date of last menstrual period was not known. Clinical estimate of gestational age was considered if dating scan was not available. Stillbirth is defined as the death of the fetus at or more than 20 weeks of gestation⁷ and further classified as antepartum if death occurred before onset of labor and intrapartum stillbirth if occurred during the labor.³ Pre-eclampsia is defined as hypertension >20 weeks of pregnancy, combined with proteinuria and/edema.⁸ Fetal growth restriction is defined as fetal weight <10th percentile for gestational age as determined through an ultrasound.⁸ Placental abruption is defined as premature separation of the normally situated placenta.³ Oligohydramnios is defined as Amniotic fluid index less than 5 cm.⁸ Polyhydramnios is defined as Amniotic fluid index > 24 cm.⁸ Preterm delivery is defined as delivery before 37 completed weeks of pregnancy.⁸ Stillbirth is considered fresh if death occurs <12 hours, skin is intact. Stillbirth is considered macerated if death occurs >12

hours before delivery and if there is discoloration and peeling of the skin, skull is soft with the presence of "Spalding's sign" umbilical cord and amniotic fluid are darkly stained.⁹

Statistical analysis

All the data analysis was carried out using SPSS version 16.0. Qualitative variables were expressed as percentages.

RESULTS

A total of 9194 births were recorded in the parturition register during the relevant period and 112 stillbirths were recorded giving hospital stillbirth rate of 12.1/1000 births. The rate of unexplained stillbirth was 62/1000 births.

Table 1: Characteristics of participants (n=112).

Maternal characteristic	No. (%)
Place of residence	
Rural	98 (87.5)
Urban	14 (12.5)
Booking status	
Booked	51 (45.5)
Un booked	61 (54.4)
Age in years	
≤ 20	27 (24.1)
21-30	80 (71.4)
>31	5 (4.4)
Parity	
Primi	53 (47.3)
Multi	69 (61.6)
Prior miscarriage	
Yes	16 (9.8)
No	96 (85.7)
Prior stillbirth	
Yes	11 (9.8)
No	101 (90.1)

Table 1 shows maternal characteristics. The mean age of the participants was 23 years (range 18-39 years). They were 9 teenage mothers, 3 were 18 years of age and 6 were 19 years of age. Most of the women with stillbirths were from rural background and belonged to low socioeconomic status. More than half of the cases with stillbirth (54.5%) never had an antenatal visit at our facility. Fifty three percent of the women were multigravida. History of previous miscarriage and stillbirth was seen in 26 (23.2%) women. Table 2 illustrates fetal characteristics. The gestational age at which most stillbirths happened was between 28 to 36 weeks (67%). Forty percent of women were in labor at the time of presentation to the hospital. Labor was induced in 60% of women either with mifepristone and misoprost or misoprost alone. The intrapartum stillbirth rate was very low (15.1%) Most of the women delivered

vaginally (80.3%). Caesarean section rate was 16%. The mean birth weight of the babies was 1.25 kg as most of the stillbirths occurred preterm between 28 to 36 weeks. Four twin pregnancies were included in the study. Male fetuses (64) outnumbered female foetuses (52). Signs of maceration was reported in 48% of stillbirths. Women with fresh stillbirths (52%) never had an antenatal visit.

Table 2: Fetal characteristics (n= 112).

Fetal characteristic	No. (%)
Gestational age in weeks	
< 28	11 (9.9)
28-36	75 (67)
>37	26 (23.2)
Type of labor	
Spontaneous	45 (40.1)
Induced	67 (59.8)
Time of death	
Antepartum	110 (98.2)
Intrapartum	2 (1.7)
Mode of delivery	
Instrumental	2 (1.7)
Caesarean section	18 (16)
Vaginal	90 (80.3)
Hysterotomy	2 (1.7)
Birth weight	
< 1kg	35 (31.2)
1-2.5kg	64 (57.1)
≥2.5kg	13 (11.6)
Condition of fetus	
Fresh	58 (51.7)
Maceration	54 (48.2)

Table 3 shows the causes of stillbirths at various trimesters according to Re Co De classification.

