

Epidemiological Risk Factors and Clinical Profile of Antepartum and Intrapartum Stillbirths: An Observational Study

Arjun N.¹, Karishma Sarwath A. Z.², Anusha G.K.³

¹Senior Resident, Nandi Medical College and Research Institute, Chikkaballapura, Karnataka, India

²Faculty in OBG, Vani Vilas Hospital, Bengaluru, Karnataka, India

³Assistant Professor, Shivamogga Institute of Medical Sciences, Shivamogga, Karnataka, India

Received: 01-04-2026 / Revised: 25-05-2026 / Accepted: 12-06-2026

Corresponding Author: Dr. Arjun N

Conflict of interest: Nil

Abstract

Background: Stillbirth remains a substantial but largely invisible contributor to adverse pregnancy outcomes worldwide, disproportionately affecting low- and middle-income countries. Identifying the sociodemographic, antenatal, and obstetric risk factors associated with stillbirth is essential for designing effective preventive strategies in resource-limited settings such as India.

Objectives: To estimate the prevalence of stillbirth, to identify the sociodemographic and obstetric risk factors associated with stillbirth, and to describe the clinical profile of stillbirth cases at a tertiary care centre.

Methods: This cross-sectional observational study was conducted among women with antepartum and intrapartum stillbirths attending the antenatal OPD and labour room of a tertiary care institute over 18 months. All eligible stillbirths (fetus >28 weeks gestation) were included after informed consent. A predesigned questionnaire recorded sociodemographic, antenatal, and obstetric details. Data were analysed using SPSS version 20, with categorical variables expressed as frequencies and percentages.

Results: Of 62 stillbirths studied, 40.3% of mothers were aged 21–25 years and 50.0% belonged to socioeconomic class IV. Consanguinity and bad obstetric history were each present in 27.4% of cases, and fewer than half of the women (41.9%) had taken iron and folic acid supplements. Most deliveries (87.1%) occurred in hospital, 71.0% were normal vaginal deliveries, and 46.8% followed induced labour. Birth weight was below 2500 g in 77.4% of cases, 83.9% of deliveries were preterm, and 53.2% of fetuses were macerated. Hypertensive disorders of pregnancy (32.3%) were the commonest associated maternal condition, followed by anemia (12.9%) and maternal fever (8.1%).

Conclusion: Young maternal age, low socioeconomic status, poor antenatal care utilisation, and hypertensive disorders of pregnancy emerged as key modifiable risk factors for stillbirth. Strengthening antenatal surveillance and early detection of hypertensive disorders may help reduce the stillbirth burden.

Keywords: Stillbirth, Intrauterine Fetal Death, Epidemiology, Risk Factors, Antepartum, Intrapartum, Antenatal Care.

DOI: 10.25258/ijcpr.18.6.403

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Stillbirth is an unfavorable pregnancy outcome, defined as complete expulsion of the baby from the mother where the fetus shows no evidence of life. For international comparison, the WHO defines stillbirth as a baby born with no signs of life at or after 28 weeks of gestation [1]. Despite constituting a substantial proportion of neonatal fatalities, stillbirths remain largely invisible; in 2008 alone, over 2.65 million stillbirths occurred worldwide, with nearly 98% of third-trimester stillbirths happening in low- and middle-income nations. However, most high-quality epidemiological research has been conducted in wealthy countries, creating a global ‘10/90 gap’ in health research

whereby only 10% of studies address 90% of the disease burden. This gap is even wider in low-income settings, making it imperative for such countries to generate better local data on stillbirth prevalence, causes, and risk factors in order to design effective preventive programs [2,3,4]. India bears the highest absolute burden of stillbirths globally. According to India’s Sample Registration System (SRS), the stillbirth rate in 2013 was 5 per 1000 live births, whereas Blencowe et al. (2016) estimated it at 23 per 1000 live births, with wide variation across states (12.5–26.48%); the Government of India has set a target to bring this down to single digits by 2025 [5,6]. Although the

precise cause of fetal death often remains unclear, it is important to distinguish between the classification of death (e.g., growth restriction), the manner of death (e.g., asphyxia), and the underlying disease process, since causes also vary with gestational age [7]. A stillbirth with no identifiable etiology is termed a stillbirth of unknown cause, and depending on the classification system used, unexplained stillbirths may account for 25–60% of all fetal deaths [8]. In low-income countries, antepartum haemorrhage (9.3%), infection (15.8%), hypoxic peripartum mortality (11.6%), other known causes (8.5%), other unidentified conditions (13.8%), and unexplained causes (41%) have been reported, while a large multi-country sub-Saharan African study found asphyxia, placental disease, maternal hypertensive disorders, infection, and cord accidents as the leading causes, with 17.9–26.0% remaining unidentified [9,10].

