

Intrauterine Fetal Death: Epidemiology, Clinical Features, Management, and Prognosis at Pikine National Hospital Center (January 2018-May 2023), Dakar, Senegal

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Abstract

Background: Intrauterine fetal death (IUFD) remains a major public health concern, particularly in low- and middle-income countries, where access to quality antenatal care and timely obstetric management may be limited. Understanding the epidemiological profile, etiological factors, and outcomes of IUFD is essential to improve preventive strategies and maternal care. **Objective:** To describe the epidemiological, clinical, etiological, therapeutic, and prognostic aspects of intrauterine fetal death at the Pikine National Hospital Center in Dakar, Senegal. **Methods:** A retrospective descriptive and analytical study was conducted over a period of five years and five months, from January 2018 to May 2023, in the Department of Obstetrics and Gynecology of the Pikine National Hospital Center. All cases of intrauterine fetal death occurring during the study period were included. Data were collected from obstetric records, delivery registers, and neonatal files. Sociodemographic characteristics, obstetric history, pregnancy follow-up, etiologies, modes of delivery, maternal complications, and fetal characteristics were analyzed. Statistical analysis was performed using R software, with a significance threshold set at $p < 0.05$. **Results:** During the study period, 616 cases of intrauterine fetal death were recorded among 25,138 deliveries, corresponding to a frequency of 2.4%. The mean maternal age was 28 years (range: 16 - 49 years), with women aged 25 - 34 years being the most represented. Most patients were multigravida (40.9%) and multiparous (27.6%), with a predominance of low educational level and low socioeconomic status. More than half of the patients (53.4%) were referred from other health facilities. The majority of IUFDs occurred before term (77.9%) and in singleton pregnancies (94.8%). Labor was induced in 57.2% of cases, mainly using misoprostol. Vaginal delivery was achieved in 77.3% of

patients. Macerated stillbirths accounted for 82.2% of cases, and fetal weight was below 2500 g in 51.4%. The leading etiologies were placental abruption (29.8%), preeclampsia (15.0%), and gestational hypertension (10.0%). A statistically significant association was found between IUFD and placental abruption, which increased the risk of fetal death fourfold. Maternal complications were observed in 42.7% of cases, predominantly infections (23.5%) and hemorrhages (12.9%), with no maternal deaths reported. **Conclusion:** Intrauterine fetal death remains frequent at the Pikine National Hospital Center and is largely associated with hypertensive disorders of pregnancy and placental complications. Strengthening antenatal care, early identification of high-risk pregnancies, and timely referral and management could significantly reduce the burden of IUFD in this setting.

Keywords

Intrauterine Fetal Death, Stillbirth, Placental Abruption, Hypertensive Disorders of Pregnancy, Labor Induction, Senegal

1. Introduction

Over recent decades, societal, economic, and cultural transformations have profoundly altered fertility patterns worldwide. Delayed age at first marriage, prolonged education, women's professional integration, and the increasing use of assisted reproductive technologies have contributed to a progressive rise in the age at first motherhood. Initially observed in industrialized countries, this trend is now also evident in low- and middle-income countries, particularly in sub-Saharan Africa [1].

Pregnancy in women aged 35 years and older, classically defined as advanced maternal age, is associated with an increased risk of maternal, obstetric, and perinatal complications. These risks are even more pronounced among older primiparous women, in whom physiological adaptation to pregnancy and labor may be less favorable. The complications most frequently reported in the literature include hypertensive disorders of pregnancy, gestational diabetes, labor abnormalities, increased rates of cesarean delivery, and adverse perinatal outcomes such as preterm birth, acute fetal distress, and perinatal mortality.

In Senegal, despite the gradual increase in maternal age observed in some urban areas, scientific data focusing on advanced-age primiparity remains limited [2]. Identifying the epidemiological, clinical, and prognostic characteristics of this population is essential to adapt prenatal care strategies and improve obstetric management.

The primary objective of this study was to assess the frequency of advanced-age primiparity (≥ 35 years), as well as its clinical characteristics and impact on maternal and neonatal outcomes at the National Hospital Center of Pikine. Secondary objectives were to analyze obstetric management modalities and identify the main associated complications.

