<u>**Original research article**</u>

A descriptive study on causes and correlates of intrauterine fetal deaths

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Abstract
India has highest number of stillbirths in the World. Healthcare and socio-cultural factors contribute to the increase in the number of stillbirths in India. These issues highlight the need for urgent action and interventions to be taken by the government and other organization to improve the situation of stillbirths in India. Early neonatal deaths and stillbirths usually have obstetric causes, and are largely preventable if good quality obstetric care is made available at the right time. Initiatives for strengthening the information management system at the grassroot level to report stillbirths on a regular basis are necessary to improve the neonatal health indicators in India. Mothers diagnosed with fetal demise confirmed (by ultrasound), prior to onset of labor or during labor and delivery were enrolled into the study after taking written consent. Detailed case history taken, mode of delivery analyzed, the fetus were examined to identify gross anomalies and the placenta preserved for histopathological evaluation. According to histopathological examination (HPE) of placenta, 60 placentas were found to be normal and 40 were having abnormality. 21 placentas which were normal by gross, found to be abnormal with histopathology examination (2more cases of 1a1v found which was missed by gross examination).
Keywords: Intrauterine fetal deaths, histopathological evaluation, HPE

Introduction
Prevalence of IUFD and stillbirth is expressed as number of fetal deaths per 1000 live births. Range of incidence varies in different countries, ranging from 5 in 1000 births in high income countries and 36 in 1000 births in developing countries[1].
"Previous estimates have highlighted a large global burden of stillbirths, with an absence of reliable data from regions where most stillbirths occur. Every Newborn Action Plan (ENAP) targets national stillbirth rates (SBRs) of 12 or fewer stillbirths per 1000 births by 2030[2].
"Karnataka, which has been doing fairly well in managing and reducing other health indicators, but has the dubious distinction of having the highest stillbirth rate- 12 deaths per 1,000 births in the country, according to the Sample Registration Survey (SRS) 2013. Early neonatal deaths and stillbirths usually have obstetric causes and are largely preventable if good quality obstetric care is made available at the right time. But lack of specialists is a major problem.In Northern districtsof state of Karnataka, India prospective population-based survey was conducted in eight clusters in Belgaum and Bagalkot districts from 2013-2014.Despite a high number of institutional deliveries, rates of stillbirth were 2.86% (28.6/1000births)[3].
Present study was conducted to understand the incidence, epidemiological and etiological factors of IUFD. In addition to any physical effects; stillbirth often has profound emotional, psychiatric and social effects on parents, their relatives and friends.To determine the incidence of IUFD and associated maternal risk factors, by understanding the contributing factors, we can seek ways of avoiding recurrence by proper antenatal care and early diagnosis of complications and its proper management. Antenatal screening for anemia, preeclampsia, GDM, previous pregnancy loss and antenatal supervision can plan an important role in decreasing the incidence of IUFD, by determining the cause of IUFD. Institutional deliveries should be promoted to prevent IUFD. Decrease in the incidence of IUFD would significantly

reduce the perinatal mortality. Majority of fetal wastage can be prevented with universal and improved antenatal care[4, 5, 6].

India has highest number of stillbirths in the World. Healthcare and socio-cultural factors contribute to the increase in the number of stillbirths in India. These issues highlight the need for urgent action and interventions to be taken by the government and other organization to improve the situation of stillbirths in India. Early neonatal deaths and stillbirths usually have obstetric causes, and are largely preventable if good quality obstetric care is made available at the right time. Initiatives for strengthening the information management system at the grassroot level to report stillbirths on a regular basis are necessary to improve the neonatal health indicators in India.India has highest number of stillbirths in the world-the rates range from 20 to 66 per 1000 births in different states.To capture the true number of stillbirths and make them visible it is necessary to have powerful reporting systems in place[7, 8].

If the cause of an IUFD can be identified, the family will have answers about the possibility of recurrence and can seek appropriate medical treatment to prevent recurrence. Identification of causes of IUFD will be helpful in counseling the parents as well as for formulating preventive measures.

Methodology

Mothers diagnosed with fetal demise confirmed (by ultrasound), prior to onset of labor or during labor and delivery were enrolled into the study after taking written consent. Detailed case history taken, mode of delivery analyzed, the fetus were examined to identify gross anomalies and the placenta preserved for histopathological evaluation. The clients were followed up postpartum throughout their hospital stay, and possible risk factors for some modifiable, non modifiable, recurrent and non-recurrent causes, maternal morbidity and mortality analyzed in detail.

- This prospective study was doneat the Tertiary care referral Hospital Vijayanagar Institute of Medical sciences, Ballari, Karnataka in the Department of Obstetrics and Gynecology.
- In this prospective study, 100 confirmed cases of intra uterine fetal demise (IUFD) were studied with priorconsent. The parameters for the analysis include maternal age, parity,booked case or unbooked case and probable cause for IUFD,mode of delivery, maternal complications, placental and fetal gross study done. Further study of placenta/fetal autopsy in 100 cases evaluated systematically after informed consent documenting.
- "Booked Case" by definition (WHO) is when the pregnant lady has had a minimum of three visits for antenatal check-up after she was registered and immunized, others would be unbooked case".

