

Analysis of Stillbirth as per Recode Classification System

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ABSTRACT

Aim: To understand and classify the causes of stillbirth as per recode classification system and delineate the demographic details of patients prone to stillbirth.

Materials and methods: A prospective, observational study conducted in a tertiary care center with a study population of 250 assessed for causes of stillbirth and maternal and fetal high-risk factors. Patients diagnosed with stillbirth clinically or via ultrasonography after 28 weeks of gestation were included after taking appropriate consent.

Results: In maternal demography Majority of the stillbirths occurred in the age group of 26–35 years with the gestational age between 28 and 32 weeks of gestation. Multigravidas were more prone to stillbirth. About 74.8% were delivered via the vaginal route of which 1.2% was instrumental and the remaining underwent C-sections. A predilection of 1.6% more was seen towards the male gender. 40.8% were macerated stillbirths and thus majority was seen to occur in the antepartum period. Application of the Relevant Condition at Death (ReCoDe) Classification system showed maximum stillbirths occurring due to maternal causes commonest of which was a hypertensive spectrum of disorders amounting to 40.4% followed by anemia (21.6%). Amniotic fluid risk factors were next where the commonest cause of oligohydramnios (19.6%) was followed by meconium-stained liquor. In fetal risk factors, the most common cause seen was congenital lethal anomalies amounting to 14% followed by fetal growth restriction which was merely 10%. Placental causes of stillbirth showed preponderance in cases of abruption placenta. In corroboration to other studies, only 12.4% were left unexplained.

Conclusion: As seen, ReCoDe classification system allowed us to classify 87.6% of the cases, thus leaving only 12.4% of stillbirths unexplained. The most common cause of stillbirth in our study was a hypertensive spectrum of disorders in pregnancy followed by various other maternal disorders in pregnancy such as anemia, jaundice, heart disease, etc. It was followed by amniotic fluid causes which was followed by fetal causes and then placental causes.

Clinical significance: Relevant Condition at Death classification system becomes an effective classification system that can be applied in developing countries to help in the reduction as well as prevention of stillbirth.

Keywords: Anemia, Congenital anomalies, Oligohydramnios, Preeclampsia, Pregnancy induced hypertension, Relevant Condition at Death classification, Stillbirth.

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INTRODUCTION

The World Health Organization (WHO) defines a stillbirth as a baby born with no signs of life at or after 22 weeks of pregnancy but recommends that a 28-week cut-off be used for international comparison.¹ International Classification of Diseases version 10 (ICD-10) recommends including the number of deaths fetuses born ≥ 22 weeks of gestation or weighing ≥ 500 gm as stillbirth.² According to the Joint News Release by the UN in 2020, one stillbirth occurs every 16 seconds with a global stillbirth rate of 13.9 per 1,000 total births.³

Stillbirth is one of the most common adverse pregnancy outcomes and the largest contributor of perinatal.

Somewhat the wide use of various classification systems to identify the exact cause of stillbirth still leaves the majority of the cases unidentified. Having a varied range of causes, stillbirth has been deemed as the largest cause of perinatal mortality.

As of 2016, there was no international classification system for stillbirth causes. The causes of a large percentage of stillbirths are unknown, even in cases where extensive testing and an autopsy have been performed. ReCoDe classification also known as Relevant Condition at Death steps in and classifies the causes and associated risk factors of stillbirth. It is one of the only classification systems specifically developed to identify causes of fetal death. The major advantage of this classification above the others is that very few cases of stillbirth are left unidentified. This system helps clinicians

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to understand what went wrong and to derive learning points for best clinical practice to assist in counseling bereaved mothers and families about the loss, the underlying reasons, and prospects for the future and to aid public health specialists and commissioners to prioritize health service resources and strategies for prevention. Using this system nearly 85% of stillbirths can be classified.

MATERIALS AND METHODS

A Prospective observational study was conducted in the Department of Obstetrics and Gynecology in a Tertiary Care Center.

The study population was selected from the patients admitted to the hospital with the diagnosis of stillbirth. The patient was assessed for the cause of stillbirth and maternal and fetal high-risk factors.

Inclusion Criteria

- Patients diagnosed on ultrasonography and clinically to have fetal demise after 28 weeks of gestation.
- Patients who gave consent to be enrolled in the study.

Exclusion Criteria

- Patients who did not wish to be enrolled in the study.

Data were collected from the patient's indoor records over a span of 2 years. Detailed, informed, and written consent was taken from the patient after thorough counseling preceding enrollment in the study. Factors that were studied included:

- Maternal factors such as age, parity, socioeconomic status, presence of preexisting diseases, infections, etc.
- Fetal factors and characteristics along with placental, amniotic fluid, and cord abnormalities.

RESULTS

There were a total of 250 cases enrolled in the study that fulfilled the criteria.

