



Detection of the Foetal and Neonatal Factors Associated with Perinatal Mortality

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Abstract

Introduction: A perinatal death is a fetal death (stillbirth) or an early neonatal death. Mortality rates in the perinatal period are used to evaluate the outcome of pregnancy and monitor the quality of perinatal (prenatal and neonatal) care. The perinatal mortality rate encompasses late fetal and early neonatal mortality.

Methodology: This cross-sectional investigation was completed in the Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chittagong over a period of 6 months to watch the extent of perinatal mortality in a tertiary healing facility and the elements impacting this demise. Still-birth children and neonates' death in first 7 day of delivery were the study population. Perinatal passing with birth weight underneath 1 kg, known gestational age beneath 28 weeks and intrauterine fetal demise (IUD) with maceration were prohibited from the investigation. A sum of 100 subjects meeting the above qualification criteria were continuously incorporated into the study. Illustrative measurements were utilized to break down the information.

Results: The findings derived from data analysis showed that the mean age of the mothers was 25.2 ± 5.1 years and the lowest and highest ages were 20 and 40 years respectively. Anemia was observed to be the most significant risk factors (90%). Physiological anemia is common in pregnancy due to haemodilution which has been evident as mild anemia in our study (72%). Then follows obstructed labor (36%), oedema (35%), hypertension (20%), preeclampsia/ eclampsia (13%), choriamnionitis (11%), abruption placentae (7%), postdated pregnancy (6%), per vaginal bleeding (5%), PROM (5%), placenta previa (3%), gestational diabetes (2%) and multiple pregnancy (2%). In terms of foetal and neonatal abnormality 28% had birth asphyxia, 40% had low birth weight, 6% IUGR and 2% congenital anomaly. 70% of the mothers had mild anemia, 8% moderate anemia, 16% severe anemia and 60% of the mothers did not have any oedema. Of the rest, 24% had mild oedema, 6% moderate oedema and 10% severe oedema. 26% of the mother had systolic blood pressure > 140 mm Hg and 18% had diastolic blood pressure > 90 mm Hg. Type of perinatal death demonstrates that 68% of patients had still birth and 32% early neonatal death.

Conclusion: Death of babies due to birth asphyxia reflects the poor status of perinatal care, while low birth weight reflects the poor nutritional status of mothers during pregnancy. In Bangladesh, particularly in rural areas, the nature and quality of labor, delivery and post-partum practices remain relatively undocumented. Thus obstetric causes of perinatal death in rural community warrant further research.

Keywords: Perinatal mortality, foetal and neonatal factors, labor, anemia, odema, stillbirth, gestational age.

Introduction

Perinatal mortality is, maybe, the most delicate pointers of both the norms of medicinal consideration and adequacy of social and general wellbeing measures. Perinatal mortality (PNM), also perinatal death, refers to the death of a fetus or neonate and is the basis to calculate the perinatal mortality rate. The World Health Organization (WHO) defines perinatal mortality as the number of stillbirths (SB) and deaths in the first week (FWD) of life per 1,000 total births, the perinatal period commences at 28 completed weeks of gestation, and ends seven completed days after birth. However, WHO's definition is not generally acknowledged. The perinatal mortality is the sum of the fetal mortality and the early neonatal mortality.^[1] In developed countries, the PNMR has fallen to 10-20 per thousand total births as compared to an alarmingly high rate of 60-120/1000 total births in developing countries.^[2] High risk pregnancies have higher PNMR and comprise the majority of perinatal death.^[3]

Background

Death rates among under-5-year-old kids in creating nations have diminished generously in the course of recent years, yet perinatal mortality has not pursued a similar example and keeps on displaying a tremendous weight. In 1995, WHO assessed the quantity of perinatal passing worldwide to be more prominent than 7.6 million, with 98% of these deaths happening in developing nations. In Africa, perinatal death rates as high as 75 for every 1000 births have been accounted for; estimates for Asia are in the range 36– 74 for each 1000 births.^[4]

Poor maternal health, adverse social conditions, and inadequate care during pregnancy, delivery, and the immediate postpartum period are the few reasons behind perinatal deaths.^[5] Techniques to enhance perinatal health include prevention and treatment of pregnancy complications such as infections (particularly syphilis) and hypertension, adequate nutrition during pregnancy, improved care at delivery, and better care of neonates.

