Tracing Causes of Death in Neonates in Urban and Rural Communities in Ahmedabad and Gandhinagar Districts

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Abstracts: Objective:To Study the socio-demographic characteristics of neonatal deaths in urban and rural communities. Methods:A Cross-sectionalCommunity- based study on Neonate was carried out during November-2004 to October-2005 with help ofPre-designed and Pre-tested Proformaof "Sample Registration System" of India, for every Neonatal death in the study area, using a structured interview schedule. Results:The population had 380(0.78%) neonates.Majority of the deaths70.27% occurred in a premature and preterm birth ofneonates. Neonatal Mortality was 31.65/1000 live births and it was1.70 times higher in rural area than urban area.Only 56.76% deceased were born inInstitutions. Exclusive breast feeding among deceasedwas 89.19%.Utilization of Antenatal Care Services by Mothers of deceased neonates was82.43%. Conclusion:The present study has been carried out to determine causes and factors related to neonatal death. The most of neonatal deaths occurred in preterm and low birth weight babies that need more strengthening of health care services.Knowledge and Practice of mothersrequired for positioning and attachment of neonate during breast feeding. The diagnosis of cause of death was mainly symptom-based according to the information collected by verbal autopsy.[Parmar R et al NJIRM 2012; 3(4) : 42-45]

KEY WORDS: Death, Neonate, VerbalAutopsy

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Introduction: Mortality influences the rate of growth of the population and provides the dimension of demographic perspective which is vital for socio-economic planning. The pattern of deaths by causes reflects the health status of the community and in turn provides a rational basis for health planning.[1]

The Neonatal mortality (NNM) varied from 53 per 1000 live births for the least developed countries to about 5 per 1000 live births for the developed countries.[2]The Neonatal mortality rate for India has declined from 48.6 to 43.4 per 1000 live births.[2] In India 55-60 percent of infant deaths (ID) occur within neonatal period. Of these more than half may die during the first week of birth, first 24 hours being 49 per 1000 live births in rural areas, 28 in urban areas and about 45 in the whole country. It is an important indicator of the quality of health care.[3] In order to bring about further reduction in these mortality rates, there is a need to study the causes of death in this age group.

In case of the urban areas, a medical certification of cause of death (MCCD) scheme is operational. This scheme has been acceded legal sanction Under the Registration of Births and Deaths (RBD) Act. All medically attended deaths are expected to be registered (Form-2) along with cause of death reports in a format (Form-4/4A) which is similar to what is prescribed by the WHO for International Classification of Cause of Death (ICD). The responsibility for reporting cause of death rests with the doctor/health care provider who last attended the deceased. Reports are sent to the municipal health authorities, who forward them to the concerned state vital statistics office.[4]

Survey of Causes of Death (SCD), rural used Verbal Autopsy to arrive at cause of deaths using paramedical personnel.[4] It is not feasible to build up statistics of mortality by causes based on "Medical Certification of Causes of Death (MCCD)" due to paucity of medical institutions in rural India, where three-fourth of the population of country lives.[1]The lack of reliable mortality statistics has prompted public health workers and researchers to search for alternative methodologies. India and China have attempted to establish sample registration systems (SRS).[5]

Verbal autopsies have been validated and used for ascertaining the cause of death in many countries by "verbal autopsy" suggested criteria.[6]

Materials And Methods: This was a community based cross-sectional study.This study has been carried out in the field area of an Urban Health Centre (UHC), Ahmedabad and field areas of Primary Health Centre (PHC)Adalaj of Gandhinagar district. Forappraisal of factors influencing Neonatal deaths, house-to-house survey of 3372 households in Urban and 8434 households in Rural area, with total 11806 (93.84%) households were studied during November-2004 to October-2005**.** A Cross-sectionalCommunity-based study on neonatal death was carried out.For collecting necessary data Pre-designed and Pre-tested Proforma of SRS (Sample Registration System) of India have been utilized.A post death verbal autopsy was conducted for every Neonatal death in the study area, using a structured interview schedule. This is followed by 6 separate modules, which are to be filled according to the symptoms; fever with rash, respiratory symptoms, diarrhoea, convulsion, not feeding and fever of sudden onset. Each symptom would then lead to the diagnosis of common cause of death in this age group.Individual interviews with relatives of deceased neonate and examination of medical records as per International Classification of Diseases(ICD)-10^{th} revision was adopted in this study. In this attempt all the specific causes have been grouped according to ICD major causes. Information collected was analysed using Epi-Info Software and Statistical tests were applied.

