DETERMINANTS OF PERINATAL MORTALITY: A CASE CONTROL STUDY

Bellara Raghavendra, Aravind Karinagannanavar

Dept of Community Medicine, VIMS, Bellary

E-mail of Corresponding Author: bellararaghu@gmail.com

ABSTRACT

Background: Perinatal mortality includes both stillbirths and early neonatal deaths. Perinatal mortality rate serves as a sensitive index of maternal and neonatal care. The increased risk of death is seen in low socio economic status, high and low maternal age, high parity, severe anemia, preeclampsia and low birth weight. **Objectives:** To study the determinants of perinatal mortality.

Methodology: A case control study was conducted from January 2011 to August 2011 at Vijayanagar Institute of Medical Sciences, Bellary. The study included 150 cases and 150 controls. Data was analysed using epi-info software version 3.4.3. Tests like proportions, Univariate and multivariate logistic regression was done. **Results**: The study revealed that anemic mothers (OR 1.3-5.0 at 95%CI), mothers with preeclampsia (OR 1.0-5.1 at 95%CI), mothers who had consanguineous marriages (OR 4.1-16.6 at 95%CI) and low birth weight of the baby (OR 3.1-13.3 at 95%CI) emerged as independent risk factors for perinatal death. **Conclusion and Recommendations**: Factors potentially amenable to intervention would be improving the maternal nutritional status and adolescent health by proper implementation of existing health programs and reducing the maternal morbidity by providing proper antenatal care and proper referral services.

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INTRODUCTION

Perinatal mortality includes both stillbirths and early neonatal deaths because the factors responsible for these types of deaths are often similar. It gives a good indication of the extent of pregnancy wastage as well as the quality and quantity of health care available to mother and new born. Perinatal mortality rate serves as a sensitive index of maternal and neonatal care. It also reflects the general health and socio-biologic features of mothers and infants. The perinatal deaths are 10 times higher in developing countries compared to developed countries. In India about 1.5 million deaths occur every year. The SRS estimates for perinatal mortality rate in India for the year 2007 was about 37 per 1000 live births and stillbirths[1]

The perinatal mortality rates are significant to capture late fetal deaths and early neonatal deaths and to ensure favorable outcome of pregnancy and survival of child after birth by adequate maternal and neonatal care. Inspite of many health programs directed towards reducing the perinatal mortality rates, still we have not made any dent in perinatal mortality which remains high.

A number of social and biologic factors are known to be associated with perinatal deaths. The increased risk of death is seen in low socio economic status, high and low maternal age, high parity, heavy smoking, bad obstetric history, malnutrition, severe anemia, preeclampsia, birth injuries, birth asphyxia and

low birth weight babies are more risk for death[1]. With this background we attempted to study the contributing and facilitating factors for perinatal death.

OBJECTIVES:
1) To study the factors associated with perinatal deaths.

METHODOLOGY

We conducted a case control study from January 2011 to August 2011 at Department of Obstetrics and Gynecology, Vijayanagar Institute of Medical Sciences, Bellary. The study included 150 cases (late fetal deaths i.e. 28 weeks gestation and more and early neonatal deaths i.e. within 7 days of birth,[2]) and 150 controls (mothers who's baby survived after 7 days of birth). After taking written consent from the study subjects data was collected using pretested predesigned semi structured questionnaire. However those mothers who did not give consent for the study were excluded. Proforma was used to collect the information on socio-demographic characteristics, risk factors for perinatal death through face to face interview. Data was analysed using epi-info software version 3.4.3. Tests like proportions, Univariate and multivariate logistic regression was done.

RESULTS

In our study we found that nearly 69% mothers belong to age group between 20-35 years with a range of 15 to 40 years, nearly 68% were from rural area, around 48% were illiterates, 65% were from lower socio-economic class according to modified B G Prasad classification, nearly 60% had non-consanguineous marriage and around 66% were from nuclear family (Table 1). The mean age (in years) of cases was 23.3+3.3 and controls was 23.0+3.3, which are comparable with respect to age groups.

Table 1: Socio-demographic profile of the study subjects

Variables	Frequency	Percentage
Age of mother		
Adults[20-35]	206	68.70%
Teenagers[<20]	94	32.30%
Locality		
Urban	98	32.70%
Rural	202	67.30%
Education		
Graduation	5	1.70%
Secondary	55	18.30%
Primary	97	32.30%
Illiterate	143	47.70%
Socio-economic status		
Lower middle	37	12.30%
Upper lower	68	22.70%
Lower	195	65%
Type of marriage		
Non-consanguineous	181	60.30%
Consanguineous	119	39.70%
Type of family		
Nuclear	199	66.30%
Joint	101	33.70%

Our study revealed that the perinatal deaths were more among the teenage mothers, mothers from rural area, illiterates, mothers who had consanguineous marriage, mothers belonging to lower socioeconomic status, joint family, multigravida, unbooked case, anemic mothers, mothers with preeclampsia, preterm babies, male babies and low birth weight. All the variables showed statistically significant association with perinatal deaths except for teenage pregnancy and educational status of mother (Table 2).

