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Using the Relevant Condition at Death (ReCoDe) classification system for Classifying Stillbirths in a Tertiary-Care Hospital

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Abstract

Objective: To find the different causes of stillbirths at our institution, using the Relevant Condition at Death (ReCoDe) classification system.
Methodology: This was a cross-sectional study that included 421 cases, complicated by stillbirth after 24 weeks of pregnancy at the Department of Obstetrics and Gynecology, Lady Reading Hospital, between January to December 2021. A structured proforma was used to gather data on their age, gestation, booking status, parity, mode of delivery, fetal weight, body mass index, maternal diabetes, pre-eclampsia, thyroid dysfunction, and the information related to stillborn babies, and findings of placental and umbilical cord examination.
Results: The stillbirth rate in the Obstetrics department during the study period was 53 per 1000 births. About 78.4% of cases were coded after the application of ReCoDe classification, while 21.61% of cases were labeled as unexplained. The majority of the cases were in the age group 18-35 years, 205 (48.6%), with most women having a spontaneous vaginal delivery, 321 (76.2%), un-booked status, 353 (83.8%), and a BMI >30, 251 (59.6%). The fetal causes were the most common, 144 (34.20%), with fetal growth restriction contributing to the most common fetal cause, 101 (23.99%). Maternal causes contributed to 99 (23.5%) of stillbirths, with pre-eclampsia the most associated maternal condition, 36 (8.55%).
Conclusion: Classification of stillbirths using ReCoDe classification is simple and practical to use, especially in low-resource settings, with the ability to identify underlying cause in the majority of cases.

Keywords: Stillbirth, ReCoDe, classification
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Introduction

The World Health Organization (WHO), defines stillbirth as the delivery of a fetus after 28 weeks of gestation, birth weight ≥ 1000 grams, or when the body length of the fetus is 35 cm or more.[1, 2] However globally, the age of viability varies depending on the available health facilities and access to the health system, hence being 20 weeks or more in the United States and 24 weeks or more in Pakistan.[3]

Stillbirth is a major obstetric problem and has a variable prevalence worldwide. South Asia has the highest rate of stillbirths in the world. The WHO reported 2.6 million stillbirths in 2015, of which 98% were from South Asia and sub-Saharan Africa, and 23/1000 births from India.4 Globally, Pakistan is among the countries with the highest.

stillbirth rate of 56.9 per 1000 births.[5] Findings from a local study in a tertiary care hospital in Pakistan reported a stillbirth rate of 18/1000.[6] Despite the fact that poor socioeconomic conditions and lack of antenatal care contribute to stillbirths, there is still a gap in our

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knowledge regarding the medical factors responsible for stillbirths as most cases are unreported using the traditional Demographic and Health Surveys.[5] Stillbirths are not only traumatic to the parents but stigmatize the mother and she holds herself accountable. It becomes further challenging when parents deny the consent for an autopsy to investigate the cause for stillbirth, hence no cause is identified in the majority of cases and are labeled as "unexplained" due to lack of complete evaluation.

There are various classification systems devised to determine the underlying causative factors of stillbirth, but according to them, more than 75% of cases remain unexplained.[7] ReCoDe is a structured, hierarchical classification system derived from a cohort study in England, specifically designed to identify causes of stillbirth at the time of delivery.[8]

Since autopsy and placental biopsy is not routinely performed procedure due to limited resources and expertise, and lack of parental consent, this classification is more relevant as it is based mainly on clinical rather than histopathological data. In our hospital, proper records of data related to stillbirths are maintained but no formal classification system for stillbirths is in use. Therefore, we aimed to apply the ReCoDe classification system of stillbirth to determine the causes at our hospital.

This would not only aid the obstetricians in counseling their patients regarding the causes of stillbirths but also enable us to compare our data both nationally and internationally and thus help formulate strategies aimed at reducing the risks of stillbirth.

Material and Method

This was a cross-sectional study of 421 women, aged 16-45 years, with pregnancies complicated by stillbirth after 24 weeks of gestation at LRH, between 1st January and 31st December 2021. Deliveries conducted outside the hospital, or cases with incomplete information, were excluded from the study.

We used a structured Performa to collect information from medical record files from March to May 2022 on demographic data like age, body mass index (BMI), gestational age, booking status, fetal weight at delivery and maternal information on co-morbid like diabetes, pre-eclampsia, thyroid dysfunction, ultrasound findings and other relevant investigations, the information pertaining to stillborn baby, placenta, and umbilical cord examination after delivery.