Ensuring that all deliveries are supervised by a trained attendant has now turned into the foundation of safe parenthood programs.^[6]

Difficulties during labor have been known to expand the danger of perinatal death. During the 1960s in Norway, for instance, perinatal death rates after uterine burst and placenta praevia were 216 and 99 for each 1000/live-births.^[7] In a doctor's facility based case– control study in Saudi Arabia, entanglements during childbirth expanded the danger of perinatal passing fivefold.^[8] Although perinatal deaths related with dystocia are presently generally uncommon in industrialized nations, they are as yet considerable in many developed countries. In Guatemala, up to 87% of babies have been reported to have died during deliveries complicated by abnormal fetal position. In India, breech delivery represented 19% and 12% of stillbirths and neonatal deaths, individually, and birth asphyxia prompted 41% of early neonatal deaths. Only a few population-based studies of perinatal mortality in developing countries have considered intrapartum risk factors. Most specialists have analyzed the place or type of delivery as opposed to the confusions encountered.

Rationale

Worldwide nearly 4 million newborns die within the 1st week of life and another 3 million are born dead. The perinatal death rate definitely reflects both the guidelines of restorative consideration and viability of social and public health measures. Perinatal passing could be diminished by in any event half if key intercessions are connected for the infant. The real medical issue in the creating locales exudes from the synergistic impact of malnutrition, infection and unregulated fertility combined with poor obstetric care. The present investigation planned to assess the degree of perinatal mortality in a tertiary consideration doctor's facility and the variables related with perinatal mortality. Since deliveries complicated by maternal pathology may be partly associated with preterm labor and with complications during

pregnancy, we have separated the effects of complications during childbirth and during early neonatal period from those detected during antenatal period.

Review of Literature

Bangladesh is experiencing a very high perinatal mortality. Few community-level studies have been conducted in this regard to assess the influence of underlying maternal health factors on perinatal outcomes.

Specialists revealed the danger of perinatal mortality was as high as 2.7 times, more probable for ladies with hypertensive issue, 5 times as high for ladies who had antepartum discharge and 2.6 times as high for ladies who had higher hemoglobin levels in pregnancy when contrasted and their partners. The potential frustrating factors, for example, poor obstetric history, sociodemographic attributes and preterm delivery impacted just possibly the net impact of critical maternal health factors related with perinatal mortality.^[9]

About 7 million perinatal deaths (stillbirths and deaths in the first week of life) occur annually in the world, mostly in developing countries which's rates as high as 75 to 100 deaths per 1000 births have been documented.^[10] Complications of pre-term birth, birth asphyxia/birth trauma and bacterial infections which are responsible for 3.3 million of the total seven million perinatal deaths. The other causes of perinatal death are largely unknown due to difficulties in documenting stillbirths in the developing world.

Perinatal mortality has been characterized as a central zone in epidemiological sectors and related fields, as perinatal mortality has been utilized for universal correlations as a pointer of national health and social development.^[11] The rate of infant mortality diminishes on the world, because the United Nations and different associations have been effectively required to reducing newborn child mortality.^[12] 98% of perinatal mortality occurs in developing countries.^[13] Mother's age, complications during labor and pregnancy, low

birth weight, little for gestational age and absence of supervision during delivery are the basic hazard factors identified with perinatal demise in Bangladesh.

