

A Retrospective Study on Etiological Aspects of Intrauterine Foetal Demise after 28 weeks of Gestation in a Tertiary Care Hospital in Eastern India

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Abstract

Back ground: An intrauterine foetal demise or death (IUID) is a major obstetrical catastrophe at any gestational age. The objective of the present study is to determine the possible causes of stillbirths or intrauterine foetal demise after 28 weeks of gestation and to determine the preventive measures. **Materials & Methods:** A retrospective study was done in all pregnant women admitted with IUID delivered at or above 28 weeks of gestation. Data analysis were done for maternal age, parity, antenatal visits, gestational age, probable causes of IUID, pregnancy complications, placental abnormalities. Statistical data were analysed by using Microsoft Excel sheet. **Results:** Incidence of IUID was 20.8 per 1000 total birth. It happened mostly (67.1%) in maternal age between >20 years and <30 years ($p < 0.001$), illiterate (64.6%; $p < 0.001$) and in middle class family (54.4%; $p < 0.001$). IUID occurred with increasing gestational age (53.2% vs 46.8%; $p = 0.045$) and occurs mostly in rural areas than urban (68.4% vs 31.6%; $p = 0.012$). IUID occurred with decrease in antenatal visit (46.2% with ≤ 1 visit; $p = 0.03$), low birth weight of baby (52.5%; $p = 0.004$), pre-term births (71.5% vs 28.5%; $p < 0.001$) and iron-folate intake is inadequate (63.3% vs 36.7%; $p < 0.001$) but it does not increase with previous pregnancy loss (13.9% vs 86.1%; p value < 0.001). Major maternal - foetal complications causing IUID included maternal hypertension related disorders (27.2%), preterm (5.7%), prolonged labour and obstructed labour (7%), maternal anaemia (12.6%), jaundice (5.1%), maternal infection (3.8%), congenital anomalies (3.2%), GDM (2.5%) and unexplained aetiology (10%). Cord complications occur in 5.1% cases. Mode of delivery is mostly vaginal (88.6%) and sex is predominantly male (54.4%). **Conclusions:** Causes of IUID are multifactorial and they can be prevented with proper community education, good quality obstetric care and urgent intervention from the healthcare provider to prevent stillbirth and improve the perinatal mortality of India.

Keywords: Intrauterine foetal death, anaemia, preeclampsia, gestational diabetes mellitus.

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Introduction

Foetal demise or death as defined by WHO in 1950 and revised by the working group formed by the 11th American Academy of paediatrics and ACOG in 1988 is death prior to complete expulsion or extraction from its mother of a product of human conception irrespective of the duration of pregnancy which is not an induced termination of pregnancy.[1] Late foetal death is those which occur at 28 or more completed weeks of gestation. According to the International Classification of Diseases, revision 10 (ICD -10) [2], an early foetal death weighing at least 500 grams (or if birth weight is

unavailable then after 22 weeks gestation or crown-heel length ≥ 25 cms) and a late foetal death is defined as death of a foetus weighing at least 1000 grams (or gestational age 28 weeks or a crown-heel length of ≥ 35 cms). In many countries particularly in the developing world, intrauterine foetal death (IUID) is calculated on the basis of deaths at 28 or more weeks of gestation or weight of 1000 gms or more.[3] Death of a foetus is really distressing when it occurs without warning in a pregnancy that has previously seemed entirely normal. It is an event that challenges both the medical and personal skill of the doctor. It is thus very essential to identify specific probable causes of foetal death to determine the risk of recurrence, prevention or corrective action. For an obstetrician, documentation of primary event or factor which has led to foetal death is a paramount importance. Only when probable aetiology of foetal death is known the patient can be given proper guidance for its treatment, prevention and recurrence if necessary. Still birth generally accounts for half of

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all perinatal mortality, with an estimated 4 million occurring worldwide each year. More than 98% of these stillbirths take place in developing countries[4] For many reasons still birth have been understudied, underreported and rarely have been considered in attempts to improve adverse pregnancy outcome in developing countries.[5] Perinatal mortality reflects one of the important health index of a country and it is one of the sensitive indicators of maternal and child health (MCH) care. Nearly 60% of perinatal deaths in our country are stillbirths and are preventable to a greater extent.[6] Stillbirths are difficult to prevent unlike early neonatal death, because all the risk factors have not been adequately identified. Despite improvement in antenatal care and intrapartum care, stillbirths remain an important, largely unstudied and major problem in obstetrics worldwide, especially in developing country like India. Although the overall perinatal mortality rate has fallen in the past several decades, the incidence of stillbirth in developing countries varies from 1.5 to 2.2 %. In India still births rate is as high as 100/1000 births in some regions.[7] Now India is a leading contributor of stillbirth and recent lancet study suggests that nearly one fourth of all stillbirths are from India.[8] Since many attempts have been made to lower the death of new born babies with the help of rapidly advancing intensive neonatal care unit, neonatal death rate is reduced in developed countries. A small reduction in perinatal mortality rate is due to reduction in the infant mortality rate and not because of foetal mortality. So, attention is now drawn towards the unborn in utero in order to deliver a healthy baby and so that perinatal mortality can be further reduced. The present study was planned to determine the characteristics of IUFD and a critical analysis of the risk factors associated with it for implementation of preventive measures.