The data was entered and analyzed using SPSS 21. We used frequencies and proportions for categorical variables to present our data.

The study was conducted after approval from the Ethics Committee of LRH (ERC-296/ LRH/MTI).

Results

The stillbirth rate was 53 stillbirth /1000 births, as there were 421 cases of stillbirth during the study period in a total birth of 7800.

Most of the women were in the age group of 18-35 years, 205 (48.6%), and advanced maternal age, 154 (36.6%) cases while 6.8 % of women were less than 18 years. The Majority of the patients 251 (59.6%) had a BMI of more than 30, with an SVD, 321 (76.2%), and were unbooked in 353 (83.8%) cases (Table-I).

Table I: Demographics (n=421)

Variable	Frequency (%)
Age (years)	
<18	29 (6.8%)
18-35	205 (48.6%)
>35	154 (36.6%)
Not documented	33 (23.2%)
Body mass index	
<19	14 (3.3%)
19-30	54 (12.8%)
>30	251 (59.6%)
Not documented	102 (24.2%)
Gestational age (weeks)	
<28	20 (4.7%)
28-31.6	35 (8.3%)
32-35.6	202 (47.9%)
36-39.6	64 (15.2%)
>40	84 (19.9%)
Not documented	16 (3.8%)
Booking status	
Booked	22 (5.2%)
Unbooked	353 (83.8%)
Not documented	46 (10.9%)
Parity	
Primiparous	172 (40.8%)
Multiparous	236 (56%)
Not documented	13 (3.1%)
Mode of delivery	
SVD	321 (76.2%)
BVD	19 (4.5%)
IVD	56 (13.3%)
LSCS/ hysterotomy	22 (5.2%)
Not documented	03 (0.7%)
Fetal weight (grams)	
<500	15 (3.5%)
500-999	06 (1.4%)
1000-1499	27 (6.4%)
1500-1999	48 (11.4%)
2000-2499	81 (19.2%)

>2500 Not documented	195 (46.3%) 49 (11.6%)
Table II: Classification of stillbirths by ReCoDe (n=421)	
Conditions	**Frequency (%)**
Fetal causes	**144 (34.20%)**
Congenital abnormalities	16 (3.80%)
Hydrops fetalis	07 (1.66%)
Fetal growth restriction	101 (23.99%)
Infection	06 (1.426%)
Selective intrauterine growth restriction in twin pregnancy	05 (1.18%)
Co-twin intrauterine death	05 (1.18%)
Rh immunization	04 (0.95%)
Umbilical cord causes	04 (0.95%)
Cord entanglement	04 (0.95%)
Placental causes	26 (6.17%)
Placental abruption	26 (6.17%)
Amniotic fluid causes	15 (3.56%)
Chorioamnionitis	02 (0.47%)
Polyhydramnios	04 (0.95%)
PPROM	9 (2.13%)
Uterine causes	18 (4.27%)
Uterine rupture	18 (4.27%)
Maternal causes	99 (23.51%)
Diabetes mellitus	18 (4.27%)
Pre-eclampsia/eclampsia	36 (8.55%)
APLA/thrombophilia	03 (0.71%)
Cardiac disease	05 (1.18%)
Maternal sepsis/infection	13 (3.08%)
Hypothyroidism	02 (0.47%)
HELLP	16 (3.80%)
Peri-partum cardiomyopathy	03 (0.71%)
Status epilepticus	03 (0.71%)
Intra partum causes	21 (4.98%)
Asphyxia	21 (4.98%)
Trauma related causes	03 (0.71%)
External trauma	03 (0.71%)
Unclassified	91 (21.61%)

Using ReCoDe classification system, 144 (34.20%) stillbirths were due to fetal causes with fetal growth restriction contributing the most 101 (23.99%). About 99 (23.5%) stillbirths were due to maternal causes, among which pre-eclampsia was the most common associated condition, 36 (8.55%). There was no obvious cause of stillbirth identified in 21.61% of cases.

Data are presented as numbers and percentages.