Maternal Risk Factors in Relation to Perinatal Deaths (n = 275)

| Risk factors | Number | Percentage |
|-------------------------|--------|------------|
| Pre-eclampsia/Eclampsia | 91 | 33.1 |
| Ante-partum hemorrhage | 37 | 13.5 |
| Bad Obstetric history | 34 | 12.4 |
| Severe anemia | 28 | 10.2 |
| Hypertension | 21 | 7.6 |
| Others | 64 | 23.3 |

A few maternal hazard factors have been noted by various authors to be associated with expanded perinatal mortality. In many examinations pre-eclampsia/eclampsia was the absolute most vital (33.1%) maternal hazard factor while another study from Karachi demonstrated that the APH was the most vital maternal hazard factor for perinatal mortality. Bad obstetric history such as previous still birth, abortion and obstructed labor stood out as the important contributory factors according to other studies.

Objectives

General objective

To observe the extent of perinatal mortality in a tertiary hospital and the factors associated with it.

Specific objective

- To determine the antenatal factors related with the perinatal death.
- To find the maternal factors associated with perinatal mortality.
- To observe the foetal and neonatal factors associated with perinatal mortality.

Clinical implications: Data generated from the study would be helpful for the identification of the maternal problems associated with perinatal mortality and help planning intervention for the reduction of perinatal mortality rate in our country.

Materials and Methods

Study design: A cross-sectional design was considered suitable for the study.

Place of Study: This study had taken place in the Department of Obstetrics & Gynecology, Chittagong Medical College Hospital, Chittagong

Period of Study: 6 months, from March 2016 to August 2016

Study population: The study population were still-born babies and neonates died within first week of delivery.

Inclusion criteria: Patients with following characteristics were eligible to be included study

- Fresh still born babies
- babies died within 7 days after delivery where birth weight was 1 kg or above.

Exclusion criteria: Patients with following characteristics were excluded from the study

- Birth weight below 1 kg
- Known gestational age below 28 weeks
- Intrauterine foetal death (IUD) with maceration

Sample size: The sample size was determined using following formula,

$$n = (Z^2 \times p \times q) / d^2$$

where, Z = Standard normal deviate = 1.96 corresponding to 95% of CI

p = Anticipated proportion, taken as 50%, i.e., 0.5

q = (1-p) = 0.5, and

d = allowable error (here 10% of 'p') = 0.05

Therefore, the required sample size, $n = (1.96^2 \times 0.5 \times 0.5) / (0.05)^2 = 384$.

Due time limitation only 100 cases were consecutively included in the study.

Sampling procedure: The required number of patients admitted in the hospital was consecutively included in the study.

Variables studied: The variables included in the study were age and sex.

- Maternal demographic and anthropometric variables studied were age, socioeconomic condition, work-load during pregnancy.
- Obstetric factors studied were parity, ANC and gestational age. Clinical variables

included were mode of presentation, foetal presentation and lie.

- Risk factors studied were anemia, hypertension, edema, diabetes, fever, prolonged labor, per vaginal bleeding, rupture uterus, cord prolapse, shock, convulsion. PROM, postdated pregnancy etc. (appendix-II).

Operational definitions: To avoid bias in data collection certain variables/terms were undertaken.

- **Fresh still-birth:** Death of baby during the process of labor
- **Early neonatal death:** Death of baby within 1st 7 days of birth
- **IUD:** Antepartum foetal death after 28 weeks of gestation but before the process of labor

