Original Research Article

https://doi.org/10.53339/aimdr.2026.12.2.4
E-ISSN: 2395-2822 | P-ISSN: 2395-2814

A Clinical Study on Antepartum Fetal Death and its Associated Risk Factors

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Abstract

Introduction: Antepartum fetal death (AFD), defined as intrauterine fetal demise after 28 weeks of gestation, is a significant obstetric complication with profound emotional, social, and public health implications. Aim of the study is to identify maternal, fetal, and socio-demographic factors associated with antepartum fetal death in a tertiary hospital setting.

Methods: This cross-sectional study was conducted among 100 consecutive pregnant women with intrauterine foetal death (IUFD) and their foetuses admitted to the obstetrics wards of Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka Medical College Hospital (DMCH), from January 2025 to December 2025. Data were analyzed using SPSS.

Result: In this study of 100 respondents, the majority were multigravida, with G2 (42%) and G3 (30%) being the most common. Primigravida accounted for 18%, while higher-order pregnancies were less frequent. Adverse pregnancy outcomes were relatively uncommon: 8% had a history of abortion, 10% had previous AFD, and none had congenital anomalies. Hypertension (22%) was the most frequent maternal condition, followed by fever (16%) and histories of bleeding, diabetes, UTI, and jaundice (12% each). ANC utilization was higher among literate women and those with literate husbands, and ANC users had significantly higher mean monthly income (8,525 BDT vs 3,319 BDT, $P < 0.001$). Maternal complications were mostly unexplained (36%), with pre-eclampsia (16%) and congenital anomalies (8%) also noted. Unexplained AFD occurred at a slightly lower maternal age (26.61 ± 4.15 years) but higher gestational age (34.67 ± 1.76 weeks) than explained AFD (28.11 ± 4.61 years, 32.50 ± 1.20 weeks), with ANC coverage not significantly different between groups.

Conclusion: Antepartum fetal death in this study was more common among younger mothers, those with lower educational levels, 2nd and 3rd gravida, and women with inadequate antenatal care. Hypertensive disorders were the most frequent maternal cause of intrauterine fetal death. Improving maternal and paternal education, promoting reproductive health education during adolescence, empowering women to make informed decisions about their pregnancies, and ensuring adequate and regular antenatal care can potentially reduce the incidence of AFD.

Keywords: Antepartum fetal death, risk factors, hypertension

Introduction

Antepartum fetal death (AFD), which is also termed intrauterine fetal death (IUFD) or stillbirth after a certain gestational age, is a very serious adverse maternal fetal outcome worldwide and a main measure of perinatal health and the quality of obstetric care.[1] Stillbirths are responsible for a large part of perinatal mortality, especially in low- and middle-income countries where

there is limited access to quality antenatal and obstetric care and comprehensive diagnostic evaluation is often missing.[1,2] For these areas, identifying the risk factors of AFD is very important to lay down preventive measures, enhance perinatal outcomes, and bring down the number of avoidable fetal losses. The causes of antepartum fetal death are many and include maternal, fetal, placental, and healthcare-related factors. Maternal health problems, e.g. hypertensive disorders of pregnancy, chronic hypertension, and diabetes mellitus, are all factors that have been linked to a higher risk of stillbirth.[3,4] Studies based on registries indicate that chronic hypertension and maternal diabetes bring about a substantial increase in the risk of stillbirth, often through mechanisms involving uteroplacental insufficiency, placental infarction, and metabolic changes that make it difficult for fetal well-being to be maintained.[3] Besides this, obstetric complications like premature rupture of membranes, placental abruption, antepartum hemorrhage, and intrauterine growth restriction also lead to fetal death.[2,3] Fetal factors, including congenital anomalies and umbilical cord abnormalities, also play a significant role, and impaired fetal growth has been shown to deepen the risk of perinatal death, especially in resource-constrained populations.[2,5] Sociodemographic characteristics have further been linked to differential risks of AFD. Maternal age extremes (both adolescent and advanced maternal age), low maternal educational attainment, high parity, and limited antenatal care utilisation have been associated with an increased likelihood of antepartum stillbirth.[6] In South Asian contexts such as Bangladesh, case–control and cohort studies have identified sociodemographic factors including maternal illiteracy, age ≥35 years, and obstetric complications as predictors of stillbirth, suggesting that broader social determinants intersect with clinical risk profiles in contributing to fetal death.[6] Adequate antenatal care is a critical modifiable factor, as inadequate or absent ANC has been correlated with higher stillbirth rates, underscoring the importance of early risk identification and timely intervention during pregnancy.[2,7] Despite known risk factors, a significant proportion of AFD cases remains unexplained, particularly in low-resource settings where diagnostic capabilities such as placental histopathology and fetal autopsy are limited.[5] Studies using standardised evaluation frameworks in higher-resource environments have shown improved identification of causes, highlighting the need for structured diagnostic approaches to better understand and prevent stillbirth.[5] Advances in classification systems for stillbirths, such as algorithmic cause-assignment models, have further demonstrated that detailed clinical and epidemiological data can enhance understanding of underlying mechanisms of fetal death, although implementation gaps remain in many regions.[2] Given this complex interplay of medical, obstetric, and socio-economic factors, research focusing on the clinical profile and associated risk factors of antepartum fetal death is vital for shaping maternal health policies.