Discussion

The findings of the current study showed a high frequency of stillbirths in our hospital during the study period (53 per 1000 births). Studies by Aziz A et al. and McClure EM et al also reported similar figures with a stillbirth rate of 53.5/1000 births and 56.9/1000 births in Pakistan respectively. [9, 10] Such an alarmingly high stillbirth rate is due to a number of causes such as lack of access to material and human resources, malnutrition, low level of education in females, a high frequency of preterm and low-birthweight babies, and non-availability of adequate maternal and neonatal care.[6, 9, 10]

In Pakistan, the stillbirth rate is very high but mostly remains under-reported and is associated with the social stigma.[6] Moreover, there is a lack of histopathology facilities in many hospitals, and parents often deny consent to fetal autopsy. In addition, currently, no formal classification system is used to identify causative factors of stillbirth, which lead to inaccurate diagnosis, both at the community level and by the health-care providers.[11]

Currently, different classification systems for the identification of causes of stillbirth are in use.

However, studies have shown ReCoDe system to be a better system in terms of identifying the cause of stillbirths in the majority of cases.[12] this is in line with our study which could code 78.4% of cases, with only 21.6% being unexplained. A local study in a tertiary care hospital in Pakistan has shown it to be effective in identifying the causes of stillbirth in 81% of cases, with only 19% being unexplained.[13]

Unexplained stillbirth refers to those cases where any maternal, fetal, placental or obstetric cause could not be found, when there is no sufficient information available to establish the cause or where the cause of stillbirth cannot be established with the available diagnostic ability.[14] Thus it is a useful classification system that can identify causes of stillbirths in the majority of patients and aids in the allocation of more heath resources to areas seeking more attention.

The current study revealed that only 22 (5.2%) patients were booked. This is much lower than a population-based study in Sindh by Noh JW et al. which showed that only 57% of patients were booked, and the least visits were during the first trimester.[15] Poor antenatal care and failure of identification of risk factors in early gestation; an important period for screening of risk factors that may lead to fetal demise, may be one of the reasons of the high stillbirth rate in Pakistan.[9]

On analyzing our data for trends of stillbirth with respect to gestation, it was revealed that the highest stillbirth rate was in the [32-35].6 weeks. This is in contrast to findings of a study by Kashif U et al. who showed a uniform frequency of stillbirth across all gestations.[13] However, in line with our findings, a study by Blythe C et al. showed a high risk

of stillbirth due to fetal growth restriction (FGR), placental insufficiency, placental abruption, and umbilical cord problems in the gestational age range of 33.2-36.5 weeks, and Chorioamnionitis at late term.[16]

About 34.20% of stillbirths were due to fetal causes with FGR contributing to the majority of them (23.99%). About 23.5% of stillbirths were due to maternal causes, among which pre-eclampsia was the most common associated condition (8.55%). We failed to identify any obvious cause in 21.61% of cases. Similar observations were found in other studies, showing FGR as a risk factor for stillbirth.[17]

According to a Population-based observational study, there was an 11% population-attributable risk of stillbirth associated with small-for-gestational-age babies. This risk was highest in those babies who were not suspected of FGR antenatally (95% CI, 3.6–7.0).[18] Thus proper antenatal checkups and diagnosis of FGR will help health professionals for timely interventions to reduce the associated morbidity and mortality.[13] FGR is also responsible for stillbirth in twin's pregnancy. The stillbirth rate in twins' pregnancy due to selective FGR in our study was 1.18%. This may be due to pregnancy continuation in the presence of selective FGR even with imminent fetal death in one of the fetuses, on parents' choice.[19] The frequency of diabetes mellitus was 4.27% and pre-eclampsia/ eclampsia was 8.55% % in the current study, with 14% of cases having FGR with co-existent preeclampsia. It has been shown in various studies that both preeclampsia and FGR share a common underlying pathophysiology.[20]

Stillbirth can result from many underlying risk factors. These include both avoidable and unavoidable causes. These depend not only on the social and cultural values of the society but also relate to individual and health professional's behaviors, knowledge, and attitudes and practices. The current study showed that most of the associated causes were avoidable and timely identification and prevention of these factors can reduce the incidence of stillbirth significantly.

The strength of our study is the inclusion of a large number of women. Its limitation includes its retrospective nature and single-centered. We were unable to perform a fetal autopsy as no such facility is available and patients usually do not consent to it.

Conclusion

Thus, ReCoDe classification system is an easy way to determine the factors contributing to stillbirth. This will enable the clinicians not only to counsel the parents regarding the possible cause but also help them in formulating plans for future pregnancies to avoid the contributing causes. It can be a useful guide for health care institutions and policymakers to focus and invest in programs to alleviate the contributing factors.

Recommendations

We recommend future long-term prospective studies to further evaluate the causes of stillbirth.

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