Original Article

The Etiology of Stillbirths Using Relevant Condition at Death (ReCoDe) Classification System; Experience in a tertiary care Hospital

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Abstract

Objective: To find out the causes of stillbirths using the ReCoDe classification system.
Methodology: A prospective cross-sectional study of 343 women diagnosed with stillbirth after 24 completed weeks of pregnancy at Khyber Teaching Hospital between 30 June 2021 and December 2023. After taking ethical approval, detailed review of maternal and fetal clinical findings, investigations and examination of placenta, cord and membranes, relevant condition at death were recorded against the headings of ReCoDe classification (along with the sub classifications) as Group A-Fetus ,Group B-Umbilical cord, Group C-Placenta, Group D-Amniotic fluid, Group E- Uterus, Group F- Mother, Group G Intrapartum, Group H-Trauma , Group I- Unclassified. Data was analyzed on the SPSS v.23.0
Results: A total of 41503 live births and 343 stillbirths were observed during the study period with a stillbirth rate of 8 per 1000 live births. Mean maternal age, and parity were24.5±4.36 and 2.62±2.35 respectively. Ninety-eight per cent of cases were un-booked. Maternal causes (Group F) including preeclampsia and diabetes were responsible for 28.35% of stillbirths followed by 22.7% fetal (Group A) and 19.9% placental causes (Group C). Among fetal causes, 14% were due to lethal congenital abnormality and 6.4% cases of fetal growth restriction were noted. In placental causes, abruption was seen in 10.5% and placenta previa in 7.3% of cases. Birth asphyxia, cord accidents and ruptured uterus were responsible for 10.8%,5.9% and 3% of stillbirths. Application of the ReCoDe classification System led to the identification of 93.6% of stillbirth cases associated condition and only 6.4% of cases were categorized as unexplained
Conclusions: The Study concluded that maternal causes like preeclampsia and diabetes in Group F, are the pre-dominant causes of stillbirths followed by Group A including fetal causes like lethal congenital abnormality and fetal growth restriction.
Key Words: Stillbirth, ReCoDe, Perinatal Deaths, Lower middle-income countries (LMIC)

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Introduction

Stillbirth is defined as a baby born with no signs of life at or after the age of viability. Every 16 seconds, a stillbirth occurs in a pregnant woman, somewhere in the world. Globally two million babies are stillborn.[1] Stillbirth is a traumatic finding for parents and has a long-lasting adverse psychological impact on women. Stillbirth rates serve as an indicator of the quality of antepartum, and postpartum care and it's a considerate marker of any country's health system strength and equity.[1,2]

India, Pakistan, and Nigeria are the top three countries in the world with the highest stillbirth rates. Developed countries have stillbirth rates between 3-5/1000 births while third-world countries have ten-fold higher rates.[3] Globally differences in stillbirth rates are predisposed by the diversity of maternal, Socioeconomic and circumstantial factors.[4]

Pakistan has failed to curtail maternal and neonatal mortality rates as per the 2015 Millennium Development Goals. "Every newborn action plan" endorsed by the World Health Assembly aims for a 12/1000 or less stillbirth rate by 2030, calling for

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concerted efforts to improve maternal and neonatal outcomes.

Most of the studies conducted on causes of stillbirths showed that prolonged obstructed labour, pre-eclampsia, and various infections, all without proper treatment are responsible for stillbirths in developing countries.[5]

Stillbirth has many causes leading to the development of various classification systems like Aberdeen, wiggles worth and ReCoDe that help health care workers to recognize “what went wrong”. These classification systems aid in recommending alterations in the current clinical practice to improve future pregnancy outcomes. Amongst these systems, only the ReCoDe classification system recognizes 85% of conditions associated with stillbirths using minimal investigations as compared to other systems that rely on histopathological data or fetal autopsy. [7,8]

In developing countries like Pakistan, where fetal autopsy and placental biopsy are not the norm, the ReCoDe classification system seems relevant and plausible for its application.

In Khyber Teaching Hospital, stillbirths are registered in hospital information management system (HIMS), but meaningful comparison with local and international data cannot be done because of lack of unified classification system for stillbirths. Our study will add to growing consensus amongst the obstetrician and policy makers to use ReCoDe classification system for stillbirths. It would enable the obstetrician to counsel the bereaved couple about the causes of stillbirths in our setup and pave the way for recommending the use of preventive and screening strategies to reduce the risk of stillbirth.

