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Intrauterine fetal death: A hospital based cross sectional study

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ABSTRACT

Introduction: Intrauterine fetal death (IUFD) is not only a medical concern but also a deeply emotional and societal one which affects the intrinsic human desire for healthy and thriving offspring. Therefore, it is important to meticulously identify the potential causal factors contributing to fetal deaths, which will help to ascertain the likelihood of its recurrence, and subsequently, to strategize for prevention or necessary interventions.

Objectives: The objective of the study is to describe the socio-epidemiological and etiological characteristics ofIUFD.

Methodology: This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Birat Medical College and Teaching Hospital, Biratnagar for a duration of 16 months from May 11st, 2022 to August 31st, 2023. All pregnant women who had IUFD with gestational age of 22 weeks and above were included in the study.

Results: During the study period there were total of 5,404 deliveries and among them 73 deliveries were IUFD (13.5 per 1000 live birth). The majority of IUFD, specifically 37 cases (50.4%), were attributed to unexplained etiology. The most common coexisting condition was hypertensive disorder of pregnancy contributing 20.5% followed by Intra-Uterine Growth Retardation (IUGR) in 11(15.1%) cases.

Conclusion: There is a significant burden of stillbirths, which will have effect in physical and psychological well-being along with socio-economic impact for grieving parents. Though hypertensive disorder, IUGR and diabetes were the major identified co-morbidities, more than half of the stillbirths were unexplained. This warrants the need of consistent antenatal care (ANC) visits and timely hospital admission for its aversion.

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INTRODUCTION

Intrauterine fetal death (IUFD) is a serious complication of pregnancy that has a significant impact on the short-term psychological well-being of women.¹ According to the International Classification of Diseases, 11th revision (ICD-11),the fetal death is defined as "death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles whether or not the umbilical cord has been cut or placenta is attached". WHO/ICD defines still births as "death of a fetus with a birth weight of at least 500 grams, or in cases where birth weight information is unavailable, a gestational age of 22 weeks or a crown-to-heel length of 25 centimeters".

Globally, an estimated 2.6 million babies are stillborn (die in the last 3 months of pregnancy or during childbirth) with a Stillbirth rate (SBR) of 18.4 per 1000 births.² According to NDHS 2022 report the stillbirth rate was 10 per thousand pregnancies of 28 or more weeks. Nepal established its Newborn Action Plan in 2016 with the goal of eliminating preventable newborn and stillbirth deaths by 2035. The action plan has set a target to reduce the stillbirth rate to less than 13 per 1000 pregnancies lasting 28 weeks or more. Stillbirth has many causes: intrapartum complications, hypertension, diabetes, infection, congenital and genetic abnormalities, placental dysfunctionand pregnancy continuing beyond forty weeks.³ This study has been conducted to examine maternal conditions associated with intrauterine fetal death. This study specifically focuses on clinical characteristics and maternal risk factors, while also assessing factors that could be mitigated to prevent fetal death.

METHODOLOGY

This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Birat Medical College and Teaching Hospital (BMCTH), Biratnagar for a duration of 16 month from May 1st, 2022 to August 31st 2023. The ethical approval was obtained from the Institutional Review Committee of BMCTH. The study population included pregnant women who had IUFD prior to onset of labor, during labor or delivery; gestational age of 22 weeks and above; and consented to participate. Those IUFD delivered outside this center were excluded from the study.

A structured proforma was designed to record all the available demographic details and clinical parameters. On receiving a case, participants were explained about the study in detail. They were assured of confidentiality and informed written consent was taken. Data was collected and noted on the proforma. Identification of all IUFD cases were done through clinical examination with the use of stethoscope, fetal doppler and confirmed by ultrasonography. Detailed history including present pregnancy and past obstetric history was taken. All baseline investigations (haemoglobin, random blood sugar, blood group, platelet, serology, urine routine, ultrasonography obstetric scan) were done. The decision for mode of delivery was based on clinical evaluation of the progress of labour and maternal condition. The fetus was examined grossly, weighed and any gross structural anomalies were recorded. The placenta and cord were also examined, and any anomalies found, were entered in the data collection record. The data collected in proforma were entered in Microsoft excel daily, was checked, cleaned and coded. The final file was then exported to SPSS version 20 software for further analysis. Categorical variables were expressed in frequency and percentage, while mean and standard deviation with minimum and maximum values are presented for continuous variables. Cross tabulation of various characteristics by sex of baby has also been presented. Bar graph has been shown to present the co-existing conditions with IUFD.

RESULTS

There were total of 5,404 deliveries during the study period and among which 73 cases were of IUFD resulting to a incidence of 13.5 per 1000 live birth.

The mean age of the mothers was 26 years, and ranged from 18 to 40 years, with most of the fetal death occurring among women of age 20-30 years. Most of them belonged to Hindu religion (75.3%), and visited form Sunsari district (50.7%), as shown in table 1.

