Original Article

Perinatal outcome in 'high risk' and 'normal term' pregnancies: A hospital based case control study

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Abstract

Objective: Assessing the morbidity, mortality pattern and co-relations between neonatal survival and different interventions in high risk pregnancies. **Design:** Case control study. **Setting:** Department of Paediatrics, Neonatology unit and Maternity ward tertiary care centre. **Method:** A 150 cases [pregnant mother with one or more medical and/or obstetrics risk factors] and 300 controls [Normal term pregnant mother] were randomly selected as study subject over a period of one year. The events were witnessed and assessed for acute life threatening events in neonates such as birth asphyxia, respiratory distress, hypothermia, hypoglycemia, neonatal convulsion, septicemia and cyanosis. Eligible neonates were received interventions in form of oxygen, bag and mask ventilation, intubation, glucose, warmth, antibiotics, phototherapy and anticonvulsant. Still birth and early neonatal death were considered as perinatal deaths**.** **Results:** Perinatal mortality rate was 54 per 1000 live births in case group whiles none in control group. A 29.25% babies develops acute life threatening events in case group as compared to 1.67% in control group [OR (23.71), 95%CI (9.01-78.13), P<0.00001]. Prematurity, low birth weight and birth asphyxia were the main causes of mortality. **Conclusion:** The study concludes the strategy to reduce perinatal deaths must be aimed at reducing still birth, incidence of low birth weight and premature babies by providing optimum antepartum and intrapartum care to high risk mothers and timely interventions for acute life threatening events.

Keywords: Acute Life Threatening Events, Early neonatal mortality, low birth weight, perinatal mortality rate, still birth rate

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INTRODUCTION

Perinatal period accounts for just 0.5% of the average life span, but deaths in this period are more than that in the next 30-40 years[1]. Perinatal mortality statistics despite inherent limitation, provide an important form of audit, to help us evaluate the efficacy of our obstetrics and neonatal services and to make a necessary change of an area in developing countries. A number of biological and social factors during pregnancy influence the perinatal mortality. Although only 10-30% of the mothers seen in antenatal period can be classified as high risk, they account for 70-80% of the perinatal mortality and morbidity[2] and so timely obstetrics and the special intervention definitely improve the outcome. In order to maximize effective and efficient use of constrained resources in the developing world, World Health Organisation has proposed the 'Risk Strategy or approach', a management tool that seek to pay special attention to those who are at risk[3]. Hence this study was carried out for assessing the morbidity, mortality pattern and correlation between neonatal survival and different intervention in high risk pregnancies.

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MATERIAL AND METHODS

A hospital based case control study was carried out in the Government Medical College, Nagpur, in department of pediatrics, neonatology unit and maternity ward, one of the largest tertiary care and referral hospital that provide care to underprivileged, socioeconomically deprived population of central India. The study population comprised of 150 cases (Pregnant mother with one or more medical and/or obstetric risk factor) and 300 controls (Normal term pregnant mother) over a period of one year. Sample size was estimated assuming prevalence of high risk pregnancy 10% with power of 75% and alpha error of 5% (both side). The cases and controls were matched with age, residence, parity, availability of health facility and socioeconomic condition. Selection criteria of cases include one or more medical and/or obstetric risk. Following risk factors were considered and include in study as cases as per WHO 'Risk strategy'.

1. Short stature (140cmandbelow)
2. Elderly primi (first pregnancy at or above 30 yrs),
3. Malpresentations
4. Antepartum hemmorage, threatened abortion,
5. Pre eclempsia, eclempsia,
6. Anemia (Hb<8gm %), 7) Twins, Hydroamnios,
7. Previous still birth, intrauterine death, manual removal of placenta,
8. Prolonged pregnancy (>14 days after expected date of delivery),
9. History of previous caesarean section or instrumental delivery,
10. Elderly grand multipara (previous four or more viable birth),
11. Pregnancy associated with kidney disease, tuberculosis, Liver disease, Epileptic mother, Sickle cell hemoglobinopathy,
12. Adolescence pregnancy

