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Intra-Uterine Fetal Death and Associated Maternal Risk Factors: A Prospective Study in a Tertiary Care Hospital in Eastern India

Shirazee HH[1]*, Abantika Ghosh[2], Suvasmita Saha[3], Murmu M[4], Bhattacharyay SK[5]

[1]Associate Professor, Dept. of Gynaecology & Obstetrics, RG Kar Medical College & Hospital, Kolkata, India
[2]Senior Resident, Dept. of Gynaecology & Obstetrics, Medical College & Hospital, Kolkata, India
[3]RMO cum Clinical Tutor, Dept. of Gynaecology & Obstetrics, College of Medicine & JNM Hospital, Kalyani, India
[4]Assistant Professor, Dept. of Gynaecology & Obstetrics, RG Kar Medical College & Hospital, Kolkata, India
[5] Professor, Dept. of Gynaecology & Obstetrics, RG Kar Medical College & Hospital, Kolkata, India

***Address for Correspondence:** Dr. Hasibul Hasan Shirazee, North Kolkata Infertility & IVF Centre, 15/1C/1G Raja Manindra Road, Paikpara, Kolkata-700037, India
E-mail: shirazeehasan@rediffmail.com

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ABSTRACT

Background: Intrauterine fetal death (IUFD) is a devastating obstetric outcome with significant psychological and medical implications. The prevalence and associated risk factors vary widely across different geographical and socioeconomic settings. The study aimed to determine the prevalence of IUFD and identify the significant maternal risk factors contributing to it in Eastern India.

Methods: A prospective, cross-sectional study was conducted over 18 months. All women with IUFD (gestational age ≥20 weeks or fetal weight ≥500g) were included. Data on sociodemographic profile, obstetric history, antenatal booking status, and maternal comorbidities were collected and analyzed using descriptive statistics and chi-square tests.

Results: Among 18,598 deliveries, 177 cases of IUFD were recorded, resulting in a prevalence rate of 9.51 per 1,000 deliveries. The mean maternal age was 25.31 years, with a majority being primigravida (47.45%). Most women (79.09%) were booked for antenatal care. The most common gestational age at IUFD was 30-35 weeks (48.58%). The leading identifiable maternal risk factors were Gestational Diabetes Mellitus(GDM) (20.33%), Obstetric Cholestasis (15.25%), and Hypertensive Disorders of Pregnancy(HDP) (14.68%). Statistical analysis revealed a significant association between IUFD and both GDM (p=0.000083) and Obstetric Cholestasis (p=0.00001), but not with HDP (p=0.54).

Conclusion: The prevalence of IUFD in our setting is lower than that reported in many Indian studies, but it remains a significant concern. GDM and obstetric cholestasis were the strongest associated risk factors. Enhanced screening, strict glycemic control, and meticulous management of these conditions during antenatal care are crucial strategies to reduce the burden of IUFD.

Key-words: Intrauterine Fetal Death, Stillbirth, Prevalence, Gestational Diabetes, Obstetric Cholestasis, Risk Factors

INTRODUCTION

Intrauterine fetal death (IUFD), defined as fetal death at or after 20 weeks of gestation, is a profound obstetric tragedy causing immense psychological distress to the parents and posing a significant challenge to healthcare providers [1].

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It remains a major public health issue, especially in low- and middle-income countries, where the rates are substantially higher than in developed nations [2].

Globally, an estimated 2 million stillbirths occur annually, with the vast majority happening in low-resource settings [3]. The etiology of IUFD is often multifactorial, encompassing maternal, fetal, placental, and unexplained causes [4]. Common maternal risk factors include hypertensive disorders, diabetes mellitus (both overt and gestational), obstetric cholestasis, antepartum hemorrhage, infections, and anemia [5,6]. Identifying these modifiable risk factors is critical for developing targeted preventive strategies.

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While numerous studies across India have reported on IUFD, the risk factor profile can vary widely by region due to differences in ethnicity, socioeconomic status, and healthcare access [7,8]. Data from tertiary care centers in Eastern India is relatively sparse. This study was conducted to determine the current prevalence of IUFD and to identify the predominant associated maternal risk factors in a tertiary care teaching hospital in Kolkata, West Bengal, to inform local clinical practice and public health policy.