Much of this mortality may nevertheless be preventable through recognition of risk factors. A systematic review of perinatal audits in low- and middle-income countries demonstrated that facility-level audits by healthcare personnel could improve the standard of care, with meta-analysis of before-and-after studies showing a 30% (95% CI: 21–38%) reduction in perinatal mortality following implementation of perinatal audit [11,12].

Nevertheless, the true risk factors contributing to stillbirth are frequently not recorded accurately, underscoring the need for structured healthcare provider training and systematic data collection to improve understanding of stillbirth risk factors and clinical correlates [13,14,15]. Since recognition of risk factors is essential for prevention, parental counselling, and healthcare surveillance, and since the majority of stillbirths are preventable through risk-factor analysis, this study was undertaken to estimate the prevalence of stillbirth and analyze the sociodemographic, antenatal, and obstetric risk factors and clinical profile associated with stillbirth at a tertiary care centre.

Objectives of the study

- To estimate the prevalence of stillbirth at the study centre.
- To identify the sociodemographic and obstetric risk factors associated with stillbirth.

- To describe the clinical and perinatal profile of stillbirth cases.

Methodology

This cross-sectional observational study was conducted among patients attending the antenatal OPD with evidence of stillbirth and patients in the labour room with intrapartum stillbirth, at Shimoga Institute of Medical Sciences, McGann District Hospital, over a period of 18 months. All cases presenting during the study period were enrolled, constituting the study sample. Institutional ethics committee clearance was obtained prior to initiation of the study, and informed consent was taken from all participants before inclusion. Stillborn fetuses beyond 28 weeks of gestation, with clinical and radiological features of intrauterine fetal death, and patients who delivered a fetus with no signs of life were included; stillbirths below 28 weeks of gestation were excluded.

The purpose and objectives of the study were explained to all subjects, following which a detailed history was elicited and a thorough clinical examination was performed on each patient, including sociodemographic details, obstetric history, antenatal care utilisation, and details of labour and delivery. A predesigned questionnaire was administered to record risk factors for stillbirth, antenatal predictors, and associated maternal conditions.

Data were compiled using Microsoft Excel and analysed using Statistical Package for Social Sciences (SPSS) version 20. Categorical variables were expressed as frequencies and percentages, and measures of central tendency and dispersion were used to summarise quantitative data. Appropriate tests of significance were applied, with a p-value of less than 0.05 considered statistically significant.

Results

A total of 62 cases of antepartum and intrapartum stillbirth were analysed. Sociodemographic and antenatal risk factors, delivery and perinatal characteristics, and associated maternal conditions were recorded using a predesigned proforma and are summarised below in three tables.

Table 1: Sociodemographic and Antenatal Risk Profile of the Study Group (n=62)

Variable	Category	Frequency	Percentage
Age group	<20 years	8	12.9%
	21–25 years	25	40.3%
	26–30 years	18	29.0%
	31–35 years	9	14.5%
	>35 years	2	3.2%
Socioeconomic status	Class II	6	9.7%
	Class III	20	32.3%

	Class IV	31	50.0%
	Class V	5	8.1%
Consanguinity	Present	17	27.4%
	Absent	45	72.6%
Bad obstetric history	Present	17	27.4%
	Absent	45	72.6%
Number of ANC visits	1	5	8.1%
	2	20	32.3%
	3	24	38.7%
	4	13	21.0%
Iron & folic acid intake	Yes	26	41.9%
	No	36	58.1%

Nearly 70% of women were aged between 21–30 years, and half belonged to socioeconomic class IV (Table 1). Consanguinity and bad obstetric history were each present in over a quarter of cases, and fewer than half of the women had received iron and folic acid supplementation despite the majority attending at least two antenatal visits, reflecting suboptimal antenatal care utilisation among this group.

