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Clinical and Pathological Evaluation of Antepartum Stillbirths: A Retrospective Observational Study at a Tertiary Care Center

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ABSTRACT

Introduction: Stillbirth, defined as fetal death beyond 20 weeks of gestation, remains a major public health issue, particularly in low- and middle-income countries like India. Despite improvements in obstetric care, stillbirths continue to cause significant physical, emotional, and psychological trauma. Identifying maternal, fetal, and placental factors associated with stillbirth can inform preventive strategies and improve outcomes in future pregnancies. **Aim and Objectives:** The study aimed to determine the proportion of stillbirths with identifiable etiologies and evaluate associated maternal, fetal, and placental factors. Objectives included categorizing stillbirths into known and idiopathic etiologies and analyzing the relationship of anemia, abnormal ultrasound findings, and placental pathology with stillbirths. **Materials and Methods:** A retrospective observational study was conducted at a tertiary care hospital on 124 antepartum stillbirths beyond 20 weeks of gestation. Maternal records, antenatal data, and ultrasonographic findings were reviewed. Placental specimens were examined histopathologically. Stillbirths were classified as idiopathic or having a probable etiology, and statistical analysis was conducted to identify associations with clinical variables. **Results:** Out of 124 stillbirths, 91.9% had an identifiable etiology while 8.1% were idiopathic. Significant associations were found between stillbirths of known etiology and the presence of maternal anemia (n=74) and abnormal ultrasonographic findings (n=44) ($p < 0.05$). No significant associations were found with maternal age, parity, socioeconomic status, or fetal gender. Histopathological placental abnormalities were present in 18.5% of cases. **Conclusion:** Most stillbirths were linked to identifiable maternal or fetal factors, especially anemia and abnormal ultrasound findings. Placental examination proved valuable in determining etiology. Routine antenatal care and placental histopathology in unexplained cases can help reduce stillbirth rates through timely interventions.

INTRODUCTION

Stillbirth is one of the most emotionally distressing complications of pregnancy, affecting not only the physical health of the mother but also inflicting deep psychological trauma on the family. It signifies the intrauterine death of a fetus occurring at or beyond 20 weeks of gestation, or with a birth weight above 500 grams, depending on national definitions. This devastating outcome continues to represent a major public health burden across the globe. According to global health estimates, approximately 3.2 million pregnancies culminate in stillbirth each year, with the vast majority of these cases occurring in low- and middle-income countries. In the Indian context, the burden remains substantial, with an estimated stillbirth rate of 13.9 per 1000 live births. Such statistics not only reflect the challenges in access to quality antenatal care but also indicate the multifactorial nature of stillbirths, necessitating comprehensive investigation and intervention [1-3]

What makes stillbirth an even more pressing concern is its tendency to recur. Research has consistently shown that women who have previously experienced a stillbirth are at significantly greater risk of encountering the same in future pregnancies. A meta-analysis reported that the odds of stillbirth in a subsequent pregnancy were nearly five times higher in women with a history of stillbirth compared to those with no such history, with an odds ratio of 4.83 and a confidence interval of 3.7 to 6.18. Additionally, around 2.5% of women with a prior stillbirth go on to have recurrent stillbirths. It is further estimated that roughly 8% of subsequent stillbirths can be attributed directly to a previous history, thereby emphasizing the need for rigorous assessment and preventive care for women deemed high-risk due to obstetric history [4].

Understanding the cause of stillbirth is central to improving clinical outcomes and informing effective preventive strategies. Identifying the underlying etiology provides a means for clinicians to modify risk factors and implement individualized monitoring plans in future pregnancies. Furthermore, establishing a medical explanation for fetal loss may be profoundly significant for grieving families, aiding in the process of emotional resolution and psychological healing. The insight gained from these investigations does not merely serve the therapeutic interest of the family but extends to broader public health objectives by identifying trends and risk clusters that may inform policy and practice. In the clinical realm, the identification of causes facilitates better categorization of risk, optimized prenatal surveillance, and tailored obstetric interventions aimed at mitigating recurrence[5].

