Determinants of Intrapartum Still Birth and Early Neonatal Death in a Periurban Hospital

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Abstract

Stillbirth and early neonatal death is quite high in Bangladesh. The current study was undertaken to find out sociodemographic and pregnancy related risk factors that may exist with cases of stillbirth and death during first 7 days of life.

This was a cross sectional study conducted at Institute of Child and mother health (ICMH) between February to June 2015. Mothers delivered still birth baby at ICMH and whose babies were admitted in neonatal ward immediately after birth for delay to cry were enrolled consecutively. Data was collected by interviewing mothers and reviewing hospital records using structured questionnaire. Follow up was done till 7 days. Data analysis was done with SPSS version 14

Among a total 116 mothers 83.6% came from rural areas, 48.2% belong to 20-25 years age group with mean age 23±5 year, 46.6% had primary education, 89.7% were primipara, and 62.9% had more than 4 antenatal visits in index pregnancy. Common pregnancy related problems were anaemia (85.3%), preeclampsia (41.4%), less fetal movement (31.9%), polyhydramnios (13.8%), oligohydramnios (12.9%), premature rupture membrane (58.6%), prolong labour 48.3%), malpresentation (8.6%) and urinary tract infection in 12.1%. About 69.8% delivered at hospital, 59% had normal vaginal delivery, instrumental delivery 17.2% and caesarean section in 24.1%. About 57.8% babies were born preterm. and 55.1% were low birth weight. During first 7 days of life 32% developed neonatal sepsis and 32.8% died. Cause of death as recorded was perinatal asphyxia (55.17%), hypoxic ischemic encephalopathy 17.2%, low birth weight with perinatal asphyxia in 35.6% and meconium aspiration syndrome 4.5%.

Stillbirth and early neonatal deaths are obstetric catastrophe and has common overlapping risk factors. Risk specific interventions with special emphasis on improvement of quality of care throughout the phases of pregnancy, delivery and postpartum period is recommended

Key words: *Stillbirth, risk factors, early neonatal death, causes, quality of care*

Introduction:

Birth is a crucial time for the mother and fetus. Stillbirth and early neonatal deaths are common adverse outcomes of pregnancy. Each year about four million newborns die before they are four weeks old, 98% of these deaths occur in developing countries[1]. There is an estimated 1.02 million intrapartum stillbirths, 904,000 intrapartum related neonatal deaths each year[2]. Gobally there were 2.6 million stillbirths in 2015[3]. Approximately 204 babies die each day before reaching their first month and 218 stillbirths occur every day[4].

Stillbirth is defined as birth of a baby which does not show any sign of life after birth[1]. Stillbirths occurring in the intrapartum period are generally normal in appearance, and are often called *fresh* stillbirths.

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When the skin is not intact, or *"macerated"* it implies death >24 hours before delivery[5]. In developed countries intrapartum stillbirths comprise less than 10% of all stillbirths, while in many developing countries, higher proportions of the stillbirths are thought to occur intrapartum[5]. It is estimated intrapartums stillbirth comprise 26% of global stillbirths and account for almost 10% of deaths in children aged under 5 years[6].

Intrapartum related neonatal mortality rates are 25 fold higher in the lowest income countries and intrapartum related stillbirth rates are 50 fold higher[2].South Asia has the world's largest numerical stillbirth burden with rates ranging from 25 to 40/1000 births[2.]. In a study from India, the incidence of stillbirth was found to be 12.3 per 1000 live births and the leading causes were fetal growth restriction and hypertensive disorders in pregnancy[7]. Bangladesh globally ranks seventh in terms of absolute number of stillbirths, with an estimated 83,000 stillbirths per annum and a stillbirth rate of 25.4 per 1000 births[8]. A population based study revealed the stillbirth rate (SBR) 20.4 per 1000 births and the neonatal mortality rate (NMR) 24.4 per 1000 live births in 2015[9].