Verbal Autopsy: A verbal autopsy is a method of finding out the medical causes of death and ascertaining the personal, family or community factors that may have contributed to the death ofneonates who died out side of a medical facility.

Results: House hold and population profile is shown in table-1.A total of 11806 households were surveyed. It included 3372 urban and 8434 rural households. Total population surveyed in study was 61866.The ratio of urban population to rural population was 0.4:1.0. The average number of persons per household was 5.24. It was slightly high in rural area (5.26%) than found in urban area (5.19%). A total of 2338 births occurred during 1 year period.

Breast feeding and Antenatal Care taken by mothers of deceased neonate according to area is shown in table-2. Out of 74 neonatal deaths, 66 (89.19%) had exclusive breastfeeding. Out of 60 rural neonatal deaths 55 (91.67%) had exclusive breast feeding while of 14 urban neonatal deaths 11 (78.57%) had exclusive breast feeding. X^2 is 2.02 ($p > 0.10$) which is not significant.

Table-1:House hold and population profile

Particular	Urban	Rural	Total
No. of Household	3372	8434	11806
Population all ages	17501	44365	61866
Average persons per household	5.19	5.26	5.24
Neonatal Population (0-28days)	119 (0.68)	361 (0.82)	380 (0.78)
Live Births	608	1730	2338

(Figures within parenthesis indicate percentage)

Table-2: Breast feeding and Antenatal Care(ANC) taken by mothers of deceased neonate and area

Particular	Urban	Rural	Total
Exclusive Breast-feeding:			
Yes	11 (78.57)	55 (91.67)	66 (89.19)
No	3 (21.43)	5 (8.33)	8 (10.81)
Total	14 (18.92)	60 (81.08)	74 (100.00)
Ante-Natal Care:			
Yes	13 (92.86)	48 (80.00)	61 (82.43)
No	1 (7.14)	12 (20.00)	13 (17.57)
Total	14 (18.92)	60 (81.08)	74 (100.00)
Agency of ANC:			
Doctor	12 (92.31)	35 (72.92)	47 (77.05)
ANM	-	1(2.08)	1 (1.64)
Trained Dai	1 (7.69)	12 (25.00)	13 (21.31)
Tetanus Toxoid:			
No T.T.	1(7.14)	9 (15.00)	10 (13.51)
T.T.- 1	-	3(5.00)	3 (4.05)
T.T.- 2/B	13 (92.86)	48 (80.00)	61 (82.43)

(Figures within parenthesis indicate percentage)

Antenatal care services utilized by deceased neonatal mothers were 13 (92.86%) in urban and 48 (80.00%) in rural area. The history of tetanus immunization indicated that 61 (82.43%) mothers had successfully completed immunization course. The ANC provided was 47 (77.05%) by doctors and 13(21.31%) by trained dais.

Table-3: Distribution of Neonatal deaths according to, area,place of birthand Sex

Particular		Age Group	
		Early neonatal	Late neonatal
Community:			
Urban	No. of Deaths	8	6
	Rate/1000 Live Births (n=608)	13.15	9.87
Rural	No. of Deaths	33	27
	Rate/1000 Live Births (n=1730)	19.08	15.61
Total	Total No. of Deaths	41	33
	Rate/1000 Live Births (n=2338)	17.54	14.11
Place of Birth:			
Hospi-tal	Male	17 (65.38)	10 (62.50)
	Female	9 (34.62)	6 (37.50)
	Total	26 (61.90)	16 (38.10)
Home	Male	7 (46.67)	11 (64.71)
	Female	8 (53.33)	6 (35.29)
	Total	15 (46.88)	17 (53.12)
Total	Male	24 (58.54)	21 (63.64)
	Female	17 (41.46)	12 (36.36)
	Total	41 (55.41)	33 (44.59)

(Figures within parenthesis indicate percentage)

Distribution of Neonatal deaths according to area, place of birth and Sex is shown in Table-3.Total 74 neonates died both from urban 14 (19.33%) and rural 60 (80.67%) areas. The difference between early and late neonatal deaths in Urban and Rural area is not significant ($X^2$is 0.02, which is lower than table value 2.71at 10% level).Only42 (56.76%) deliverieswere institutional. Male and female neonatal deaths were 60.81% and39.19% respectively.

