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Original Research Article

Evaluation of risk factors for intrauterine foetal death during third trimester of pregnancy: a hospital-based cross-sectional study

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ABSTRACT

Background: In most cases of intrauterine foetal death (IUFD) in which the aetiology is known, a recurrence risk can be determined, and sometimes prenatal diagnosis and prevention are possible. In the present study, we evaluated the risk factors for intrauterine foetal death during 3rd trimester of pregnancy.

Methods: This was a hospital based cross sectional study, which was conducted in department of obstetrics and gynecology in tertiary Government Teaching Hospital in North Maharashtra for the period of 24 months. We enrolled 131 patients attending ANC OPD/labour room in their 3rd trimester of pregnancy who were diagnosed to have IUFD.

Results: There were 131 stillbirths out of 6402 live births hence incidence of IUFD was 20 per 1000 birth. IUFD was maximum seen in age group of 21 to 35 years (83.2%). Mortality was higher in un-booked cases (81.7%) and maximum (83.2%) mothers were from rural area. Most common presenting complaint was pain in abdomen (29.8%) followed by bleeding per vaginum in 16.8%. Only a small percentage i.e. 6.9% had no complaint. Hypertensive disorder of pregnancy (preeclampsia, eclampsia, chronic hypertension) was found to be an important comorbid factor among patients of IUFD which accounts for 31%. About 54.2% stillborn were males showing male preponderance. Post partum complications were relatively rare but most frequent was occurrence of severe anaemia due to APH. Maternal mortality occurred in 0.8% cases.

Conclusions: In conclusion, IUFD is closely associated with maternal health disorders and demo-socioeconomic factors are highlighting the need for improved antenatal care and management to mitigate risks.

Keywords: Intrauterine foetal death, Mothers health disorder, Risk factors, Stillborn, Western India

INTRODUCTION

According to American College of Obstetricians and Gynaecologists (ACOG), intrauterine foetal death (IUFD) is defined as the “death of the foetus after the 20th week of gestation”. Moreover, it is characterized as early or late in which early IUFD referred as the “death of the foetus before the 24th week of gestation” whereas late referred to the “death of the foetus after the 28th week of pregnancy”.¹ As per ICD-10, IUFD is defined as the “death prior to the whole expulsion or extraction from the mother of a product of conception, irrespective of the duration of pregnancy; without breathing or displaying any other evidence of life,

such as heart beating, pulsation of the umbilical cord, or definite movement of voluntary muscles”.²

Generally, IUFD is a difficult event for the parents and healthcare providers, which predicted in approximately 6 of 1000 births in developed countries. Understanding of etiology and recognition of risk factors is essential for preventive measures, counselling of parents, surveillance and comparison of healthcare nationally and internationally.³

It was reported that the bulk of intrauterine deaths are ascribed usually some avoidable risk factors in the

developing countries, which are included pre-eclampsia, intrauterine growth restriction, abruptio placentae, infections, umbilical cord complications, meconium-stained liquor and environmental hazards. Moreover, maternal smoking, advanced maternal age, high parity, obesity, and obstructed labour are also widely recognised risk factors of IUFD.⁴⁻⁶ Numerous maternal demographic factors are associated with an increased risk of IUFD. Higher rates of foetal deaths were observed in higher age group, body weight, un-booked cases who do not have proper access to healthy antenatal care and poor socioeconomic status.⁶

The diagnosis of intrauterine death is often reported by patients who noted absence of foetal movements. Confirmation is based on ultrasound. Obstetrical and psychological management remains a major concern for the practitioner. Some earlier studies evaluated IUFD associated with clinical characteristics, maternal risk factors and preventable factors for foetal demise.^{4,6-9}

Thus, in most cases of foetal death in which the aetiology is known, a recurrence risk can be determined, and sometimes prenatal diagnosis and prevention are possible. Women with an unexplained foetal death can be reassured that the risk of recurrence is low. On the other hand, the study is lacking in the western part of India.

In the present study, we evaluated the risk factors for intrauterine foetal death during 3rd trimester of pregnancy.

METHODS

Study design

It was a hospital based cross sectional study.