In most of low and middle income countries vital registration system is poorly functional and there are challenges in reporting. Under-reporting of vital events is a common problem[10]. Babies who die very soon after birth are less likely to be registered than are older babies who die, and stillbirths are even less likely to be recorded. The distinction between a still birth and an early neonatal death is a delicate one and the causes are likely to overlap and records may be missed[10]. Additionally, live-born babies not breathing might be misclassified as stillbirths and vice versa for several reasons. In home delivery heart beat may not be assessed. Noncrying, nonmoving infant who could have survive after proper resuscitation may be designated as stillbirth. There may be a tendency of non-recording of stillbirth to avoid blame, extra work, or audit review for the birth attendant. Stillbirth may also be deliberately misclassified as live birth if social and maternal benefits are only given to mothers of live birth [2].

Globally 40% of infant mortality and 75% of neonatal mortality are occurring in perinatal period[4] According to health survey data in Bangladesh out of the 28 neonatal deaths per thousand live births, 22 deaths occurred during the early neonatal period[11]. Early neonatal mortality is more related to the neonatal care condition at and after delivery while stillbirth has a broader perspective and linked with the maternal health during pregnancy along with other factors associated at delivery[11].

The association between pregnancy related risk factor for perinatal mortality is less under stood in developing countries like Bangladesh[12]. This current study was done to find out sociodemographic characteristics, obstetric risk factors and delivery related risk factors in woman having still birth and Outcome of babies with delayed cry at birth during early neonatal period (within 7 days of life).

Material and method:

This was a Cross sectional study conducted at Obstetric & neonatal in patient departmentof Institute of Child and Mother Health (ICMH), during February to June 2015. Mothers delivered stillborn baby (Baby born failed to show signs of life at birth) at ICMH and whose babies admitted in neonatal ward referred from labour room of ICMH and outside immediately after birth for breathing problem were enrolled consecutively. Follow up was done till 7 days of life Weight and height of mother was measured. Data was collected by interviewing mothers and reviewing hospital records using structured questionnaire Ethical clearance was obtained from Ethical review board of ICMH. Informed written consent was obtained from mothers. Babies diagnosed intrauterine fetal death (macerated stillbirth)and mothers unwilling to participate were excluded. Data was analyzed by SPSS statistical package version 14.

Result

Atotal 116 mothers enrolled. Majority came from rural areas (83.6%) and 14.7% from periurban areas. More common age group was 20-25 years, adolescent pregnancy was 29.4%. Mean age 23±5.6 years, range 15-50 years only 10.3% mothers were illiterate, (46.6%) and (29.3%) had primary and secondary education respectively (Table-1). Majority of them were primigravida (89.7%). Previous history of abortion or IUD was found in 15.5 and 6.9% respectively. Majority of them (98.3%) had antenatal care in current pregnancy, however only 37.1% had recommended 4 visits or more. Nearly half of them (42.7%) were delivered at term (38 – 41 week) and 40.6% were born between 34-37 weeks (Table-2).

Distribution of weight of mother showed mean weight 60±5.7 kg, 38.8% belong to 56-60 kg weight range(Table-3). Mean height was 154±5.1 cm and about half of them (47.6%) belong to 156-160cm group (Table- 4).

Table-I
Socio demographic characteristics

Residence	Number	Percent
Urban	2	1.7
Periurban	17	14.7
Rural	97	83.6
Age in years		
15-19	34	29.4
20-25	56	48.2
>25 years	26	22.3
Education level		
No Schooling	12	10.3
Primary	54	46.6
Higher secondary and above	16	13.8

Table-II
Distribution according to obstetric characteristics

Characteristics	Number	Percent
Primipara	104	89.7
H/o Abortion	18	15.5
H/o IUD	8	6.9
Took ANC in current pregnancy	114	98.3
ANC >4 times in current pregnancy	73	62.9
Gestation age(weeks) at birth		
28-33 weeks	20	17.2
34.37 weeks	47	40.6
38-41 weeks	49	42.7

Table-III
Distribution according to Weight in Kg of Mother (N=116)