Table 2: Delivery and Perinatal Characteristics of the Study Group (n=62)

Variable	Category	Frequency	Percentage
Place of delivery	Hospital	54	87.1%
	Home	8	12.9%
Mode of delivery	NVD	44	71.0%
	LSCS	16	25.8%
	PTVD	2	3.2%
Labour initiation	Spontaneous	33	53.2%
	Induced	29	46.8%
Colour of liquor	Blood-stained	22	35.5%
	Brown	21	33.9%
	Clear	11	17.7%
	Green	5	8.1%
	Yellow	2	3.2%
	Dark yellow	1	1.6%
Birth weight	<2500 g	48	77.4%
	≥2500 g	14	22.6%
Sex of fetus	Male	34	54.8%
	Female	28	45.2%
Gestational age	Preterm	52	83.9%
	Term	10	16.1%
Type of stillbirth	Macerated	33	53.2%
	Fresh	29	46.8%

Most deliveries occurred in hospital and were achieved vaginally (Table 2). Nearly half of the labours were induced, and abnormal (blood-stained or brown) liquor was noted in almost 70% of cases. The large majority of stillbirths were preterm and low birth weight, and over half of the fetuses showed maceration, suggesting antepartum fetal death in many cases.

Table 3: Associated Maternal Conditions in Stillbirth (n=62)

Associated maternal condition	Frequency	Percentage
Hypertensive disorders of pregnancy (HDP)	20	32.3%
Nil (no associated condition)	10	16.1%
Anemia	8	12.9%
Maternal fever	5	8.1%
Gestational diabetes mellitus (GDM)	4	6.5%
Hypothyroidism	3	4.8%
Rh-negative isoimmunization	3	4.8%
Others (cervical insufficiency, cord thrombosis, eclampsia, epilepsy, intrahepatic cholestasis, abruptio placentae, jaundice, malformations, placenta previa, postdated pregnancy, RPL with anemia, RVD positive, severe preeclampsia, snake bite, status epilepticus, thrombophilia, twin pregnancy)	9	14.5%
Total	62	100%

Hypertensive disorders of pregnancy were the single largest contributor among associated maternal conditions, followed by anemia, maternal fever, and gestational diabetes mellitus (Table 3); no associated maternal condition was identified in 16.1% of cases.

Discussion

Stillbirths continue to be a substantial but largely invisible contributor to adverse perinatal outcomes globally, with almost 98% of third-trimester stillbirths occurring in low- and middle-income countries despite the bulk of epidemiological research originating from wealthier nations — the well-recognised ‘10/90 gap’ in health research [2,3]. This underscores the need for locally generated risk-factor data of the kind presented here, since preventive strategies must be tailored to the sociodemographic and healthcare-access realities of the population being served. The present study was undertaken to estimate the prevalence of stillbirth and characterise the sociodemographic, antenatal, and obstetric risk factors and clinical profile associated with stillbirth in a tertiary care hospital setting.

The demographic profile observed in this study — a predominance of women aged 21–30 years, over-representation of lower socioeconomic strata, and substantial gaps in antenatal iron-folic acid supplementation — is broadly consistent with prior Indian studies. Yagnik et al. reported a similar age distribution (majority 20–24 years) and male preponderance (53.0%) among stillbirths [16], while Shanker et al. found 55.0% of cases aged 20–25 years and 55.38% male babies [17], and Prasanna et al. reported comparable maternal age (55.6% aged 21–30 years) and male preponderance (56.48%) [18], all closely mirroring the present findings of 40.3% mothers aged 21–25 years and 54.8% male fetuses. Consanguinity and bad obstetric history, each present in over a quarter of cases in this study, alongside suboptimal antenatal visit adequacy and iron-folic acid intake, together point to modifiable gaps in preconception counselling and antenatal care utilisation that merit targeted community-level intervention. Obstetric and perinatal parameters in this study — a high proportion of preterm delivery (83.9%), low birth weight (77.4%), and fetal maceration (53.2%) — were considerably more pronounced than in comparable series: Yagnik et al. reported 48.0% preterm and 40.0% macerated stillbirths, with over a third weighing above 2.5 kg [16], while Shanker et al. reported 34.61% in the 33–37 week range, 23.27% macerated births, and substantial proportions with birth weight 1.5–2.5 kg [17]. Hypertensive disorders of pregnancy emerged as the leading associated maternal condition in this study (32.3%), broadly aligning with the 34.63%

prevalence reported by Prasanna et al. [18] and the 15.77% reported by Shanker et al. [17], reinforcing hypertensive disorders as a key, potentially modifiable, maternal risk factor for stillbirth in this population and supporting the case for intensified antenatal blood-pressure surveillance.

Conclusion

Stillbirth remains a distressing but largely preventable adverse pregnancy outcome, and prevention should therefore remain the cornerstone of clinical practice. This study found that women affected by stillbirth were predominantly young (21–25 years), belonged to lower socioeconomic strata, and had inadequate antenatal care utilisation, while hypertensive disorders of pregnancy were the leading associated maternal condition.