Place of the study

Study was conducted in department of obstetrics and gynecology in tertiary Government Teaching Hospital in North Maharashtra.

Study period

The study was conducted for 24 months (from 01 September 2022 to 30 September 2024).

Study population

All patient attending ANC OPD/Labour room at tertiary hospital in their 3rd trimester of pregnancy who were diagnosed to have IUFD.

Sample size estimation

In a study conducted by Tantengco et al on epidemiology of intrauterine foetal demise in a tertiary hospital found that prevalence of IUFD was 2.2%.¹⁰

Sample size was calculated by using the formula:

$$\text{Sample size } n = z^2 \times P \times Q / L^2$$

Z = Critical value of the normal distribution at the required confidence level its value is 1.96 P = Proportion = 56.1%

$$Q = 100 - P = 43.9\%$$

$$L = \text{Absolute error} = 5\%$$

At 99.99% confidence interval, calculated sample size was 131. So, 131 patients attending ANC OPD/labour room at tertiary hospital in their 3rd trimester of pregnancy who were diagnosed to have IUFD, were included.

Sampling method

In the present study patient diagnosed with IUFD in 3rd trimester and fulfilling the set of inclusion criteria was enrolled after the approval of the institutional ethical committee using universal/convenient sampling method.

Inclusion criteria

All patients attending labour room beyond 28 weeks of gestation. Patients with USG sign of absent cardiac activity. Patients willing to participate.

Exclusion criteria

Patients with absent foetal cardiac activity before 28 weeks of gestation. Patients not willing to participate.

Methodology

Study was started after getting permission from institutional ethics committee. Patients with USG sign of absent foetal cardiac activity has been enrolled. Study population was pregnant women attending tertiary care centre, fulfilling inclusion criteria with pregnancy. Informed consent was taken. Detailed obstetric history viz. mode of delivery, complaints, etc. and last menstrual period was recorded. Estimated date of delivery and duration of pregnancy was calculated. If the LMP was not sure, then duration of pregnancy was calculated by 1st trimester or earliest USG. Quickening-when was it started, can the movements be perceived by mother, when was the last the foetal movements were felt by mother. Clinical examination was performed. Abdominal examination was performed. Foetal heart sound would be tried to localize by stethoscope and doppler. Vaginal examination was done to see change in colour of liquor, any bleeding. Serial USG reports are to be seen.

Demographic and socioeconomic factors viz. age, parity, gestational age, residence, socio-economic status, type of marriage and booking status of the patients maternal and foetal outcome was studied. Confidentiality of the patient was maintained.

Statistical analysis

The collected data was entered using MS Excel software. Data analysis was done using SPSS Software (version, 22). The data was collected from desired sample population using standard, pre-validated case record proforma. Quantitative variables between different groups were compared using Z-test for continuous data. Qualitative and nominal variables was compared with the help of Chi-square test. If calculated p values found <0.05 , the difference was considered as significant.

RESULTS

Table 1 evaluated demo-socioeconomic features among mothers in which maximum patients (109, 83.2%) belong to age group of 21 to 35 years, followed by 19 patients (14.5%) from age group ≤ 20 years. Only 3 patients had from age >35 years. The mean age of the patients was 25.3 ± 4.8 years. For parity and gestational age distribution, out of 131 cases, more than half (81, 61.8%) of the patients with IUFD were multi-gravida and 86 (65.6%) cases had gestational age <37 weeks. Mean gestation age was 35.3 ± 3.2 weeks. Maximum mothers were observed IUFD who resided in rural area (109, 83.2%). The majority of mothers were non-consanguineous type of marriage (118, 90.1%). More than $3/4^{\text{th}}$ (107, 81.7%) were un-booked cases. Out of 131, 76 cases (57.1%) belonged to low socio-economic status.

Table 1: Demo-socioeconomic features among mothers.