Weight in Kg	Number	Percent
49-50	11	9.4
51-55	10	8.7
56-60	45	38.8
61-65	28	24.1
>65	22	19

Table-IV
Distribution according to Height in cm of Mother (N=116)

Height in cm	Number	Percent
<145	1	0.9
146-150	38	32.8
151-155	17	14.7
156-160	48	47.6
>160	12	10.3

Common obstetric problems were preeclampsia (41.4%), polyhydramnios (13.8%), oligohydramnios (12.9%), UTI (12.1%), less fetal movement (31.9%, eclampsia in 2.6% and placenta Previa in 1.7%. Clinical anaemia was reported in 85.3%, Diabetes (1.7%), and chronic hypertension 2.6%, high fever in 6% and multiple pregnancy in 2.6%. Heart disease and Rhis immunization was found in less than 1% patients (Table 5). Common intrapartum complications showed premature rupture of membrane in 58.6%, 48.3%, had prolong labour, malpresentation in 8.6%, cord round the neck found in 7.8% and cord prolapse 3.4%, liquour was meconium stained in 52.6%.(T able 6). About 69.8%

Table-V
Distribution according to associated pregnancy related and medical problems (N=116)

Characteristics	Number	Percent
Anaemia	99	85.3
Preeclampsia	48	41.4
Less Fetal movement	37	31.9
Polyhydramnios	16	13.8
oligohydromnius	15	12.9
Eclampsia	3	2.6
Multiple pregnancy	3	2.6
Placenta previa	2	1.7
Urinary tract infection	14	12.1
chronic hypertension	3	2.6
Diabetes	2	1.7
Diarrhea	8	6.9
Rh iso immunization	1	0.9
Maternal Heart disease	1	0.9
High fever	7	6

was delivered at hospital. Majority of them 59% were delivered vaginally, instrumental delivery in 17.2% and 24.1% required caesarean section. About 20.7% percent babies were delivered by untrained person and baby was managed by a doctor in 66.4% (Table 7). Distribution of birth weight shows mean birth weight was 2239± 703 gm., range 800-3900 gm. , 14.6% were very low birth weight (<1.5 gm.) and about half 44.8% belong to normal weight (Table-8).

Regarding outcome of baby stillbirth was 25%, delayed cry 73.3%, resuscitation required in 71.6%, admission to neonatal ward 75%, 32% developed septicemia and 32.8% died within 7 days (Table 9). Regarding cause of early neonatal death multiple causes were recorded. Most common was perinatal asphyxia (55.1%), low birth weight with perinatal asphyxia was 35.86%, and Low birth weight with hypoxic ischemic encephalopathy in 36.7% and 18.3 % develop septicaemia (Table 10).

Table-VI
Distribution according to intrapartum complication (N=116)

Characteristics	Number	Percent
Premature rupture of membrane .	68	58.6
Time lapse since membrane rupture		
<12 hours>	7	6
12 hours	61	94
Prolong labour	56	48.3
Meconium stain liquour	61	52.6
Malpresentation	10	8.6
Cord round neck	9	7.8
Cord prolapse	4	3.4

Table-VII
Distribution according to intrapartum care to mother and baby (N=116)

Characteristics	Number	Percent
Mode of Delivery		
NVD	68	58.6
Assisted VD	20	17.2
LUCS	28	24.1
Place of Delivery		
Home	35	30.2
Hospital	81	69.8
Person provide intrapartum care		
Doctor	52	44.8
Nurse	25	21.6
FWV/CSBA	15	12.9
Untrained person	24	20.6
Person managed baby at birth		
Doctor	77	66.4
Nurse	22	19.0
FWV/CSBA	3	2.6
Untrained person	14	12.0

Table-VIII
Distribution according to birth weight (N=116)

Birth weight	Number	Percent
Low (1.5 – 2.4)	47	40.5
Very low <1.5gm)	17	14.6
Normal weight	55	44.8