2. Methods

All patients presenting with a diagnosed Intrauterine Fetal Death (MFIU) at admission or during delivery and managed in the service during the study period were included; twin pregnancies with a gestational age of 22 weeks or more are included despite low fetal weight. Fetal deaths occurring before 22 weeks and singleton pregnancies with a fetal weight of less than 500 grams were not included, nor were cases of medical termination of pregnancy and incomplete records. Data collection was carried out using individual questionnaires based on the patients' medical records and hospitalization registers, and the information was recorded on the survey form.

Studied variables for each patient, the following variables were studied: Socio-demographic variables, clinical and paraclinical variables, and therapeutic variables (type of labor induction, method of initiation, route of administration of misoprostol, and delivery route). Data exploitation and analysis were performed using SPSS 26 software for bivariate analysis. Chi-square and Fisher's tests were conducted for the comparison of qualitative variables, and student's t-test was used for comparing the means of quantitative variables. The significance threshold was set at 0.05.

3. Results

During the study period from January 1, 2018, to May 31, 2023, a total of 616 cases of Intrauterine Fetal Death (IUFD) were recorded out of 25,138 deliveries, corresponding to a frequency of 2.4%. **Table 1** reports the evolution of the number of IUFD over time.

Table 1. Distribution of intrauterine fetal death frequency according to the study years.

Deliveries per year	Frequency (n)	Percentage (%)
2018	95	15.4
2019	108	17.5
2020	125	20.3
2021	145	23.5
2022	101	16.4
2023	42	6.8
Total	616	100

3.1. Maternal Age, Gravidity, and Parity

The mean maternal age was 28 years, with extremes ranging from 16 to 49 years. Women aged 25 - 34 years were the most represented age group, accounting for 53.7% of cases, while women aged 35 years and older were the least represented, with a proportion of 13.8%.

In our series, multigravidae were the most represented group (40.9%), followed

by primigravidae (32%) and paucigravidae (27.1%). Regarding parity, multiparous women predominated (27.6%), followed by primiparous women (26.9%).

More than half of the patients were uneducated, representing 59.5% of cases. The remaining patients had a primary education in 28.9% of cases and a secondary or higher education in 11.6%.

3.2. Socio-Professional Status

Housewives were the most represented group, accounting for 36.7% of cases. Women working in the informal sector were mainly traders, seamstresses, and hairdressers. Salaried women were underrepresented (4.2%) and were primarily employed in the fields of education and healthcare.

3.3. Mode of Admission

The majority of patients (53.4%) were referred from other healthcare facilities, either by ambulance or by their own means. Several reasons for admission were identified. The most frequent was abdominopelvic pain (31.3%), followed by absence of perceived fetal movements (17.7%).

At admission, most patients were not in labor (42.2%), while the lowest proportion was observed among women admitted after delivery. Most pregnancies were preterm (77.9%), followed by post-term pregnancies (9.7%), and a minority were at term (5.1%).

The majority of patients carried a singleton pregnancy (94.8%), whereas triplet pregnancies were rare (0.2%). Regarding malaria prevention, 43% of patients had received intermittent preventive treatment (IPT) at least twice during pregnancy. Most women had an unscarred uterus (88.6%).

3.4. Course of Labor

Table 2. Distribution according to fetal presentation.

Presentations	Frequency (n)	Percentage (%)
Shoulders presentation	1	0.2
Face presentation	2	0.3
Brow presentation	1	0.2
Not specified	19	3.1
Complete Breech	64	10.4
Breech incomplete	18	2.9
Cephalic (vertex)	505	82
Transverse lie	6	1
Total	616	100

Fetal cardiac activity was absent in the majority of patients (86.2%). More than half of the patients had intact membranes (78.2%). The appearance of the amni-

otic fluid was documented in only 9.4% of cases; when specified, it was clear (3.7%), bloody (1.5%), or meconial (4.2%).

The duration of labor was recorded in 46.6% of patients, with 37.1% having a labor duration of less than 12 hours. In our series, cephalic presentation was the most frequent (82.0%) (Table 2).