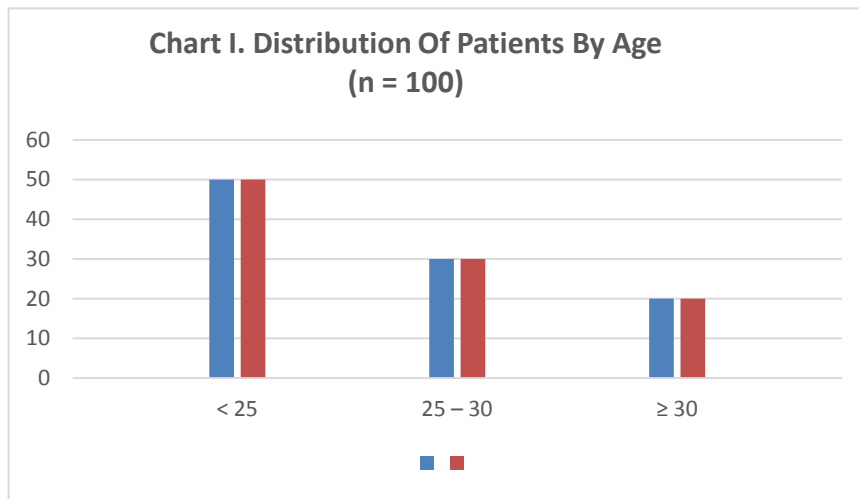
Institutional approval: Prior approval was sought from Ethical Review Committee, Chittagong Medical College Hospital, Chittagong to carry out this study.

Addressing ethical issues: According to Helsinki Declaration for Medical Research Involving Human Subjects 1964, mothers and the relatives of the study subjects were informed verbally by local language about the study design, the purpose of the study and how the study would be beneficial for the community, procedures, diagnostic methods, risks. Mothers who gave informed consent to participate in the study were included as study sample.

Data collection: A structured questionnaire was developed which contained all the variables of interest and was finalized following pretesting. Data were collected by interview, observation and clinical examination.

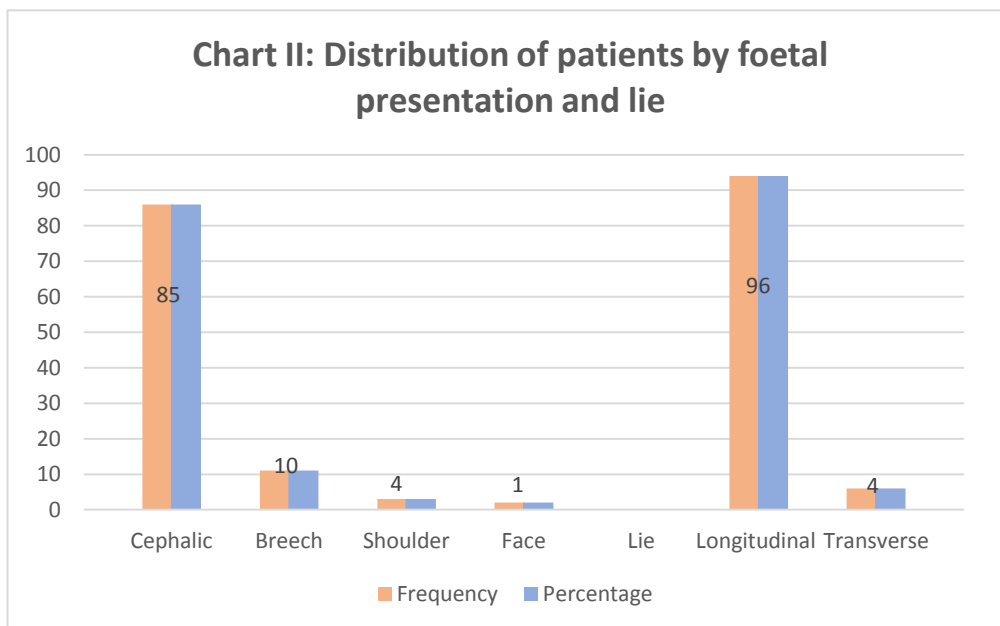
Data processing and Statistical analysis: Data were processed and analyzed using SPSS (Statistical Package for Social Sciences). Descriptive statistics like frequency and its corresponding percentage, SD, range were used to analyze the data.