Table-IX
Distribution according to outcome of baby at birth and within 7 days of age (N=116)

Characteristics	Number	Percent
Still birth	29	25
Apgar score at 1 mm <3	48	41.4
Delayed cry	85	73.3
Congenital abnormality	8	6.9
Resuscitation required	83	71.6
Admission to neonatal unit	87	75
Neonatal sepsis	37	31.9
Death within 7 days	38	32.8

Table-X
Distribution according to cause of death (N=38)[*]

Cause of death	Number	Percent
Hypoxic ischemic encephalopalthy (HIE)	15	17.2
Low birth weight with HIE	4	4.5
Perinatal asphyxia (PNA)	48	55.17
Low birth weight	8	9.1
IUGR with PNA	3	3.4
Meconium aspiration syndrome	4	4.5
Low birth weight with PNA	31	35.6
Septicemia	16	18.3
PNA & HIE	32	36.7

*Multiple response

Discussion:

Decision-making for obstetric and neonatal health programs depends on identification of obstetric and fetal risk factors that are threats to newborn survival. In some study maternal age distribution shows a U shaped distribution with a slight increase in younger <25 years and older > 35 years[13]. Study from Taiwan reported an increased risk of stillbirths in both older (>40 years) and younger mothers (<20 years)[14]. In the current study teen age pregnancy was 29.4% and majority mothers were <25 years and very few mothers belong to more than 35 years. This may be a reflection of the fact that in our country early childbearing is a norm and most of them complete family before reaching 30 years[11].

Newborns with less educated mothers are 2.3 times more likely to die compared to those born to mothers with higher education consistent with current study[15]. In this study majority were primipara which is consistent with analysis of Bangladesh demographic and health survey data that revealed stillbirth rates are higher in rural areas, and low maternal education, poor household, and having one child (primiparity) are significant predictors of stillbirth in Bangladesh[11].

It is speculated that the major causes for stillbirths are complications during child birth, post-term pregnancy, maternal infections, maternal medical disorders, fetal growth restriction and fetal congenital abnormalities [13]. In the current study preeclampsia was common but placental or cord complication was very few. Prolong labour and premature rupture of membrane were common which is consistent with other studies, Birth asphyxia was found in about half of the infants and one quarter of them were stillborn. In a population based study presence of congenital anomaly, abruption and cord complication were associated with antepartum stiilbirth[16]. In a study from rural Bangladesh perinatal mortality risks were found to be elevated for women having hypertension during pregnancy, or experience antepartum haemorrhage[12]. A retrospective analysis of hospital records of obstetric inpatients between January 2001 to December 2005 having a diagnosis of stillbirth or IUD in a tertiary hospital of Bangladesh shows the prevalence was 2.7%., 54.29% were fresh stillbirth 29.19% macerated stillbirth . About 34% were preterm. severe Preeclampsia and eclampsia 14.6%, less fetal movement/Fetal distress 6.8%, prolonged labour 2.2%, rupture uterus 2.02%, cord prolapse 1.5%, premature rupture membrane 4.2%, congenital malformation (anencephaly, hydrocephalous) 1% diabetes 1.5% and no diagnosis was mentioned in 29.2% cases[17].

Gardosi et al found Preeclampsia and antepartum haemorrhage were strongly associated with stillbirth whereas gestational diabetes was not[13]. In a multi country study spontaneous preterm delivery and hypertensive disorders were the most common obstetric event leading to perinatal deaths (28.7 % and 23.6 % respectively) and prematurity was the main cause of early neonatal death 62% [18.] Among preexisting conditions diabetes is a known risk factor[19]. However, this was less common in current study. This may be due to low prevalence of diabetes among study population or missed to diagnose due to lack of resources to screen for diabetes during pregnancy.