Controls were defined as those full term mothers admitted for delivery without any of above mentioned risk factors. After approval from institutional ethical committee, a pretested, semi structural questionnaire was used comprising of detailed information related to personal biodata, obstetric history, complaints of present pregnancy, available health care facility, general, systemic and obstetric examination and results of investigation which was then used to classify the study subjects as cases and controls. Newborn babies were examined within 24 hours of birth and were followed for 7 days of life. Morbidity and mortality in the newborn were noted after complete examination of baby during follow up. Mortality was taken in term of still birth and early neonatal death. The diagnosis of neonatal illness and neonatal deaths were ascertained. National Neonatology Forum classification was utilized in determining acute life threatening events which were like birth asphyxia, respiratory distress, hypothermia, hypoglycemia, birth trauma, cyanosis, neonatal convulsion and hyperbilirubinemia. Neonates recognized with Acute Life Threatening Events were received interventions like mechanical ventilation, oxygen supplementation, warmth, Intravenous dextrose, anticonvulsant, Phototherapy and antibiotics. Clinical improvement was assessed just after birth, 24 hrs after birth and at 7 days to rule out any congenital malformation or complication during early neonatal period. All live babies were followed up to 7 days and then discharged. Statistical analyses were done in terms of proportions, Odd's ratios, attributable risk and chi square /p value.

RESULTS

Perinatal mortality rate was 54 per 1000 live birth among cases including three babies who were still born (still birth rate 20 per 1000 total births) while none in control group. Among control 1.67% newborn babies and 29.25% among cases received interventations. Thus number of babies receiving interventations are far excess in cases as compared to controls [OR (23.71), 95%CI (9.01-78.13), p<0.00001].

Table 1: Overview of Perinatal Mortality and morbidity

Outcome	Cases	control	
Perinatal mortality rate	54	0	
Still birth rate	20	0	
Early neonatal mortality rate	34	0	
Intervention received	43 (29.25%)	5 (1.67%)	P<0.00001

A 75% perinatal mortality was in babies whose mother were exposed to risk factor for more than 6 months and 64.11% babies were received intervention in same exposure group compared to 25% perinatal mortality and 34.89% were received intervention whose mother exposed to risk factor less than 6months.

Table 2: Correlation between Duration of exposure of risk factor and perinatal outcome

Duration of risk factor	Morbidity(n=43)	Mortality (n=08)
Less than 6 months	15(34.89%)	2 (25%)
More than 6months	28 (64.11%)	6 (75%)

Further analyzing and scrutinizing the causes of deaths in cases and controls, it was observed that three babies were still born; all were fresh still born and from high risk group; one of them was product of multifoetal gestation, one was born of eclamptic mother and one was born to mother with history of previous still birth. All the three mothers of still born babies were unbooked and

intermittently receiving care from primary health care and referred to tertiary hospital in labour. Most of these babies were premature and very low birth weight. Five babies died in early neonatal period (early neonatal mortality 34 per 1000 live births); two of them were born to mother with antepartum haemorrhage, each was born of elderly mother with history of threatened abortion and previous intrauterine death and one was born to mother with heart disease. All the five early neonatal death were in preterm; among them 2 were extremely low birth weight and died because of respiratory distress, 2 were low birth weight and died because of birth asphyxia and respiratory distress and one was average birth weight died due to septicemia in spite of appropriate interventions. Amongst early neonatal deaths 90% mothers were unbooked and received improper care from primary health care.

Table 3: Overview of birth weight of babies

Birth weight	Cases (n=150)	Control(n=300)
Average weight	61 (40.67%)	255 (85%)
Low Birth weight	67 (44.67%)	44 (14.67%)
Very Low Birth weight	18 (12%)	01 (0.33%)

Three babies were extremely low birth weight and one baby of diabetic mother was above average birth weight in case group whiles none in control group. In case group 30.67% pre term, 68.67% term and 0.66% babies were post term while all control group babies were full term. Amongst the various Acute Life Threatening Events (ALTEs) majority Of neonates (22) in cases and 3 in control developed respiratory distress and birth asphyxia. There were 7 cases of Hypothermia, 3 of hypoglycemia and one baby developed neonatal convulsions. Of the 43 cases of acute life threatening events, mechanical ventilation (Bag mask and IPPV) and oxygen supplementation were required in 22 cases compared to 3 babies in control group (p <0.001) followed by antibiotics in 8 babies compared to 2 babies in control group (p<0.01), warming and oxygenation in 7 and I.V. Dextrose in 3 cases, phototherapy in 2 cases and one baby received anticonvulsant compared to none in control group. Most of these babies were preterm and low birth weight and very low birth weight.