Results



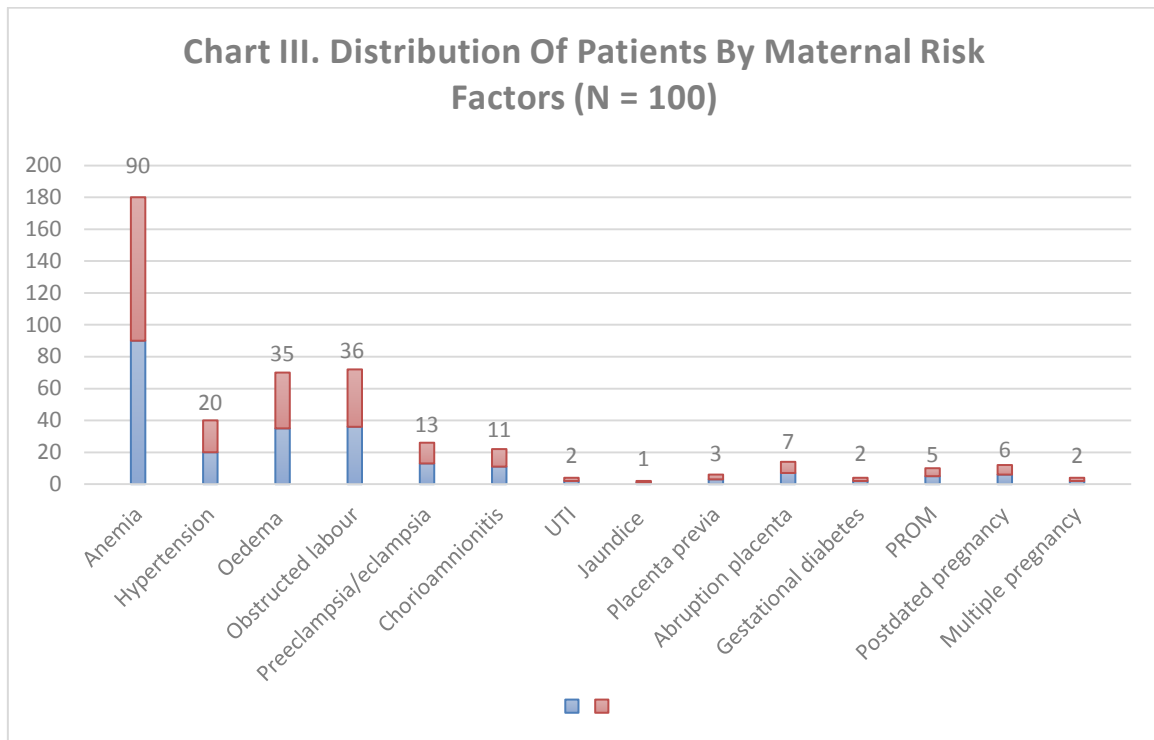
Age distribution: Chart I shows the age distribution of the patients. Half of the patients was below 25 years of age, 30% in the range of 25 – 30 years and the remaining 20% 30 or more than

30 years. The mean age of the patients was 25.2 ± 5.1 years and the lowest and highest ages were 20 and 40 years respectively.