Neonatal deaths by major cause group reported under this study are presented in table-4. Major neonatal deaths occurred due to Low Birth Weight (17.57%), Neonatal Pneumonia (14.86%) and Diarrhoea of New Born (12.16%). In Early neonatal deaths, Low Birth Weight (24.39%), Pneumonia (14.63%), Birth Asphyxia (12.19%), Birth Injury (12.19%) and Sepsis(9.76%) were main causes. In Late neonatal deaths Diarrhoea of new born (24.24%), Neonatal Pneumonia (15.15%), Neonatal Tetanus (12.12%), Digestive disorders (12.12%), Low Birth Weight (9.09%) and Disorders of Central Nervous System (9.09%) were main causes.

Table-4: Distribution of Neonatal deaths by Major cause groups

Causes	Age group			
	Early Neonatal deaths		Late Neonatal deaths	
	No.	%	No.	%
Low Birth Weight	10	24.39	3	9.09
Neonatal Pneumonia	6	14.63	5	15.15
Congenital malformations	2	4.88	1	3.03
Sepsis	4	9.76	2	6.06
Disorders of Central Nervous System	3	7.32	3	9.09
Digestive disorders	2	4.88	4	12.12
Fevers	2	4.88	2	6.06
Birth Asphyxia	5	12.19	0	0.00
Birth Injury	5	12.19	0	0.00
Diseases of Circulatory system	1	2.44	1	3.03
Diarrhoea of New born	1	2.44	8	24.24
Neonatal Tetanus	0	0.00	4	12.12
Total	41	100.00	33	100.00

Discussion: High Neonatal Mortality is mainly correlated with inadequate Maternal and Child Health services.

In the present study 74 neonatal verbal autopsies were performed in the area ofUrban Health Centre of Ahmedabad and a Primary Health Centre, Adalaj, to evaluate the causes of neonatal deaths. Our study is based on verbal autopsy method to know the causes of neonatal deaths and factors responsible for death in urban and rural area of Ahmedabad and Ganghinagar districts.

In present study the overall calculated mortality rates was 17.96 in early neonate, 13.69 in late neonate. Similar findings were observed Shrivastav et al,[7]Talsania et al,[8]Lala et al,[9] bang AT and RA et al.[6] Since the majority of neonatal mortality occurs

in the first few days of life, before postnatal environmental conditions have a substantial effect, these reports suggested the existence of environmental factors which may operate prenatal and predispose to early death, Dwight T. et al.[10]

All India figures health related programmes S. P. Shrivastava et al (2001),[7] carried out the study of causes of neonatal deaths in 1000 verbal autopsies in patna, Bihar showed that Deaths due to Low birth weight, congenital malformation, respiratory distress syndrome, neonatal pneumonia, post natal aspiration were more common during first 7 days of life. Deaths due to diarrhoea, dysentery and sudden death were recorded only in the late neonatal period.[7]

The present study re-affirmed the important causes/associates of neonatal deaths, namely, Low birth weight, Diarrhoea and Pneumonia. Similar observations have been made in earlier studies (SCD-1995). The ongoing and future programs for alleviating neonatal mortality should direct attention to these causes for the maximal benefit.
Most of the neonatal deaths due to Low birth weight, Neonatal Pneumonia, Birth asphyxia and congenital malformation were recorded during the first 7 days of life whereas deaths due to diarrhoea including dysentery were recorded over the next 3 weeks of life. Deaths due to birth injury/asphyxia and sepsis were common during 2nd and 4th weeks of neonatal life. Singh et al,[11] also reported that 55.41% of total neonatal deaths occurred during the first 7 days of life. Thus the LBW problem requires active intervention at national level. Unfortunately there is no single effective method of eliminating the problem of LBW babies.[12]

Conclusion: The use of the verbal autopsy tool by health workers to find out the cause of death is feasible. It can also provide health related information according to which local health authority can take action and contribute to the reduction of neonatal mortality. Further the training of health workers and their supervision can improve the quality.

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