Table 4: Occurrence, pattern and Strength of association of ALTE in cases and controls

Acute Life Threatening Events (ALTE)	Total no of Live Birth (n=147)	Control(n=300)	P value
Total number of neonate that developed ALTE	43 (29.25%)	5(1.67%)	<0.001
Birth Asphyxia andRespiratory Distress	22(14.96%)	3(1%)	<0.001
Hypothermia	7(04.76%)	0	-
Hypoglycemia	3(2.04%)	0	-
Neonatal convulsion	1(0.68%)	0	-
Septicemia	8(5.44%)	2(0.67%)	<0.01
Hyperbilirubinemia	2(1.36%)	0	-

DISCUSSION

Despite recent advances in maternal and neonatal care in India, perinatal mortality is still very high (28 per 1000 live births compared to 5-10 per 1000 live births in developed countries[4]. Around 70-80% of perinatal deaths in developing countries are accounted for by the mothers falling in the high risk category. In the present study, the perinatal mortality was 54 per 1000live births in cases and none in control group. Similar type mortality 46.1Mufti Samiya and Mufti Samina[2], 68 GuptaN *et al*[5] and 87 per 1000 live births Siddalingappa H *et al*[1] were reported in high risk pregnancy cases. There is a significant association of perinatal deaths with risk factors (P<0.00001) in our study and is well supported by Kannan MP *et al*[6], Pratinidi *et al*[7] and Gupta N *et al*. However survival during first 7 days of life was found favorable in 94.66% neonates in cases and 100% in controls. Similar observation of survival 93.2% in cases and 99.2% in controls was observed by Gupta N *et al* and Mufti S. This high survival could be because of highly specialized and well equipped care available both to mothers and timely intervention for life threatening events in babies of the study population. The perinatal mortality and morbidity was more in babies whose mothers were exposed to risk factor for more than six month duration. Similar observations were noted by Evers ACC *et al*[8] and Sun L *et al*[9]. So early identification of risk factors and timely intervention is a key to improve perinatal mortality and morbidity. Among the three stillbirths, all were fresh still born, born to high risk mother of multifoetal gestation, eclamptic mother and a mother of previous history of still born. Similar Sultana M *et al*[13] and Hanumaiah I *et al*[14] from twin pregnancy and eclamptic mothers. Most of the still born in developed countries now a days are antepartum (macerated) where as in developing countries, high rate of intrapartum still birth. The reason for this difference is availability of high intrapartum care in developed world. Similar reports are reported by Evers ACC et (Netherlands), Unterscheider J *et al* (Ireland)[15], Kamat AA *et al* (India)[16], and Chandra S (India)[17.] In the present study, there were five neonatal deaths; all were having severe birth asphyxia, respiratory distress and septicemia. Gupta N *et al*, Rao S *et al*[18], Gaddi SS *et al*[19] were analyzed asphyxia, prematurity and low birth weight are more important causes of perinatal loss. All neonatal deaths were in babies with mother of antepartum hemorrhage, elderly primigravida, heart disease mother

and a mother with previous history of threatened abortion. Such a high mortality were recorded by BlombergM *et al*[20], Elliott C *et al*[21], and Dodmani GB[22] in such high risk mothers. Life threatening events were observed in 43 cases (29.25%) and 5 controls (1.67%); with cases having significant difference (p<0.001). Similar high morbidity in high risk mothers (30%) and Controls (16.4%) were observed by N. Gupta *et al* in their study. Low morbidity in our study is because of high level of antenatal and intranatal care provided at our institute. Present study reveals respiratory distress as the most common life threatening event (10.20%) in cases which is statistically more significant compared to 0.33% in control group. In cases 19.75% preterm babies suffered from respiratory distress while none in control group. There is strong correlation of premature birth and respiratory distress. Birth Asphyxia was observed 4.08% in case group, while only one baby in control group. Birth Asphyxia was more common in preterm, caesarean born, extremely low birth weight baby and is continued to be one of major cause of perinatal morbidity. Similarly prematurity and birth asphyxia commonest cause of morbidity were reported by Siddalingappa H *et al*. In present study, most of the morbidity and mortality were recorded in babies whose mothers receive antenatal care from primary health care level compared to tertiary care. So it is indicated to improve our primary health care system and timely indentify high risk mother and refer to tertiary care level. Similar observations were noted by Evers ACC *et al*. In the study 43 babies received intervention for various life threatening events, only 5 perinatal deaths was observed, hence study revel that intervention for acute life threatening events results in remarkably improved early neonatal survival.

CONCLUSION

Obstetrical risk screening should be the integral part of organized perinatal health care delivery system. Registration of all pregnant mothers, early identification of high risk cases and timely intervention is need of hour. The strategy to reduce perinatal mortality must be aimed at reducing still births and incidence of low birth weight and premature babies by providing optimum antepartum and intrapartum care of high risk mothers and by improving early neonatal intensive care.

What is Already Known?
Perinatal mortality is very high in high risk pregnancies.
What this study Adds?
Early identification and early referral of high risk pregnant mother to tertiary care centre and timely intervention of sick neonate improve perinatal mortality and morbidity.

