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Causes and Maternal Complications of Intrauterine Fetal Death: A Retrospective Analysis from a Tertiary Care Hospital in South India

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KEYWORDS

Fetal death; intrauterine fetal death; maternal morbidity; preventive strategy; stillbirth; hypertensive disorders of pregnancy

ABSTRACT:

Introduction: Intrauterine fetal death (IUFD) remains a devastating obstetric outcome associated with substantial maternal morbidity and profound psychological impact. Preventable etiologies predominate in developing countries, warranting institution-specific analysis to guide targeted interventions.

Objectives: To identify etiological factors contributing to IUFD, evaluate associated maternal complications, and propose evidence-based preventive strategies applicable to tertiary care settings in South India.

Methods: Retrospective observational study of 150 sonologically confirmed IUFD cases ≥20 weeks gestation at a tertiary care hospital. Medical records were analyzed for maternal demographics, obstetric history, gestational age, IUFD causes, delivery mode, laboratory investigations, maternal complications, and transfusion requirements.

Results: Mean maternal age was 26.8±4.5 years. Leading causes: hypertensive disorders (22.0%), antepartum hemorrhage (18.0%), and congenital anomalies (14.7%). Maternal complications occurred in 42.0% of cases, predominantly postpartum hemorrhage (24.0%). Blood transfusion was required in 18.0%. Vaginal delivery was achieved in 68.0%; mean hospital stay 4.2±2.3 days.

Conclusions: Preventable obstetric complications, particularly hypertensive disorders and antepartum hemorrhage, remain leading IUFD causes. Strengthening antenatal surveillance, early high-risk pregnancy identification, and timely intervention may reduce IUFD incidence and maternal morbidity..

1. Introduction

Intrauterine fetal death represents one of the most devastating outcomes in obstetrics, profoundly affecting both mothers and their families.1 The World Health Organization defines intrauterine fetal death as death occurring before complete expulsion or extraction of a product of conception from the mother, irrespective of gestational duration, excluding induced terminations, with death indicated by absence of signs of life including heartbeat, umbilical cord pulsation, or voluntary muscle movement after separation.2 Globally, an estimated 2.6 million stillbirths occur annually, with disproportionate burden in low- and middle-income countries where preventable causes predominate.3

The definition and reporting requirements for stillbirth vary internationally. Most jurisdictions require reporting of fetal deaths at 20 weeks of gestation or birthweight exceeding 350 grams, though some authorities use higher thresholds.4 This variability complicates international comparisons and may underestimate the true burden in regions with limited reporting infrastructure. In India, where institutional delivery rates have improved substantially but stillbirth rates remain elevated compared with developed nations, systematic investigation of IUFD etiology remains essential for targeted intervention strategies.5

Identified causes of intrauterine fetal death include maternal conditions (hypertensive disorders, diabetes mellitus, infections, anemia), placental abnormalities (abruption, insufficiency), fetal factors (congenital anomalies, growth restriction, cord accidents), and unexplained cases where thorough investigation fails to

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identify a definitive etiology.6 The relative contribution of each category varies by population, healthcare infrastructure, and investigation protocols. Understanding local etiological patterns is crucial for developing context-appropriate prevention strategies.

Beyond the immediate loss, intrauterine fetal death carries significant maternal risks including postpartum hemorrhage, disseminated intravascular coagulation, infection, and need for blood transfusion.1 Psychological trauma associated with perinatal loss can result in prolonged grief, depression, anxiety, and adverse effects on subsequent pregnancies. Comprehensive management must therefore address both physical and emotional aspects of care.7 This study was undertaken to characterize the etiological spectrum of IUFD at our tertiary care institution, document associated maternal complications, and identify opportunities for preventive intervention.

2. Objectives

This study was undertaken with the following specific objectives: (1) to identify etiological factors contributing to intrauterine fetal death in a tertiary referral population; (2) to evaluate maternal complications associated with IUFD, including postpartum hemorrhage, coagulopathy, sepsis, and blood transfusion requirements; and (3) to propose evidence-based preventive strategies applicable to similar tertiary care settings in South India.

Achievement of these objectives is expected to inform institutional quality improvement initiatives and contribute to the broader evidence base for IUFD prevention in resource-limited settings, where the burden of preventable perinatal loss remains disproportionately high.

3. Methods

Gokce Iscan R, Malvasi A. Intrauterine fetal death: management and complications. In: Practical Guide to Simulation in Delivery Room Emergencies. Springer; 2023:219-243.

Inclusion criteria comprised women with sonologically confirmed intrauterine fetal death at 20 weeks of gestation or greater, or fetal weight exceeding 350 grams, consistent with standard definitions of intermediate and late stillbirth. Cases presenting through both antenatal clinic and obstetric emergency were included. Women with induced terminations of pregnancy were excluded.

Data extracted included maternal age, parity, past obstetric history, mode of admission, gestational age at diagnosis, presumed cause of fetal death, mode of delivery, laboratory investigations, maternal complications (postpartum hemorrhage, disseminated intravascular coagulation, sepsis, retained placenta, wound infection), blood transfusion requirements, and duration of hospital stay.

Probable causes were determined through comprehensive clinical assessment including maternal history, examination findings, ultrasound evaluation, laboratory investigations, placental examination, and autopsy findings when consent was obtained. Causes were categorized as hypertensive disorders, antepartum hemorrhage, congenital anomalies, intrauterine growth restriction, maternal infections, cord accidents, gestational diabetes mellitus, severe anemia, Rh isoimmunization, and unexplained when no definitive cause was established despite thorough evaluation.