Parameters	Frequency	Percentage
Age groups (years)		
≤ 20	19	14.5
21 to 35	109	83.2
>35	3	2.2
Mean $\pm$ SD	25.3 ± 4.8 years	
Parity		
Primigravida	50	38.2
Multigravida	81	61.8
Gestational age (weeks)		
<37	86	65.6
37 to 42	45	34.4
>42	0	0.0
Mean $\pm$ SD	35.3 ± 3.2 weeks	
Residence		
Rural	109	83.2
Urban	22	16.8
Type of marriage		
Consanguineous	13	9.9
Non-consanguineous	118	90.1
Booking status		
Booked	24	18.3
Un-booked	107	81.7
Socioeconomic status		
Middle SES	55	42.9
Low SES	76	57.1

Table 2: Presenting complaints among mothers.

Chief complaints	Frequency	Percentage
Pain in abdomen	39	29.8
Bleeding PV	22	16.8
Leaking PV	19	14.5
Absent foetal movements	14	10.7
Decreased foetal movements	8	6.1
Headache	8	6.1
Seizures	3	2.3
History of fall	3	2.3
Vomiting	2	1.5
Convulsion	1	0.8
Fever with jaundice	1	0.8
PROM	1	0.8
Unconscious	1	0.8
No complaints	9	6.9

Most common presenting complaint of mothers with IUFD was pain in abdomen in 39 (29.8%), followed by bleeding PV in 22 (16.8%), leaking PV in 19 (14.5%) and absent fetal movements in 14 (10.7%). Only a small number (6.9%) patients did not have any complaints (Table 2).

Table 3: Medical and obstetrical co-morbid factors among mothers.

Parameters	Frequency	Percent
Medical co-morbid factors		
Hypertension in pregnancy	31	23.6
Gestational diabetes mellitus	8	6.2
Hyperbilirubinemia	2	1.5
Sickle cell disease	1	0.8
Nil	89	67.9
Obstetrical co-morbid factors		
Previous LSCS	8	6.1
Congenital anomaly	7	5.3
Grand multipara	7	5.3
Transverse lie	6	4.6
MSL (post datism)	5	3.8
Rh negative pregnancy	5	3.8
Twin gestation	2	1.5
Breech presentation	1	0.8
Preterm with breech presentation	1	0.8
Nil	89	67.9

Most common medical co-morbid factor among patients with IUFD was found to be hypertension in pregnancy (31, 23.6%), which included mild preeclampsia, severe preeclampsia, eclampsia and chronic hypertension, gestational diabetes mellitus in 8 cases (6.2%), hyperbilirubinemia in 2 cases (1.5%) and sickle cell disease in only one mother (0.8%) while 89 (67.9%) mothers did not have any medical co-morbid factor.

Regarding obstetrical co-morbid factors, among patients with IUFD was previous LSCS in 8 cases (6.1%), congenital anomaly in 7 cases (5.3%), grand multipara in 7 cases (5.3%) and transverse lie in 6 (4.6%) mothers. About 89 (67.9%) mothers did not have any obstetrical comorbid factor (Table 3).

About 89 (67.9%) mothers with IUFD were delivered vaginally and 42 (32.1%) mothers underwent LSCS (Table 4).

Table 4: Mode of delivery among mothers.

Mode of delivery	Frequency	Percentage
Vaginal	89	67.9
LSCS	42	32.1

About 60 (45.8%) stillborn were females and 71 (54.2%) were males. About 72 (55%) stillborn had low birth weight, 29 (22.1%) had normal birth weight and 28 (21.4%) were very low birth weight (Table 5).

Table 5: Sex and birth weight of stillborn.

Parameters	Frequency	Percent
Sex		
Female	60	45.8
Male	71	54.2
Birth weight		
Extremely low birth weight (<1000 gm)	2	1.5
Very low birth weight (1001-1500 gm)	28	21.4
Low birth weight (1501-<2500 gm)	72	55.0
Normal birth weight (2500-4500 gm)	29	22.1

Table 6: Post-partum complications among mothers.

Post-partum complications	Frequency	Percent
ICU admission	11	8.4
Severe anaemia due to PPH	7	5.3
Moderate anaemia	2	1.5
Acute renal injury	2	1.5
Puerperal infection	2	1.5
Obstetric hysterectomy	2	1.5
Maternal mortality	1	0.8
DIC	1	0.8
Ventilatory support	1	0.8
Haemorrhagic shock with pulmonary oedema	1	0.8
Nil	103	78.6

Most common post-partum complications (Table 6) among mothers with IUFD were observed severe anemia due to PPH in 7 cases (5.3%) and ICU Admission in 11 cases (8.4%). Moderate anemia, acute renal injury, puerperal infection and obstetric hysterectomy were seen in 2 (1.5%) of each. Maternal mortality was seen only in one patient (0.8%).