3.5. Biological Abnormalities

During hospitalization, several laboratory tests were performed, including complete blood count, serum creatinine, liver transaminases, and blood grouping. A total of 162 patients were found to have Anemia of unspecified type, while elevated serum creatinine levels were observed in 35 patients.

3.6. Etiologies

The most frequently identified etiologies were vascular disorders, with placental abruption as the leading cause, accounting for 29.8% of cases. This was followed by preeclampsia (15%) and gestational hypertension (10%, Table 3).

Table 3. Distribution of patients according to the identified etiologies according to the Re-CoDe classification.

Etiologies	Frequency (n)	Percentage
Preventable causes of IUFD		
Dystocic delivery	21	3.4
Umbilical cord prolapse	18	3
Anemia	9	1.4
Post-term pregnancy	9	1.4
Prematurity	32	5.2
Prolonged pregnancy	11	1.7
Genitourinary infection	9	1.4
Partially preventable causes of IUFD		
Abruptio placentae	183	29.8
Preeclampsia	92	15
Gestational hypertension	62	10
Chronic hypertension	21	3.4
Eclampsia	19	3.2
Diabetes	49	8
Inevitable causes of IUFD		
Alloimmunization	7	1.1
Not specified	74	12
Total	616	100

Although malaria is recognized as a significant risk factor for intra-abdominal disease (IAD), its formal role was not demonstrated in our study. This may be explained by the fact that not only are IPTs almost always administered, but also that treatments for malaria attacks are sometimes not reported.

Among our patients, 238 women (57.2%) underwent labor induction, while the remaining patients did not require induction to deliver.

In this study, 57.2% of patients benefited from labor induction, either by pharmacological methods—with misoprostol being the most commonly used agent (21.2%)—or by mechanical methods. The most frequently used route of administration for misoprostol was the vaginal route, accounting for 60.4% among the 182 patients who received the drug.

The oral route was used in 23%. The remaining patients either went into labor spontaneously or were induced by a foley catheter.

The majority of patients were delivered by vaginal Route, with a rate of 77.3%.

Macerated stillbirths were more frequent in our series, accounting for 82.2%, compared with fresh stillbirths (17.8%). Male fetuses represented 50.2% of cases, whereas female fetuses accounted for 47.9%.

Most fetuses weighed less than 2500 G (51.4%). Macrosomic fetuses were uncommon, representing 1.5% of cases.

3.7. Recorded Complications

Out of the 616 patients, 287 (42.7%) experienced complications. Infections were the most frequent, with a rate of 23.5% (**Table 4**).

Table 4. Distribution according to the recorded complications.

Pronostic	Effectives (n)	Percentages (%)
No complications	353	57.3
Infections	145	23.5
Disseminated intravascular coagulation (DIC)	18	2.9
Haemorrhages	79	12.9
Others	21	3.4
Total	616	100.0

The proportion of Intrauterine Fetal Death (IUFD) among Nulliparous Women (25.4%) was not significantly different from the proportion of Non-IUFD Cases among nulliparous women (26.4%).

Similarly, the proportion of IUFD among primiparous women (28.5%) was not significantly different from the proportion observed among primiparous women without IUFD (26.9%). The proportion of IUFD among pauciparous women (30.7%) did not differ significantly from that observed among pauciparous women without IUFD (28.1%).

Among multiparous women, the proportion of IUFD (14.6%) was not signifi-

cantly different from the proportion of non-IUFD cases (17.2%). Likewise, the proportion of IUFD among grand multiparous women (0.8%) was not significantly different from that observed among women without IUFD in this parity group (1.5%).

Overall, no statistically significant association was found between parity and the occurrence of IUFD ($p = 0.064$).

The mean maternal age among women with IUFD was not significantly different from that of women without IUFD ($p = 0.4$), indicating no statistically significant association between maternal age and the occurrence of IUFD.

In contrast, the proportion of IUFD among women with placental abruption (abruptio placentae) (8.52%) was significantly higher than among women without placental abruption. A statistically significant association was observed between placental abruption and IUFD, with placental abruption increasing the risk of IUFD by fourfold.

