Section: Obstetrics and Gynaecology

Original Research Article

INVESTIGATION OF THE CAUSES OF INTRAUTERINE FOETAL DEMISE OCCURRING AFTER 28 WEEKS OF GESTATION

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Received : 17/08/2023
Received in revised form : 24/09/2023
Accepted : 06/10/2023

Keywords:
IUFD, Pre-eclampsia, Eclampsia, Anaemia.

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DOI: 10.47009/jamp.2023.5.5.244

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

Int J Acad Med Pharm
2023; 5 (5); 1235-1240

Abstract

Background: Intrauterine foetal death elicits emotional grief among the woman, her family, and the obstetrician as well. Engaging in effective planning and actively seeking prenatal care may contribute to a reduction in this phenomenon. Aim: Investigation of the causes of intrauterine foetal demise occurring after 28 weeks of gestation. **Materials and Methods:** The study included a total of 2987 deliveries in the labour ward, out of which 120 (40.17%) were cases of intrauterine foetal demise (IUFDs). During the study period, pregnant women with various numbers of previous pregnancies and a gestational period ranging from 28 to less than 42 weeks, along with a foetus weighing at least 1000 grammes in singleton pregnancies, were included if they were attending the outdoor clinic or labour room. In this investigation, cases of intrauterine foetal demise (IUFD) associated with molar pregnancies, multiple pregnancies, and instances where gestational age was indeterminate were removed from the analysis. **Results:** The current investigation revealed that 45.83% of instances occurred within the age range of 20-25 years, while 31.67% of cases were seen in individuals aged 25-30 years. it was observed that among the maternal causes, pre-eclampsia and eclampsia were present in 19.17% of cases, anaemia was observed in 10.83% of cases, oligohydramnios and prematurity were each observed in 9.17% of cases, Rh negativity was observed in 5.83% of cases, diabetes mellitus was observed in 5% of cases, hypothyroidism, fever, and trauma were reported in each 4.17% of cases, and the cause was unknown in 5.83% of cases. In the study sample, it was shown that IUGR occurred in 5.83% of instances, whereas congenital malformations were seen in 1.67% of cases. Placenta previa was seen in 7.50% of instances, whereas Abruptio placenta was present in an equivalent proportion of cases, as stated in the study. **Conclusion:** The present research revealed that the incidence of intrauterine foetal demise (IUFD) was seen in 40.17% of live births, with a substantial majority (88.33%) of these cases being un-booked. Pre-eclampsia and eclampsia were identified as the predominant maternal factors contributing to intrauterine foetal demise (IUFD), accounting for 19.17% of cases.

INTRODUCTION

Foetal demise, as originally defined by the World Health Organisation (WHO) in 1950 and subsequently revised by a working group established by the 11th American Academy of Paediatrics and the American College of Obstetricians and Gynaecologists (ACOG) in 1988, refers to the death of a developing human embryo or foetus before it is fully expelled or extracted from the mother's body, regardless of the length of the pregnancy. It is important to note that this definition excludes cases of intentionally induced termination of pregnancy.[1] Late foetal death refers to the occurrence of foetal demise at or after 28 weeks of gestation. As per the International Classification of Diseases, 10th revision (ICD-10),[2] an early foetal demise is characterised by a minimum weight of 500 grammes (or, if birth weight is not known, a gestational age of at least 22 weeks or a crown-heel length of ≥25 centimetres). On the other hand, a late foetal demise is defined as the death of a foetus weighing at least 1000 grammes (or a gestational age of 28 weeks or a crown-heel length of ≥35 centimetres). In several nations, especially those in the developing regions, the measurement of intrauterine foetal death (IUFD) is determined by considering deaths occurring at 28 weeks of gestation or beyond, or when the weight of the foetus is 1000 grammes or more.[3] The unexpected death of a foetus in a pregnancy that has previously shown no