Inclusion criteria

Consented 100 IUFD cases at or above 28 weeks of gestation or>1kg birth weight were included.
All the details were thoroughly analyzed and entered in a preformed proforma.

Exclusion criteria

All Pregnancies with gestational age <28 weeks/less than 1000gms weight/not consented/ twin pregnancy with single demise, cord prolapse, IUFDdue to malpresentations were excluded.

Results

Table 1: Distribution of study participants according to demographic variables

Variables	Frequency (100)	Percentage (100)
Age group (in years)		
< 20	16	16
20 – 25	43	43
26 – 30	37	37
31 – 35	4	4
Mean ± SD = 24.83 ± 4.015		
Income of Family RS/month		
4000	7	7
5000	71	71
6000	22	22
Education of study subject		
Illiterate	25	25
1-5TH	20	20

6-10TH	47	47
11/12 OR Diploma	4	4
Graduate	4	4
Husband Education		
Illiterate	21	21
1-5TH	17	17
6-10TH	47	47
11/12 OR Diploma	10	10
Graduate	5	5

The age distribution of the study participants ranged from 12 to 35 years with mean age ± SD being 24.83 ± 4.015 years. Income of the family was rupees 5000 in most (71) of the participants, 6000 in 22 participants and 4000 rupees in 7 participants. Most (47%) of mothers as well as husbands studied up to 6-10th standard. 21% mothers and 25% husbands were illiterates. 20% of mothers and 17% of husbands had studied first to fifth standard, 4 % each of the mothers had completed Pre -university and graduation, where as 10% of husbands completed pre-university and 5% were graduates.

Table 2: Distribution of study participants according to socio-demographic variables

Variables	Frequency (100)	Percent (100)	
Booking status			
Booked	87	87	Chi square = 0.0313
Un-booked	13	13	P value = 0.8595
Referred cases			
No	16	16	
Yes	84	84	
Consanguinity			
Consanguineous	42	42	Chi square = 0.0379
Non-consanguineous	58	58	P value = 0.8456
Blood Group			
A+ve	15	15	
AB+ve	8	8	
B-ve	1	1	
B+ve	37	37	
O-ve	4	4	
O+ve	35	35	
Tobacco consumption			
NIL	87	87	
Passive smoker	9	9	
Tobacco chewing	4	4	

Table 2 shows that 87 of mothers were booked and 84 of the mothers were referred cases. 41% of them had consanguineous marriage, 58 % non-consanguineous and one mother is un-married. 37% of mothers had B+ blood group, 35% had O+ve, 15 had A+ve, 8 had AB+ve, 4% had O-ve and only one mother had B-ve blood group. 87 mothers were non- smokers, 9 passive smokers and 4 chew tobacco.

Table 3: Distribution of study participants according to obstetric variables

Variables	Frequency (100)	Percent (100)
Married life		
Less Than 5 Years	58	58
6-10 Years	26	26
11-15 Years	12	12
16-20 Years	4	4
Gravida		
Primigravida	33	33

Gravida 2 -3	42	42
Gravida ≥ 4	25	25
Parity		
0	37	37
1	26	26
2	19	19
3	15	15
4	3	3
Living		
0	43	43
1	28	28
2	20	20
3	8	8
4	1	1
Abortion		
0	79	79
1	17	17
2	3	3
5	1	1

Table 3 shows that, 57 mother's married life was less that 5 years, 26 had 6-10 years, 12 had 11-15years, only 4 had >16 years of married life where as one is unmarried. 33 mothers were primi mothers, 42 were pregnant for 2/ 3 times, 25 were multigravida. 37 mothers did not cross the viable period once also. 29, 19, 15 and 3 mothers crossed viable period for once, twice, thrice and four times respectively. 43 mothers did not have any living child, 28,20,8,and 1 mother had 1,2,3 and 4 living children respectively. 79 mothers did not have abortion in their score where as 17, 3 and one mother had once, twice and five times history of abortions respectively.

Table 4: Distribution of the study participants according to mode of delivery

Mode of delivery	Frequency	Percent
LSCS	6	6
Medical	36	36
Medical + Foleys	14	14
Spontaneous	43	43
ARM+ Oxytocin	1	1

43 mothers had spontaneous expulsion of the fetus, 36 were induced by medical method, 14 with medical and Foley's, six were done with LSCS and one induced with ARM and oxytocin.

