Factors Influencing Infant Deaths In A Tribal Area Of South Gujarat

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Abstracts: Backgroud: : Background & objectives: With decrease in infant mortality rate, it becomes important to find out various types of determinants and their interplay leading to the infant deaths. This study was carried out with objective of finding out prevalence of environmental factors, factors influencing nutritional status and vaccination among infant deaths in a tribal block of south Gujarat. Methods: The study incorporated all the infant deaths, which occurred during selected one year period in all 51 villages of 3 selected Primary Health Centres. Data collection was done through house to house visits in the study area and analyzed with Epi Info 6.04 version software. Results: Out of total 48 infant deaths, in 81.3 % cases type of house was Kutcha and adequate ventilation was only in 16.7 % cases. Environment and sanitation was overall poor in majority of cases. Overcrowding was present in 87.5% cases. 27.1% mothers were enrolled in Anganwadi and half of them received food supplementation. Only 37.5 percent were fully vaccinated for age. Interpretation & conclusion: Awareness regarding importance of environmental and other factors in preventing infant deaths should be raised through health education programmes. Anganwadi workers should be sensitized regarding their work.
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Introduction: Infant mortality is not only an indicator of infant health, but also of the entire population and of their poverty ridden social status. [1] Infant mortality rate (IMR) (infant deaths per 1000 live births) has declined in last decades in India (50) and in Gujarat (48) [2] though it is still high compared to developed countries [3]. With decrease in IMR, it becomes important to find out various types of determinants and their interplay leading to the infant deaths. In addition to biological causes of death, environmental factors, factors influencing nutritional status and vaccination also play an important role in prevention of infant deaths. Because most common causes of death are low birth weight and infectious diseases like pneumonia and acute watery diarrhea. [4-5] Therefore, study of these factors is necessary in order to reduce number of such deaths.

With this background, we have carried out this study with objective of finding out prevalence of environmental factors, factors influencing nutritional status and vaccination among infant deaths in a tribal block of south Gujarat.

Material And Methods : Study was carried out in all 51 villages of 3 selected Primary Health Centers (PHCs) of a remotely located, tribal dominated block

from a border district of South Gujarat. Purposive sampling was done to select study populations keeping in mind the resources, feasibility, logistics and the availability of time. It was thought that population of 3 PHCs would be sufficient to meet the required sample size to fulfill the objective of the study. The study incorporated all the infant deaths, which occurred during selected one year period from 1st September 2004 to 31st August 2005. Field based data collection was accomplished within three months period. The infant deaths in which the mother was daughter-in-law of the village only, were included in the study. The information regarding infant deaths was gathered through 4 sources namely health care system, Integrated Child development services (ICDS) scheme, Civil Registration System (CRS) and Investigator himself. Data collection was done through house to house visits in study area. For every infant death noticed, interview was conducted at informant's house in the local language. First of all the purpose for study was explained to the informant and his/ her consent was obtained. Information about housing conditions, environmental sanitation, support of anganwadi for both mother and child and vaccination status of child were gathered by interviewing the available parent (preferably mother), on a designed verbal autopsy (VA)

questionnaire - developed with the help of VA questionnaire of various agencies like WHO, SEARCH team, Centre for Global Research and Aga Khan foundation.[6-8] Data was entered and analyzed with Epi Info 6.04 version software.

Result: Out of total 48 infant deaths, in 81.3 percent cases type of house was Kaccha and semi pucca was in 16.7 percent cases. While in one case it was of pucca type. Ventilation wise, adequate ventilation was only in 16.7 percent cases, whereas cross ventilation was present in 70.8 percent cases. Daylight in house was adequate just in 18.8 percent cases, while heat stress was present in 85.4 percent cases. In relation to kitchen and fuel facility, it came to notice that in about one-third (35.4%) cases there was no separate kitchen. In remaining cases there was separate kitchen mostly of sitting type (58.3%) and in 3 cases it was of standing type. Fuel used for cooking was wood in majority (87.5%), while in rest it was LPG [Table 1].

About environment and sanitation, it was revealed that in most of (87.5%) cases house was dirty. Sullage was disposed off outside house in most of cases (83.4%), in 8.3 percent cases there was open drain pit and in sewerage system in 8.3 percent cases. Regarding excreta disposal, it was open field defecation in most (91.7%) cases, own toilet in 6.2 percent cases and public toilet in only one case. Source of water supply, in one-third (33.3%) cases, their own and in remaining two third cases it was public source. Water was supplied by tap in 41.7 percent cases, by hand pump in same number of cases and water was taken up from well in rest 16.6 percent cases. In most of cases (93.8%) stored drinking water was covered. In more than three fourth (77.1%) cases straining of water was done for purification. Chlorination of water as a measure of purification was observed only in 2(4.2%) cases, while in one case measure of purification was boiling and in 16.7 percent cases no measure of purification was used [Table 2].