ISSN (O): 2687-5365; ISSN (P): 2753-6556

abnormalities may be very traumatic. The event presents a challenge that tests the medical expertise and personal aptitude of the physician. Therefore, it is essential to accurately ascertain the potential underlying factors contributing to foetal mortality in order to assess the likelihood of recurrence, implement preventive measures, or undertake appropriate interventions. The documenting of the main event or circumstance that has resulted in foetal mortality is of utmost relevance for an obstetrician. The provision of appropriate recommendations for the treatment, prevention, and potential recurrence of foetal death may only occur when the likely cause of the occurrence is established. Stillbirth is a significant contributor to perinatal death, constituting around 50% of all cases. It is estimated that there are approximately 4 million stillbirths annually on a global scale. The majority of these stillbirths, namely over 98%, occur in underdeveloped nations.[4] There has been a lack of comprehensive research, inadequate reporting, and little attention given to stillbirths in efforts to improve unfavourable pregnancy outcomes in poor nations.[5] Perinatal mortality is a significant health indicator within a nation and serves as a sensitive measure of maternity and child health (MCH) care. Approximately 60% of prenatal mortalities in our nation are classified as stillbirths and possess a higher degree of preventability.[6] Preventing stillbirths is a greater challenge compared to early neonatal mortality, mostly due to the incomplete identification of all relevant risk factors. Despite advancements in prenatal care and intrapartum care, stillbirths continue to be a significant and inadequately researched issue in the field of obstetrics on a global scale, particularly in developing countries such as India. While there has been a general decline in the perinatal death rate over the last several decades, it is important to note that the occurrence of stillbirth in developing nations exhibits a range of 1.5 to 2.2%. In many places of India, the incidence of stillbirths remains as high as 100 per 1000 births.[7] India now has a prominent position as a significant contributor to the occurrence of stillbirths. A recent research published in The Lancet indicates that around 25% of all stillbirths worldwide may be attributed to India.[8,9] The implementation of advanced intensive neonatal care units has led to a decrease in neonatal mortality rates in industrialised nations, since several efforts have been undertaken to mitigate the loss of newborn infants. The decrease in perinatal death rate may be attributed mostly to the decline in newborn mortality rate, rather than the reduction in foetal mortality. Currently, there is a growing focus on the unborn foetus inside the uterus, with the aim of ensuring the birth of a healthy baby and further decreasing perinatal death rates. The objective of this research was to investigate the features of intrauterine foetal demise (IUFD) and conduct a comprehensive analysis of the risk factors associated with it, with the aim of informing the development and implementation of preventative strategies.

MATERIALS AND METHODS

This retrospective observational research was undertaken with the agreement of the institutional ethics committee at the department of Obstetrics and Gynaecology. The study included a total of 2987 deliveries in the labour ward, out of which 120 (40.17%) were cases of intrauterine foetal demise (IUFDs). These cases were selected based on the inclusion and exclusion criteria for mothers. During the study period, pregnant women with various numbers of previous pregnancies and a gestational period ranging from 28 to less than 42 weeks, along with a foetus weighing at least 1000 grammes in singleton pregnancies, were included if they were attending the outdoor clinic or labour room. These women may or may not have been experiencing labour pain. Additionally, they had a clinical diagnosis or ultrasonographic confirmation of intrauterine foetal death, and reported a perception of reduced or absent foetal movement. In this investigation, cases of intrauterine foetal demise (IUFD) associated with molar pregnancies, multiple pregnancies, and instances where gestational age was indeterminate were removed from the analysis. The data was gathered using a pre-designed proforma, after the acquisition of written informed permission from the participants. The data collection form encompassed various aspects related to the patients, such as their literacy level, social and economic status as a couple, both their current and past obstetric history, any medical history, ongoing complaints during the antenatal period along with their duration, details of antenatal check-ups, presence of any antepartum haemorrhage, pregnancy-induced hypertension, eclampsia, or severe anaemia, the duration of labour onset, any prior intrapartum care received, the mode of delivery, and information regarding any intrauterine foetal demise (if applicable) that occurred. The general and obstetric examinations were conducted in accordance with established clinical protocols. Ultrasonography was performed in order to validate the occurrence of foetal demise, and a comprehensive review of all preceding blood investigation findings was conducted. A comprehensive analysis was conducted to assess the presence of congenital malformations in the stillborn infant, including an assessment of the infant's weight. Additionally, the placenta was thoroughly inspected to determine its weight and to identify any potential abnormalities such as retro-placental clots, ulceration, calcifications, or other gross abnormalities, if present. A prenatal autopsy was not conducted as part of this investigation. We used a significance threshold of 95% and α=0.05, hence each covariate was deemed statistically significant if its p-value was less than 0.05. The findings pertaining to categorical measures are reported in numerical values accompanied by their respective percentages. The data was analysed using the statistical programme Microsoft Excel.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

