

ORIGINAL ARTICLE

Subsequent Pregnancy After Stillbirth: Risks, Outcomes and Clinical Insights

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ABSTRACT

Background: Women with a prior stillbirth are at elevated risk for adverse outcomes in subsequent pregnancies. Identifying these outcomes and contributing factors is essential for improved antenatal surveillance and care.

Objective: To assess pregnancy outcomes in women with a prior history of stillbirth and to classify the etiology of previous stillbirths using the ReCoDe system (Relevant Condition at Death).

Materials and methods: This was a prospective observational study conducted at a tertiary care center in Pune, India, from June 2023 to June 2025. A total of 116 pregnant women with a prior history of stillbirth were enrolled after informing consent the subjects were enrolled in a study. Detailed demographic, obstetric, and clinical data were collected. Pregnancy outcomes were analyzed and the causes of previous stillbirth were categorized using the ReCoDe classification system.

Results: In this study, the mean maternal age was 29.2 years. Most participants (67.2%) had a BMI in the overweight or obese range. Hypertensive disorders were significantly associated with placental abruption ($p=0.01$) and uteroplacental insufficiency ($p=0.004$). Gestational diabetes mellitus was present in 13.8% of cases. Fetal growth restriction (FGR) was significantly associated with preterm birth ($p=0.01$) and NICU admission ($p=0.01$). The recurrent stillbirth rate was 10.3%. The ReCoDe classification identified hypertensive disorders (26.7%) and

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placental abruption (18.1%) as the most common causes of prior stillbirths, while 31.9% remained unclassified.

Conclusion: Women with prior stillbirths exhibit significantly higher rates of adverse maternal and fetal outcomes in subsequent pregnancies. Hypertensive disorders and FGR are major contributors. Structured antenatal monitoring and use of classification systems like ReCoDe can guide risk stratification and clinical management.

KEYWORDS

- Stillbirth • Pregnancy Outcomes • ReCoDe Classification • Hypertensive Disorders • FGR • NICU Admission

INTRODUCTION

Nearly 2 million women and families worldwide are affected every year, one every 16 seconds, by stillbirths, which is a hidden tragedy¹. One measure of a nation's medical system's quality is the stillbirth rate. The causes of stillbirth are complex. Pregnancy outcomes may be improved and avoidable stillbirths may be decreased with early detection of risk factors for stillbirth and proper prenatal care¹. Research on the causes of stillbirth as well as efficient measures to prevent and treat them are necessary.

Counseling families on their risk of stillbirth recurrence and the best way to handle a subsequent pregnancy is a significant problem. Future pregnancies carry an increased risk of stillbirth, which are also marked by higher rates of intervention (elective caesarean sections, induction of labor) due to medical concerns, anxiety on the part of the patient and/or provider, and iatrogenic unfavorable outcomes, such as postpartum hemorrhage, premature birth, low birth weight, and cesarean section².

Depending on the situation, the overall chance of stillbirth recurrence increases two to ten times in the subsequent pregnancy. Counseling regarding the possibility of a stillbirth recurrence requires an understanding of the circumstances surrounding the first stillbirth. Classifying the cause of the prior stillbirth can help guide care and improve individual recurrence risk estimation of the stillbirth-associated disease³.

After a loss, little is known about the fate of pregnancy, making it challenging for doctors to counsel, assess, and manage following

pregnancies. A considerable proportion of patients either had an incomplete evaluation or the previous stillbirth was remained unexplained after a thorough work-up. Dealing with a pregnancy that ends in a loss also raises significant psychological and emotional concerns⁴.

Furthermore, many medical diseases, as well-controlled diabetes mellitus and pregnancy-related hypertension disorders, may be linked to stillbirths without being the main cause. According to classification systems like ICD and Wigglesworth, it is therefore difficult to pinpoint the precise cause of many stillbirths. For this reason, ReCoDe system of classification (Relevant Condition at Death) of stillbirth is crucial, as it reduces the percentage of unclassified stillbirths to 15.2% that cannot be explained⁵.

Additionally, it is recognized that many stillbirth causes, such as placental abruption, reoccur in later pregnancies, increasing the likelihood of recurrent loss linked to that cause; yet, in situations where stillbirth remains unexplained there is no consensus about the risk of stillbirth in the next pregnancy⁶.