When causes were analyzed trimester wise according to Re Co De classification system, the percentages of stillbirths occurred at less than 28 weeks, between 28 to 36 weeks and at term were 9.8%, 67%, and 23.2 % respectively. Maternal and fetal groups contributed almost equally to the cause of stillbirth in this population. (21.4%, 20.5%). Pre-eclampsia, fetal growth restriction, oligohydramnios and abruptio placenta, grouped as ischemic placental disease was the main contributor of stillbirth. Fifty percent of these women did not visit any healthcare facility for their prenatal care. When sub analysis was done trimester wise, out of 11 stillbirths that occurred before 28 weeks only 6 had obvious causes. Ischemic placental disease was the major cause of stillbirth between 28 and 36 weeks. Lethal congenital anomalies were detected late in this population after 28 weeks as they never had a prenatal visit and fetal anomaly scan. The causes of stillbirth towards term included mainly umbilical cord, amniotic fluid and placental causes. Among intrapartum stillbirth causes, fetal asphyxia was major contributor of stillbirth. 7 cases had preeclampsia, 1 was associated with FGR 5 were

associated with abruptio placenta and 1 case with PROM and prolonged labour.

DISCUSSION

The stillbirth rate in the present study was 12.1/1000 births. Our rate is lower than reported by National Family Health Survey which reported stillbirth rate of 23/1000 for India.¹⁰ A tertiary care centre from South India also reported a high rate of 57.9 /1000 deliveries.¹¹ The low rate observed in the present study can be explained by the low intrapartum stillbirth rate, which reflects intensive monitoring of labour of high risk pregnancies by the health care professionals available round the clock. Stillbirth rate was high in the age group 21-30 years (71.4%) which was similar to Balu et al from India (80%).¹² Though advanced maternal age is considered to be a risk factor for stillbirth, our hospital being situated in rural area had most women from rural background where women get married early and conceive soon. This is probably the reason why gestational hypertension became the prime cause for stillbirth as young primigravidas are more predisposed to get Gestational Hypertension. Stillbirths were high in multigravida women (61%), similar to a study by Balu et al where they reported it as 60.8%.¹² History of stillbirth in the first pregnancy carries a higher incidence of stillbirth recurrence in the second pregnancy. In the present study 24% of women had bad obstetric history. Sharma et al observed a five-fold increased risk of recurrence of stillbirth in subsequent pregnancies.¹³

Stillbirths are broadly categorized as antepartum/intrapartum. Time of death is important to reduce the incidents of stillbirths by appropriate interventions. Intrapartum deaths constituted 15%. Global modelling estimates that 1/3rd of all stillbirths are intrapartum.¹⁴ It indirectly reflects the quality of Intrapartum care. In Prasanna et al study, 12.1% deaths occurred during labor.¹ The other way of classifying stillbirths is based on the appearance of the fetus. In fresh stillbirths, death occurred less than 12 hours and skin is intact. In macerated stillbirths, where death occurred more than 12 hours before delivery, skin is discoloured and peeled off, skull becomes soft and amniotic fluid, umbilical cord is darkly stained.⁹ Fresh stillbirths comprised 51% of cases. Of these 30% of the cases are associated with hypertension and abruptio placenta. Fresh still births that occurred during labour were due to fetal asphyxia caused by prolonged labour oligohydramnios, cord accidents like tight nuchal cord and cord prolapsed due to mal presentations and polyhydramnios. There was one case of fresh still birth due to rupture uterus and a single case of central placenta praevia and difficulty in delivering fetus on time. Congenital anomalies also accounted for a few cases of fresh still births. Labour was induced in 60% of stillbirths. The preferred mode of delivery in stillbirth is vaginal delivery. Vaginal delivery rate of 80% was seen in present study consistent with findings observed in Ifman F et al study.¹⁵

Table 3: Classification of etiological factors according to Re Co De at various trimesters of pregnancy.