The likelihood of identifying a cause in cases of stillbirth is not insignificant. Literature suggests that in nearly 60% of stillbirth cases, a probable cause can be discerned. When considering both possible and probable causes, this rate increases to more than 80%, underlining the potential benefits of systematic and thorough evaluation. These causes can generally be categorized into three main groups: maternal, fetal, and placental. A comprehensive systematic review and meta-analysis published in 2023 highlighted the relative contribution of each of these categories to stillbirth. Maternal conditions such as preeclampsia, gestational diabetes, infections, and other chronic diseases were responsible for around 25% of stillbirths. Fetal factors, including genetic anomalies, intrauterine growth restriction, and infections, accounted for 14%. Placental abnormalities, including infarctions, abruption, and insufficiency, were identified in 13% of cases, while congenital malformations were implicated in about 6% [6].

Among these, placental pathology has emerged as a critical focus in the exploration of stillbirth causes. The placenta, as the key organ responsible for fetal oxygenation, nutrition, and waste exchange, often harbors pathophysiological clues that can explain fetal demise. A detailed histopathological examination of the placenta can yield findings such as villous immaturity, infarctions, thrombotic lesions, intervillous hemorrhage, inflammatory infiltrates, and abnormalities in maternal and fetal vascular architecture. These abnormalities may reflect underlying maternal disorders, immunologic dysfunctions, infections, or complications of fetal development. In many cases, they serve as the only tangible evidence of the events leading up to stillbirth. Consequently, placental examination is now considered an essential component of any stillbirth investigation protocol [7].

Furthermore, integrating placental pathology with autopsy findings, clinical data, imaging studies, and maternal investigations forms the cornerstone of a multidisciplinary approach aimed at elucidating the cause of fetal loss. The value of such an approach lies in its capacity to not only improve diagnostic yield but also reduce the proportion of stillbirths labeled as idiopathic or unexplained. This is particularly relevant in resource-limited settings, where advanced diagnostic tools may not always be readily available, and placental examination can provide relatively cost-effective, yet crucial, insights into the pathogenesis of stillbirth[8].

Despite the recognition of these investigative avenues, there remains a significant gap in research focused on the classification of stillbirths based on identifiable causes. Many studies tend to focus on isolated risk factors or demographic correlations, often neglecting the integrated analysis necessary to determine probable etiologies. In this context, our study aims to fill this gap by systematically categorizing stillbirths into those with "probable etiologies or risk factors" and those without any identifiable cause, referred to as "idiopathic stillbirths." Through this classification, we intend to examine the contribution of clinical, maternal, and placental parameters to stillbirth and identify patterns that may inform both diagnosis and prevention. Specifically, our study places emphasis on the role of placental pathology in understanding the pathophysiology of stillbirths, given its potential to reveal critical, and often overlooked, etiological clues [9].

The ultimate goal of this research is to enhance the diagnostic and preventive framework surrounding stillbirth. By improving our ability to distinguish between preventable and non-preventable causes, clinicians can make more informed decisions regarding antenatal care and risk stratification. Moreover, families affected by stillbirth may benefit from greater clarity and direction in planning future pregnancies. Thus, through comprehensive evaluation and thoughtful classification, this study aspires to contribute meaningfully to both clinical practice and public health strategies aimed at reducing the incidence and impact of stillbirths [10].

The aim of this study is to identify the proportion of stillbirths with a probable or known etiology and to evaluate

the maternal, fetal, and placental factors associated with antepartum stillbirths. The objectives include determining the proportion of stillbirths with identifiable causes, assessing contributing maternal, fetal, and placental factors, and analyzing the relationship between abnormal ultrasonographic findings, infections, and maternal anemia with the occurrence of stillbirths to enhance understanding and guide preventive strategies in future pregnancies.

MATERIALS AND METHODS

This retrospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital over a defined period. All cases of antepartum stillbirths beyond 20 weeks of gestation were included. Relevant maternal history, antenatal records, laboratory isadvantaged but medically registered population base. investigations, and ultrasonographic findings were reviewed. Placental specimens were collected and sent for histopathological examination to identify abnormalities. Data were analyzed to classify stillbirths into those with probable or identifiable etiologies and those deemed idiopathic. Maternal, fetal, and placental factors were assessed for associations with stillbirth using appropriate statistical tools to derive meaningful clinical correlations.