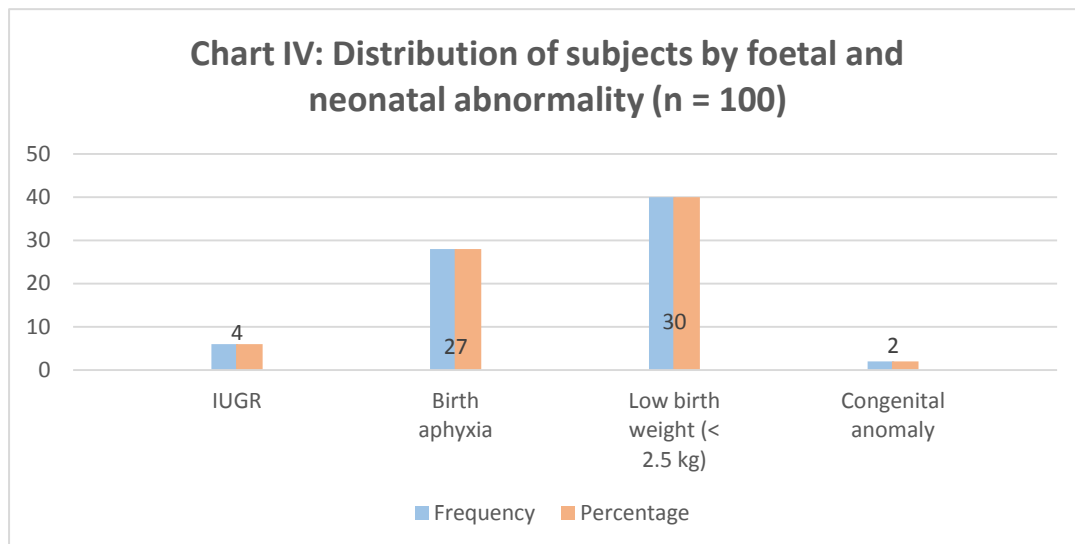
Foetal presentation and lie: Chart II shows foetal presentation and lie shows that majority (85%) of the foetus exhibited cephalic presentation followed by breech presentation

(10%), shoulder (4%) and face (1%). In terms of lie majority (96%) had longitudinal lie and only 4% transverse lie.



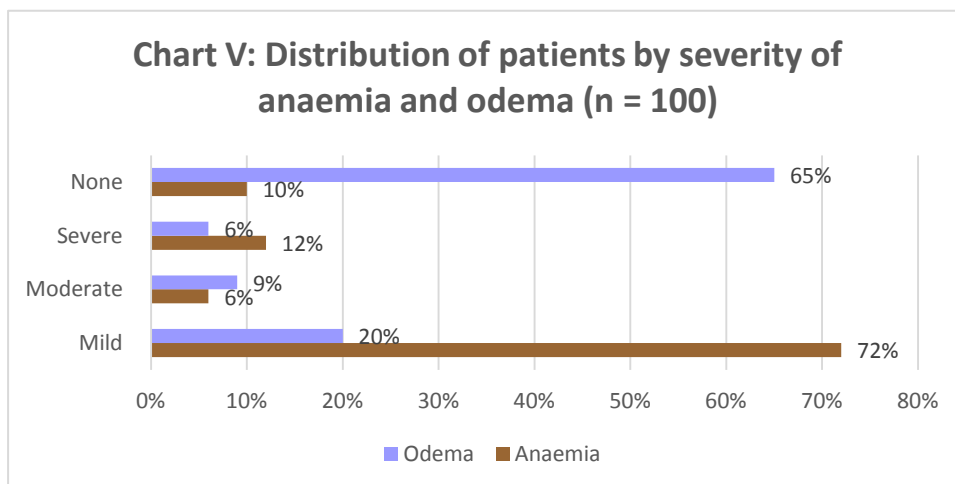
Maternal risk factors: Chart III shows, physical examination 90% of the mothers was found anemic, 20% hypertensive, 36% had obstructed labor, 35% had oedema, 13% preeclampsia/

eclampsia, 11% choriamnionitis, 7% abruption placenta, 5% PROM, 3% placenta previa, 2% gestational diabetes 6% postdated pregnancy and 2% multiple pregnancy.



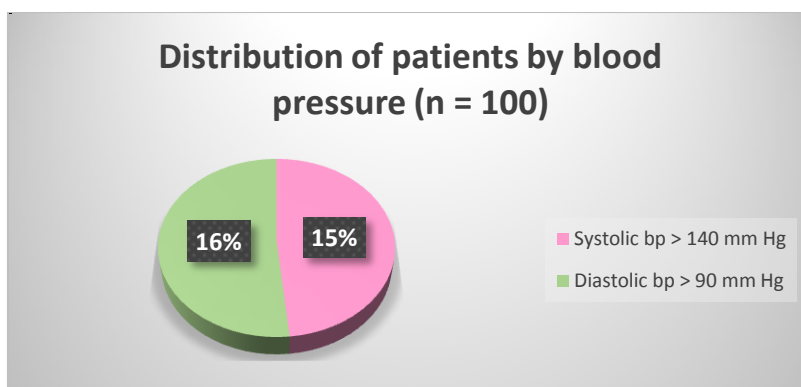
Foetal and neonatal abnormality: In terms of foetal and neonatal abnormality 27% had birth

asphyxia, 30% had low birth weight, 4% IUGR and 2% congenital anomaly.