Methodology

We conducted a cross-sectional study of 343 pregnant women with an antepartum and intrapartum diagnosis of stillbirth at the Khyber Teaching Hospital, Peshawar, between 30 June 2021-December2023, after obtaining consent from ethical permission institutional research and ethical review board. Twin pregnancies, women who delivered stillborn babies outside the hospital and those who did not give consent, were excluded from the study. The questionnaire was filled out for each patient before and after delivery. Baseline demographic data, maternal age, parity, booking status, gestational age, fetal gender and weight. Maternal past medical history, examination findings, Obstetric ultrasound & Baseline investigation findings were recorded on pre-designed proforma. Stillborn baby, placenta, and umbilical cord examination findings were recorded. The causes were classified according to the Re Co De system into Group A (Fetal causes), Group B(Cord accidents)Group C(Placental causes), Group D(liquor abnormalities), Group E(Rupture Uterus), Group F(Maternal causes), Group G(Birth asphyxia), Group H(Trauma), Group I(Un-classified)

Data was entered and analyzed in SPSS package version 2. Continuous data was shown as the mean ± standard deviation, while the categorical and nominal data were presented as frequencies and percentages.

Results

There were a total 343 cases of stillbirth during the study period fulfilling the inclusion criteria. Total births during this period were 41503 with still birth rate of 8 per 1000 live births. Mean maternal age, and parity were24.5±4.36 and 2.62±2.35 respectively.

Table I: Baseline Characteristics of Patients. (N=343)

Variable		Value
Mean Age		24.5±4.36
Mean Parity		2.62±2.35
Fetal Weight	<1500gm	53(15.4%)
	1600-2500gm	108(31.45)
	2600-3400gm	169(49.2%)
	3500-3900gm	7(2.0%)
	>4000gm	6(1.7%)
Period of Gestation	24-27	15(4.4%)
	28-31	62(18%)
	32-35	90(26%)
	36-39	138(40.2%)
	>40	38(11%)
Booking Status	Booked	6(1.7%)
	Un-Booked	337(98.3%)
Fetal condition	Fresh Still Birth	255(74.3%)
	Macerated	88(25.7%)

Causes of stillbirth according to Re Code classification system are given in table II. Maternal causes (Group F) were responsible for 28.35% of stillbirths followed by 22.7% fetal (Group A) and 19.9% placental causes (Group C). Hypertension and diabetes were responsible for stillbirth in 16.3% and 9% of cases respectively. Among fetal causes, 14% were due to lethal congenital abnormality and 6.4% cases of fetal growth restriction were noted. In placental causes, abruption was responsible for 10.5% and placenta previa for 7.3% of cases. Birth asphyxia, cord accidents and ruptured uterus were responsible for 10.8%,5.9% and 3% of stillbirths. Only 6.4% of cases of stillbirth were unclassified according to ReCode classification system.

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Table II: Still Birth Causes according to Re Code Classification System. (N=343)

	Conditions	No of cases N(%),
GROUP A	Congenital abnormality	48(14%)
	Fetal Infection	1(0.3%)
	Non immune Hydrops	3(0.9%)
	Isoimmunization	5(1.5%)
GROUP B	Cord Prolapse	5(1.5%)
	Constricting Loop or knot	15(4.4%)
GROUP C	Abruptio	36(10.5%)
	Previa	25(7.3%)
	Placental Insufficiency/Infarcts	9(2.6%)
GROUP D	Oligohydramnia	1(0.3%)
	Polyhydramnia	1(0.3%)
GROUP E	Rupture Uterus	11(3.2%)
GROUP F	Diabetes	31(9%)
	Thyroid Disorder	3(0.9%)
	Essential Hypertension	4(1.2%)
	Hypertensive Disorder of Pregnancy	56(16.3%)
	Lupus/APLS	1(0.3%)
	Cholestasis	2(0.6%)
GROUP G	Birth Asphyxia	38(11.1%)
GROUP H	Trauma	0
GROUP I	Unclassified	22(6.4%)

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Discussion

Globally maternal and perinatal health indicators are improving due to the realization of the importance of investment in maternal and child health for fostering strong foundations in every region and country. Despite of International community's unwavering resolve to curtail maternal and perinatal mortality in Global programmes like the Millennium Development Goals and every newborn action plan, every sixteen seconds a stillbirth occurs in the world. Stillbirth rate of 53/1000 livebirths was reported for Pakistan in the year 2015, which was third highest after India and Nigeria. The lack of a universally agreed classification system for stillbirths and the beleaguered health system is responsible for the worst static stillbirth rate in Pakistan over the years.[9]