MATERIALS AND METHODS

Study Design- A prospective, cross-sectional study was conducted in the Department of Obstetrics and Gynaecology at R.G. Kar Medical College and Hospital, Kolkata, a major tertiary care and teaching institution in Eastern India. The study was conducted over 18 months, from March 1, 2021, to August 31, 2022.

Inclusion criteria

- All antenatal patients with gestational age >=20 weeks getting admitted from Out-Patient Department or Emergency Department with complaints of absent fetal movements with clinical and/or radiological evidence of IUFD who are in labour.
- All antenatal patients with gestational age >=20 weeks getting admitted from Out-Patient Department or Emergency Department with complaints of absent fetal movements with clinical and/or radiological evidence of IUFD who are not in labour.

Exclusion criteria

- Patients with missing information.
- Antenatal patients with gestational age less than 20 weeks with missed or inevitable abortion.
- Antenatal patient or patient party not giving consent to share their information.
- Patient admitted with postoperative complications (IUFD delivered outside).

Study Population and Sample Size- All women delivering an IUFD baby (as per the definition of gestational age ≥20 weeks or fetal weight ≥500g) during the study period were included.

The minimum sample size was calculated as 160 using the formula for cross-sectional studies:

[n=(Z^2 * P*Q)/L^2]

with a prevalence (P) of 3.9% from a previous study [9], a 95% confidence level (Z=1.96), and a relative precision (L) of 3.

Data Collection- After obtaining ethical clearance from the Institutional Ethics Committee (Memo No. RKC/324, Date: 13.02.2021), data were collected prospectively using a structured case record form. Information included maternal demographics, obstetric history, antenatal booking status, detailed medical history, and findings from clinical examination and investigations.

Statistical Analysis- Data were entered into a Microsoft Excel spreadsheet and analyzed using appropriate statistical software. Descriptive statistics were expressed as mean (±standard deviation) for numerical variables and frequencies (percentages) for categorical variables. The Chi-square test was used to determine the association between specific maternal co-morbidities (GDM, Obstetric Cholestasis, HDP) and IUFD. A $p<0.05$ was considered statistically significant.

Ethical Approval- Approval for the study was obtained from the Institutional Ethics Committee, R G Kar Medical College & Hospital, Kolkata, West Bengal, India (Memo No. RKC/324, Date: 13.02.2021).

RESULTS

During the 18-month study period, there were 18,598 deliveries, of which 177 were IUFD cases, yielding a prevalence rate of 9.51 per 1000 deliveries. In our study, 55 (31.07%) of the study subjects had a low socio-economic status.

The mean age of the mothers included in this study was 25.31 years. The largest number of participants was in the 20-30-year-old age group. The majority of patients were primipara (53.10%), and 0.56% were grand multipara. In our study, 140 (79.09%) patients had at least three antenatal visits (booked case). Thirty-seven (20.09%) patients were unbooked cases and had not had a single antenatal visit (Table 1).

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Table 1: Socio-demographic and Obstetric Profile of Study Subjects (N=177)

Variable	Category	Frequency (n=177)	Percentage (%)
Age Group	<20	22	12.42
	20–25	62	35.02
	25–30	62	35.02
	30–35	28	15.81
	>35	3	1.69
Parity	P0	94	53.10
	P1	44	24.85
	P2	24	13.55
	P3	4	2.25
	P4 and above	1	0.56
Antenatal Booking	Yes	140	79.09
	No	37	20.90
Previous Vaginal Delivery	Yes	53	29.94
	No	124	70.05
Previous Cesarean Section	Yes	40	22.59
	No	137	77.40

The majority of the patients (86) in this study were in the gestational age group of 30-35weeks (48.58%), followed by 50 patients (28.24%) having gestational age between 35-40 weeks. The gestational age was unknown for 1(0.56%) of the candidates (Table 2).

