

Factors Related to Late Intrauterine Fetal Death in a Tertiary Level Hospital: A Retrospective Study

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ABSTRACT

Background: Intrauterine fetal death (IUFD) is an unfortunate perinatal occurrence with serious global and local impacts. Despite improved diagnostic methods, a significant fraction of stillbirths remains unexplained, especially in resource-constrained settings such as Nepal. Thus, the present study aimed to determine the frequency and associated characteristics of late intrauterine fetal death (≥ 28 weeks) in a tertiary-level hospital in Nepal.

Methods: A retrospective descriptive study was conducted at Dhulikhel Hospital, Nepal, from January 2024 to January 2025. Medical records from 36 women with late IUFD (≥ 28 weeks of gestation) were reviewed. Data on sociodemographic variables, obstetric history, antenatal care (ANC) attendance, and fetal factors were gathered and analyzed using descriptive statistics.

Results: The mean maternal age was 27.3 ± 6.3 years, with most women (88.9%) in the age group between 20-34 years. The majority were multigravida (80.6%) and had attended at least four ANC visits (83.3%). The mean gestational age at delivery was 35.8 ± 4.1 weeks, with a mean fetal birth weight of 1905 ± 834 grams. 41.7% of fetuses weighed less than 1500 grams. Male fetuses prevailed (61.1%). Surprisingly, 80.6% of instances were unexplained. Fetal malpresentation (8.3%), hypertensive disorders (5.6%), and other maternal comorbidities were all identifiable variables.

Conclusions: This study highlights a high proportion of unexplained stillbirths despite appropriate antenatal care in a tertiary care setting.

Keywords: Antenatal care; intrauterine fetal death; perinatal mortality; stillbirth.

INTRODUCTION

Intrauterine fetal death (IUFD) is a devastating obstetric complication that carries profound emotional, social, and healthcare implications worldwide. Around the world, the definition and reporting standards for fetal death are different, which makes it harder to compare data.¹ In the United Kingdom, stillbirth refers to fetal death occurring after 24 weeks of gestation,² whereas the American College of Obstetricians and Gynecologists (ACOG) defines it as fetal death at or beyond 20 weeks.³ The World Health Organization recognizes stillbirth as a major but underreported component of perinatal mortality, emphasizing the urgent need to strengthen maternal and neonatal care to address this silent global burden.⁴

The etiology of IUFD is multifactorial, involving maternal,

fetal, placental, and environmental factors.^{5,6} Studies from Nepal have reported congenital anomalies, placental insufficiency, and umbilical cord accidents as common causes.⁵⁻⁸ Despite ongoing efforts, stillbirth remains a major public health issue, with tertiary-level data indicating rates as high as 14.8 to 16.0 per 1000 live births.⁹⁻¹²

In Nepal, maternal conditions such as hypertension and limited diagnostic resources further contribute to this challenge.¹³ Therefore, identifying the local determinants of IUFD is essential to guide preventive strategies, improve antenatal surveillance, and support bereaved families with evidence-based counseling. Thus, the present study aimed to determine the frequency and associated characteristics of late intrauterine fetal death (≥ 28 weeks) in a tertiary-level hospital in Nepal.

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METHODS

A hospital-based, retrospective, descriptive study was conducted at the Department of Obstetrics and Gynaecology of Dhulikhel Hospital a tertiary care teaching hospital affiliated with Kathmandu University. The hospital serves a diverse population in several districts and functions as a major referral center for complicated obstetrics cases in the region.

The study population comprised all pregnant women who were admitted with a diagnosis of IUFD between September 1, 2022, and August 30, 2023. The study was conducted from January 2024 to January 2025 for a year. The inclusion criteria for the final analysis were a confirmed diagnosis of late IUFD, defined as fetal death occurring at or after 28 completed weeks of gestation, and the availability of complete medical records for review. Cases were excluded if the gestational age was less than 28 weeks, the fetal weight was less than 500 grams (in cases of unknown gestational age), or if key data points were missing from the hospital records.

Since this study relies entirely on existing hospital records, data were collected using a standardized, pre-designed data extraction form developed by the research team. The hospital's admittance logs first showed that there were 43 instances of IUFD. After using the gestational age as the inclusion criterion, we took out seven cases that were less than 28 weeks, leaving us with a final sample size of 36 cases for the study. All cases meeting the inclusion criteria during the study period were included; hence, a census sampling technique was employed.