In our study stillbirths were uniformly present across all maternal age groups, parity and period of gestation as compared to a study by Aziz et al that compared Pakistani maternal and perinatal mortality indicators with countries like India, Kenya, and Guatemala. Other studies across the globe implicate, advanced maternal age, increased parity and low fetal birthweight as causative in increased perinatal mortality.[10]

In our study, 98.3% of pregnant women with stillbirths were un-booked and referred, showing a lack of access to antenatal care. A study in Sindh province showed that only 52% of pregnant women had three or more antenatal visits.[11] Antenatal care serves to identify high-risk pregnancies and detect and treat anaemia, hypertension and diabetes. As compared to other countries, Pregnant women in Pakistan have fewer material and human resources for seeking antenatal care, this fact is further compounded by high parity, short inter-delivery intervals and low educational levels.[12,13]

Research studies across Pakistan have elaborated on different causes of stillbirth including antepartum maternal and intrapartum causes contributing to higher stillbirth rates.[14] Although a standard classification system for stillbirth is not yet applied across the country, Using the ReCode classification system in our study allowed us to identify contributory conditions at the time of stillbirth which may be implicated in its causation, without relying on fetal autopsy.

In our study 93.6% of stillbirth causes were identified with only 6.4% of stillbirths left un-classified. A study by Gardosi et al and an Indian study showed similar trends in identifying relevant conditions at death, making the ReCode system a valuable tool in reporting stillbirths.[15,16]

Maternal causes (Group F) including hypertension and diabetes contributed to most of the fetal deaths in our study. Hypertension is a contributory factor in fetal growth restriction, placental abruption, and intrapartum asphyxia.[17] Other studies in Pakistan have also shown

hypertensive disorders to be the most common cause of stillbirths. Simply measuring blood pressure at each antenatal visit is of paramount importance to avoid stillbirth. Pakistan has the highest diabetes prevalence in the region, calling for increased vigilance by obstetricians to screen pregnant women for diabetes and avoid stillbirths.[18,19,20]

In our study, fetal cause (Group A) were responsible for 22.7% of cases with lethal congenital abnormality at 14%, fetal growth restriction at 6.4% and isoimmunization at 1.5%. Different studies across Pakistan have shown comparatively higher rate of fetal congenital abnormalities as a cause of stillbirth. Heterogenous figures related to congenital fetal abnormality might be suggestive of ultrasound detection of anomalies and legal and religious limitations of termination of pregnancies. [9,10,14] A study in Karachi showed 23.6 % of stillbirths caused by fetal growth restriction in contrast to 6.4% in our study possibly because of timely detection or other confounding factors like hypertension-induced fetal growth restriction and exclusion of twin pregnancies from our study.[21,22]

Placental causes (Group C) were responsible for 19.8% of stillbirths in our setup mostly due to abruption and placenta previa. These figures are similar to local and global estimates.[23]

Another entity in the ReCode classification system is, cord accidents (Group B) which include constricting loop or knots (1.5%) and prolapse (4.5%) which stands out as a cause of stillbirths necessitating increased ultrasound surveillance and swift intrapartum care in face of cord accidents.[24]

An important consideration emerging from our study is birth asphyxia (Group G) and uterine rupture (Group E) contributing to 10.8% and 3% of stillbirths respectively, warranting adequate obstetric care of the parturient mother. Intrapartum events leading to stillbirths vary from 10.0% in developed countries to 59.3% in South Asia.[25] Our figures are somewhat similar to developed countries because it's tertiary care hospital-based data without the input of community data. Improving intrapartum care and following the labour care guide or partogram are way forward in reducing stillbirths related to suboptimal intrapartum care.[26,27]

The strength of our study is that we used ReCoDe classification, for the first time in our hospital. Further endorsement by multicenter research involvement across the country will pave the way for recording the causes of stillbirths as per new system and also suggest local modification of this system for local and international comparison in order to develop comprehensive preventive measures.

Conclusion

As per ReCoDe classification system maternal causes like preeclampsia and diabetes in Group F, are the predominant causes of stillbirths followed by Group A including fetal causes like lethal congenital abnormality and fetal growth restriction. Concerted efforts like screening for preeclampsia, diabetes and focusing on improving maternal nutrition, folic acid supplementation and better detection and management of fetal abnormalities can reduce the stillbirth rate in developing country like ours. Moreover, Re Co De classification system is simple and useful tool for identifying causes of stillbirths in low resource settings.

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