RESULTS

The sociodemographic data indicate that the majority of participants were over 21 years old (83.9%) and belonged predominantly to the lower socioeconomic class (54.8%). A significant portion of the study population was from booked cases (87.1%), reflecting prior antenatal care engagement. Only a small fraction of women was under 21 years (16.1%) or belonged to middle socioeconomic status (12.1%). These trends suggest a mature, economically.

Table 1: Categorization of Stillbirths Based on Presence of a Known Etiological Factor

Variable	Category	Frequency
Still birth	With probable etiology/risk factor	114 (91.9)
	Idiopathic	10 (8.1)

The data show that 91.9% of stillbirths had an identifiable probable etiology or risk factor, suggesting a strong association with detectable maternal, fetal, or placental conditions. Only 8.1% of cases were idiopathic, indicating unexplained causes. This highlights the importance of thorough clinical evaluation to prevent potentially avoidable stillbirths.

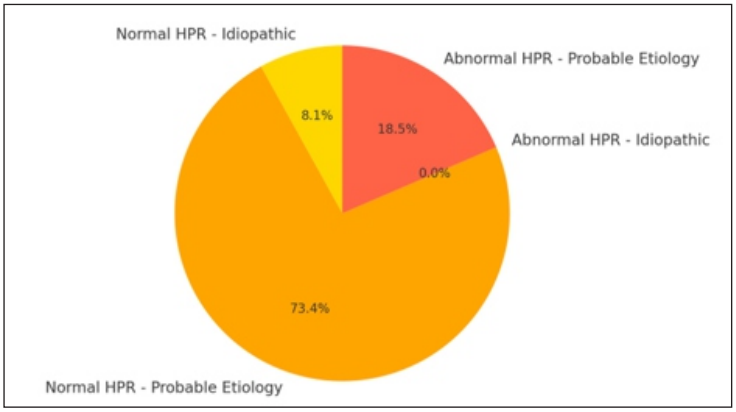

Figure 1: Distribution of Stillbirths by Placental Histopathological Report (HPR) and Risk Factors

The pie chart shows that most stillbirths (73.4%) had a normal placental HPR but with a probable etiology, while 18.5% had an abnormal HPR with identifiable causes. Only 8.1% were idiopathic with normal placental findings, and no cases had both abnormal HPR and idiopathic etiology. This underscores the diagnostic value of placental evaluation in uncovering causes of stillbirth.

Table 2: Association of Stillbirths with Risk factors and Sociodemographic Factors

Variable	Idiopathic Stillbirths	Probable Etiology/Risk Factor	P-Value*
Age			
≤21 years	1 (5%)	19 (95%)	
>21 years	9 (8.7%)	95 (91.3%)	1
Type of case			
Booked	10 (9.3%)	98 (90.7%)	
Unbooked	0	16 (100%)	0.36
Socioeconomic status			
Lower	6 (8.8%)	62 (91.2%)	
Lower middle+middle	4 (7.1%)	52 (92.9%)	1

The table shows no statistically significant association between idiopathic stillbirths and maternal age, booking status, or socioeconomic status (p-values ≥ 0.36). Most stillbirths across all subgroups had identifiable etiological factors. This suggests that stillbirth etiology is largely independent of these sociodemographic variables in the studied population.

Table 3: Association of Stillbirths with Risk Factors and Obstetric Factors

Variable	Idiopathic Stillbirths	Probable Etiology/Known Risk Factor	P-Value
History of Death Among the Previous Children			
No	10 (8.5%)	108 (91.5%)	
Yes	0	6 (100%)	1
History of Past Abortions			
No	9 (8.3%)	99 (91.7%)	
Yes	1 (6.3%)	15 (93.7%)	1
Gravida			
Primi	8 (10%)	62 (90%)	
Multi	2 (3.7%)	52 (96.3%)	0.184
Preterm			
No	10 (8.8%)	103 (91.2%)	
Yes	0	11 (100%)	0.598
Past History of Stillbirths or Anomalous Fetuses			
No	10 (8.5%)	108 (91.5%)	
Yes	0	6 (100%)	1
Presence of Comorbidities			
No	10 (8.8%)	104 (91.2%)	
Yes	0	10 (100%)	1

The table indicates no statistically significant association between idiopathic stillbirths and obstetric factors like parity, preterm birth, past abortions, stillbirths, or comorbidities (all p-values ≥ 0.184). Most stillbirths in all groups had an identifiable etiology. This suggests that these obstetric variables do not strongly predict idiopathic versus explained stillbirths in this cohort.