These significant variables were subjected to multiple logistic regression analysis and we found that anemic mothers, mothers with preeclampsia, mothers who had consanguineous marriages and low birth weight of the baby emerged as independent risk factors for perinatal death (Table 3).

Table 2: Univariate analysis of risk factors for perinatal mortality:

Variables	Perinatal deaths		OR	95%CI	p-value
	Present (cases)	Absent (controls)			
Age of mother					
Teenage[94]	53[56.4%]	41[43.6%]	1.4	0.8-2.3	0.13
Normal[206]	97[47.1%]	109[52.9%]	1	-	-
Locality					
Rural[202]	120[59.4%]	82[40.6%]	3.3	1.9-5.5	0.00
Urban[98]	30[30.6%]	68[69.4%]	1	-	-
Education					
Graduation	1[20%]	4[80%]	1	-	-
Secondary	14[25.5%]	41[74.5%]	1.3	0.1-13.2	0.78
Primary	39[40.2%]	58[59.8%]	2.6	0.2-24.9	0.38
Illiterate	96[67.1%]	47[322.9%]	8.1	0.8-75.1	0.06
Type of marriage					
Consanguineous	94[79%]	25[21%]	8.3	4.8-14.4	0.00
Non-consanguineous	56[30.9%]	125[69.1%]	1	-	-
Socio-economic status					
Lower middle	11[29.7%]	26[70.3%]	1	-	-
Upper lower	25[36.8%]	43[63.2%]	1.3	0.5-3.2	0.46
Lower	114[58.5%]	51[41.5%]	3.3	1.5-7.1	0.00
Type of family					
Joint	62[61.4%]	59[38.6%]	2	1.2-3.2	0.00
Nuclear	28[44.2%]	111[55.8%]	1	-	-
Gravida					
Multigravida	16[59.3%]	11[40.7%]	1.8	0.8-4.3	0.14
Primigravida	74[54.4%]	62[45.6%]	1.5	0.9-2.4	0.07
Normal	60[43.8%]	77[66.2%]	1	-	-

Case					
Unbooked	34[72.3%]	13[27.7%]	3	1.5-6.1	0.00
Booked	116[45.8%]	137[54.2%]	1	-	-
Anaemia					
Present	59[69.4%]	26[30.6%]	3	1.8-5.2	0.00
Absent	91[4.3%]	124[57.7%]	1	-	-
Preeclampsia					
Present	59[69.4%]	26[30.6%]	3	1.8-5.2	0.00
Absent	91[42.3%]	124[57.7%]	1	-	-
Gestation					
Preterm	68[84%]	13[16%]	8.7	4.5-16.7	0.00
Full term	82[37.4%]	132[62.6%]	1	-	-
Gender of baby					
Male	97[57.7%]	71[42.3%]	2	1.2-3.2	0.00
Female	53[40.2%]	79[59.8%]	1	-	-
Birth weight					
<2.5kg	106[79.7%]	27[20.3%]	10.9	6.3-18.9	0.00
>2.5kg	44[26.3%]	123[73.7%]	1	-	-

Table 3: Multivariate Analysis of Risk Factors For Perinatal Mortality

Multivariate analysis of risk factors for perinatal mortality			
Variables	OR	95% CI	p-value
Presence of anaemia	2.6	1.3-5.0	0.00
Presence of Pre-eclampsia	2.3	1.0-5.1	0.04
Consanguineous marriage	8.2	4.1-16.6	0.00
Birth weight less than 2.5kg	6.5	3.1-13.3	0.00

DISCUSSION

With the decline of infant mortality rate to low levels in many developed countries, perinatal mortality has assumed greater significance as a yard stick of obstetric and pediatric care before and around the time of birth. Although perinatal period occupies less than 0.5% of the average life span, there are more deaths within this period than during the next 30-40 years of life in many developing countries like India[3].Therefore it is important to know the risk factors of perinatal deaths so that better preventive measures can be framed to reduce the deaths.

Our study revealed that the perinatal deaths were more among the teenage mothers, mothers from rural area, illiterates, mothers who had consanguineous marriage, mothers belonging to lower socioeconomic status, joint family, multigravida, unbooked case, anemic mothers, mothers with preeclampsia, preterm babies, male babies and low birth weight.