Methods

This cross-sectional study was conducted among 100 consecutive pregnant women with intrauterine foetal death (IUFD) and their foetuses admitted to the obstetrics wards of Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka Medical College Hospital (DMCH), from January 2025 to December 2025. The study population was selected purposively based on their consent, including women with gestational age ≥28 weeks, absence of foetal movement and heart rate, and sonographic confirmation of intrauterine death or macerated foetus, while patients admitted with labour pain, ruptured membranes with chorioamnionitis, or gestational age <28 weeks were excluded. Variables included maternal factors (socio-demographic and economic characteristics, clinical features, investigation reports, and gross placental features) and foetal factors (gestational age, weight, gross abnormality, and umbilical cord findings). Data were collected using a pre-designed questionnaire, supplemented by history, physical examination, investigation reports, and gross examination of the placenta,

umbilical cord, and foetus. After careful checking and editing, the data were analysed using SPSS, presented in tables and graphs, and evaluated with descriptive and bivariate statistical methods. Continuous variables were expressed as mean ± standard deviation, and categorical variables as frequencies and percentages, with a significance level of 0.05.

Results

The age distribution of the study participants (n = 100) showed that the mean age was 26.83 ± 5.74 years, with a range from 16 to 38 years. The largest proportion of participants belonged to the 25–29 years age group (32%), indicating that most individuals were concentrated in the mid-twenties. Additionally, 26% of participants were aged ≤20 years, while 18% were in the 21–24 years group. Smaller proportions were observed in the older age groups, with 14% in 30–34 years and 10% aged ≥35 years [Table 1].

Most respondents had a primary education (44%), followed by illiterate (20%) and Class VI–X (18%), while fewer participants completed SSC (10%), HSC (6%), or were graduates (2%). A similar trend was observed among husbands, with the majority having primary education (36%), followed by Class VI–X (20%) and illiterate (16%), with relatively lower proportions achieving higher education. Regarding occupation, the vast majority of respondents were housewives (84%), whereas only a small proportion were engaged as teachers (6%), service holders (6%), and day labourers (4%) [Table 2].

The distribution of respondents according to gravida showed that the majority were multigravida, with the highest proportion in G2 (42%), followed by G3 (30%). Primigravida accounted for 18% of the study population. Higher-order pregnancies were relatively less common, with G4 and G5 each comprising 4%, and only 2% in G6 [Table 3].

Table 1: Age distribution of study participants (n = 100)

Age group (years)	Frequency (n)	Percentage (%)
≤20	26	26%
21–24	18	18%
25–29	32	32%
30–34	14	14%
≥35	10	10%
Total	100	100%
Mean ± SD (years)	26.83 ± 5.74	
Minimum–Maximum	16–38	

Table 2: Distribution of respondents according to education and occupation (n = 100)

Variable	Category	Respondents n (%)	Husband's n (%)
Education	Illiterate	20 (20%)	16 (16%)
	Primary	44 (44%)	36 (36%)
	Class VI–X	18 (18%)	20 (20%)
	SSC	10 (10%)	14 (14%)
	HSC	6 (6%)	8 (8%)
	Graduate	2 (2%)	6 (6%)
	Total	100 (100%)	100 (100%)
Occupation	Housewife	84 (84%)	—
	Teacher	6 (6%)	—
	Service holder	6 (6%)	—
	Day laborer	4 (4%)	—
	Total	100 (100%)	—

Table 3: Distribution of respondents according to gravida (n = 100)

Obstetric score	Frequency (n)	Percentage (%)
Primi	18	18%
G2	42	42%
G3	30	30%
G4	4	4%
G5	4	4%
G6	2	2%
Total	100	100%

The history of adverse pregnancy outcomes among respondents revealed that 8% had a history of abortion, while a slightly higher proportion (10%) reported a history of AFD (intrauterine fetal death). Notably, no respondents had a history of congenital anomalies (0%). The vast majority had no such adverse outcomes, with 92% reporting no history of abortion, 90% no history of AFD, and 100% no history of congenital anomalies [Table 4].