RESULTS

The current investigation revealed that 45.83% of instances occurred within the age range of 20-25 years, while 31.67% of cases were seen in individuals aged 25-30 years. Additionally, 11.67% of cases were identified in those older than 30 years, while 10.83% of cases were distributed among individuals less than 20 years (Table 1). According to the findings of this research, a significant majority of prenatal instances, namely 88.33%, were categorised as un-booked, while a comparatively smaller proportion of cases, specifically 11.67%, were classified as booked, as shown in Table 1. In the current investigation, it was observed that 33.33% of the cases fell into the G1 category, while 48.33% of the cases were classified as G2. Additionally, 12.50% of the cases were categorised as G3, 5% as G4, and a little proportion of 0.83% were assigned to G5 (Table 1). The findings of this research indicate that 18.33% of the observed instances fell under the category of less than 32 weeks, while 58.33% of the cases were classified within the range of 32-36 weeks. Additionally, 23.33% of the cases were found to belong to the category of greater than 37 weeks, as shown in Table 1.

In Table 2, pertaining to the aetiology, it was observed that among the maternal causes, pre-eclampsia and eclampsia were present in 19.17% of cases, anaemia was observed in 10.83% of cases, oligohydramnios and prematurity were each observed in 9.17% of cases, Rh negativity was observed in 5.83% of cases, diabetes mellitus was observed in 5% of cases, hypothyroidism, fever, and trauma were reported in each 4.17% of cases, and the cause was unknown in 5.83% of cases. In the study sample, it was shown that IUGR occurred in 5.83% of instances, whereas congenital malformations were seen in 1.67% of cases. Placenta previa was seen in 7.50% of instances, whereas Abruptio placenta was present in an equivalent proportion of cases, as stated in the study.

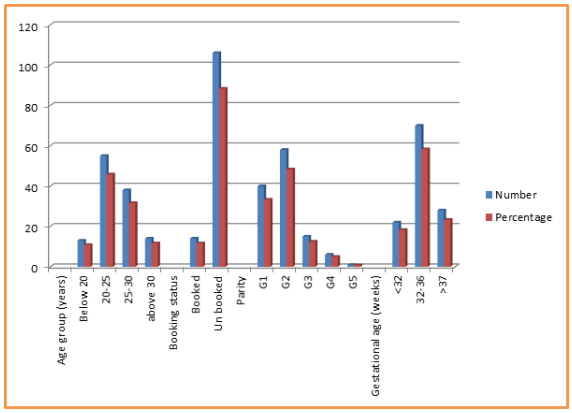

Figure 1: Basic parameter

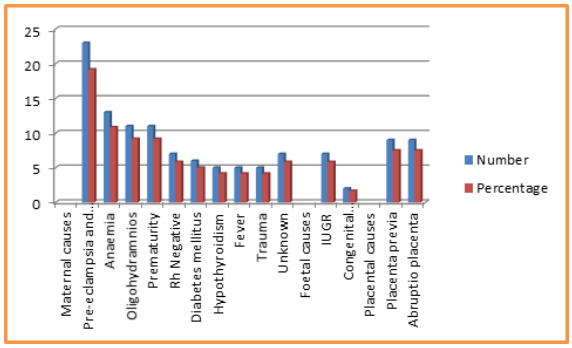

Figure 2: A etiology of the participants

Table 1: Basic parameter

Parameters	Number	Percentage
Age group (years)		
Below 20	13	10.83
20-25	55	45.83
25-30	38	31.67
above 30	14	11.67
Booking status		
Booked	14	11.67
Un booked	106	88.33
Parity		
G1	40	33.33
G2	58	48.33
G3	15	12.5
G4	6	5
G5	1	0.83
Gestational age (weeks)		
<32	22	18.33
32-36	70	58.33
≥37	28	23.33

Table 2: A etiology of the participants

Aetiology	Number	Percentage
Maternal causes		
Pre-eclampsia and eclampsia	23	19.17
Anaemia	13	10.83
Oligohydramnios	11	9.17
Prematurity	11	9.17
Rh Negative	7	5.83

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Diabetes mellitus	6	5
Hypothyroidism	5	4.17
Fever	5	4.17
Trauma	5	4.17
Unknown	7	5.83
Foetal causes		
IUGR	7	5.83
Congenital malformation	2	1.67
Placental causes		
Placenta previa	9	7.5
Abruptio placenta	9	7.5