Grade of Anemia and Oedema: Chart V illustrates that 72% of the mothers had mild anemia, 6% moderate anemia, 12% severe anemia

and 65% of the mothers did not have any oedema. Of the rest, 20% had mild oedema, 9% moderate oedema and 6% severe oedema.



Blood pressure: This figure shows that 15% of the mother had systolic blood pressure > 140 mm

Hg and 16% had diastolic blood pressure > 90 mm Hg.

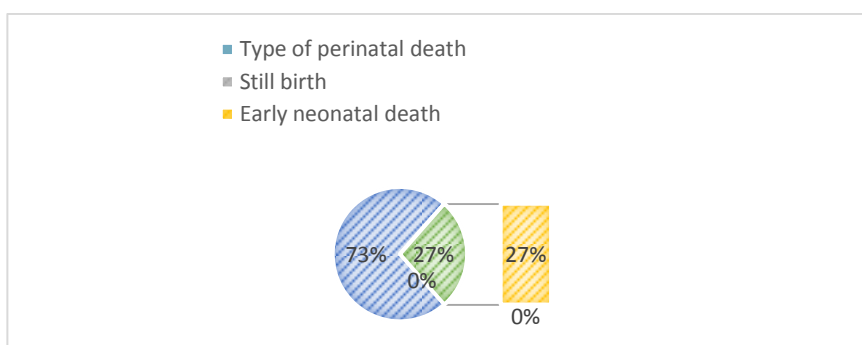


Figure: Distribution of patients by type of perinatal death

Type of perinatal death demonstrates that 73% of patients had still birth and 27% early neonatal death.

Discussion

The findings derived from data analysis showed that the mean age of the mothers was 25.2 ± 5.1 years and the lowest and highest ages were 20 and

40 years respectively. Anemia was observed to be the most significant risk factors (90%).

Physiological anemia is common in pregnancy due to haemodilution which has been evident as

mild anemia in our study (72%). But moderate to severe anemia indicate actual deficiency of iron and folic acid which could be corrected by iron and folic acid supplementation during antenatal period. Almost two thirds of mothers (60%) reported that they had not taken any iron tablets and a sizable portion of them (26%) also informed that they did know that they need iron during pregnancy. These findings suggest that there is scope of intervention to reduce the knowledge gap and supplementation of iron and folic acid. Then follows obstructed labor (36%), oedema (35%), hypertension (20%), preeclampsia/eclampsia (13%), choriamnionitis (11%), abruption placentae (7%), postdated pregnancy (6%), per vaginal bleeding (5%), PROM (5%), placenta previa (3%), gestational diabetes (2%) and multiple pregnancy (2%). Mirsa and Fiayder in separate studies,^[14] noted pre-eclampsia/eclampsia as the single most important maternal risk factor while another study from Karachi showed that the APH was the most important maternal risk factor for perinatal mortality. Delia reported that the independent risk factors for perinatal mortality was UTI which contrasts with findings of our study. In terms of foetal and neonatal abnormality 28% had birth asphyxia, 40% had low birth weight, 6% IUGR and 2% congenital anomaly. 70% of the mothers had mild anemia, 8% moderate anemia, 16% severe anemia and 60% of the mothers did not have any oedema. Of the rest, 24% had mild oedema, 6% moderate oedema and 10% severe oedema. 26% of the mother had systolic blood pressure > 140 mm Hg and 18% had diastolic blood pressure > 90 mm Hg. Type of perinatal death demonstrates that 68% of patients had still birth and 32% early neonatal death. Death of babies due to birth asphyxia reflects the poor status of perinatal care, while low birth weight reflects the poor nutritional status of mothers during pregnancy. Both are preventable if perinatal health care service is improved and measures are taken to improve mothers' nutritional status.