Hypertension was the most common condition (22%), followed by fever (16%). A similar proportion of respondents (12% each) reported a history of bleeding, diabetes, urinary tract infection, and jaundice. PROM (8%) and trauma (2%) were relatively less frequent [Table 5].

Table 4: History of adverse pregnancy outcomes among respondents (n = 100)

Episodes occurrence	Abortion *n* (%)	AFD *n* (%)	Congenital anomaly *n* (%)
Yes	8 (8%)	10 (10%)	0 (0%)
No	92 (92%)	90 (90%)	100 (100%)
Total	100 (100%)	100 (100%)	100 (100%)

Table 5: Distribution of information related to present pregnancy (n = 100)

Factors related to pregnancy	Frequency (*n*)	Percentage (%)
History of bleeding	12	12%
History of fever	16	16%
History of hypertension	22	22%
Drug history	0	0%
History of diabetes	12	12%
History of trauma	2	2%
History of UTI	12	12%
History of radiation exposure	0	0%
History of jaundice	12	12%
History of PROM	8	8%

Table 6 shows a significant association between ANC status and socio-demographic factors. ANC uptake was higher among literate women and those with literate husbands ($P < 0.001$). Monthly income also differed significantly between groups ($P < 0.001$), indicating higher ANC utilization among higher-income families [Table 6].

Table 6: Relationship of ANC with education and monthly income (n = 100)

ANC status	Patient's education	Husband's education	Monthly income (Mean BDT)
	Illiterate	Literate	Illiterate
ANC taken	2	58	2
No ANC	18	22	14
Statistics	$\chi^2 = 26.04$, $P < 0.001$	$\chi^2 = 12.05$, $P < 0.001$	$t = 4.48$, $P < 0.001$

Table 7: Distribution of probable maternal causes (n = 100)

Maternal complications	Frequency (*n*)	Percentage (%)
Unexplained	36	36%
Pre-eclampsia	16	16%
Eclampsia	4	4%
Pre-existing hypertension	2	2%
Diabetes mellitus	6	6%
PROM with fever	4	4%
APH	6	6%
UTI	6	6%
Jaundice	4	4%
Cord abnormalities	4	4%
Acute diarrhoea	3	3%
High fever	3	3%
Fever with congenital anomaly	2	2%
Congenital anomaly	8	8%
Rh-isoimmunization	2	2%
Oligohydroamnions	2	2%
Heart disease	2	2%

The probable maternal causes of complications in the study population showed that the majority were unexplained (36%), followed by pre-eclampsia (16%). Other notable causes included congenital anomalies (8%), diabetes mellitus (6%), APH (6%), and UTI (6%). Less frequent complications, each contributing 4% or less, included eclampsia, PROM with fever, jaundice, cord abnormalities, acute diarrhoea, high fever, fever with congenital anomaly, pre-existing hypertension, Rh-isoimmunization, oligohydroamnions, and heart disease [Table 7].

In this study, the mean age at delivery was slightly lower in the unexplained AFD group (26.61 ± 4.15 years) compared to the explained AFD group (28.11 ± 4.61 years), but this difference was not statistically significant (P = 0.11). The mean gestational age was significantly higher in the unexplained group (34.67 ± 1.76 weeks) than in the explained group (32.50 ± 1.20 weeks, P = 0.001). Regarding ANC coverage, 33.33% of the unexplained AFD group and 25% of the explained AFD group had received ANC, whereas the majority in both groups had not, and this difference was not statistically significant (P = 0.37) [Table 8].