Materials & Method

This retrospective observational study was conducted after taking approval from institutional ethics committee in the department of Obstetrics and Gynaecology, Nil RatanSirkar Medical College and Hospital, Kolkata, India from April 2019 to March 2020 (1year) which includes 158 IUFDs delivered in the labour ward fulfilling the inclusion and exclusion criteria of mothers. Pregnant women of any parity or gravida with gestational period of (≥ 28 to < 42) weeks, birth weight of foetus (≥ 1000 gm) with singleton pregnancies attending the outdoor clinic or labour room associated with or without labour

pain ultimately went into labour and having a perception of less or absent foetal movement diagnosed clinically or by ultrasonography as intrauterine foetal death were included during the study period. IUFDs with molar pregnancies, multiple pregnancies and where gestational age was not known were excluded from the study. Data was collected in predesigned proforma after taking the written informed consent of those enrolled. The data collection form contained details regarding patient particulars including literacy, social and economic condition of the couples, current and past obstetric history, any medical history, present complaints with duration of antenatal period, details of antenatal check-up, presence of any antepartum haemorrhage, pregnancy induced hypertension, eclampsia, severe anaemia, duration of onset of labour, any intrapartum care already received, mode of delivery and details of any IUFD baby (if delivered) were recorded. General and obstetric examination were carried out was per standard clinical protocol. Ultrasonography was done to confirm foetal death and all previous blood investigation reports were examined thoroughly. Detailed examination of still birth baby for any congenital anomalies weight was done and the placenta was examined for weight, retro-placental clots, ulceration, calcifications and other gross abnormalities (if any). No perinatal autopsy was carried out during this study. We considered 95% level of significance and $\alpha=0.05$, hence any covariate was considered statistically significantly if p value was < 0.05 . Results on categorical measurements are presented in number (%). Statistical software Microsoft Excel was used to analyse the data.

Results

Total number of deliveries encountered during the study period of one year (April 2019 to March 2020) was 7589. Out of them number of IUFD deliveries recorded was 158. Therefore, the calculated incidence of IUFD observed was 20.8/1000 total birth. In **Table 1** demographic profile of the study participants were depicted. Most common age group of the mother delivered IUFD was found to be 20-30 years belonging maximum to the middleclass family residing at rural area which was statistically significant ($p < 0.01$). Mothers who gave birth to still born babies were mostly primigravida, illiterate, visiting not more than one time for antenatal check-up, taking inadequate iron and folate supplementation and delivered pre term babies which were all statistically very significant ($p < 0.05$).

Table 1:Demographic profile of study participants (n=158)

Parameters	Frequency (n)	Percentage (%)	P value
Maternal age (years)			
< 20	27	17.1	
20-30	106	67.1	< 0.001
> 30	25	15.8	
Residence			
Rural	108	68.4	0.012
Urban	50	31.6	
Gravidity			
Primi	74	46.8	
Multi	84	53.2	0.045
Socioeconomic status			
Lower class	70	44.3	
Middle class	86	54.4	0.001
Upper class	2	1.3	
Education			
Literate*	56	35.4	
Illiterate	102	64.6	
Antenatal visits			

≤ 1	76	46.2	0.03
2-3	56	35.4	
≥ 4	29	18.4	
Previous pregnancy loss			
Yes	22	13.9	
No	136	86.1	< 0.001
Iron- folate intake			
Adequate	58	36.7	
Inadequate	100	63.3	< 0.001
Gestational age			
Preterm (< 37 weeks)	113	71.5	
Term (≥ 37 weeks)	45	28.5	
Birth weight of baby			
Very low (<1.5kg)	48	30.4	
Low (1.5- 2.5 kg)	83	52.5	0.004
Normal	27	17.1	

* Literate = At least can read and write with understanding in local language and above

In **Table 2** the various causes of foetal death are shown which were observed and extracted from retrospective evaluation of case histories and clinical examination and laboratory reports. Pre-

eclampsia was found to be the most common cause (14.6%) followed by gestational hypertension and anaemia, (11.4%) each respectively.