The demography of the said mothers showed the majority of the stillbirth occurred in the age group of 26–35 years followed by less than 25 years of age. Maximum stillbirths occurred during the gestational age ranging from 28–32 weeks followed by 32–36 weeks of gestation.

A whopping 75.2% of the stillbirths in the mothers were from cases that had been referred to the institute. Meanwhile, multigravidas were more prone to stillbirth as compared to primigravidas. Patients with a history of previous intrauterine death were more prone to have a repeated intrauterine fetal death (IUFD) shown by a frequency of 28 patients out of 250 having a repeated stillbirth.

Most of the stillbirths were induced for labor (60%) while the remaining progressed spontaneously of which the majority of them of preterm (78.8%). Of these, 74.8% of the babies delivered were via the vaginal route which includes 1.2% of instrumental deliveries. The remaining underwent C-section, the major cause of which was malpresentation and failure of progression of normal labor along with maternal high-risk factors.

About 40.8% of the stillbirths were macerated and had a very slight predilection of 1.6% towards the male gender. Around 53.6% of the deaths were antepartum. Basic demographic features of the study.

On application of the ReCoDe classification system to this study, in maternal risk factors, a hypertensive spectrum of disorders in pregnancy was the commonest cause of stillbirth amounting to 40.4%. Other maternal factors that were observed to be the second most common cause of stillbirth majorly included anemia in the mother (21.6%) followed by other medical disorders such as thrombocytopenia, jaundice, disseminated intravascular coagulation, aorto-arteritis, heart disease in pregnancy, etc.

In fetal risk factors, stillbirth occurred most commonly due to oligohydramnios (19.6%) followed by lethal congenital malformations (14%), meconium-stained liquor (12.8%), and then fetal growth restriction which was only 10%.

Placental causes of stillbirth were seen to be led by abruptio placenta which was 12.8%. However, in more cases than often abruptio placenta was associated with hypertensive disorders of pregnancy.

Unexplained causes of stillbirth in the study were only 12.4%.

DISCUSSION

Nearly half the study population was of the age group 26–35 years which is closely followed by the less than 25-year-old age group. Considering the median birth interval of approximately 32 months, our finding with regard to the most common age group for pregnancy and resultant stillbirth corroborates with the cultural practices and beliefs of India that are known for early marriages and early pregnancies.^{4,5} In fact, maternal age <25 years has been reported to have an increased odds of 29% to have stillbirths in India.⁶

Multigravida has been reported to increase the odds of stillbirth by approximately 3 times and thus nearly 2/3rd of the cases were multigravida.⁶

Nearly 60% of our cases were induced and this increase in the number of induced labors over spontaneous delivery is reflective of the fact that the number of pre-term fetuses that had to be delivered was high amounting to 78%. This is in line with the protection of maternal health, where induction is carried out in cases of the presence of high-risk factors. We report that almost three-fourths were normal vaginal delivery in our study. This is probably because they were smaller in size as many were pre-term babies. Since almost half of the stillbirths were antepartum deaths, it is understandable that a greater proportion was fresh stillbirths amounting to 60%. Notably, there was a slight male preponderance, reflective of the prevailing sex ratio at birth in the state of Maharashtra, India. Similar findings were observed in a study conducted by Kaur et al.⁷

We report that the most common cause of stillbirth in our study was maternal causes accounting for 43.6% of all stillbirths followed by placental causes and amniotic fluid causes (17%) representative of the socioeconomic and cultural background. The major reason for stillbirth was due to pregnancy-induced hypertension like the study by Kashif et al. which reported 33.3% as compared to our study which reported 40.4% of stillbirths.⁸ It was followed by miscellaneous illnesses such as anemia (21.6%). Tomashek et al. from the United States of America has reported that a diagnosis of moderate anemia made before 28 weeks of gestation increases the hazard of stillbirth in non-black mothers by 4.4 times.⁹ Nair et al. from the UK have reported similar findings in their study wherein the risk increases five-fold when the mother is moderate–severely anemic.¹⁰ The possible mechanisms include poor oxygen delivery to the fetoplacental unit and suppression of iron dependent metabolic activities in the fetus. Other maternal causes (6.6%) of stillbirth included disseminated intravascular coagulation, thrombocytopenia, hepatitis, etc., and stillbirth usually occurred due to organ dysfunction causing insult to the growth of the fetus.