Discussion

In this study, the mean age of the patients was 26.83 ± 5.74 years), with around 26% were within 20 years old. Their age fell between 16 and 40 years, gathered more within 25 and 29 years. Most of the respondents were Housewives (84%). While the husbands were mainly businessmen (56%) and day labourers (28%). Only very few of the women are serving in society. This reflects the status of women and might hinder independent decision-making regarding pregnancy. Eight patients had a previous history of abortion, and 10 patients gave a history of previous stillbirth, while no patients gave any history of congenital anomaly of their previous dead fetuses. Maybe they were not aware of a congenital anomaly or had gathered no knowledge about it either from home or from any hospital setting. Of the 10 respondents, 2 had no other pregnancy-associated complications apart from a previous history of stillbirth. Four patients suffered twice from stillbirth in their previous pregnancies. Rogar KF et al. stressed the fact that a previous history of stillbirth carries maximum risk of developing AFD in subsequent pregnancies. They advised antepartum foetal surveillance to be initiated early for those pregnancies whose history of previous stillbirth is positive, so that timely intervention can be initiated.[8] AFD tended to accumulate in B+ve blood group (46%), O+ve (24%), and A+ve (18%). Two patients had a negative blood group and were complicated by Rh isoimmunization. Seventy-eight patients were normotensive throughout the pregnancy, 20 were not hypertensive before but developed pregnancy-induced hypertension (PIH) during this pregnancy, and 2 were hypertensive before this pregnancy and developed HTN superimposed with pre-eclampsia. Studies indicated chronic HTN with eclampsia and pre-eclampsia as risk factors associated with stillbirth.[9–11] Only 2% patients had diabetes mellitus before pregnancy, and 4 patients developed gestational diabetes mellitus. These 6 patients had AFD after 35+ weeks of gestational age. Six per cent of patients had antepartum haemorrhage, of which 2 patients had placenta praevia. Two per cent of patients who developed abruptio placentae had pre-eclampsia. Amo AB et al. found in their case-control study of stillbirth that APH was

Table 8: Comparison of AFD with age, gestational age, and ANC coverage (n = 50)

Variable	Unexplained AFD (n = 18)	Explained AFD (n = 32)	P-value
Age at delivery (years)	26.61 ± 4.15	28.11 ± 4.61	0.11 NS
Gestational age (weeks)	34.67 ± 1.76	32.50 ± 1.20	0.001 S
ANC coverage			
Yes	6 (33.33%)	16 (25.0%)	0.37 NS
No	12 (66.67%)	24 (75.0%)	

Data analysed using: unpaired t-test for continuous variables; Chi-square test for categorical variables.

an important case of stillbirth.[12] Routine blood investigation explored neutrophilic leukocytosis in 26% cases, lymphocytosis in 10% cases and severe anaemia in 8% subjects. The study by Dasgupta et al. in India[12] revealed 8% severe anaemia related to AFD. Others found bacterial infection, especially syphilis,[11] to be associated with foetal death, but in this study, all patients were VDRL negative. Placental abnormalities were present in 30% cases of this study, and in 30% cases there were large placentas. The umbilical cord was inspected meticulously, and a lot of observations were made. There was a cord around the neck or body of the foetuses in 18% of cases, a long cord in 16% and an anomaly of the cord was present in 8% cases. Congenital malformations were also found in many studies related to AFD.[13–15] The recent rapid refinement of sonography has made ultrasound the most accurate and rapid method in the diagnosis of antepartum foetal death. A complete systematic autopsy significantly contributes not only to the diagnosis of intrauterine fetal death but also to the genetic counselling of parents and management of future pregnancy. In my study, an autopsy was not done. Foetal autopsy is a must in all cases of intrauterine fetal death, whether explained or unexplained.[16]

Limitations of the Study

The study had several limitations, including lack of placental weight measurement and absence of histopathological examination. Maternal weight at diagnosis was not recorded, and the relatively small sample size due to time constraints may limit the generalizability of the findings.

Conclusion

Antepartum fetal death in this study was more common among younger mothers, those with lower educational levels, 2nd and 3rd gravida, and women with inadequate antenatal care. Hypertensive disorders were the most frequent maternal cause of intrauterine fetal death. Improving maternal and paternal education, promoting reproductive health education during adolescence, empowering women to make informed decisions about their pregnancies, and ensuring adequate and regular antenatal care can potentially reduce the incidence of AFD. Unexplained fetal deaths were notably higher among women who had limited or no ANC, highlighting the critical role of antenatal monitoring in prevention.

Recommendations

Preconception counselling and management of maternal medical conditions are essential to reduce the risk of antepartum fetal death. Women with previous fetal loss should receive close monitoring in subsequent pregnancies, including frequent ultrasounds, fetal heart rate assessment, and maternal kick counts during the third trimester. Genetic screening and detailed evaluations can help identify congenital anomalies or other risks for future pregnancies. Placental histopathology and fetal autopsy should be performed in all cases of stillbirth to determine the cause and guide prognosis. Additionally, larger multicenter studies with bigger sample sizes are recommended to better identify risk factors and develop effective protocols for the prevention of AFD.

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How to cite this article: Ara MZ, Haque MA. A Clinical Study on Antepartum Fetal Death and its Associated Risk Factors. Ann. Int. Med. Den. Res. 2026;12(2):22–28.

Source of Support: Nil, **Conflict of Interest:** None declared

Received: 08-Feb-26; **Revised:** 19-Mar-26;
Acceptance: 04-Apr-26; **Published:** 30-Apr-26