Group	Causes of stillbirths	Total No. (%)	Gestational age < 28 weeks	Gestational age 28-36 weeks	Gestational age ≥37 weeks
A. Fetus	A1) Lethal congenital anomaly	13 (11.6)	-	11 (9.8)	2 (1.78)
	A2) Infections	-	-	-	-
	A3) Non-immune hydrops fetalis	1 (0.89)	-	-	1 (0.89)
	A4) Iso immunization	-	-	-	-
	A5) Feto maternal hemorrhage	-	-	-	-
	A6) Twin twin transfusion syndrome	-	-	-	-
	A7) Fetal growth restriction	28 (25)	-	23 (20.5)	5 (4.4)
B- Umbilical Cord	B1) Cord prolapse	2 (1.7)	-	1(0.89)	1 (0.89)
	B2) Cord loop/knot	12 (10.7)	1 (0.89)	5 (4.4)	6 (5.3)
	B3) Velamentous insertion	-	-	-	-
C- (Placenta)	C1) Abruption	19 (17)	-	14 (12.5)	5 (4.4)
	C2) Praevia	-	-	-	-
	C3) Vasa Praevia	-	-	-	-
D- (Amniotic fluid)	D1) Chorioamnionitis	-	-	-	-
	D2) Oligohydramnios	27 (24.1)	2 (1.7)	19 (16.9)	6 (5.3)
	D3) Polyhydramnios	10 (8.9)	1 (0,8)	5 (4.4)	4 (3.5)
E -(Uterus)	E1) Rupture	1 (0.8)	-	1 (0.8)	-
	E2) Uterine anomaly	-	-	-	-
	E3) Obstructed labor	-	-	-	-
F- (Mother)	F1) Diabetes Mellitus	-	-	-	-
	F2) Thyroid	-	-	-	-
	F3) Essential Hypertension	1 (0.8)	-	-	-
	F4) Hypertension	28 (25)	2(1.7)	24(21.4)	2 (1.7)
	F5) Antiphospholipid antibody syndrome	-	-	-	-
	F6) Cholestasis	-	-	-	-
	F7) Drug abuse	-	-	-	-
	F8) Infections	-	-	-	-
	F9) Anemia, Heart disease	7(6.2)	-	-	-
G- (Intrapartum)	G1) Asphyxia	17(15.1)	-	11 (9.8)	6 (5.3)
	G2) Birth trauma	-	-	-	-
H-(Trauma)	H1) External	-	-	-	-
	H2) Iatrogenic	-	-	-	-
I (Unclassified)	I1) No relevant condition identified	7 (6.25)	3 (2.6)	4 (3.5)	-
	I2) No information available	-	-	-	-

Multiple conditions coexist in a single woman. Hence the total number of causes exceed the number of cases

Weight of the baby influences the neonatal outcome. Stillbirths were reported to be high in babies who weight between 1 to 2.5 kgs in the present study.

In Bharthi et al study stillbirth rate was 26.7% for babies who weighted between 1 to 1.5 Kgs.¹⁶ The classification systems used in the study was ReCoDe in ordered to cut down the rates of unexplained stillbirths.

Hypertensive pregnancies, fetal growth restriction, oligohydramnios, abruptions were main causes of stillbirths in present analysis. Hypertensive pregnancy, the most common medical complication of pregnancy accounts for 4 to 9% of all fetal death.³ In Prasanna et al analysis, hypertension, abruption were the main causes of stillbirths.¹¹ The present analysis showed 25% of stillbirths were caused by hypertension.

Fifty percent of these cases were unbooked and 62% were pregnant for 1st time. Abruptio placenta accounts for 9 to 15.2% of total stillbirths.³ Predisposing factors for abruption include hypertension, advanced age, previous caesarean section etc. Hypertension was associated with fetal growth restriction and oligohydramnios in 18% of cases and caused fetal asphyxia in 25% of cases. Hypertension, preeclampsia, abruption was more frequent in preterm stillbirths than in term stillbirths. Half of the fetal growth restrictions were associated with oligohydramnios suggesting uteroplacental insufficiency.

Among term stillbirths, umbilical cord pathology, Oligohydramnios and abruptions were the leading causes. Cord prolapse causing vessel compression and cessation of blood flow in the higher in 3rd trimester. Lethal congenital anomalies accounted for 11.6% of deaths. Most of the cases were detected late in pregnancy. In Parihar et al study, fetal lethal anomaly formed the largest group (8.14%).¹⁶

Strengths and Limitations: MIMS is a large tertiary care referral centre probably a lone referral centre for all high risk obstetric cases catering to a large rural population. MIMS also has significant number of booked cases that have regular obstetric care. The study therefore represents true (or very close) data on still births precluding any bias.

There are not many studies showing trimester wise analysis of still births from India. This sort of reporting will enable one to have a better understanding of the problem to develop effective management strategies. This study however does not mention or focus on bereavement aspect of stillbirths which plays a vital role in the management of still births was one of the limitation of the present study. Another drawback of this study is that it does not have a control group Therefore qualitative statistical analysis could not be done.

CONCLUSION

Several important findings have been identified from the present study. Women from rural background with low socio-economic status are more prone for stillbirths. As the causes of stillbirth were more among unbooked cases, the study highlights the importance of counseling, creating awareness in the rural areas through health education regarding the importance of regular antenatal checkups.

Identifying risk factors like pre-eclampsia, anemia etc, at early weeks and initiating appropriate strategies will improve pregnancy outcome. Better understanding of stillbirth at various trimesters could lead to more effective programs for prevention and improving the pregnancy outcome. It is also important to know the cause and to offer information and counselling about the risk of recurrence in subsequent pregnancies.

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