DISCUSSION

Regarding age group distribution, similar findings were observed in a study by Jovanovic et al in which analysis of the demographic data revealed that the average age of patients with IUFD was 30.6±6.38 years, with no patients younger than 18 years while 3.3% patients were older than 40 years.⁸ In past study, Fretts et al reported that the risk of IUFD nearly doubles in patients over 35 years of age, which is not consistent with our findings.¹¹ The

majority of patients (97.7%) were between 18 and 35 years old, which is in line with the profile of pregnant women in our country.

Sharma et al indicated that the risk increases after the second or even the fifth delivery.¹² However, the study by Jovanovic et al, the parity of the patients showed that they were mainly primiparous (53.33%), which was slightly higher compared to our study.⁸ Man et al stated that primiparous women are at higher risk.¹³ Our findings are supported by the study of Liu et al where only 14.9% stillbirths that occurred at term pregnancy (after 37 weeks of gestation).¹⁴ But contrary to our findings, Jovanovic et al reported that mean gestational age of the patients was 38.5±1.14 weeks (higher than our study), with more than half (58.33%) occurring after 37 weeks of gestation.⁸

Regarding booking status, Mufti et al reported similar findings where un-booked cases were higher (58.9%).⁶ Petronijevic et al mentioned that the level of socioeconomic status is associated with accessibility of healthcare and awareness of the necessity of regular prenatal checkups.¹⁵

Similarly, Jovanovic et al found that the most common pathologies among our patients were disorders of hypertensive syndrome in pregnancy, which were present in 21.67% patients, 8.3% patients had gestational diabetes.⁸ 58.33% of the women had no comorbidities. In a study by Sharma et al revealed that hypertensive disorders, and diabetes are consistently linked to a higher incidence of this event, similar findings reported by the study of Ohana et al.^{12,16} Moreover, Liu et al also supported that the increased risks of third trimester stillbirths are significantly associated with diabetic or hypertensive pregnancies.¹⁴ Hypertensive disorders, accounted for the most common maternal medical conditions that resulted in stillbirth in the 3rd trimester.⁶

The comparable findings were observed in study by Jovanovic et al in which about 78.33% of cases, pregnancies ended with vaginal delivery, while in 21.67% of cases, a caesarean section was performed.⁸ Mufti et al also supported the present study regarding maximum vaginal deliver among mothers (71.9%).⁶

Jovanovic et al in their study found that there were 55% male and 45% female foetuses.⁸ In a systematic review by Mondal et al reported that the risk of IUFD is up to 10% higher in male foetuses compared to female fetuses.¹⁷ However, an explanation for such a significant gender difference has not yet been found. Liu et al revealed similar observation where the increased risks of 3rd trimester stillbirths were significantly associated with males born.¹⁴

Our findings are in accordance with the findings of study by Liu et al observed that the average foetal birth weight for all stillbirths was 1.13 kg.¹⁴ Contrary to our findings, Jovanovic et al found that only 18.33% stillborns weighing less than 2.5 kg (low birth weight), may be because, in our study majority of the patients reported before 37 weeks so occurrence of LBW and VLBW was comparatively higher in our study.⁸

Gold et al in their study reported that overall, 6.0% women experienced at least one of the serious maternal complications measured.¹⁸ Occurrence of complications were comparatively higher in our study as being a tertiary care centre, majority of cases are referred from other hospitals and already having many complications.

CONCLUSION

The study concluded that IUFD is closely linked to maternal health conditions and socioeconomic factors, which is highlighting the need for improved antenatal care and management to mitigate risks. Hypertensive disorder

of pregnancy, antepartum haemorrhage were leading causes of IUFD. Most of women who had IUFD were un-booked cases who had not received adequate antenatal care.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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