MATERIALS AND METHODS

This prospective observational study was conducted at the Department of Obstetrics and Gynaecology, Bharati Hospital, Pune, a tertiary care teaching hospital. The study was carried out over a two-year period from June 2023 to June 2025. The study population included all pregnant women with a documented history of stillbirth attending the antenatal clinic and labor ward, who provided

written informed consent. Data collection was conducted through structured interviews, clinical examination, and review of medical records, using a pre-designed proforma. Collected data included demographic details, obstetric, medical, and surgical history, as well as drug use and comorbidities. Details of the current pregnancy including antenatal care, biochemical and sonographic evaluations, intrapartum and postpartum events were recorded. The cause of the prior stillbirth was classified using the 2005-ReCoDe (Relevant Condition at Death) classification system.⁷

The primary predictor variable in this study was a history of stillbirth. Outcome variables were categorized as maternal (abortion, pre-eclampsia, placental abruption, gestational diabetes mellitus, chorioamnionitis, premature rupture of membranes, uteroplacental insufficiency, induction of labor, instrumental delivery, and caesarean delivery), placental and umbilical cord-related (morphology, abnormal cord insertion, true knots, and uteroplacental insufficiency), and fetal (intrauterine growth restriction, preterm birth, fetal distress, NICU admission, hypoxic-ischemic encephalopathy, intracranial hemorrhage, congenital anomalies, and intrauterine fetal demise).

Statistical analysis: Using SPSS version 20.0 and Chi-square test descriptive statistics were calculated.

RESULTS AND OBSERVATIONS

A total of 116 pregnant women with past history of still birth after considering inclusion criteria.

Table 1: Distribution of women according to Age

Age	Frequency (n)	Percentage (%)
18 to 25 years	30	25.9
26 to 35 years	75	64.6
> 35 years	11	9.5
Total	116	100
Mean ± Standard deviation	29.20 ± 4.63	

The above table shows, 64.6% of women were in the age group of 26 to 35 years while 25.9% were in the age group of 18 to 25 years. Only

9.5% of women were aged above 35 years. The mean age in our study was 29.20 years.

Table 2: Distribution of women according to Body mass index (BMI)

Body mass index (BMI)	Frequency (n)	Percentage (%)
Normal (18.5 to 22.9 kg/m ²)	16	13.8
Overweight (23 to 24.9 kg/m ²)	22	19
Obese (≥ 25 kg/m ²)	78	67.2
Total	116	100
Mean ± Standard deviation	27.18 ± 4.16	

The above shows the distribution of women according to body mass index (BMI). 78 women were in obese category followed by 22 women being overweight. 16 women had normal BMI. The mean BMI in our study was 27.18 kg/m².

Obstetric History

Table 3: Distribution of women according to number of previous stillbirth

Previous stillbirth	Frequency (n)	Percentage (%)
One	102	88 %
Two or more	14	12%
Total	116	100

The above table depicts death status. 102 women had history of one child dead followed by 14 women who had history of two or more children being dead.

Table 4: Distribution of women with Abortions

Abortions	Frequency (n)	Percentage (%)
No	75	64.7
One	27	23.3
Two or more	14	12.1
Total	116	100

Table 5 shows the distribution of women with abortions. 75 women had no history of any abortion followed by 27 women with history of one abortion. 14 women had history of two or more abortions.

Tables and figures below are of Present Pregnancy

MATERNAL VARIABLES

Table 5: Association between hypertensive disorder and Placental abruption

Hypertensive disorder	Placental abruption		p-value*
	Present n (%)	Absent n (%)	
Present	09 (75)	22 (21.2)	0.01
Absent	03 (25)	82 (78.8)	
Total	12 (100)	104 (100)	

* p-value < 0.05 statistically significant

Table 5 show the association of pregnancy with hypertensive disorder complicated with placental abruption in the present study. 75% of women with placental abruption had hypertensive disorder. The association of pregnancy hypertensive disorder and placental abruption was statistically significant (**p = 0.01**).