Among the placental causes, almost 70% was due to abruptio placenta (mostly secondary to pregnancy-induced hypertension), similar to the study by Kaur et al. followed only by the other causes namely placental previa and other causes of placental insufficiency and abnormalities.⁸

In amniotic fluid causes, we report that 19.6% of all stillbirths were complicated with oligohydramnios similar to the study done by Yagnik and Gokhle.¹¹

Oligohydramnios may be secondary to other maternal conditions like pregnancy-induced hypertension spectrum, diabetes, uteroplacental insufficiency, post-term gestation, rupture of membranes, etc. many of which are themselves risk factors for stillbirth.¹² It can adversely affect the health of the fetus by causing complications such as cord compression, pulmonary hypoplasia, meconium aspiration syndrome, and infections in cases of prolonged rupture of membranes.^{10,13} The other fetal risk factor identified was meconium-stained liquor (19.6%). Tasew et al. have reported that births associated with meconium-stained liquor were 3.1 times more likely to have a stillbirth when compared to the others.¹⁴ This meconium staining can be secondarily due to other conditions listed above such as the hypertensive disorders of the pregnancy, diabetes or other maternal conditions, placental insufficiency or fetal distress due to any cause.

The most common foetal risk factor identified in our study was congenital malformations wherein 14% of all stillbirths showed some features suggestive of the same. These findings are similar to the findings reported by Gardosi et al. where the incidence of congenital abnormalities was 14.95% among stillbirths.¹⁵ In fact, a retrospective cohort study by Frey et al. analyzing routine antenatal ultrasound anatomical identified major congenital anomalies as an independent risk factor for stillbirth with an increased odds of approximately 15 times.¹⁶ This was reflective of the lack of antenatal services for early diagnosis available to patients.

Some of the other causes reported are asphyxia, and umbilical cord-related issues. Notably, in only a few cases ($n = 31$), a cause could not be attributed.

Ajini et al. reported the classification of stillbirths of 177 women with IUFD admitted during a 2-year period from March 2014 to February 2016 from Kerala, India using the ReCoDe system. The cause for stillbirth was identified in 87.58%. Intrauterine growth restriction (IUGR) (41.8%) was the commonest cause identified, followed by hypertensive disorders (27.68%), congenital abnormalities (15.81%), and congenital abnormalities (14.68%).¹⁷ This corroborated the original study by Gardosi et al. who came up with this classification system. They also reported IUGR to be the most common association with stillbirth and that 85% of all stillbirths had an identifiable cause.¹⁵

In our study conducted, the most common cause of stillbirth was pregnancy-induced hypertension as opposed to IUGR.

Kashif et al. from Karachi, Pakistan classified 207 stillbirths between 1st January 2015 and 31st December 2019. A total of 34.7% of stillbirths were attributed to the fetal issues and the majority comprised intra-uterine growth restriction (23.6%). Maternal causes contributed to 30.4% of all stillbirths and the commonest condition associated with them was preeclampsia. A cause was identified in approximately 81.2% of all cases which was similar to what we have reported in our study.⁸ It is to be noted that the number of unclassified causes is similar in almost all the studies cited here and it is one of the advantages of the ReCoDe classification over the earlier ones as it has brought down the number of 'unclassified' causes of stillbirth.

Ego et al. classified a total of 969 stillbirths from three districts of the Rhône-Alpes region that were recorded in a local registry between 2000 and 2010. Approximately half of all stillbirths (49%) were attributed to small gestational age due to various causes. Of this, stillbirths attributable to primary fetal growth retardation were 14%.¹⁸

Having said that maternal causes account for more than 50% of all still births in our study, of which hypertensive diseases of

pregnancy being the most common cause, it is not out of place to mention that hypertension is one such illness that affects nearly 2–8% of all pregnancies.¹⁹ Elevated blood pressure during pregnancy can increase the risk of stillbirth as it increases peripheral vascular resistance and decreases the blood flow to the placenta. Thus, the growing fetus lacks supply of oxygen supply and nutrition thereby leading to stunted growth, increased susceptibility to infections, and sudden fetal demise. Elevated blood pressure can also cause abruption of the placenta resulting in bleeding in fetal hypoxia.

We also report a total of 6.8% of mothers with thyroid disorders, the commonest being hypothyroidism. The prevalence of thyroid disorders that we have reported is also similar to other studies reported earlier. It is estimated that the prevalence of subclinical and overt hypothyroidism is 2.3–8%, and 0.1–2% respectively and that 0.83% of all stillbirths could be attributed to hypothyroidism with a stillbirth rate of 0–125/1,000 births.^{20,21} It is thought to involve an autoimmune process that can influence maternal blood pressure and also cause fetal anomalies.²²

Another important maternal illness causing fetal demise is gestational diabetes which was reported in 4.8% of all mothers. In general, it is estimated that diabetes in pregnancy accounts for nearly 3% of all stillbirths and is similar to what we have reported in our study. The rate of stillbirth due to diabetes is 3–35 per birth.

CONCLUSION

As seen, ReCoDe Classification system allowed us to classify 87.6% of the cases, thus leaving only 12.4% of stillbirths unexplained. The most common cause of stillbirth in our study was the hypertensive spectrum of disorders in pregnancy followed by various other maternal disorders in pregnancy such as anemia, jaundice, heart disease, etc.

Thus, ReCoDe classification system becomes an effective classification system that can be applied in developing countries to help in the reduction as well as prevention of stillbirth.

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