The proportion of IUFD among women with post-term pregnancy (0.79%) was significantly lower than the proportion among women who did not exceed term (2.52%). A statistically significant association was found between post-term pregnancy and the occurrence of IUFD.

4. Discussion

4.1. Study Limitations and Biases

Due to the retrospective nature of our study, it was primarily limited by the insufficient quality and completeness of medical records. In addition, the assessment of side effects related to misoprostol use during labor could not be adequately performed because of insufficient documentation in patient records.

4.2. Epidemiology

Intrauterine fetal death accounted for 2.4% of all deliveries recorded at the Pikine National Hospital Center during the study period. This rate is comparable to the global prevalence of IUFD, estimated at approximately 2%, and remains markedly lower in high-income countries, where it is around 0.5%. Low- and middle-income countries are the most affected [3].

However, our result is significantly lower than those reported by Kubuyajiff in the Democratic Republic of Congo (4.9%) [4], Andriamandimbison in Madagascar (5.2%) [5], Diallo Mh in Guinea (6.9%) [6], and Bwama in Kamina, DRC (13.9%) [7]. Conversely, it is higher than rates reported by Marie C in France (0.3%) [8] and Peggy Deros-Degras in the French West Indies (0.1%) [9].

Globally, IUFD prevalence varies widely and depends mainly on:

- The socioeconomic level of countries;
- Methodological differences, particularly gestational age thresholds (14, 22, or 28 weeks of gestation) and fetal weight criteria (500 g or 1000 g).

The relatively lower IUFD rate observed in our study compared with other developing countries may be explained by efforts made by healthcare providers in

terms of:

- Early identification of high-risk pregnancies;
- Improvement in the quality of antenatal care, as well as strengthening referral and evacuation systems for pregnancy-related complications.

4.3. Sociodemographic and Clinical Characteristics

4.3.1. Maternal Age

Women aged 25 - 35 years were the most represented group in our series (53.7%), with a mean age of 28 years. These findings are comparable to those reported by Amrouche and ait in Algeria, where the most represented age group was 30 - 35 years (35%), followed by 20 - 30 years [10].

However, a substantial proportion of IUFD occurred among women aged 35 years and older, accounting for 32.5% of cases. In the literature, maternal age above 35 years is widely recognized as a risk factor for IUFD [3] [8].

In our study, the lack of a statistically significant association between maternal age and IUFD occurrence ($p = 0.4$) may be explained by the fact that the 25 - 35-year age group corresponds to the peak reproductive period rather than the highest-risk group. This finding contrasts with that of Kangulu Ib *et al.* [7] [11], who identified maternal age >35 years as a significant risk factor (OR = 6.23; 95% CI: 1.30 - 29.80).

4.3.2. Maternal Weight

Maternal overweight and obesity are modifiable risk factors with a significant impact on IUFD [11]. In a meta-analysis, Flenady *et al.* [12] reported a 23% increase in IUFD risk among overweight women and a 63% increase among obese women. Another analysis showed that a Body Mass Index (BMI) > 40 Kg/M² doubled the risk of IUFD.

D. Peggy [9] found that 27.47% of women were obese, of whom 5.49% were morbidly obese. Sarah Naden Smith [13] found that 37.6% of patients had a BMI ≥ 30 kg/m². C. Serena [14] found that 24% were overweight and 7% were obese.

In our study, BMI data were available for only 270 out of 616 patients. Among these, 51.5% were overweight and 28.9% were obese. Preventive strategies should therefore include nutritional counseling, lifestyle modification, and weight management for women planning pregnancy, especially those with additional risk factors [12] [15].

Although excess weight appears to be a significant risk factor, in our study, this parameter was not recorded in all cases. This may introduce bias into the interpretation of the results.

4.3.3. Gravidity and Parity

Multigravidae predominated in our series (40.9%). Regarding parity, multiparous women were the most represented (27.6%), followed by primiparous women (26.9%). These findings are consistent with the literature, where both primiparity and grand multiparity are recognized risk factors for IUFD.

Although primiparity has been associated with a 42% increased risk of IUFD in

the meta-analysis by Flenady *et al.* (RR = 1.42; 95% CI: 1.33 - 1.51) [12] [15], our study did not demonstrate a statistically significant association between parity and IUFD ($p = 0.064$).

