Original Research Article

A community based study of neonatal mortality in Aligarh by using verbal autopsy

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ABSTRACT

Background: Neonatal mortality rate is regarded as an important and sensitive indicator of the health status of a community. Children face the highest risk of dying in their first month of life. The present study was aimed to 1) determine the prevalence of neonatal mortality rate 2) identify socio-biological factors in relation to neonatal mortality.3) determine the causes of neonatal mortality.

Methods: A community based cross sectional study was conducted in the field practice areas of Department of Community Medicine, AMU, Aligarh. All the live births and all neonatal deaths were taken for one year from June 2016 to May 2017. A standard Verbal autopsy questionnaire (WHO 2012) was used as a study tool.

Results: The prevalence of neonatal mortality rate was 38.2/1000 live births. The early neonatal mortality rate was 28.3/1000 live births and late neonatal mortality rate was 9.9/1000 live births. The associated socio –biological factors were gender [OR-2.381, 95% CI-1.037-5.468], birth order [OR-4.090, 95% CI-1.119-14.946] and gestational age [OR-12.62, 95% CI-3.26-48.82]. The leading causes of deaths among newborns were preterm births (22.2%), birth asphyxia (22.2%), other causes (19%), ARI (14.3%), congenital anomalies (14.3%) and diarrhoea and neonatal sepsis accounted for (4.8%) each.

Conclusions: The neonatal mortality rate assessed by verbal autopsy is higher than nationally reported. Most of the deaths were in early neonatal period. There is a need for programs encouraging the use of antenatal care, encouraging institutional deliveries and care of LBW neonates; as well as implementation of community-based newborn survival strategies.

Keywords: Neonatal mortality, Verbal autopsy, Socio-biological factors

INTRODUCTION

Globally, 2.6 million children died in the first month of life in 2016, most of which occurred in the first week, with about 1 million dying on the first day and close to 1 million dying within the next six days[1]. The first 28 days are the most vulnerable time for a child's survival. Children face the highest risk of dying in their first month of life.[1] Most newborn deaths occurred in two regions: Southern Asia (39%) and sub-Saharan Africa (38%). Five countries accounted for half of all new-born deaths: India (24%), Pakistan (10%), Nigeria (9%), the Democratic Republic of the Congo (4%) and Ethiopia (3%).[2] About a quarter of global neonatal deaths occur in India. Neonatal mortality is an important indicator of quality of healthcare of a country. Neonatal mortality is becoming increasingly important because the proportion of under-five deaths that occur during the neonatal period is increasing.[2] However, the neonatal deaths have declined from 4.7 million in 1990 to 2.8 million in 2013.[3]

METHODS

A cross sectional study was conducted in the field practice areas of Rural Health Training Centre and Urban Health Training Centre under Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, India. The period of study was for one year (i.e. June 2016 to May 2017). The study was approved by the Institutional Ethics Committee of JNMC, AMU Aligarh. Before the study commenced MSW, ASHA and anganwadi worker with good reputation in the community were approached to identify those women who had registered with them for delivery. In addition to it, a house to house survey was done by the researcher and medico social workers to identify women who had a live birth within 28 ± 7days prior to the survey. Line listing of births was done to avoid overlapping. All the houses where live births had taken place during the study period were revisited after 28 days of the neonates birth. Informed verbal consent was taken from the mother with live single baby prior to conducting the study

Verbal autopsy questionnaire (WHO 2012) was used to gather information on neonatal mortality. Verbal autopsy is a method used to ascertain the cause of a death based on an interview with mother or other caregivers. This is done using a standardized questionnaire that elicits information on signs, symptoms, medical history and circumstances preceding death. The cause of death, or the sequence of causes that led to death, are assigned based on the data collected by a questionnaire and any other available information.[4]

Inclusion criteria

Inclusion criteria were all live births reported in the study area (rural and urban) during the study period; all the neonatal deaths in the study area (rural and urban) during the study period.

RESULTS

During the study period, there were 705 total live births, out of which 27 died during the neonatal period. So the neonatal mortality rate yielded within our study was 38.2/1000 live births (Table 1).

Table 1: Prevalence of neonatal mortality.

Neonatal mortality rate	
Total	38.2/1000 live births
ENMR	28.3/1000 live births
LNMR	9.9 /1000 live births

Of the neonatal deaths, about 60% (21) were in the early neonatal period whereas 40% (06) died in the late - neonatal period giving the early neonatal mortality and late neonatal mortality rate to be 28.3/1000 live births and 9.9/1000 live births respectively (Table 1). Out of 27 neonatal deaths reported during the study period, 77.7%

(21) deaths occurred in the rural area and 23.3% (06) were in urban area.

Table 2: Background characteristics of the deceased neonates.

Variable	Number	%
Mother's age (years)		
<20	04	14.8
21- 30	18	66.7
>30	05	18.5
Mother's education		
Illiterate	17	70
Literate	10	30
Father's education		
Illiterate	07	26
Literate	20	74
Religion		
Muslim	09	33.3
Hindu	18	66.7

Table 2 shows the background characteristics of the respondents. The majority of the mothers were within 21-30 years of age (66.7%). Nearly one-third of mothers and three-fourth of fathers were literate. Hindu families had two–third of neonatal deaths in contrast to Muslim families.

Table 3: Obstetrics and delivery history of the mothers.