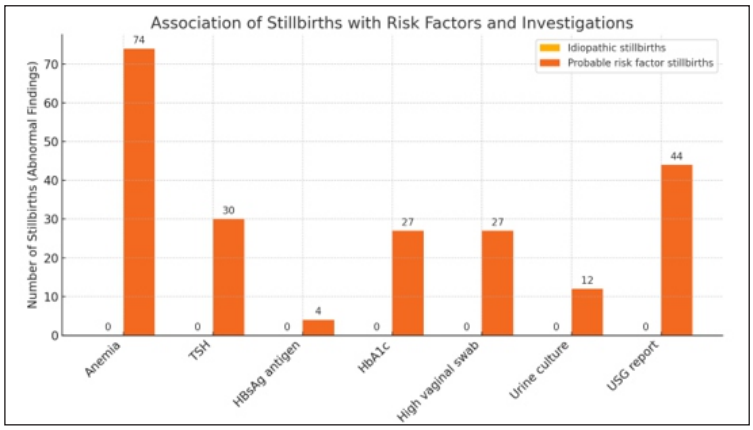

Figure 2: The Association of Stillbirths with Risk Factors and Investigations

The bar graph shows that all abnormal investigation findings were associated exclusively with stillbirths of known etiology, with anemia (74 cases) and abnormal USG reports (44 cases) being the most frequent. No abnormal findings were observed in idiopathic stillbirths. This highlights the diagnostic significance of routine investigations in identifying underlying causes of stillbirth.

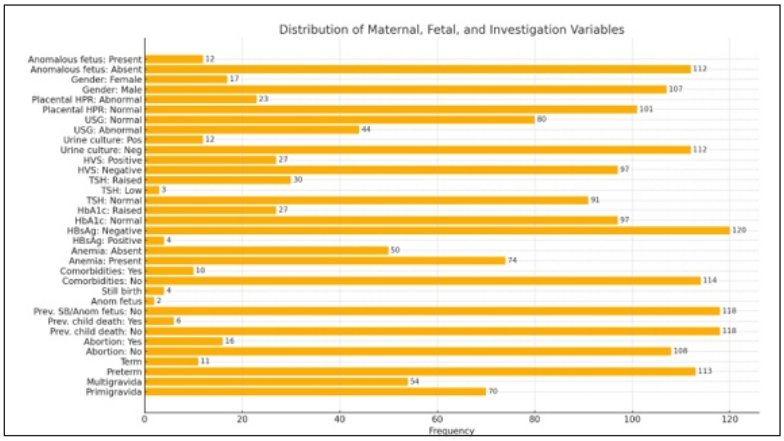

Figure 3: Frequency Distribution of Maternal, Fetal, and Clinical Investigation Characteristics Among Stillbirth Casesa

The chart reveals that most stillbirth cases were associated with normal TSH, HVS, and HbA1c values, while anemia (74 cases), abnormal USG (44 cases), and raised TSH (30 cases) were frequent findings. Multigravida status and absence of prior stillbirth or comorbidities were also common. These patterns suggest multifactorial contributions, with anemia and USG abnormalities being prominent clinical correlates.

Table 4: Association of Stillbirths with Risk Factors and Foetal Factors

Variable	Idiopathic Stillbirths	Probable Etiology/Risk Factor	P-Value*
Anomalous fetus			
Absent	8 (7.3%)	104 (92.7%)	0.25
Present	2 (16.7%)	10 (83.3%)	
Gender of the fetus			
Male	9 (8.4%)	98 (91.6%)	1
Female	1 (5.9%)	16 (94.1%)	

The data show no statistically significant association between idiopathic stillbirths and the presence of fetal anomalies (p=0.25) or fetal gender (p=1). Most stillbirths occurred in fetuses without anomalies and were of male gender. These findings suggest that fetal anomalies and gender are not major determinants of unexplained stillbirths in this study.