4.3.4. Socioeconomic and Educational Level

IUFD is widely considered an indicator of a country's socioeconomic development. Flenady *et al.* [12] [14] demonstrated that low educational level increases the risk of IUFD by 70%. Similar findings have been reported in studies conducted in Australia and New Zealand [16] [17].

In our study, 57% of IUFD cases occurred among women of low socioeconomic status, and 59.5% of patients were uneducated. More than 60% of IUFD cases occurred among women without formal education. Education plays a critical role in health-seeking behavior, prenatal care utilization, hygiene practices, and women's autonomy in healthcare decision-making [18] [19].

4.4. Clinical Aspects

Referred patients accounted for 53.4% of cases, consistent with findings reported by Yehia A.A. [20] [21] and Koné Y [22]. Referral status has been associated with a significantly higher risk of IUFD, as demonstrated by Koffi A. [23], who reported a 3.36-fold increase.

This finding is explained by the referral nature of the Pikine National Hospital Center, where patients are often admitted for severe maternal or fetal complications.

4.4.1. Gestational Age

Most IUFD cases occurred before term (77.9%). Andriamandimbison [5] identified prematurity—particularly extreme prematurity—as a major risk factor for IUFD. Conversely, Quibel *et al.* [3] reported that post-term pregnancy is associated with increased fetal and maternal morbidity, including IUFD. In our study, post-term pregnancies accounted for 9.7% of cases.

A statistically significant association was found between post-term pregnancy and IUFD ($p = 0.001$), in line with the findings of Divon *et al.* [24], who demonstrated an increased risk starting at 41 weeks of gestation.

4.4.2. Type of Pregnancy

The majority of pregnancies were singleton (94.8%). Although IUFD is known to occur more frequently in multiple pregnancies [3], the low proportion of multiple gestations in the general population may explain this finding.

4.4.3. Labor Induction

Labor induction was artificial in 57.2% of cases and spontaneous in 42.8%. Artificial induction is now routinely recommended once IUFD is diagnosed and uterine evacuation conditions are met, in order to reduce the risk of coagulation disorders [25]-[27].

Three main methods were used: Misoprostol (200 µg) for cervical ripening in

76.5% of cases, intravenous oxytocin in 5%, and foley catheter balloon in 9.7%. Antispasmodics were occasionally used as adjuvant therapy.

4.4.4. Mode of Delivery

The majority of women (77.3%) delivered vaginally, which is consistent with the findings of Traoré [26] and reflects the preference for vaginal delivery in IUFD cases. Cesarean delivery was performed in 22.7% of cases due to contraindications to vaginal delivery or maternal emergencies. No significant association was found between mode of delivery and maternal mortality.

4.4.5. Fetal Sex

Male fetuses predominated, accounting for 50.2% of IUFD cases. Several studies have reported a higher risk of IUFD among male fetuses [28]-[30].

4.4.6. Fetal Appearance

Macerated stillbirths accounted for 82.2% of cases, reflecting delayed diagnosis. Maceration typically begins approximately 48 hours after fetal death. Early diagnosis reduces the risk of maceration.

4.4.7. Fetal Weight

IUFD frequency decreased with increasing fetal weight. More than half of IUFD cases (51.4%) involved fetuses weighing < 2500 g. This finding is consistent with multiple studies and reflects the impact of growth restriction, prematurity, and maternal pathology [31]-[33].

4.4.8. Etiologies

Placental abruption was the most frequent etiology (29.8%), followed by preeclampsia (15%). Chronic hypertension and diabetes were also major contributors. Placental abruption increased the risk of IUFD by fourfold, consistent with international literature [34]-[37].

4.5. Prognosis

In our study, 57.3% of patients experienced no complications. The most common complications were infections (23.5%) and hemorrhage (12.9%). No maternal deaths were recorded.

5. Conclusion

Intrauterine fetal death remains frequent at the Pikine National Hospital Center and is largely associated with hypertensive disorders of pregnancy and placental complications. Strengthening antenatal care, early identification of high-risk pregnancies, and timely referral and management could significantly reduce the burden of IUFD in this setting.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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