Table 2: Aetiology of foetal deaths observed in the study (N=158)

Causes	Frequency (n)	Percent (%)
Pre-Eclampsia	23	14.6
Gestational hypertension	18	11.4
Anaemia	18	11.4
Unknown aetiology	16	10
Prolonged labour and Obstructed labour	11	7.0
Prematurity	9	5.7
Jaundice	8	5.1
Hyper pyrexia	7	4.5
Infection due unknown cause	6	3.8
Congenital anomalies	5	3.2
Previous Caesarean Section	5	3.2
Cord prolapses	4	2.5
Diabetes	4	2.5
Antepartum Haemorrhage	4	2.5
Placenta previa	3	1.9
Breech	3	1.9
Premature Rupture of Membrane	3	1.9
Thalassemia	2	1.3
Eclampsia	2	1.3
Oligohydramnios	2	1.3
Antiphospholipid antibody syndrome	1	0.6
Acute Renal Failure	1	0.6%
Transverse Lie	1	0.6%
Polyhydramnios	1	0.6%
Meconium Aspiration Syndrome	1	0.6%
Total	158	100%

Discussion

Antepartum foetal death occurring during pregnancy and labour is a tragic and traumatic outcome of any pregnancy. It is really disheartening when it occurs without warning in a pregnancy that was previously normal. [9] It is an event that challenges both the medical and personal skill of the doctor. It is thus essential to identify causes of foetal death to determine the risk of recurrence, prevention or corrective action. In our study still birth rate was 20.8 per 1000 total birth. In India still birth rate is from 20-66 per 1000- total birth in different states.[10]The still birth rate in our study is close to the lower limit the national average. In 2016 a study by Bhatia T et al

[11] still birth rate was 27.76/1000 birth and a study conducted by Vidyadhar B et al [12]in 2010 showing stillbirth rate of 33/1000 births which were higher than our stillbirth rate but Korde-Nayak et al [13] showed stillbirth rate of 23.4/1000 birth which was close to our present study. In this study, the highest percentage of stillbirths was in the age group between 20 to 30 years (67.1%). A study by Anupamarani V et al [14]showed maximum rate of stillbirth in 21-30 years age group (69.09%) and in another study by Mostafa et al [15]in 1991 of Bangladesh reported that socio-demographic variables such as age, marital status, rural versus urban residence are important risk factors for perinatal deaths. In this study, maximum mothers

(68.4%) were from rural areas in stillbirth group. Rao et al [16] of India observed that stillbirth rates as high as 100/1000 births in remote rural areas of India and it is concordant with our study.

From our study it was found that the maximum stillbirths were in multigravida mother (53.2%) than primigravida (46.8%) and there was significant association between these two ($p < 0.05$). Unlike in two separate studies by Mostafa et al [15] of Bangladesh in 1991 and Golding et al [17] of Jamaica in 1994 observed that women with no previous children were found to have the highest incidence of stillbirth. The current study revealed that 54.4% mothers were from middle class status and 44.3% were from lower class status having IUFD having statistical significance of ($p < 0.05$) similar to study of Bartlett et al [18] during 1999-2002.

There was strong relation ($p < 0.001$) between educational status of mother with higher incidence of stillbirth in this study. Similar outcome in studies by Korde-Nayak et al [13] from Pune observed 57% of mothers of stillbirth group were illiterate. McClure et al [7] conducted a prospective population based multisite study regarding stillbirth in 6 developing countries including India, Pakistan, Argentina and other countries in 2005-2006; they observed that mothers who had not received any formal education were at greater risk of having stillbirths compared to live births.

WHO [19] recommends minimum 4 antenatal visits but in this study very few of total pregnant mothers had antenatal visits regularly (18.4%) and 46.2% mothers had one or no antenatal visits delivered most stillbirths. Rosario et al [20] of Jamaica in 1994 observed that women who visited the ANC less than three times during their pregnancy were twice as likely to have stillborn babies compared to women who visited the ANC more than three times ($OR=2.0$).

According to WHO [21] guidelines all pregnant women should receive a standard dose of 60 mg of elemental iron and 400 μ g folic acid daily for 6 months during antenatal period as part of their routine ANC check-up. In our study, lack of adequate intake of iron folic acid was associated with higher incidence of stillbirths ($p < 0.001$) with only 36.7% women took IFA tablets adequately and 63.3% women took inadequately. Vidyadhar B et al [12] study in 2011 observed that incomplete or no intake of IFA tablets were more associated with stillbirths. Ravi kumar et al [22] also observed similar observations in their studies.

A significant p value is < 0.001 , suggests that previous history of stillbirth is associated with increased incidence of stillbirths. In a study by Cahalane et al [23] in Ireland found that mothers who have previous miscarriages had twice the risk of perinatal mortality compared to mothers who had not experienced such event.