The socio-demographic variables included the maternal age (grouped into 20-34 years and ≥ 35 years) and ethnicity. Obstetric variables include parity (primigravida or multigravida), number of antenatal care (ANC) visits (0, 1-3 [inadequate], or ≥ 4 [sufficient]), referral status, and gestational age at delivery. Variables related to the fetus and delivery are the fetus's birth weight (less than 1500 g, 1500-2499 g, or 2500 g or over), the sex of the fetus, and the kind of delivery (vaginal or caesarean section).

The associated clinical factors were constructed by classifying the most likely cause of IUFD based on the diagnoses that were already in the patient's file. Some of the categories were hypertensive disorders of pregnancy (pre-eclampsia, eclampsia), fetal factors (malpresentation), other maternal co-morbidities (such as severe anemia or fibroids), and unexplained/

idiopathic (cases with no identifiable factor in the record). Perinatal autopsy and genetic testing of stillborn babies were not routinely performed at the study site; therefore, classification relied on the information documented in the medical records.

The obtained data were entered into Microsoft Excel 2016 and then imported into the Statistical Package for Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY) for analysis. We used descriptive statistics to summarize the data. The mean $\pm$ standard deviation (SD) was used for continuous variables such as maternal age, gestational age, and fetal birth weight. The categorical variables were expressed as frequencies and percentages (n, %).

Ethical approval for this study was obtained from the Institutional Review Committee of the X (X-IRC), reference no. 27/24, on January 26, 2024. As the study was a retrospective review of existing medical records, the requirement for individual informed consent was waived by the committee.

RESULTS

A total of 36 cases of late IUFD met the inclusion criteria during the one-year study period. The socio-demographic and obstetric characteristics of the patients are detailed in Table 1. The mean maternal age was 27.3 ± 6.3 years (range: 20-45 years). The majority (n = 32, 88.9%) were aged 20-34 years, and a smaller proportion (n = 4, 11.1%) were of advanced maternal age (≥ 35 years). Tamang was the most common ethnicity (33.3%), followed by Chhetri (19.4%). Most participants were multigravida (n = 29, 80.6%). Regarding antenatal care (ANC), 83.3% of women (n = 30) attended four or more visits, meeting the national standard for adequacy. A minority had inadequate ANC, with 13.9% (n = 5) attending 1-3 visits and one patient (2.8%) having no visits. Additionally, 22.2% of cases (n = 8) were referred from other health facilities (Table 1).

The fetal and delivery characteristics are summarized in Table 2. The mean gestational age at the time of delivery was 35.8 ± 4.1 weeks, with a range from 29 to 43 weeks. The mean fetal birth weight was 1905 ± 834 grams. The distribution of birth weight was varied, with 41.7% weighing less than 1500g and 22.2% weighing 2500g or more. There was a predominance of male fetuses (n=22, 61.1%). Most women (n=33, 91.7%) had a vaginal delivery, with only 3 cases (8.3%) requiring a cesarean section. The cesarean section were not consistently documented in a manner that allowed

meaningful categorization.

Table 1. Socio-demographic and obstetric characteristics of patients with late IUFD. (N=36)

Characteristic	Category	Frequency (n)	Percentage (%)
Maternal age (years)	20-34	32	88.9
	≥35	4	11.1
Ethnicity	Tamang	12	33.3
	Chhetri	7	19.4
	Brahmin	4	11.1
	Newar	3	8.3
	Others*	10	27.8
Parity	Primigravida	7	19.4
	Multigravida	29	80.6
Number of ANC visits	0	1	2.8
	1-3 (Inadequate)	5	13.9
	≥4 (Adequate)	30	83.3
Referral status	Referred from another facility	8	22.2
	Direct Admission / Not Stated	28	77.8

*Others include Sherpa, Majhi, Thing, Danuwar, Chaudhary, Magar, Rai, and Lama.

Table 2. Fetal and delivery characteristics. (N=36)

Characteristic	Value / Category	Frequency (n)	Percentage (%)
Mean gestational age (weeks)	-	35.8±4.1	-
Mean fetal birth weight (grams)	-	1905±834	-
Fetal birth weight Categories	<1500 g	15	41.7
	1500-2499 g	13	36.1
	≥2500 g	8	22.2
Fetal sex	Male	22	61.1
	Female	14	38.9
Mode of delivery	Vaginal delivery	33	91.7
	Cesarean section	3	8.3

Table 3. Frequency of identifiable associated factors in late IUFD. (N=36)

Associated Factor	Frequency (n)	Percentage (%)
Unexplained / idiopathic	29	80.6
Fetal factors (malpresentation)	3	8.3
Hypertensive disorders of pregnancy	2	5.6
Other maternal co-morbidities	2	5.6

Note: Percentages are based on the total of 36 cases. No documented cases of placental or cord abnormalities were found in the final cohort.