DISCUSSION

The occurrence of antepartum foetal death, which can place throughout pregnancy and childbirth, is a distressing and emotionally challenging event of pregnancy. The sudden onset of complications in a previously uneventful pregnancy may be very discouraging.[9] This event presents a challenge that tests the medical expertise and personal aptitude of the physician. Therefore, it is essential to ascertain the underlying factors contributing to foetal mortality in order to assess the likelihood of reoccurrence, implement preventive measures, or take remedial actions. The occurrence rate of intrauterine foetal demise (IUFD) in India was reported to range from 24.4 to 41 per 10,000 pregnancies.[10] The present research observed an incidence rate of intrauterine foetal demise (IUFD) at 40.17%. The increased incidence seen may be attributed to the tertiary care nature of the hospital, which leads to a larger number of patients being referred to it. Additionally, the hospital tends to attract a significant proportion of high-risk individuals seeking treatment. The current research observed a prevalence rate of 10.83% for instances occurring in individuals under the age of 20. This proportion was found to be higher compared to the rates reported by Kanavi et al (3.8%), Kalasua et al (4.2%), Kumar et al (5.26%), and Meena et al (5.26%). However, it was lower than the rate reported by Radha et al (15.08%).[10-14] In the current investigation, it was observed that 45.83% of the cases were between the age range of 20-25 years. This finding aligns with the results reported by Gupta et al (48.2%) and Kumar et al (47.4%). However, it is noteworthy that the prevalence in our research was greater than that reported by Dedhrotiya (4%), while it was lower than the findings of Meena et al (59.64%).[12-16] In the present investigation, it was observed that a proportion of 31.67% of the cases fell between the age range of 25-30 years. This finding is consistent with the results reported by Gupta et al (29.4%) and Kumar et al (36.8%), indicating a similar distribution pattern. However, it should be noted that the observed proportion was greater than that reported by Meena et al (22.8%).[12-16] In the present investigation, a proportion of 11.67% of cases were seen in individuals aged over 30 years. This finding aligns with the results reported by Meena et al (12.3%), Karale et al (13.9%), and Kanavi et al (13.9%). However, it is lower than the prevalence reported by Gupta et al (22.4%), Kalasua et al (15.6%), and Radha et al (15.93%), while being higher than the prevalence reported by Kumar et al (10.53%).[10,12-17] In the present research, a total of 88.33% of prenatal cases were categorised as un-booked, a finding that aligns with the observations made by Gupta et al (90.6%) and Anjali et al (89.5%). However, it should be noted that this percentage is higher than the figures reported by Meena et al (85.96%), Dedhrotiya et al (72%), Kumar et al (75%), and Patel et al (70%).[12,13,16,18,19] In contrast, the research conducted by Kanavi et al and Karale at al.[10,17] reported that just 5.1% of cases were un-booked. In the current investigation, it was found that 33.33% of the observed instances belonged to G1, while 48.33% of the cases were classified as G2. Additionally, 12.50% of the cases fell into the G3 category, whilst 5% of the cases were assigned to G4. Lastly, a little proportion of 0.83% of the cases were categorised under G5. In the current investigation, it was shown that 33.33% of the cases belonged to primi para, a percentage that exceeded Gupta et al's findings of 24.7%, but fell behind the percentages reported by Kalasua et al (41%), Karale et al (43%), Kanavi et al. (43%), Meena et al (45.61%), and Kumar et al (56.6%).[10,11-13,15-17] The present research observed that 48.33% of patients belonged to G2, a greater proportion compared to the findings of Kumar et al (18.4%) and Meena et al (22.8%). Additionally, 12.50% of cases were classified as G3, which was comparable to the results reported by Meena et al (14.91%), but lower than those reported by Kumar et al (17.1%).[12,13] In the current investigation, the prevalence of G4 cases was found to be 5%, which was lower than the findings reported by Kumar et al (6.6%) and Meena et al (13.15%). Additionally, 0.83% of patients belonged to G5 in our study, which was comparable to the prevalence reported by Kumar et al (1.32%), but lower than that reported by Meena et al (3.53%).[12,13] The present research found that 18.33% of the instances fell within the category of less than 32 weeks, 58.33% of the cases fell within the category of 32-36 weeks, and 23.33% of the cases fell within the category of more than 37 weeks. In the present investigation, it was observed that 23.33% of the cases fell under the gestational age category of more than 37 weeks. This proportion was found to be higher compared to the findings reported by Gupta et al (14.1%), Kalasua et al (14.4%), and Kanavi et al (12.7%).[10,11,15] Kumar et al, Meena et al, and Karale et al used varying gestational age classifications.[12,13,17] In the present research, the