DISCUSSION

The present study explored maternal, fetal, and placental characteristics associated with stillbirths in a tertiary care setting among 124 women who delivered stillborn babies. The global burden of stillbirth is substantial, particularly in resource-limited regions, and understanding associated factors is critical for targeted interventions. The mean maternal age was 24.7 years, consistent with previous findings by Neogi S et al. and Newtonraj et al. Most participants were above 21 years, in agreement with Goldenberg RL et al. Nearly 50% of participants were from lower socioeconomic backgrounds, paralleling Shelke et al.'s findings of a 48% stillbirth rate in this group [11-14].

In terms of parity, 56% of mothers were primigravida, similar to the findings of Boo YY et al. However, this contrasts with Changded P et al. and Mali RV et al., who reported a higher proportion of multigravida mothers, likely due to differences in study populations and settings. Regarding etiological factors, placental abruption was observed in 18.8% of cases by Goldenberg et al., 10% by Aggarwal R et al., 8% by Singh A et al., 15.8% by Mali RV et al., and 17% by Sharma B et al.. Chorioamnionitis was found in 44.4% by Goldenberg et al., 0.58% by Mali RV et al., and 0.3% by Yagnik A et al. [13, 15-21].

A gender-based skew was noted in our study, with a male predominance (86.3%), diverging from most studies where males comprised 42–58% of stillbirths . This may reflect sampling limitations. Categorization of cases based on cause showed 91% of stillbirths had an identifiable etiology, while 9% were idiopathic. Similar proportions of idiopathic stillbirths were observed in other studies: Singh A et al. reported 12% , Mali RV 9.3%, Aggarwal R et al. 20%, Sharma B 19%, and Yagnik A et al. 10% using ReCoDe classification [17-21].

Significant associations were observed between anemia, abnormal ultrasound findings, and stillbirths with known etiologies ($p < 0.05$). However, placental pathology was not significantly associated in this study. Contrastingly, a London-based study found histopathological abnormalities in 29% of placentas from stillbirths, including maternal vascular malperfusion and abruption. A Tanzanian study identified strong associations between stillbirth and placental abnormalities such as uteroplacental vascular pathology (OR = 13.19), acute chorioamnionitis (OR = 4.27), and coagulation lesions (OR = 4.86). Similarly, Patel O et al. reported associations between stillbirth and placental calcifications, retroplacental clots, and chorioamnionitis[22-24].

According to Mali RV et al., several factors were significantly linked with stillbirth: anemia (OR = 21.9), early childbirth (OR = 22.3; 95% CI: 15.35–32.5), congenital malformations (OR = 11.24; 95% CI: 6.99–18.06), abruptio placenta (OR = 10.14; 95% CI: 6.43–15.97), oligohydramnios (OR = 4.88; 95% CI: 3.23–7.39), and hypertensive disorders (OR = 3.01; 95% CI: 2.03-4.46)(17).

CONCLUSION

Our study concluded that abnormal ultrasound findings and maternal anemia were significantly associated with stillbirths. Regular, periodic antenatal check-ups are essential for timely identification and management of such risk factors, thereby improving maternal and fetal outcomes. In cases of unexplained stillbirths, histopathological examination of the placenta can help identify hidden causes and guide future preventive strategies. Strengthening antenatal care services, especially in resource-constrained settings, is crucial for reducing stillbirth rates. However, further large-scale, multicentric research is needed to explore additional maternal, fetal, and placental factors contributing to stillbirths and to formulate comprehensive prevention and intervention protocols.