Table 6: Association between hypertensive disorder and Uteroplacental insufficiency

Hypertensive disorder	Uteroplacental insufficiency		p-value*
	Present n (%)	Absent n (%)	
Present	12 (50)	19 (20.7)	0.004
Absent	12 (50)	73 (79.3)	
Total	24 (100)	92 (100)	

* p-value < 0.05 statistically significant

This table show the association of pregnancy with hypertensive disorder complicated with uteroplacental insufficiency. 50% of women with uteroplacental insufficiency had hypertensive disorder.

The association was statistically significant (**p = 0.01**) with higher number of women without hypertensive disorders having no uteroplacental insufficiency.

Table 7: Distribution of women according to Gestational diabetes mellitus

Gestational diabetes mellitus	Frequency (n)	Percentage (%)
Present	16	13.8
Absent	100	86.2
Total	116	100

Charts above show 13.8% of women in present pregnancy with previous stillbirth had

gestational diabetes mellitus.

Table 8: Distribution of women according to Mode of delivery

Mode of delivery	Frequency (n)	Percentage (%)
Full term vaginal delivery	37	32
Preterm term vaginal delivery	11	09
Full term Caesarean section	40	34.5
Preterm term Caesarean section	28	24.5
Total	116	100

Of 116 in the study, 40 (34.5%) patients delivered at full term via caesarean section followed by 37 (32%) patients who delivered at full term via normal vaginal delivery. 28 (24.5%) patients got delivered at preterm via caesarean section while 11 (9%) patients delivered at preterm via normal vaginal delivery.

Foetal Variables

Table 9: Association between FGR and Preterm birth

FGR	Preterm birth		p-value*
	Present n (%)	Absent n (%)	
Present	13 (34.2)	06 (7.7)	0.01
Absent	25 (65.8)	72 (92.3)	
Total	38 (100)	78 (100)	

* p-value < 0.05 statistically significant

The above table show 34.2% of women with preterm birth who had FGR, and only 7.7% of women without preterm birth with IUGR. The association between FGR and preterm birth was statistically significant (**p = 0.01**).

Table 10: Association between FGR and NICU Admission

FGR	NICU Admission		p-value*
	Present n (%)	Absent n (%)	
Present	12 (48)	07 (7.7)	0.01
Absent	13 (52)	84 (92.3)	
Total	25 (100)	91 (100)	

* p-value < 0.05 statistically significant

This shows the association between FGR and NICU admission. 52% of women with NICU admission had no FGR as compared to 48% of

women with NICU admission who had FGR, 92.3% of women without NICU admission had no FGR as compared to only 7.7% of women without NICU admission with FGR. There was a statistically significant correlation between FGR and NICU admission. ($p = 0.01$).

Table 11: Distribution of women according to recurrent stillbirth

Stillbirth	Frequency (n)	Percentage (%)
Yes	12	10.3
No	104	89.7
Total	116	100

Recurrent cause of stillbirth

Recurrent cause in current pregnancy	No of pregnancy
Hypertensive disorder of pregnancy	4
Abruption placenta	1
Gestational Diabetes Mellitus	1

10.3% of women had recurrent intrauterine death in present pregnancy as well. The causes of same varied but hypertension being the leading cause in the study.

Out of 12 women with recurrent stillbirths, in 6 women cause was recurred such as; HDP in 4, Abruptio placenta in 1, Gestational Diabetes Mellitus in 1.

Placental and Umbilical Cord Variables

Table 12: Distribution of women with Placental and umbilical cord variables

Placental calcifications		Loop of cord around neck		Insertion of cord	
Yes n (%)	No n (%)	Yes n (%)	No n (%)	Eccentric n (%)	Other n (%)
11 (9.5)	105 (90.5)	04 (3.4)	112 (96.6)	107 (92.2)	09 (7.8)

Table 12 shows the distribution of women according to placental and umbilical cord variables. 9.5% of women had placental calcifications in the present pregnancy. 3.4% of women had loop of cord around neck in the

present study. Cord insertion was eccentric in 107 (92.2%) women patients.