Similar risk factors were revealed in a study conducted by Fazili F, Mattoo GM where the perinatal mortality was significantly higher among illiterate mothers, in extremes of age, among those living in joint families, and those having incomplete antenatal care. Perinatal

mortality was low among the higher socioeconomic classes[4].

Another similar study conducted by Dasgupta S, Saha I, Lahiri A, Mandal AK showed that 53.6% of the perinatal deaths involved primiparas and 22.8% involved mothers of parities above 3. 35.1% of mothers in perinatal mortality cases presented with pregnancy-related risk factors, including toxemia (14.8%), severe anemia (13%), and antepartum hemorrhage (2.6%). In 494 (85.9%) of the 575 deaths, antenatal care was absent or inadequate[5] which is in consonance with our study risk factors.

One more study conducted by Kumar MR, Bhat BV, Oumachigui A. among the 6,048 babies born from January 1984 to December 1985 showed that Unbooked cases accounted for the majority of perinatal deaths during both the periods. The overall mortality rates in unbooked cases were three to four times higher than booked cases. Among the various causes of still births, antepartum hemorrhage and uterine rupture, septicemia, birth asphyxia and prematurity were the major cause of early neonatal deaths[6].

A community based prospective study was conducted in Karnataka by Chandrashekar S etal, among 13,214 births showed that breech deliveries and babies of multiple pregnancies had a very high perinatal mortality rate. The previous bad obstetric history of the mother, parity and sex of the newborn were among the other important factors influencing the perinatal mortality rate[7].

Using multiple logistic regression our study revealed that anemic mothers, mothers with preeclampsia, mothers who had consanguineous marriages and low birth weight of the baby emerged as independent risk factors for perinatal death. All the socioeconomic variables became insignificant after being adjusted for other variables. Thus, the effect of socioeconomic variables is probably mediated through other more proximate maternal biological, antenatal, and intra-partum factors, and in the study

population, socioeconomic status appears not to have had significant independent effects on the risk of perinatal mortality. This is important because changes in socioeconomic status are generally not within the scope of the health sector, while modification of proximate factors, such as antenatal care or nutritional status, may be possible through health interventions. A study conducted by Sachar RK, Soni RK showed that the maternal weight less than 40 kg, height less than 152 cm, body mass index < 20, illiteracy, a birth to conception interval less than 100 weeks, prematurity, late registration and home delivery were found to be significant on univariate analysis on multiple logistic regression, the full model identified the significance of all the risk factors except late registration[8].

In a study conducted by Malvankar DV et al. showed that poor maternal nutritional status, absence of antenatal care, and complications during labour were independently associated with substantially increased risks of perinatal death. Estimates of attributable risk derived from the prevalence of exposures in the population survey suggest that improvements in maternal nutrition and antenatal and intra-partum care could result in marked reductions of perinatal mortality[9].

Similar risk factors were revealed by many other studies conducted elsewhere where the important of determinants of perinatal deaths were maternal malnutrition, inadequate antenatal, intranatal and postnatal care, and premature and low birth weight babies which are amenable for prevention. In this regard Government of India has taken number of health initiatives directed towards preventing maternal malnutrition through ICDS (Integrated Child Development Services) services where nutritional supplements are given for pregnant women, lactating mothers and adolescent girls. The intergenerational cycle of growth failure theory is that small adult women are more likely to have low-birth-weight babies, in part because maternal

size has an important influence on birth weight. Children born with a low birth weight are more likely to have growth failure during childhood. Thus, in turn, girls born with a low birth weight are more likely to become small adult women. This cycle is accentuated by high rates of teenage pregnancy, as adolescent girls are even more likely to have low-birth-weight babies[10]. To provide proper care during pregnancy, the Government of India has started IMNCI (Integrated Management Of Neonatal And Childhood Illness) to provide better newborn care and Janani Suraksha Yojana to promote institutional deliveries under RCH program (Reproductive and Child Health) and upgraded the Primary Health Centers for delivering MCH services round the clock under NRHM.

CONCLUSION

Our study concludes that maternal factors like maternal malnutrition, absence of antenatal care, maternal complications like pre-eclampsia, consanguineous marriage, teenage mothers and multiparous women and fetal factors like low birth weight, preterm babies and male babies were associated with substantially increased risks of perinatal death.

RECOMMENDATIONS

Factors potentially amenable to intervention would be improving the maternal nutritional status and adolescent health by proper implementation of existing health programs and reducing the maternal morbidity by providing proper antenatal care and proper referral services. Promoting institutional delivery for better newborn care. Educate girls about normal age for conception and importance of non consanguineous marriages. Maternal education is a long term intervention.

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