As presented in Table 3, a specific associated factor was documented in only 7 of the 36 cases (19.4%), while the majority (n = 29, 80.6%) were classified as unexplained based on available medical records. Among the identifiable factors, fetal malpresentation (breech) was the most common, accounting for 3 cases (8.3%). Hypertensive disorders of pregnancy (one case of eclampsia and one of pre-eclampsia) were noted in 2 cases (5.6%). Other maternal conditions, including one case of fibroid uterus and one of severe anemia, were associated with IUFD in another 2 cases (5.6%). No documented cases of gestational diabetes mellitus were identified in the available records. No cases of placental abnormalities (like previa or abruption) or cord accidents were explicitly documented in the records of the included cohort.

DISCUSSION

This retrospective study on late intrauterine fetal death (IUFD) at a tertiary hospital in Nepal both supports and diverges from existing literature, reflecting unique diagnostic and contextual challenges. The most striking finding was the high proportion of unexplained cases (80.6%), substantially exceeding the 25-60% reported in high-resource settings with established post-mortem protocols. Man et al. demonstrated that placental histopathology and perinatal autopsy markedly reduce unexplained cases,¹⁴ while Yamauchi et al. in Japan identified specific causes in 87% of IUFDs through comprehensive evaluation.⁹ In contrast, our results are consistent with findings from similar low-resource contexts, such as Manandhar et al., who reported 62% unexplained stillbirths in Nepal,⁵ and Tamrakar and Chawla, who documented 41% unexplained cases at the same institution.⁶ These findings underscore systemic gaps in perinatal diagnostics due to limited access to placental pathology, autopsy, and maternal investigations, as highlighted by Man et al.¹⁴ At our study site, perinatal autopsy and genetic testing of stillborn babies are not routinely performed, which likely contributed to the large unexplained category.

There is an important and contradictory outcome about ANC. Most mothers in our study (83.3%, 30/36) attended at least four ANC appointments, meeting the national standard for adequacy. This contrasts with established data that insufficient ANC visits are associated with an increased risk of intrauterine fetal demise (IUFD). This contrasts with the findings of Zhang and Cai, who reported that having fewer than three ANC visits significantly increased the risk of IUFD (OR 3.1).¹² Additionally, Thakur et al. found in Nepal that

68% of IUFD cases were associated with inadequate ANC.⁷ In Saudi Arabia, where 74% of IUFD mothers received "adequate" ANC, Shaaban et al. corroborate our findings.¹⁵ This paradox suggests that simple attendance measures may not be enough; instead, the quality of ANC, which includes careful risk assessment, efficient patient education (e.g., on monitoring fetal movements), attentive monitoring for diseases like hypertension, and proper action, is crucial. Routine ANC may not be able to find or fix minor or serious problems because unexpected things like cord accidents can happen even with regular monitoring.

Hypertensive disorders accounted for 5.5% of cases, comparable to Hematyar and Yarjou's 6.7% in Iran,¹¹ but lower than the 18-24% reported by Pradhan et al.⁸ and Sinha and Pandey.¹³ This discrepancy may indicate underdiagnosis or incomplete documentation. Fetal malpresentation (8.3%) was higher than the 1.9% reported by Bahtiyar et al.¹⁶ and may be linked to uterine or fetal abnormalities, or delays in intrapartum recognition. Other maternal comorbidities, including severe anaemia and fibroid uterus, accounted for 5.6% of cases, aligning with evidence that anaemia increases IUFD risk (AOR 2.3).

Advanced maternal age (≥ 35 years) was 11.1% of cases, consistent with findings by Bahtiyar et al. (2008), which showed that women over 35 had a 2.5-fold increased risk of term stillbirth.¹⁶ The male predominance of stillbirths (61.1%) indicates a potential biological vulnerability, aligning with global stillbirth statistics referenced by ACOG (Metz et al., 2020).³ More than 22% of its IUFD cases come from outside facilities. It stresses how important hospitals are for dealing with obstetric emergencies, but it also makes it clear those making basic and secondary health facilities better at seeing and treating problems early is an important part of successful prevention program.

This study was limited by its retrospective design and reliance on medical records, which may have led to incomplete data and underreporting of causes. In addition, the indications for cesarean section were not consistently documented, and perinatal autopsy and genetic testing were not routinely available at the study site. Lack of post-mortem and placental examinations also restricted definitive determination of IUFD etiology.