In some study pre-pregnancy weight greater than 68 Kg, birth weight ratio (defined as ratio of birth weight to mean weight for gestational age) between 0.75 and 0.85, fewer than four antenatal visits prematurity, parity of three of more were found associated with unexplained fetal death. However, low maternal weight, postdate pregnancy, fetal to placental weight ratio, previous fetal death, abortion, cigarette smoking alcohol use were not significantly associated with unexplained fetal death[20]. Incurrent study post pregnancy body mass index (BMI) was calculated, and weight and height distribution shows adequate nutritional status.

Maternal smoking in early pregnancy is associated with stillbirth with an average risk of 1.36[21]. The increased risk of smoking works mostly through fetal growth restriction[22]. Passive or environmental smoking also found to be 30% increase in risk of still birth [23]. A recent meta-analysis shows the effect of smoking is more pronounced if associated with intrauterine growth retardation[23].

Fetal growth restriction is an important risk factor for stillbirth and it appears that there was a fivefold greater risk if growth restriction was not detected antenatally [13]. Many stillborn fetuses fail to reach their growth potential [24]. Placental disease related causes may contribute to growth restriction[25]. Compared with pregnancies with normal growth, the stillbirth rate in those with fetal growth restriction increased fourfold, and increased further to eightfold

if growth restriction was not detected antenataly[13]. If growth restriction can be detected early measures can be taken for well-timed delivery thus preventing stillbirth. In our context investigation facilities are limited and there remain gaps in identifying intrauterine growth retardation (IUGR) and its effect on stillbirth. Intrapartum-related hypoxia is the cause of stillbirth in 20.5% of stillbirth cases and half of global stillbirths occur at intrapartum period [26]

Number of antenatal visit does not predict intranatal outcome that is consistent with present study. Although majority of them avail antenatal care it appears that full potential of antenatal surveillance was not employed as obstetric risk factors like IUGR, placental insufficiency was not monitored adequately. Professional skilled care at birth in combination with antenatal care has an enormous potential for reducing the burdens of stillbirth and early neonatal deaths. In Bangladesh efforts has been undertaken to ensure better coverage of newborn care and skilled attendants at delivery promoting institutional delivery, However, in this study even in the hospital some deliveries were not attended by doctors or nurses and labour process was not monitored adequately. In neonatal ward also there was limited resources for diagnosis and care of sick neonates. Hospital records are usually poorly maintained. This indicates gaps in quality of care or a reflection of inadequate intrapartum management of babies.

Intrapartum stillbirths in developing countries may represent inadequate access to essential obstetric care and inadequate care[27]. If the babies at risk of asphyxia or infection not detected during intrauterine life and seek care late there is little opportunity to overcome the negative consequences. Evidence shows moving the deliveries from home or lower level clinics to a hospital does not substantially improve the outcome especially where the quality of hospital care is poor[27]

Bangladesh has made significant improvements in different health indicators and achieved success in millennium development goal and perinatal mortality has declined[15]. In a recent study showed the perinatal mortality significantly reduced from 64 (95% CI: 57–73) to 41 (95% CI: 35–48) per 1000 pregnancies between 2004 and 2014 with stillbirths from 34 to 19 and early neonatal deaths from 30 to 22)[28]. .However, still the rate remain major contributor for South Asia[3]. To achieve UN declared Sustainable Development goal (SDG) 3.2 of reducing neonatal mortality rate to 12 deaths per 1,000 live births and ending preventable stillbirths by 2030 the issue of stillbirth and neonatal death should be addressed as a priority concern.

Conclusion

Still birth and early neonatal death has overlapping pregnancy and child birth related risk factors which can be prevented through proper monitoring. Anaemia , premature rupture of membranes, preeclampsia were common obstetric risk factors of stillbirth and perinatal asphyxia and septicaemia were common cause of early neonatal death. It is recommended to put emphasis on antenatal detection of oxygen deprivation of fetus, proper labour management and newborn care. A regular maternal and neonatal death audit involving both obstetrician and neonatologist and support staff has the scope to improve quality of care and reduction of stillbirth and early neonatal deaths. A concerted effort to deal with different parameters relating to poverty, education, equity, quality of life is recommended.

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