REFERENCE

1. Siddalingappa H, NarayanaMurthy MR., kulkarni P, Ashok NC. Prevalence and factors influencing perinatal mortality in Rural Mysore, India. Journal of clinical and diagnostic research 2013 Dec, 7(12);2796-2799
2. Mufti S., Mufti S. Identification of high risk pregnancy by scoring system and its correlation with perinatal outcome. Indian Journal for the Practising Doctor vol. 5 No.1 (2008-03-2008-04)
3. Risk Approach for MCH Care, WHO Offset Publication No39 (WHO1978)
4. Registrar General of India. Sample Registration system (SRS) statistical report. New Delhi: 2013
5. Gupta N, Jani KK, Kumari S, Sood M. Early neonatal morbidity and mortality in 'At Risk' and 'Normal' term pregnancies. Indian J. Pediatr 1997; 64:523-527
6. Kannan MP, Bhat BV, Sharma R, Ferns S, Reddy. Perinatal mortality-Identification of risk factors. J. Obstet Gynecol of India May/June 2003; 53(3):240-243
7. Pratinidhi A, Shortri A, Shah U. Risk approach strategy in M.C.H. care. Indian J. Com Med. 1990;15:74-81
8. Evers ACCE, Brouwers H AA, Hukkelhoven CWPM, Nikkels PGJ, Boon J, Egmond-Linden AV et al. Perinatal mortality and severe morbidity in low and high risk term pregnancies in the Netherlands: prospective cohort. BMJ 2010;341:c5639
9. Sun L, Yue H, Sun B, Han L, Tian Z, Qi M et al: Estimation of high risk pregnancy contributing to perinatal morbidity and mortality from a birth population - based regional survey in 2010 in China. BMC Pregnancy and Childbirth 2014, 14:338
10. Aabidha PM, Cherian AG, Paul E, Helan J. Maternal and fetal outcome in pre-eclampsia in a secondary care hospital in south India. J Family Med Prim Care. 2015Apr-Jun;4(2); 257-260
11. Yucesoy G, Ozkan S, Bodur H, Tan T, Caliskan E, Vural B, Corakci A. Maternal and perinatal outcome in pregnancies complicated with hypertensive disorder of pregnancy: a seven year experience of a tertiary care centre. Arch Gynecol Obstet. 2005 Nov; 273(1): 43-9
12. Ananth CV, Basso O. Impact of pregnancy-induced hypertension on stillbirth and neonatal mortality in first and higher order births: A population-based study. Epidemiology 2010 January; 21(1): 1118-123.
13. Sultana M, Khatun S, Ara R, Saha AK, Akhter P, Shah ABS. Maternal and perinatal outcome of twin pregnancy in tertiary hospital. Ibrahim Card med J. 2011; 1(2): 35-39
14. Hanumaiah I, Shivanand DR, Visweshwaraiah KG, Hoolageri MS. Perinatal outcome of twin pregnancies at a tertiary care centre, South India. Int J Biol Med Res. 2013;4(1):2683-2685.
15. Unterscheider J, O'Donoghue K, Daly S, Geary MP, Kennelly MM, McAuliffe FM et al: Fetal growth restriction and the risk of perinatal mortality- case studies from the multicentre PORT study. BMC Pregnancy and Childbirth 2014; 14:63
16. Kamat AA., Jindal MV. Perinatal mortality in Goa Medical College. J. of Obst and Gyn of India July/August 2001;51(4):115-117
17. Chandra S, Mathews SC. Perinatal mortality and morbidity in live low birth weight babies. J Obstet Gynecol IndVol 53, No 3: May /June 2003 : 237-239

18. Rao S, Akolekar R, Shah PK, Badhwar VR, Vaidya PR. Perinatal Mortality – The wider perspective. J. of obst and Gyn. of India July/August 2001: 51(4): 118-122.
19. Gaddi SS, Seetharam S. A study of perinatal mortality in Head Quarters hospital Bellary.J.of Obst and Gyne of India Nov/Dec 2001;51(6);101-108.
20. Blomberg M, Tyrberg RB, Kjolhede P. Impact of maternal age on obstetric and neonatal outcome with emphasis on primiparous adolescents and older women: a Swedish Medical Birth Register study.BMJ Open 2014;4:e005840.
21. Elliott C, Sliwa K, Anthony J. Perinatal outcome in pregnant women with heart disease attending a combined obstetric and cardiology clinic in a resource limited country. International Journal of Gynecology and Neonatal Care, 2015, Vol. 2 No. 2, 8-15
22. Doddmani GB., Doddmani UG. Perinatal outcome in pre-eclampsia: A prospective study. Sch. J. App. Med.Sci., 2014; 2(1C): 291-293.

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