REFERENCES

1. Cacciatore J, editor Psychological effects of stillbirth. Seminars in Fetal and Neonatal Medicine; 2013: Elsevier.
2. Rosa-Mangeret F, Benski A-C, Golaz A, Zala PZ, Kyokan M, Wagner N, et al. 2.5 million annual deaths-are neonates in low-and middle-income countries too small to be seen? A bottom-up overview on neonatal morbi-mortality. 2022;7(5):64.
3. Sharma B, Lahariya C, Majella MG, Upadhyay A, Yadav S, Raina A, et al. Burden, differentials and causes of stillbirths in India: A systematic review and meta analysis. 2023;90(Suppl 1):54-62.
4. Lamont K, Scott NW, Jones GT, Bhattacharya SJb. Risk of recurrent stillbirth: systematic review and meta-analysis. 2015;350.
5. Reinebrant HE, Leisher SH, Coory M, Henry S, Wojcieszek AM, Gardener G, et al. Making stillbirths visible: a systematic review of globally reported causes of stillbirth. 2018;125(2):212-24.
6. Aminu M, Unkels R, Mdegela M, Utz B, Adaji S, Van Den Broek NJBAIJoO, et al. Causes of and factors associated with stillbirth in low-and middle-income countries: a systematic literature review. 2014;121:141-53.
7. Graham N, Heazell AEJO, Clinics G. When the fetus goes still and the birth is tragic: the role of the placenta in stillbirths. 2020;47(1):183-96.
8. Sergi CM, Spencer D, Al-Jishi TJJoLP. Stillbirth Investigations: An Iconographic and Concise Diagnostic Workup in Perinatal Pathology. 2023;15(04):475-87.

9. Aminu M, Bar-Zeev S, van den Broek NJAoegS. Cause of and factors associated with stillbirth: a systematic review of classification systems. 2017;96(5):519-28.
10. Smith GCJBp, obstetrics rC, gynaecology. Screening and prevention of stillbirth. 2017;38:71-82.
11. Neogi SB, Negandhi P, Chopra S, Das AM, Zodpey S, Gupta RK, et al. Risk Factors for Stillbirth: Findings from a Population-Based Case-Control Study, H aryana, I ndia. 2016;30(1):56-66.
12. Newtonraj A, Kaur M, Gupta M, Kumar RJBp, childbirth. Level, causes, and risk factors of stillbirth: a population-based case control study from Chandigarh, India. 2017;17(1):371.
13. Goldenberg RL, Saleem S, Goudar SS, Silver RM, Tikmani SS, Guruprasad G, et al. Preventable stillbirths in India and Pakistan: a prospective, observational study. 2021;128(11):1762-73.
15. Boo YY, Bora AK, Chhabra S, Choudhury SS, Deka G, Kakoty S, et al. Maternal and fetal factors associated with stillbirth in singleton pregnancies in 13 hospitals across six states in India: a prospective cohort study. 2024;165(2):462-73.
16. Changede P, Venkateswaran S, Nayak A, Wade D, Sonawane P, Patel R, et al. Causes and demographic factors affecting stillbirth in a tertiary care centre in India. 2022;72(3):225-35.
17. Mali RV, Dalal A, Khursheed R, Gan AJO, International G. Association of stillbirths with maternal and fetal risk factors in a tertiary care hospital in south India. 2021;2021(1):8033248.
18. Aggarwal R, Suneja A, Mohan V, Guleria KJIJoPH. A critical assessment of stillbirths at a tertiary care hospital. 2022;66(1):15-9.
19. Singh A, Kumar MJTJoO, India Go. An analysis of cause of stillbirth in a tertiary care hospital of Delhi: A contribution to the WHO SEARO Project. 2019;69(2):155-60.
20. Sharma B, Prasad G, Aggarwal N, Siwatch S, Suri V, Kakkar NJBAIJoO, et al. Aetiology and trends of rates of stillbirth in a tertiary care hospital in the north of India over 10 years: a retrospective study. 2019;126:14-20.
21. Yagnik A, Gokhle AJIJoMR, Sciences H. Study of cases of still births at tertiary maternity care hospital (ReCoDe). 2016;5(6):102-21.
22. Man J, Hutchinson J, Heazell A, Ashworth M, Jeffrey I, Sebire NJUiO, et al. Stillbirth and intrauterine fetal death: role of routine histopathological placental findings to determine cause of death. 2016;48(5):579-84.
23. Lema G, Mremi A, Amsi P, Pyuza JJ, Alloyce JP, Mchome B, et al. Placental pathology and maternal factors associated with stillbirth: An institutional based case-control study in Northern Tanzania. 2020;15(12):e0243455.
24. Patel O, Pradhan P, Das P, Mishra SK, Das Jr PJC. Placental pathology and maternal risk factors for stillbirth: a case-control study. 2023;15(5).

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