Table 1: Socio-demographic characteristics of mother (n= 73)

Characteristics		Frequency	Percentage	
Age (in years)	15 - < 20	1	1.4	
	20 - <25	28	38.4	
	25 - <30	26	35.6	
	30 - <35	14	19.2	
	35 - 40	4	5.5	
	Mean ± SD (min, max)	26.0 ± 4.6 (18, 40)		
Religion	Buddhist	2	2.7	
	Hindu	55	75.3	
	Muslim	16	21.9	
Address	Ilam	1	1.4	
	India	2	2.7	
	Jhapa	1	1.4	
	Khotang	1	1.4	
	Morang	21	28.8	
	Sankhuwasabha	1	1.4	
	Saptari	5	6.8	
	Siraha	4	5.5	
	Sunsari	37	50.7	
Total		73	100.0	

The majority 33 (45.2%) of women were primi gravid, followed by 2ndgravida in 20 (27.4%) women. Although 98.6% received ANC care but only 41.7% received ANC care as per national protocol. Thirty-three (45.2%) women did not have previous pregnancy event while 25(34.2%) women had previous live births, 4(5.5%) women had previous IUFD and 11(15.1%) had history of abortion. Fifty-seven (78.1%) women were in labor at the time of admission while 16 (21.9) were not in labor. The mode of delivery was decided as per hospital protocol where 59 (80.8%) women underwent vaginal delivery and 14 (19.2%) underwent cesarean section. The majority of IUFD, specifically 37 cases (50.4%), were attributed to unexplained etiology (figure 1). The most common coexisting condition was hypertensive disorder of pregnancy contributing 20.5% followed by IUGR in 11(15.1%) cases. Diabetes was third leading coexisting maternal condition contributing 6 (8.2%) cases. Thyroid disorder followed as fourth leading condition, affecting 6.8% of cases, with placental causes, oligohydramnios, and preterm premature rupture of membrane (PPROM) each contributing 2.7% of cases. There was one case of syphilis leading to non-immune hydrops and IUFD (table 2).

Table 2: Obstetric characteristics of mother (n = 73)

Chara	cteristics	Frequency	Percentage	
	1	33	45.2	
	2	20	27.4	
Gravida	3	14	19.2	
	4	3	4.1	
	5	1	1.4	
	6	2	2.7	
	0	38	52.1	
	1	19	26.0	
Parity	2	13	17.8	
	3	2	2.7	
	4	1	1.4	
Dessived ANC	No	1	1.4	
Received ANC	Yes	72	98.6	
ANC As per	No	42	58.3	
protocol (n = 72)	Yes	30	41.7	
	Abortion	11	15.1	
Previous	IUFD	4	5.5	
event	Live birth	25	34.2	
	No prev pregnancy	33	45.2	
Any co-existing	No	37	50.6	
condition	Yes	36	49.4	
	Hypertensive disorder	15	20.5	
	IUGR	11	15.1	
	Diabetes	6	8.2	
Co-existing	Thyroid disorders	5	6.8	
conditions*	Placenta and related	2	2.7	
	Oligohydroamnios	2	2.7	
	PPROM	2	2.7	
	Syphilis	1	1.4	
Total		73	100.0	

*Multiple responses



Majority of IUFD, i.e. 42 (54.7%) cases occurred between 28 to 37 weeks of gestation and 24(32.9%) IUFD occurred at 37 weeks of gestation or more. Most of the babies were preterm.IUFD occurred between 20 to 28weeks of gestation were 7(9.6%). Macerated stillbirth accounted for 47(64.4%), while fresh stillbirth were 26 (36.5%). (Table 3)

Table 3: Distribution of delivery and fetus characteristics by sex of fetus

Characteristics		Sex of baby		
	Female	Male		Total
Condition at admission	In labor	3 (9.7%)	13 (31%)	16 (21.9%)
	Not in labor	28 (90.3%)	29 (69%)	57 (78.1%)
Mode of delivery	Breech delivery	3 (9.7%)	4 (9.5%)	7 (9.6%)
	Caesarean	3 (9.7%)	11 (26.2%)	14 (19.2%)
	Normal vaginal	23 (74.2%)	27 (64.3%)	50 (68.5%)
	Vaccuum delivery	1 (3.2%)	0 (0%)	1 (1.4%)
	VBAC	1 (3.2%)	0 (0%)	1 (1.4%)
Gestational age (in weeks)	22- <28	3 (9.7%)	4 (9.5%)	7 (9.6%)
	28 - <37	18 (58.1%)	24 (57.1%)	42 (57.5%)
	37 - <42	10 (32.3%)	14 (33.3%)	24 (32.9%)
Birthweight (in grams)	500 - <1500	9 (29%)	13 (31%)	22 (30.1%)
	1500 - <2500	16 (51.6%)	10 (23.8%)	26 (35.6%)
	2500- <4000	6 (19.4%)	18 (42.9%)	24 (32.9%)
	≥ 4000	0 (0%)	1 (2.4%)	1 (1.4%)
Type of fetal death	Fresh	8 (25.8%)	18 (42.9%)	26 (35.6%)
	Macerated	23 (74.2%)	24 (57.1%)	47 (64.4%)
FHS during admission	No	27 (87.1%)	33 (78.6%)	60 (82.2%)
	Yes	4 (12.9%)	9 (21.4%)	13 (17.8%)
Total		31 (100%)	42 (100%)	73 (100%)