Table 2: Period of Gestation of the subjects included in the study (N=177)

Period Of Gestation (Weeks)	Frequency (N =177)	Percentage (%)
20-25	09	5.08
25-30	22	12.42
30-35	86	48.58
35-40	50	28.24
>=40	09	5.08
Unknown	01	0.56
Total	177	100

Hypothyroidism was the most common medical co-morbidity observed in 74(41.80%) mothers, followed by gestational diabetes mellitus (GDM) in 36(20.33%) and hypertensive disorder of pregnancy (HDP) in 26(14.68%) mothers. 19(10.73%) mothers had overt diabetes mellitus. (Fig. 1).

Table 3 shows that Gestational Diabetes Mellitus (GDM) was the most common contributing factor to IUFD (20.33%), followed by Obstetric cholestasis (15.25%) and hypertensive disorder of pregnancy (14.68%). The least common contributing factor was a deranged Doppler study (3.95%).

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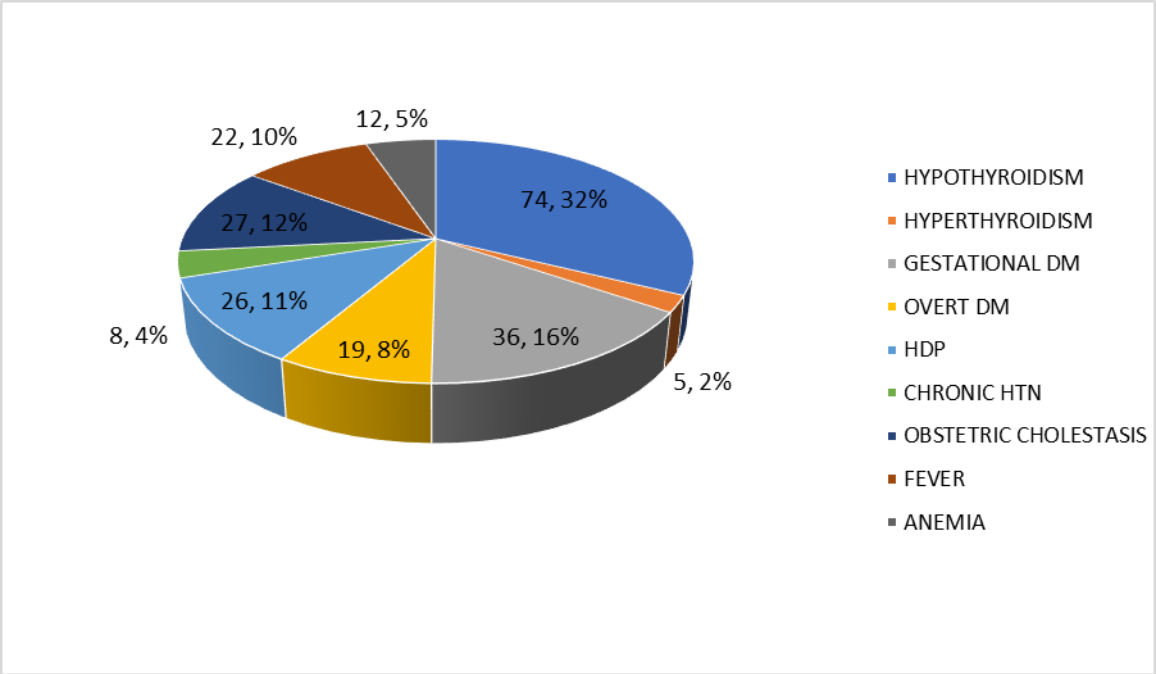

Fig. 1: Medical comorbidities amongst the study population (n=177)

Table 3: Distribution of Maternal Risk Factors Contributing to IUFD (n=177)

Contributing Risk	Factor Frequency (n=177)	Percentage (%)
Gestational Diabetes Mellitus(GDM)	36	20.33
Obstetric Cholestasis	27	15.25
Hypertensive Disorder of Pregnancy (HDP)	26	14.68
Abruptio Placentae	18	10.16
Overt Diabetes Mellitus	19	10.73
Hydrops Fetalis	12	6.77
Anemia	12	6.77
Deranged Doppler	7	3.95
Congenital Anomalies	8	4.51
Severe Oligohydramnios	5	2.82
Twin-Twin Transfusion Syndrome	3	1.69

From Table 4, it is observed that the total number of pregnant women who had Gestational Diabetes mellitus during the study period was 2063, and among these mothers, 36 had IUFD. This association is statistically significant ($p<0.05$).