Table 5: Distribution of the study participants according to variables after delivery

Variables	Frequency	Percent
Gender of the fetus		
Female	41	41
Male	57	57
Ambiguous	2	2
Liquor Status		
Brown stained	11	11
Meconium	6	6
Normal	50	50
Oligohydramnios	28	28
Polyhydramnios	5	5
Birth weight (kg)		
1.0-1.5	38	38
1.5-2.0	23	23
2.0-2.5	23	23
2.5-3.5	14	14
>3.5	2	2

41 were female, 57 male and 2 were ambiguous fetus. The status of liquor was Normal (50), oligohydramnios (28), brown stained (11), Meconium (6) and polyhydramnios (5).38 fetuses weighed < 1.5 kg, 46 weighed 1.5-2.5 kg, and others (16) weighed > 2.5, among them two were macrosomic. Birth weights of 1-1.5 kg higher prevalence of 38%,1.5-2kg 23%,2-2.5kg 23%,>3.5kg was2%.

Table 6: Distribution of the fetus according to histopathological appearance of placenta

Histopathologic Examination of Placenta	Frequency	Percent
NAD	60	60
One Artery One Vein (1a1v)	3	3
Abruptio with Marginal Placenta	1	1
Abruptio	4	4
Acute Chorioamnionitis	7	7
Chorioangiosis of Placenta	1	1
Conical Shaped Placenta with Grey Brow White Areas	1	1
Eclampsia Placenta	4	4
Hydrops Placenta with Nucleated RBCS	2	2
Hypoperfusion	4	4
Placental Infarct	13	13
Total	100	100

According to histopathological examination (HPE) of placenta, 60 placentas were found to be normal and 40 were having abnormality. 21 placentas which were normal by gross, found to be abnormal with histopathology examination (2more cases of 1a1v found which was missed by gross examination).

Table 7: Distribution of the fetus according to characteristics of autopsy

Normal	78
1a1v enlargedhead with low set ears, nodular kidney	2
Acrania exencephaly	1
Anencephaly, encephalocele, gastroschisis, ectopia cardia, spina bifida	1
Ambiguous genitalia, absent (ab) anus rt kidney transverse polycystic, ab adrenals, ab gonads	1
Ambiguous genitalia, anal atresia ab rt kidney and ureter, with mega cystitis	1
Anencephaly	2
Autolysed organs	2
B/l club foot	1
Bilateral anotia	1
Both kidneys enlarged	1
Exencephaly low set ears eyes not developed	1
Hydrops fetalis (HF)	1
HF spina bifida lumbosacral region	1
Hydranencephaly, hypoplasia of cerebrum and mandible	1
Left little finger rudimentary, bilateral club foot	1
Lipomyelomeningocele	1
Overriding of cranial bones	1
Post auricular tag, polydactyly rt hand, absent anal opening, lumbosacral defect	1
Right side cleft lip	1

78 fetuses were normal by autopsy findings. Rest 22 were abnormal.Of these 22 abnormal fetuses eleven were normal by HPE. 11 abnormal autopsy findings, three had one artery one vein, five had placental infarct, two had chorioamnionitis, one had hydrops placenta.

Table 8: Distribution of maternal risk factors among the study participants

Maternal factors	Present	Absent
Anaemia	77	23

Hypertension	40	60
Endocrinology problems	30	70
Infections & viral fever*	6	94
Other factors**	5	95
NAD	5	95

*HbsAg +ve 5, pyelonephritis1.
**2ARF,3RH-ve blood groups.

In the study we found study participants were having one or the other maternal risk factors and ended with intrauterine death of the fetus.

Discussion

Maternal age was 20-25yrs in 43% and 37% in 26-30yrs (mean age ± SD being 24.83 ± 4.015 years)in our study compared to Abdulla M et al[11] 30yrs mean age. In a study by Tulsi Bhatia et al[12]maternal age between 20-30 years was71.74% and it was 80% in our study.Booked cases were 87% in our study as against Susmita et al study which was only 11.2%. In our study primi gravida were 33% and multigravida were 67%, and it was 43.47%and 56.53% in a study by Tulsi Bhatia et.al. In our study the incidence of vaginal delivery was 94% and LSCS being 6% which was comparable to 84.06% and 13.77% done by Tulsi Bhatia et.al. The incidence of spontaneous labour was 43% and induced labour was 51% as against 69.57% and 30.43% in a study by Tulsi Bhatia et.al.In our study male fetus were 57% and female were 41% which was comparable to a study by Tulsi Bhatia et al., the percentages being 56.52% and 43.48% respectively. Birth weight of most of the fetuses was between 1 to 1.5 kgs i.e 38% which was 27.5% in study of Tulsi Bhatia et. al.

Conclusion

Teenage pregnancy, lack of antenatal care, poor nutrition are due to poor socio-economic factors which have to be considered as contributing factors and need to be tackled. As IUFD occurred least among well educated and graduates, education also is a factor to be emphasised. Histopathological evaluation of the placenta is the best method to detect the cause of foetal demise where no identifiable clinical cause of the demise was found. Fetal autopsy showed 8% better results than USG for determining the cause of fetal death. Hence education of the patient to avail obstetric care, more frequent visits for high risk pregnancies, timely referral to specialists will minimise intra uterine fetal death.

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