Tables and figures below are observations from previous pregnancy

Table 13: Distribution of women according to ReCoDe Classification

ReCoDe Classification	Frequency (n)	Percentage (%)
Unclassified	37	31.9
Hypertensive disorders of pregnancy	31	26.7
Abruption	21	18.1
Constricting loop of cord	05	4.3
Asphyxia	04	3.4
Lethal congenital anomaly	03	2.6
Others (Fever)	03	2.6
Other (PROM)	02	1.7
Others (PPROM)	02	1.7
Diabetes	02	1.7
Cervical insufficiency	01	0.9
Isoimmunization	01	0.9
Lupus or Antiphospholipid syndrome	01	0.9
Other (Fall)	01	0.9
Thyroid disorder	01	0.9
TTTS	01	0.9
Total	116	100

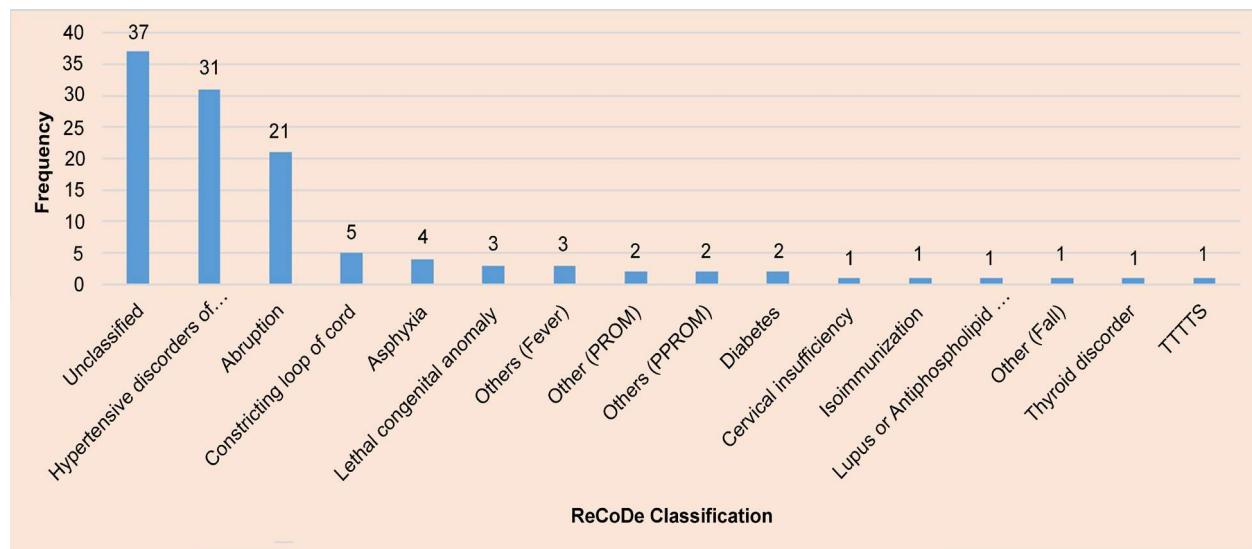


Figure 1: Distribution of women according to ReCoDe classification

Above table shows distribution of women according to ReCoDe classification, out of 116 women 26.7% had HDP, 18.1% had abruptio placentae, but still 31.9% remained as unclassified.

Table 14: Association between of hypertension and APH

Hypertension	APH		p-value*
	Present n (%)	Absent n (%)	
Present	09 (42.8)	30 (31.6)	0.32
Absent	12 (57.2)	65 (68.4)	
Total	21 (100)	95 (100)	

* p-value < 0.05 statistically significant

This shows the association between stillbirth with hypertensive disorder of pregnancy complicated with APH in the present study. 42.8% of women with APH had history of hypertension as compared to 57.2% of women with APH without hypertension. APH and hypertension did not statistically significantly correlate. (p = 0.32).

Table 15: Distribution of women with Gestational diabetes mellitus

Gestational diabetes mellitus	Frequency (n)	Percentage (%)
Present	03	2.6
Absent	113	97.4
Total	116	100

In our study, 2.6% of women had gestational diabetes mellitus in previous pregnancy.

DISCUSSION

In this study, 116 women were enrolled, with the age group of 26–35 years, with a mean age of 29.2 years.

Majority of women in the study were aged 26–35 years (64.6%), these findings are consistent with those of Clemenza *et al* (2022)⁸ indicating that reproductive age remains a predominant window for subsequent conception following such adverse outcomes. 11 women (9.5%) were above 35 years, comparable with Lamont *et al.* (2015) and Lean *et al.* (2017) indicating that advanced maternal age, although less prevalent, increases perinatal risk^{2,9}.