Table 4: Association Of GDM And IUFD

GDM	IUFD	Live Birth	p-value
Yes	36	2027	0.000083
No	141	16394	
Total	177	18421	

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Table 5 showed that the total number of pregnant women diagnosed with obstetric cholestasis during the study period was 987, of whom 27 mothers had IUFD, indicating a significant association (p<0.05).

Table 5: Association between Obstetric cholestasis and IUFD

Obstetric Cholestasis	IUFD	Live Birth	p-value
Yes	27	960	0.00001
No	150	17461	
Total	177	18421	

The total number of pregnant women with Hypertensive disorder of pregnancy during the study period was 2446 and among them, 26 mothers had IUFD, showing no significant association (p= 0.54) (Table 6).

Table 6: Association between Hypertensive Disorder of Pregnancy and IUFD

HDP	IUFD	Live Birth	p-value
Yes	26	2420	0.54
No	151	16001	
Total	177	18421	

DISCUSSION

This prospective study found a prevalence of IUFD of 9.51/1000 deliveries. This rate is lower than those reported in several other Indian studies from different regions, which have shown rates ranging from 24.4 to 41.9/1000 births [7,8,10]. This discrepancy could be attributed to the higher proportion of booked patients (79.09%) in our study population, indicating better access to and utilization of antenatal care services than in predominantly unbooked populations in other studies [10,11].

The most significant finding of our study is the identification of Gestational Diabetes Mellitus (20.33%) and Obstetric Cholestasis (15.25%) as the leading risk factors for IUFD; both are highly significantly associated with IUFD. This finding contrasts with many previous Indian studies that identified hypertensive disorders as the most common cause [7,10,12]. The high prevalence of GDM aligns with the increasing global and national burden of diabetes. Poorly controlled GDM leads to macrosomia, sudden fetal metabolic acidosis, and intrauterine demise [13]. Our results underscore the critical need for universal screening for GDM and intense glycemic control during antenatal follow-up.

The strong association with obstetric cholestasis, a condition characterized by maternal pruritus and raised bile acids, is particularly notable. Elevated bile acid levels are known to cause sudden fetal cardiac arrest and meconium staining, leading to an increased risk of IUFD [14]. This finding calls for a low threshold for investigating pruritus in pregnancy and aggressive management, including timely delivery upon diagnosis.

Interestingly, Hypertensive Disorders of Pregnancy (14.68%), while a common factor, did not show a statistically significant association with IUFD in our cohort (p=0.54). This observation may be attributable to closer surveillance and timely obstetric interventions, including early delivery, in women identified as high-risk. However, this finding should be interpreted with caution, as the hospital-based nature of the study and limitations inherent to observational data may have influenced the observed association. Therefore, the absence of statistical significance does not rule out the potential contribution of hypertensive disorders to IUFD [15].

LIMITATIONS

The limitations of our study include its conduct in a single tertiary center, which may limit the generalizability of the findings to community settings. Furthermore, a significant proportion of cases had multiple overlapping

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risk factors, making it challenging to isolate a single causative factor.

CONCLUSIONS

The prevalence of IUFD in our tertiary care setting was 9.51 per 1000 deliveries. The risk factor profile appears to be evolving, with Gestational Diabetes Mellitus and Obstetric Cholestasis emerging as the most significant contributors, surpassing hypertensive disorders. This study highlights the critical importance of Universal and early screening for GDM and Obstetric Cholestasis in all pregnant women, aggressive management and close fetal surveillance for pregnancies complicated by these conditions, and continued emphasis on quality antenatal care to identify and promptly manage all risk factors. Future public health initiatives should focus on educating healthcare providers and patients about the risks associated with GDM and obstetric cholestasis to mitigate the burden of IUFD.