In the study it was evident that mothers of stillbirth had some sort of antenatal complications like hypertension, pre-eclampsia, anaemia, jaundice, diabetes, fever, antepartum haemorrhage etc. Studies by RaziaKorejo et al [24] (2007), Korde -Nayak et al [13] (2008) and Anupama Rani V et al [14] (2011) showed hypertensive disorders in pregnancies as a leading cause of IUFD antenatally which also corroborate with our study. Maternal anaemia in pregnancy present in significant percentage (11.4%) in our study. Abdullah et al [25] conducted study on stillbirths and observed that 5th most common cause of antenatal stillbirths was severe maternal anaemia constituting 2% of all stillbirth. Nayak et al [13] in their study also observed of all mothers delivered stillbirths were anaemic. In a retrospective cohort by Manisha Nair et al [26] in 2015 showed that among 1007 pregnant women who delivered in 5 medical colleges of Assam from January to June 2015, 35% pregnant women had moderate to severe anaemia had significant perinatal death ($OR=16.42$, 95% CI 4.38 to 65.55).

Pre term babies were more prone to end up with still birth according to our study findings (71.5%) in preterm babies (< 37 weeks of gestational age). In a study by Gupta et al [27] of India in 2002-2003 showed that maximum stillbirth was among the gestational age of 32-36 weeks (41.1% fresh and 43.4% macerated). In rural Maharashtra, study conducted by Shah U et al [28] observed that among 90

stillborn studied, majorities were preterm deliveries. Korde-Nayak et al [13] reported 78% of total stillbirths were preterm. These studies corroborate with our study.

In our study stillbirths are more associated with low-birth-weight babies (52.5%). In a case – control study conducted to assess the risk factors of stillbirth among pregnant women in Jamaica in 2004 [20], low birth weight was found to be associated with stillbirth. In that study, 54% stillborn babies had low birth weight (< 2500 g), and 19% had very low birth weight (< 1500 g). In a study conducted in K.G.M.U., Lucknow, Uttar Pradesh by Sujata et al [29] in 2004-2005, it was found that occurrence of stillbirth was associated with low-birth-weight babies. Chitrakumari et al [30] in 2001 found that preterm labour and low birth weight were associated with more stillbirths and Vidyadhar et al [12] also stated the same. In this study it is found that 3.2% stillbirth babies were born with congenital anomalies while Vidyadhar et al [12] in their study in 2011 observed that 7% of total stillbirths were congenitally malformed. Sikha Rani et al [31] in their prospective cohort study in Chandigarh in 2011 observed that long referral interval between health centres and tertiary health institutions, delay in seeking care, inadequate intrapartum monitoring were major causal factors for intranatal stillbirths in that locality.

Intrapartum stillbirths are the results of foetal distress and obstructed labour and often reflect poor care during delivery. Lack of antenatal care, rural residence, low socio-economic status, lack of education, lack of partner, primiparity, short inter pregnancy intervals, prior stillbirth, and other pregnancy complications are responsible for adverse pregnancy outcomes. Stillbirths are difficult to prevent unlike early neonatal death, because all the risk factors have not been adequately identified, for which substantial portion of stillbirths are still classified under the heading of unexplained group.

Prevention of intranatal foetal death as well as stillbirths and unexpected early neonatal deaths should be a multi-disciplinary approach and should include obstetricians, paediatric pathologists, paediatricians, radiologists, geneticist and other paramedical support staffs. Preconception care, early detection of risk factors like maternal diseases, congenital malformations, IUGR etc are necessary to plan the next level of management. The mothers should be referred to a tertiary care centre for management of prematurity and other obstetric and medical complications. Finally, awareness in the community level improves the ultimate outcome to a large extent.

Limitations of the Study

Autopsy of the still birth babies which could reveal the cause of death was not done as consent from the parents could not be obtained due to social and cultural factors. Thus, the unknown aetiology of still birth constituted a separate major group (10%) in our study.

Conclusion

Reasons behind still birth and IUFD are multifactorial as observed in this study and most of them are preventable. The authors feel that preconception counselling and care, early detection of maternal and foetal complication (eg. PIH, foetal anomaly etc), confirmation of foetal growth retardation and hypoxia and foetal distress, organised referral system for problematic delivery and prompt detection and intervention of intrapartum complications can address the problem to a great extent. There may be a multidisciplinary approach for prevention of still birth including obstetrician, specialist in foetal medicine, radiologist and anaesthetist. Education of the patient to avail obstetric care, proper planning of midwives visits to pregnant women, more frequent visits for high-risk pregnancies, timely referral to specialist will minimize fatal wastage. Hence improving the general condition of the people including their education, availability of emergency transportation facilities available at peripheral centres can go a long way in reducing still births.

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