In Bangladesh, particularly in rural areas, the nature and quality of labor, delivery and post-partum practices remain relatively undocumented. Thus obstetric causes of perinatal death in rural community warrant further research.

Conclusion

Perinatal mortality is a delicate marker of a nation's wellbeing and financial status. Despite the fact that WHO and numerous nations have given prime significance to decrease perinatal mortality, the issue has not yet been tended to appropriately in Bangladesh. Primary reasons of poor perinatal result are absence of antenatal consideration which, among others, ought to incorporate supplementation of iron and folic acid. Poor perinatal consideration administrations are another determinants of perinatal mortality which merits need in the maternal and neonatal human services program. As the discoveries of the examination were contrasted and those of different investigations led the world over, broadly dissimilar components were distinguished as the determinates of perinatal death. The study, in this manner, suggests that a huge scale case-control concentrate to be directed in Bangladesh and dependent on the discoveries of the examination a rule to be detailed to give perinatal consideration in our country.

References

1. Richardus JH, Graafmans WC, Verloove-Vanhorick SP, Mackenbach JP. The perinatal mortality rate as an indicator of quality of care in international comparisons. *Med Care*. 1998 Jan;36(1):54-66.
2. Singh M, Deorari AK, Khajuria RC; paul VK. Perinatal and neonatal mortality in a hospital. *Indian J Med Res* 1991; 13:1-5.
3. Misra PK et al. Perinatal mortality in rural India with special reference to high-risk pregnancies. *Journal of Tropical Pediatrics*, 1993, 39: 41-44.
4. Perinatal mortality: a listing of available information. Geneva, World Health

- Organization, 1996 (unpublished document).
5. Mother–baby package: implementing safe motherhood in countries. Geneva, World Health Organization, 1994 (unpublished document).
 6. Ceesay SM. Effects on birth weight and perinatal mortality of maternal dietary supplements in rural Gambia: 5-year randomised controlled trial. *British Medical Journal*, 1997;315:786–90.
 7. Bakketeig LS, Hoffman HJ, Oakley ART. Perinatal mortality. In: Bracken M, ed. *Perinatal epidemiology*. Oxford, Oxford University Press, 1984: 99–151.
 8. Milaat WA, Du V Florey C. Perinatal mortality in Jeddah, Saudi Arabia. *International Journal of Epidemiology*, 1992, 21: 82–90.
 9. Mamun AA, Padmadas SS and Khatun M. Maternal health during pregnancy and perinatal mortality in Bangladesh: evidence from a large-scale community-based clinical trial. *Padiatrics and Perinatal Epidemiology* 2006;20(6),482-90.
 10. Rao RSS and SG Inbaraj. Extent of perinatal loss in South Indian urban and rural populations. *Indian Paediatr* 1995; 12:221-7.
 11. Glinianaia, S.V., J. Rankin, R. Bell, M.S. Pearce and L. Parker, 2005. Temporal changes in the distribution of population risk factors attenuate the reduction in perinatal mortality. *J. Clin.Epid.*, 58(12): 1299-1307;
 12. Nault, F., 1997. Infant mortality and low birthweight, 1975 to 1995. *Heal. Rep.*, 9 (3): 39-46.
 13. Kusiako TC, Ronsmans and Paal LVD. Perinatal mortality attributable to complications of childbirth in Matlab, Bangladesh. *Bul. Wor Heal Organ* 2000;78(5):621-627.
 14. Fiayder A. Perinatal mortality in a district general hospital in upper East regions, Ghana. *Trop Doctor* 1992; 22: 82.