Variable	Number	%
ANC visits		
None	08	29.6
<4 visits	09	33.3
≥4 visits	10	37.1
Place of delivery		
Home	02	7.4
Govt. hospital	07	25.9
Pvt.hospital	03	11.2
CHC	15	55.5
Delivery attendant		
ANM	15	55.5
Doctor	10	37
UTBA/family member	02	7.5
Type of delivery		
Normal	22	81.5
Cesarean section	05	18.5

Table 3 shows that 29.6% of women received no antenatal care. More than half of women had delivery at the Community Health Centre (55.5%). 7.4% mothers delivered at home and deliveries were conducted by unskilled attendants in 7.5%, who included relatives and/or traditional birth attendants. Most women had normal vaginal delivery (81.5%).

Table 4: Association of neonatal deaths with socio-biological factors.

	Neonatal mortality			
Gender	Present (%)	Absent (%)	OR	CI(95%)
Female	17 (5.4)	299 (94.6)	2.381	1.037-5.468
Male	10 (2.6)	379 (97.4)	1	
Birth order				
1	4 (1.6)	241 (98.4)	1	
2-4	20 (4.7)	403 (95.3)	4.090	1.119-14.946
≥5	3 (8.1)	34 (91.9)	5.456	0.729-40.817
Gestational age				
Preterm	05 (23.8)	16 (76.2)	12.628	3.26-48.82
Term	22 (3.2)	662 (96.8)	1	
Birth weight				
LBW	08 (4.8)	156 (95.2)	1.409	0.605-3.281
Normal	19 (3.4)	522 (96.6)	1	

Table 4 depicts the association of neonatal mortality with socio biological factors of the deceased. There were more female deaths in the neonatal period. The newborn females had higher odds of neonatal mortality as compared to males (OR 2.381, CI 1.037-5.468). The neonatal deaths were more in the birth order of ≥5 (8.1%) followed by birth order group of (2–4) (4.7%). The neonates in birth order of (2-4) had 4.09 times higher odds of neonatal mortality as compared to 1st order birth. On bivariate logistic regression analysis, the association of neonatal mortality with birth order group of 2 to 4 was statistically significant (OR 4.090, CI 1.119-14.946) as compared to first order. However, when compared with birth order of ≥5 with the 1st order of birth it was statistically insignificant (Table 4). 23.8% of neonatal deaths were among preterm births in contrast to 3.2% of neonatal deaths being among at term births. On bivariate regression analysis there was a significant association between neonatal mortality and gestational age of newborn. The preterm neonates were at 12.62 times increased odds of dying as that of term neonates. 4.8% of neonatal deaths occurred among LBW babies whereas 3.4% were among normal weight newborns. LBW babies had 1.409 times higher odds of neonatal as compared to normal weight newborns.
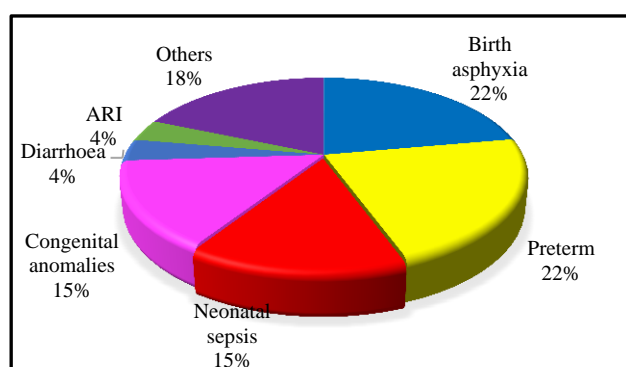

Figure 1: Causes of neonatal deaths.

Figure 1 shows the causes of neonatal deaths in the study population. The leading causes were preterm (22.2%), birth asphyxia (22.2%), other causes including SIDS (18.6%), ARI (14.8%), diarrhoea and congenital malformations (3.7%).

DISCUSSION

This study aimed to identify the prevalence rate and sociobiological factors related to neonatal mortality in rural and urban areas under the aegis of Department of Community Medicine. Neonatal mortality rate in our study population was 38.2/1000 live births. This rate is quite high compared with the nationally reported rate of 26/1000 live births.[5] There are wide variations in reported rates of neonatal mortality in India. Some studies reported higher neonatal mortality rate of 49.4/1000 live births in Aligarh and 52.4 per 1000 live birth in Gadchiroli, India whereas other studies reported a lower neonatal mortality rate of 32.2/1000 live births and 21 per 1000 live births in Bihar.[6-9]

Corroborated by the results of studies in India, our study found substantial differences in deaths due to residence, where rural area accounted for a larger proportion of deaths than urban area.[10-12] The residence difference in neonatal mortality may be due to deprived health facility services and poor referral system.

In cohesion to other studies in India, the present study found a statistically significant difference between gender, birth order and gestational age of newborn.[10,12] The findings of this study emphasized the need for the identification of high-risk babies and early postpartum interventions. Relevant strategies include special training to birth attendants in resuscitation, immediate postnatal check-up in the home for high-risk babies identified at delivery and promotion of institutional deliveries. The community should be motivated towards seeking timely and proper care for mothers and newborns.

Around three-fourth of neonatal deaths in this study occurred within 7 days after birth. This finding is in concurrence with those reported by other studies from India.[13,14] This highlights the need for a more focused newborn-care at institution as well as at home.

CONCLUSION

Neonatal mortality rate assessed in this study is higher than the national average reported for the studied population but lower than the State. However, when compared to district level it was found to be lower. The causes of neonatal deaths in the study population were preterm (22.2%), birth asphyxia (22.2%), other causes including SIDS (18.6%), ARI (14.8%), diarrhoea and congenital malformations (3.7%).The burden of neonatal mortality can be reduced by strengthening of Reproductive and child health programme, promotion of institutional deliveries, strengthening of referral system,, aggressive IEC activities to combat gender bias, building of stronger health services and ensuring that every birth is attended by skilled personnel even at home.

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