CONCLUSIONS

This study highlights a high proportion of unexplained stillbirths despite appropriate antenatal care in a

tertiary care setting. The findings indicate important gaps in perinatal diagnoses and the need to shift focus from quantity to quality in antenatal treatment. To decrease the incidence of late IUFD in Nepal, future efforts should focus on strengthening diagnostic tools, such as perinatal autopsy and placental examination, as well as improving risk detection at peripheral health facilities.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

REFERENCES

1. Kowaleski J. State definitions and reporting requirements for live births, fetal deaths, and induced terminations of pregnancy (1997 revision). Hyattsville, MD: National Center for Health Statistics; 1997.
2. Confidential Enquiry into Maternal and Child Health (CEMACH). Perinatal Mortality 2007: United Kingdom. London: CEMACH; 2009.
3. Metz TD, Berry RS, Fretts RC, Reddy UM, Turrentine MA, American College of Obstetricians and Gynecologists. Obstetric Care Consensus No. 10: Management of Stillbirth. *Am J Obstet Gynecol*. 2020;222(3):B2-B20. doi: <https://doi.org/10.1016/j.ajog.2020.01.017>
4. World Health Organization. Maternal, newborn, child, and adolescent health. Available from: https://www.who.int/maternal_child_adolescent/topics/maternal/maternal_perinatal/en/
5. Manandhar SR, Ojha A, Manandhar DS, Shrestha B, Shrestha D, Saville N, et al. Causes of stillbirths and neonatal deaths in Dhanusha district, Nepal: a verbal autopsy study. *Kathmandu Univ Med J (KUMJ)*. 2010;8(29):62-72. doi: <https://doi.org/10.3126/kumj.v8i1.3224>
6. Tamrakar SR, Chawla CD. Intrauterine foetal death and its probable causes: two years' experience in Dhulikhel Hospital-Kathmandu University Hospital. *Kathmandu Univ Med J (KUMJ)*. 2012;10(40):44-48. doi: <https://doi.org/10.3126/kumj.v10i4.10994>
7. Thakur A, Basnet P, Rai R, Agrawal A. Risk Factors Related to Intrauterine Fetal Death. *J Nepal Health Res Counc*. 2019;17(1):46-50. doi: <https://doi.org/10.33314/jnhrc.v17i01.1534>
8. Pradhan P, Poudel S, Maharjan A. Stillbirth--a tragic journey: a critical analysis. *Nepal Med Coll J*. 2010;12(4):239-43. [PubMed]
9. Yamauchi A, Minakami H, Ohkuchi A, Usui R, Idei S, Sato I. Causes of stillbirth: an analysis of 77 cases. *J Obstet Gynaecol Res*. 1999;25(6):419-24. doi: <https://doi.org/10.1111/j.1447-0756.1999.tb01187.x> [PubMed]
10. Man J, Hutchinson JC, Heazell AE, Ashworth M, Levine S, Sebire NJ. Stillbirth and intrauterine fetal death: factors affecting determination of cause of death at autopsy. *Ultrasound Obstet Gynecol*. 2016;48(5):566-73. doi: <https://doi.org/10.1002/uog.16016> [PubMed]
11. Hematyar M, Yarjou S. Causes of perinatal mortality at Javaheri hospital during 7 years 1996-2003. *Med Sci J Islam Azad Univesity-Tehran Med Branch*. 2005;15(1):37-40. [Article]
12. Zhang J, Cai W. Risk factors associated with antepartum fetal death. *Early Hum Dev*. 1992;28(3):193-200. [PubMed]
13. Sinha K, Pandey S. Risk Factors in Patients with Intrauterine Fetal Death at Tertiary Referral Centre. *J Nepalgunj Med Coll*. 2019;17(2):14-16. doi: <https://doi.org/10.3126/jngmc.v17i2.28752>
14. Jahanfar S, Ghiyasi P, Haghani H. Risk Factors Related to Intra Uterine Fetal Death in Iran, A Case-control Study. *Shiraz E-Med J*. 2005;6(3 and 4):32897. [Article]
15. Shaaban LA, Al-Saleh RA, Alwafi BM, Al-Raddadi RM. Associated risk factors with ante-partum intra-uterine fetal death. *Saudi Med J*. 2006;27(1):76-9. [PubMed]
16. Bahtiyar MO, Funai EF, Rosenberg V, Norwitz E, Lipkind H, Buhimschi C, et al. Stillbirth at term in women of advanced maternal age in the United States: When could the antenatal testing be initiated? *Am J Perinatol*. 2008;25(5):301-4. [PubMed]