In this study 100 women with higher BMI were found to be associated with adverse pregnancy outcome, suggesting a strong correlation between elevated BMI and prior fetal loss, which was comparable by other studies as Cortés *et al* (2017) Clemenza *et al.* (2022) and Deng *et al.* (2024) showing high BMI is associated with vascular complications and poor placental function, thereby increasing stillbirth and adverse outcomes in future pregnancies^{9,10,11}.

Out of all recruited participants, 102 (88%) had prior 1 stillbirth, while 14 (12%) had two or more. (table 3) emphasizing the risk of recurrence, as supported by Lamont *et al.* (2015), who documented a fivefold higher recurrence risk².

History of abortion was present in 35.3% of women (table 4), reflecting overlapping etiologies such as thrombophilia or uterine

anomalies, as shown in studies by Zhang *et al.* (2023) and Priyadarshinee *et al.* (2023)^{12,13}.

Statistically significant associations were noted between hypertensive disorders and both placental abruption ($p = 0.01$) and uteroplacental insufficiency ($p = 0.01$), consistent with findings from Clemenza *et al.* (2022), Deng *et al.* (2024), and Gardosi *et al.* (d2005)^{5,8,11} reinforcing the need for close blood pressure monitoring in subsequent pregnancies.

In this research, 13.8% of women had gestational diabetes mellitus (GDM) in current pregnancy. Dandona *et al* (2023)¹⁴ reported that GDM substantially increased risk of stillbirth, particularly when the condition was poorly managed. Similarly, Jamal S *et al* (2024).¹⁵

Fetal growth restriction (FGR) showed strong correlations with both preterm birth and NICU admission (both $p = 0.01$), emphasizing its central role in poor perinatal outcomes, as supported by Wojcieszek *et al.* (2018) and Lamont *et al.* (2015).^{2,16}

Intrauterine death (IUD) occurred in 10.3% of current pregnancies, reflecting stillbirth recurrence despite increased surveillance. These cases often involved abnormal placental findings, including calcifications (9.5%) and eccentric cord insertion (92.2%), consistent with previous findings by Clemenza *et al.* (2022) and Zhang *et al.* (2023), suggesting compromised placental function^{8,12}.

Using the ReCoDe classification, hypertensive disorders and placental abruption emerged as the most common identified causes of stillbirth, though 37 cases remained unclassified, highlighting the limitations in current diagnostic capabilities and the need for improved investigation and surveillance.

Overall, this study highlights the necessity for individualized antenatal care, early identification of risk factors, and targeted interventions in women with prior stillbirth to improve maternal and fetal outcomes in future pregnancies.

Limitations

- With 116 participants, the sample size may not be sufficient to detect all statistically significant associations or rare outcomes.

- The generalizability of the results to other populations or healthcare set ups with different demography or resources.
- The absence of a control group (pregnant women without a history of stillbirth) limits the ability to compare and establish the relative risk of complications in the study group.
- As a descriptive observational study, it cannot establish causality only associations between risk factors and outcomes can be inferred.

CONCLUSION

This study reinforces that pregnancies following a prior stillbirth are inherently high-risk and demand intensive antenatal surveillance. Key maternal factors such as obesity, hypertensive disorders, and gestational diabetes were found to be significantly associated with adverse outcomes including fetal growth restriction (FGR), preterm birth, and NICU admissions. The prevalence of placental and umbilical cord abnormalities, further emphasizes the vulnerability of these pregnancies. The study also demonstrated a statistically significant association between hypertensive disorders and both placental abruption and uteroplacental insufficiency. Application of the ReCoDe classification helped identify leading causes of prior stillbirth, with hypertensive disorders and placental abruption being the most common. However, a considerable proportion remained unclassified, indicating the need for improved diagnostic evaluation. Ultimately, individualized care plans, early risk identification, and timely interventions are essential to improving perinatal outcomes and reducing the recurrence of stillbirth in future pregnancies.

Abbreviation:

ReCoDe: Relevant Condition at Death, FGR: Fetal growth restriction

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