Antenatal fetal deaths can be minimised through regular, quality antenatal care, timely detection and treatment of hypertensive disorders, and prompt hospital admission. These findings highlight important, modifiable sociodemographic and obstetric risk factors for stillbirth, and support strengthening community-level antenatal surveillance to reduce the stillbirth burden.

References

1. Tavares Da Silva F, Gonik B, McMillan M, et al. Stillbirth: Case definition and guidelines for data collection, analysis, and presentation of maternal immunization safety data. *Vaccine*. 2016;34(49):6057-6068.
2. Froen JF, Gordijn SJ, Abdel-Aleem H, Bergsjø P, Betran A, Duke CW, et al. Making stillbirths count, making numbers talk - issues in data collection for stillbirths. *BMC Pregnancy Childbirth*. 2009;9:58.
3. Doyal L. Gender and the 10/90 gap in health research. *Bull World Health Organ*. 2004;82(3):162.
4. Aminu M, Unkels R, Mdegela M, Utz B, Adaji S, van den Broek N. Causes of and factors associated with stillbirth in low- and middle-income countries: a systematic literature review. *BJOG*. 2014;121(Suppl 4):141–53.
5. Lawn JE, Blencowe H, Pattinson R, Cousens S, Kumar R, Ibiebele I, et al. Stillbirths: where? When? Why? How to make the data count? *Lancet*. 2011;377(9775):1448–63.
6. Blencowe H, Cousens S, Jassir FB, Say L, Chou D, Mathers C, et al. National, regional, and worldwide estimates of stillbirth rates in 2015, with trends from 2000: a systematic analysis. *Lancet Glob Health*. 2016;4(2):e98–e108.
7. Bell R, Glinianaia SV, Rankin J, Wright C, Pearce MS, Parker L. Changing patterns of perinatal death, 1982–2000: a retrospective

- cohort study. *Arch Dis Child Fetal Neonatal* Ed. 2004;89:F531.
8. Vergani P, Cozzolino S, Pozzi E, Cuttin MS, Greco M, Ornaghi S. Identifying the causes of stillbirth: a comparison of four classification systems. *Am J Obstet Gynecol*. 2008;199:319.e1.
 9. McClure E, Nalubamba-Phiri M, Goldenberg R. Stillbirth in developing countries. *Int J Gynecol Obstet*. 2006;94(2):82–90.
 10. Ministry of Health and Medical Education. Safe mother country program: integrated maternal health care. 7th ed. Tehran: Ministry of Health and Medical Education, Family and Population Health Office, Maternal Health Office; 2016.
 11. Lawn JE, Blencowe H, Pattinson R, Cousens S, Kumar R, Ibiebele I, et al. Stillbirths: Where? When? Why? How to make the data count? *Lancet*. 2011;377:1448–63.
 12. Pattinson R, Kerber K, Waiswa P, Day LT, Mussell F, Asiruddin SK, et al. Perinatal mortality audit: counting, accountability, and overcoming challenges in scaling up in low- and middle-income countries. *Int J Gynaecol Obstet*. 2009;107:113–21.
 13. George A, Young M, Bang A, Chan KY, Rudan I, et al. Setting Implementation Research Priorities to Reduce Preterm Births and Stillbirths at the Community Level. *PLoS Med*. 2011;8(1):e1000380.
 14. Baqui A, Choi Y, Williams E, Arifeen S, Mannan I, Darmstadt G, et al. Levels, timing, and etiology of stillbirths in Sylhet district of Bangladesh. *BMC Pregnancy Childbirth*. 2011;11:25.
 15. Cockerill R, Whitworth MK, Heazell AE. Do medical certificates of stillbirth provide accurate and useful information regarding the cause of death? *Paediatr Perinat Epidemiol*. 2012;26:117–23.
 16. Yagnik A, Gokhale AV. Study of cases of stillbirths at tertiary maternity care hospital (ReCoDe). *Int J Med Res Health Sci*. 2016;5(6):102-121.
 17. Shanker O, Saini V, Gupta M. Stillbirths: Incidence, Causes and Surrogate Markers of Intrapartum and Antepartum Fetal Deaths. *Int J Innov Res Med Sci (IJIRMS)*. 2020;5(8):289–95.
 18. Prasanna N, Mahadevappa K, Antaratani RC, Lokare L. Cause of death and associated conditions of stillbirths. *Int J Reprod Contracept Obstet Gynecol*. 2015;4:1970-4.