ISSN (O): 2687-5365; ISSN (P): 2753-6556

prevalence of anaemia was seen to be 10.83%, a finding that aligns closely with the findings reported by Patel et al (11.2%). However, it should be noted that the prevalence of anaemia in our study was greater compared to the studies conducted by Kumar et al (6.52%) and Meena et al (6.14%). Conversely, our findings indicate a lower prevalence of anaemia compared to the studies conducted by Anjali et al (16%) and Kanavi et al (20.2%).[10,12,13,18,19] The prevalence of placenta previa in this research was found to be 7.50%, which is comparable to the findings of Meena et al (8.96%), but lower than those reported by Kalasua et al (13%), and higher than the rates seen in the studies conducted by Kumar et al (5.26%) and Patel et al (1.96%).[10,11-13,18,19] The incidence of abruptio placenta in this investigation was found to be 7.50%, which is consistent with the findings of Bhatia et al (7.25%). However, it is lower than the rates reported by Meena et al (10.52%), Kalasua et al (35.2%), and Kumar et al (13.1%). On the other hand, it is higher than the incidence reported by Patel et al (3.92%).[11-13,20] In the current investigation, a prevalence rate of 19.17% was observed for the occurrence of Pre-eclampsia and eclampsia. This finding aligns with the studies conducted by Kumar et al (18.2%), Lawn et al (19%), Sharma et al (19.6%), Dedhrotiya (16%), while being lower than the prevalence reported by Gupta et al (31%) and Meena et al (23.68%).[12-16,21] In the present investigation, the incidence of intrauterine growth restriction (IUGR) was found to be 5.83%. This prevalence was greater compared to the findings reported by Meena et al (2.63%), but lower than those reported by Gupta et al (11.9%), Dedhrotiya (13%), and Kalasua et al (18%).[11-16] The present research found a prevalence rate of congenital malformation at 1.67%, which is consistent with the findings reported by Meena et al (1.75%) and Kumar et al (2.63%). However, it is lower than the rates reported by Gupta et al (9.4%), Anjali et al (10.5%), Dedhrotiya S (12%), and Kalasua et al (25.6%).[[11-18] The current research observed a prevalence of prematurity in 9.17% of cases, which was found to be greater compared to the findings reported by Gupta et al (3.5%).[15] The current research observed a prevalence of oligohydramnios in 9.17% of patients, a finding that aligns with the Dedhrotiya study (8%), but above the prevalence reported by Meena et al (2.63%).[13,16] The prevalence of diabetes mellitus in this research was seen to be 5%, a finding that aligns with the rates reported by Dedhrotiya (4%), Meena et al (4.38%), but exceeds the figures reported by Kanavi et al (3.8%) and Karale et al (3.8%).[10,13,16,17] The prevalence of hypothyroidism in this study was found to be 4.17%, which was lower compared to the findings reported by Kanavi JV et al,[10] (10.8%). The incidence of fever was found to be 4.17% in the present study, a rate comparable to that reported by Dedhrotiya (4%), but higher than the findings of Meena et al (0.8%).[13,16] In this investigation, the cause of intrauterine foetal demise (IUFD) was undetermined in 5.83% of cases. This percentage was higher compared to the findings of Gupta et al.[15] at 5.9%, but lower than the rates reported by Kumar et al. at 28.9%, Dedhrotiya at 32%, and Meena et al. at 35.08%.[12,13,16] The incidence of intrauterine foetal demise (IUFD) in this research was found to be 40.17%. This finding aligns with the results reported by Meena et al (38.22), Patel et al (36.17), Singh et al (40), and is lower than the incidence reported by Choudhary et al (49). However, it is higher than the incidence reported in the studies conducted by Karale et al (27) and Kalasua et al (27.2).[11,13,17,19-23]

CONCLUSION

The present research revealed that the incidence of intrauterine foetal demise (IUFD) was seen in 40.17% of live births, with a substantial majority (88.33%) of these cases being un-booked. Pre-eclampsia and eclampsia were identified as the predominant maternal factors contributing to intrauterine foetal demise (IUFD), accounting for 19.17% of cases. Anaemia was the second most prevalent maternal cause, accounting for 10.83% of IUFD cases. In order to mitigate the occurrence of intrauterine foetal deaths (IUFDs), it is essential to ensure that all prenatal cases are scheduled for comprehensive care throughout the antenatal period, as well as effective treatment of any potential difficulties. It is important to provide health care education to expectant moms throughout the prenatal period, as well as extend this knowledge to their families.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556