Statistical analyses were performed using SPSS version 28.0 (IBM Corp.). Continuous variables were expressed as mean±standard deviation. Categorical variables were presented as frequencies and percentages. Descriptive statistics characterized the study population, etiological distribution, and maternal outcomes.

4. Results

During the 23-month study period, 150 women presented with intrauterine fetal death meeting inclusion criteria. Table 1 presents demographic and obstetric characteristics. Mean maternal age was 26.8±4.5 years; 48 women (32.0%) were in the 26–30 year group. Multigravid women constituted 93 cases (62.0%) and 108 (72.0%) presented as emergency admissions. Hypertensive disorders were the leading identifiable cause (33 cases, 22.0%), followed by antepartum hemorrhage (27, 18.0%), congenital anomalies (22, 14.7%), intrauterine growth restriction (18, 12.0%), and unexplained (6, 4.0%) (Table 2). Vaginal delivery was achieved in 102 cases (68.0%) and cesarean section in 48 (32.0%). Maternal complications occurred in 63 women (42.0%); postpartum hemorrhage was most frequent (36, 24.0%), followed by retained placenta (18,

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www.jchr.org
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12.0%) and disseminated intravascular coagulation (12, 8.0%). Blood transfusion was required in 27 patients (18.0%) and mean hospital stay was 4.2±2.3 days (Table 3).

Table 1. Demographic and Obstetric Characteristics

Characteristic	**n (%) or Mean±SD**
Maternal age (years)	26.8±4.5
<20 years	18 (12.0)
20–25 years	52 (34.7)
26–30 years	48 (32.0)
31–35 years	22 (14.7)
>35 years	9 (6.0)
Parity	
Primigravida	57 (38.0)
Multigravida	93 (62.0)
Mode of admission	
Emergency	108 (72.0)
Registered ANC	42 (28.0)
Gestational age at diagnosis	
20–28 weeks	37 (24.7)
29–36 weeks	63 (42.0)
≥37 weeks	49 (32.7)

ANC = antenatal care. Data are n (%) or mean±SD.

Table 2. Etiological Distribution of Intrauterine Fetal Death

Cause	**n (%)**
Hypertensive disorders	33 (22.0)
Antepartum hemorrhage	27 (18.0)
Congenital anomalies	22 (14.7)
Intrauterine growth restriction	18 (12.0)
Maternal infections	12 (8.0)
Cord accidents	10 (6.7)
Gestational diabetes mellitus	9 (6.0)
Severe anemia	7 (4.7)
Rh isoimmunization	4 (2.7)
Unexplained	6 (4.0)

Data are n (%).

Table 3. Delivery Outcomes and Maternal Complications

Outcome	**n (%) or Mean±SD**
Mode of delivery	
Vaginal delivery	102 (68.0)
Cesarean section	48 (32.0)
Maternal complications	
Postpartum hemorrhage	36 (24.0)
Disseminated intravascular coagulation	12 (8.0)
Retained placenta	18 (12.0)
Sepsis	9 (6.0)
Wound infection	7 (4.7)
Any complication	63 (42.0)
Blood transfusion required	27 (18.0)
Hospital stay (days)	4.2±2.3

Data are n (%) or mean±SD.

5. Discussion

Our study demonstrates that preventable obstetric complications, particularly hypertensive disorders and antepartum hemorrhage, remain leading causes of intrauterine fetal death at our tertiary care institution. Hypertensive disorders accounted for 22% of cases, consistent with global literature.8 This underscores the critical importance of early blood pressure screening, proteinuria assessment, and timely antihypertensive therapy, with implementation of structured management protocols.9 Antepartum hemorrhage, primarily placental abruption, accounted for 18% of cases, an acute emergency requiring immediate recognition and delivery.10 Risk factors should be systematically

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assessed at antenatal visits.11 Congenital anomalies accounted for 15% of cases, many detectable through systematic second-trimester ultrasound screening.12 Intrauterine growth restriction contributed to 12% of IUFD, requiring serial growth assessment and Doppler evaluation.13,14

The maternal complication rate of 42% was substantial, with postpartum hemorrhage most frequent (24%), reflecting increased hemorrhage risk due to the underlying causative condition and delivery complications.1,15 The 8% incidence of disseminated intravascular coagulation emphasizes the need to monitor coagulation parameters, particularly with prolonged retention of a dead fetus. Active management of third stage labor and preparedness for massive transfusion are essential.16 Perinatal loss profoundly affects families, often causing prolonged grief, depression, and anxiety.17 Comprehensive IUFD management must include structured psychological support and bereavement counseling.18 Study limitations include the retrospective design, single-center setting, and variable autopsy rates. Prevention strategies should focus on universal quality antenatal care, structured ultrasound protocols, evidence-based management of high-risk conditions, strengthened emergency obstetric capabilities, comprehensive bereavement support, and systematic IUFD investigation protocols.19 In conclusion, preventable complications remain leading IUFD causes in our population with substantial associated maternal morbidity. Strengthening antenatal surveillance, improving access to quality prenatal care, and implementing evidence-based management protocols are essential to reduce the burden of perinatal loss.

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Declaration Statements

Conflicting interests: The authors declare that they have no competing interests.

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Ethical approval: The study protocol was approved by the Institutional Ethics Committee of Chettinad Hospital and Research Institute [approval number: IHEC-I/051/11/2025]. The study was conducted in accordance with the Declaration of Helsinki.

Guarantor: Sravya Varupula accepts full responsibility for the work and the conduct of the study, had access to the data, and controlled the decision to publish.

Contributorship: Sravya Varupula conceptualized and designed the study, conducted data analysis, and drafted the manuscript. Sailatha R contributed to data collection, literature review, and manuscript revision. All authors critically reviewed and approved the final manuscript.

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