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CONTRIBUTION OF AUTHORS

Research concept- Hasibul Hasan Shirazee, Abantika Ghosh, Monimala Murmu
Research design- Hasibul Hasan Shirazee, Abantika Ghosh, Monimala Murmu
Supervision- Hasibul Hasan Shirazee, Suvasmita Saha, Monimala Murmu
Materials- Abantika Ghosh, Suvasmita Saha
Data collection- Abantika Ghosh, Suvasmita Saha
Data analysis and interpretation- Hasibul Hasan Shirazee, Abantika Ghosh, Suvasmita Saha
Literature search- Hasibul Hasan Shirazee, Abantika Ghosh, Monimala Murmu
Writing article- Hasibul Hasan Shirazee, Subir Kumar Bhattacharyay
Critical review- Hasibul Hasan Shirazee, Subir Kumar Bhattacharyay
Article editing- Hasibul Hasan Shirazee, Suvasmita Saha
Final approval- Hasibul Hasan Shirazee, Subir Kumar Bhattacharyay

REFERENCES

[1] Lawn JE, Blencowe H, Waiswa P, et al. Stillbirths: rates, risk factors, and acceleration towards 2030. Lancet, 2016; 387(10018): 587-603.
[2] McClure EM, Saleem S, Goudar SS, et al. Stillbirth rates in low-middle income countries 2010-2013: a population-based, multi-country study from the Global Network. Reprod Health, 2015; 12(Suppl 2): S7.
[3] World Health Organization. Making every baby count: audit and review of stillbirths and neonatal deaths. Geneva: World Health Organization; 2016.
[4] Silver RM. Fetal death. Obstet Gynecol., 2007; 109(1): 153-67.
[5] Gehlot H, Singh S, Shrivastava A. A study of incidence and causes of intrauterine fetal death. Int J Sci Res., 2020; 9(3): 1-4.
[6] Sharma S, Sidhu H, Kaur S. Analytical study of intrauterine fetal death cases and associated maternal conditions. Int J Appl Basic Med Res., 2016; 6(1): 11-13.
[7] Jayashree VK, Shruthi MN, Shruthi R. Study of intra uterine fetal death and associated maternal risk factors. J Evid Based Med Healthc., 2019; 6(20): 1496-500.
[8] Noor S, Majeed R, Qazi SA, et al. Audit of stillbirths in a tertiary care hospital of a developing country. J Pak Med Assoc., 2019; 69(5): 619-23.
[9] Kanavi JV, Shobha G, Kavita G. Incidence and risk factors for intrauterine foetal demise: a retrospective study in a tertiary care centre in India. Int J Pregn Chi Birth, 2017; 2(2): 33-36.
[10] Patel M, Patted S. A prospective study of etiology and management of intrauterine fetal death. Int J Reprod Contracept Obstet Gynecol., 2017; 6(5): 1944-1948.
[11] Archibong EI, El-Sayed M, Sobande AA. Stillbirths in a tertiary care hospital in Saudi Arabia. East Mediterr Health J., 2005; 11(3): 376-382.
[12] Shaveta, Sharma S. A study of etiology and risk factors of intrauterine fetal death. J Obstet Gynaecol India, 2018; 68(1): 43-47.
[13] Rosenstein MG, Cheng YW, Snowden JM, et al. The risk of stillbirth and infant death stratified by

doi: 10.21276/SSR-IIJLS.2026.12.1.13

gestational age in women with gestational diabetes. Am J Obstet Gynecol., 2012; 206(4): 309.e1-e7.

[14]Ovadia C, Seed PT, Sklavounos A, et al. Association of adverse perinatal outcomes of intrahepatic cholestasis of pregnancy with biochemical markers: results of aggregate and individual patient data meta-analyses. Lancet, 2019; 393(10174): 899-909.

[15]Shaveta, Sharma S. A study of etiology and risk factors of intrauterine fetal death. J Obstet Gynaecol India, 2018; 68(1): 43-47.