DISCUSSION

During the study period, there were 73 cases of IUFD out of a total of 5404 births resulting in IUFD for pregnancies beyond 22 weeks to be 13.5 per 1000 total births. However, based on the World Health Organization (WHO) criteria for international comparison which considers pregnancies beyond 28 weeks, the stillbirth rate in our study was 12.2 per thousand live birth, slightly higher than the stillbirth rate reported by NDHS 2022 (10 per thousand births). In the present study out of 73 IUFD cases in which 98.6% received ANC care but only 41.75% received ANC care as per national protocol. A significant concern highlighted by our findings is the lack of adequate antenatal care (ANC), which requires immediate attention. With proper ANC, complications such as anemia and hypertensive disorder of pregnancycan be identified at an earlier stage and effectively managed, thus preventing IUFD due to these factors. Research conducted by Al Kadri et al. revealed that women who did not receive ANC face a 70% higher risk of IUFD.⁴ The Increased risk of fetal death is present amongst the teenage group and older women.^{5,6} In this study, it is evident that the majority of fetal deaths, approximately 38.4%, were recorded among women aged 20 to 25 years, followed closely by 35.6% within the age group of 26 to 30 years. This observation can be attributed to several factors. Firstly, the legal minimum age for marriage in Nepal, which stands at 20 years, could contribute to the relatively lower incidence of fetal deaths in women below this age bracket. Secondly, a significant

percentage of women may aim to complete their families prior to reaching the age of 35, potentially influencing the distribution of fetal deaths within these age groups.

In the present study, the proportion of IUFD cases was notably higher among primigravida accounting 33 (45.2%) of women which is similar to study by Meena $et.al^7$ but dissimilar to various other study where incidence of IUFD were higher among multigravida.^{8,9,10}. The risk of stillbirth in subsequent pregnancies is higher in women who experience a stillbirth in their first pregnancy .¹¹Our study provides evidence that 15 individuals (20.54%) had a documented history of reproductive loss, encompassing 11 cases (15.06%) of induced abortion and 4 cases (5.48%) of IUFD. These findings support the results of a study conducted by Lamont K et al.¹¹ Furthermore, in our study, hypertensive disorders of pregnancy accounted for 15 cases, representing 20.5% of IUFD cases. This finding aligns with the results reported in a study conducted by Saha D. et al.¹² Additionally, other studies conducted in Africa and India have reported a higher incidence of hypertensive disorderranging from 32% to 34% of cases.^{9,13} This variation in prevalence may be attributed to regional differences in patient populations, healthcare practices, or other contributing factors. The incidence of intrauterine growth retardation in our study was 15.1%. The other studies have reported the incidence from 2.2% to 18.4%.^{14,15,16}Notably, 6 cases (8.2%) were attributed to diabetes mellitus .Thyroid disorder followed as fourth leading condition,

affecting 6.8% of cases, with placental causes, oligohydramnios, preterm premature rupture of membrane (PPROM) each contributing 2.7% of cases. There was one case of syphilis leading to non-immune hydrops and IUFD. Macerated stillbirth accounted for 47(64.4%), while fresh stillbirth were 26(36.5)%. The higher proportion of macerated stillbirth may be due to lack of awareness about warning sign among mothers or delay in seeking care.

Many studies reported a large proportion of IUFD as unclassifiable or as cause 'unknown' (3.8–57.4%).^{17,18} Unexplained IUFD was observed in 37cases (50.6%) in our study. Similar to our study, nearly half of all stillbirths were reported as cause 'unknown' in studies from Bangladesh (49%). In contrast, unknown causes of IUFD account for 30% of stillbirths in high-income countries, although this could be as low as 5% with full assessment.¹⁹

Our research findings indicated that 57.5% of cases of IUFD involved male fetuses, while 42.4% involved female fetuses. These observations align with a study conducted by Mondal et al., which identified a 10% higher risk of stillbirth among male fetuses.²⁰ The reason why males are at higher risk is unknown. Majority of women in our study group delivered vaginally(80.8%) as compared to Korde et al (73.1%) ⁸ and Chitra et al(89.4%).²¹

CONCLUSION

More than half of the stillbirths were attributed to unexplained etiology, with hypertensive disorder of pregnancy, IUGR and diabetes being the major co-existing conditions among those identified. More than half of the mothers in this study were not found to be attaining ANC as per protocol. This warrant the need of consistent ANC visits and timely hospital admission, as asignificant portion of stillbirths can be averted through it. Continual monitoring and follow-up care play vital roles in preventing fetal loss and recurrences. While individual factors may contribute to fetal deaths, it is often a complex interplay of multiple factors that leads to such outcomes. Therefore, continuous research on stillbirths is crucial for uncovering complex pathways causing fetal deaths, with the ultimate goal of preventing stillbirths.

LIMITATIONS OF THE STUDY

This study is not able to identify and confirm the factors contribution to stillbirths as the methods for confirmation requires a comprehensive autopsy diagnosis and karyotyping.

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