Table 1: Distribution of infant deaths according to housing conditions

Housing condition	Infant Deaths (N=48)	
	No.	%
Type of house		
Kutcha	39	81.3
Semi pucca	8	16.7
Pucca	1	2.1
Ventilation		
Adequate	8	16.7
Inadequate	40	83.3
Cross ventilation		
Yes	34	70.8
No	14	29.2
Daylight in house		
Adequate	9	18.8
Inadequate	39	81.2
Heat stress		
Yes	41	85.4
No	7	14.6
Kitchen		
Sitting	28	58.3
Standing	3	6.3
No	17	35.4
Fuel		
Wood	42	87.5
LPG	6	12.5

Table 2: Distribution of infant deaths according to environment and sanitation

Environment & Sanitation	Infant Deaths (N=48)	
	No.	%
Cleanliness of house		
Clean	6	12.5
Dirty	42	87.5
Sullage disposal		
Outside house	40	83.4
Open drain pit	4	8.3
Sewage system	4	8.3
Excreta disposal		
Open field defecation	44	91.7
Public toilet	1	2.1
Own toilet	3	6.2
Ownership of water supply		
Own	16	33.3
Public	32	66.7
Source of water supply		
Tap	20	41.7
Hand pump	20	41.7
Well	8	16.6
Storage of drinking water		
Covered	45	93.8
Uncovered	3	6.2
Measures of purification		
Straining of water	37	77.1
Chlorination	2	4.2

Boiling	1	2.1
None	8	16.7

Overcrowding was present in 42 (87.5%) cases based on number of persons per room, in 33 (68.8%) cases on basis of sex separation and in 13 (27.1%) cases based on floor space criteria. History of previous infant death in family was present in 4 (8.4%) infant deaths and to same mother was observed in 2 (4.2%) infant deaths. Mothers had habit of tobacco use during pregnancy in form of Gutakha among 5(10.4%) infant deaths. No alcohol or any other addictive substance use was found in any case. Height of the mother could not be recorded in 8 cases, where subjects were not available. For the remaining 40 women it varied between 130 and 167 cm with mean height of 149 $\pm$ 6.8 cm. The height less than 145 cm is taken as cut off to identify the high-risk pregnancies[9] and accordingly 17.5 percent were the high-risk pregnancies.

Table 3: Distribution of infant deaths according to Anganwadi support for mother

Anganwadi support for mother	Infant Deaths (N=48)	
	No.	%
Enrollment		
Yes	13	27.1
No	35	72.9
Food supplementation		
Yes	6	12.5
No	42	87.5

Out of 48 infant deaths, in over one fourth cases (27.1%), mothers were enrolled in Anganwadi. But only in 6 (12.5%) cases food supplementation was received by mother. In other words only half of those women who were enrolled during pregnancy received the food supplementation [Table 3]. Anganwadi enrollment of child was found in 11(22.9%) infant deaths. All 7 infants above 6 months age were not given food supplementation. Vaccination coverage was considered according to infant's age at death. A child was considered as fully vaccinated if the child had received all the vaccinations for which he was eligible at his or her age. In three fourth of infant deaths, BCG vaccine was received. 81.3 percent, 71.4 percent and 69.2

percent cases had first, second and third dose of OPV and DPT vaccine respectively. First, second and third dose of Hepatitis B vaccine was taken in 62.5 percent, 64.3 percent and 61.5 percent infant deaths respectively. In 6-8 percent cases, history of hepatitis B vaccination was not revealed. Half cases had received measles and first dose of vitamin A. Out of 16 post-neonatal deaths only 37.5 percent were fully vaccinated for age, while 43.8% and 18.7% cases were partially vaccinated and not vaccinated (for their age) respectively [Table 4].

Table 4: Distribution of infant deaths according to vaccination for age

Vaccination	N*	Infant Deaths	
		No.	%
BCG	16	12	75.0
OPV1+ DPT1	16	13	81.3
OPV2 + DPT2	14	10	71.4
OPV3 + DPT3	13	9	69.2
HBV1	16	10	62.5
HBV2	14	9	64.3
HBV3	13	8	61.5
Measles	4	2	50.0
Vitamin A	4	2	50.0
Vaccination status (N=16)*			
Fully vaccinated for age		6	37.5
Partially vaccinated for age		7	43.8
Not vaccinated for age		3	18.7

* N indicates the number of infants who were eligible for particular vaccination

Discussion: Present study showed that in more than 80 percent cases house was Kutcha with poor ventilation, lighting and heat stress as well as wood used as fuel. A study from north India observed Kutcha house in 50 percent or more infant deaths.[10] Another study also correlated poor housing with infant mortality.[11] 36.4 percent households had Kutcha house and wood as most common fuel (78%) in rural Gujarat.[12] Our study found environmental sanitation as poor in most of cases (87.5 - 91.7%), which reflected as dirty house, improper sullage disposal and open field defecation. Another study[13] noticed that lack of toilet has no independent effect on perinatal mortality. It is natural as poor housing and poor environmental sanitation go hand in hand with poverty which is indicated by social classification; and lower

socioeconomic status adversely affects infant's health. Source of water supply was hand pump and well in majority (58.3%), chlorination and boiling were used for water purification in only (6.3%) cases. Findings in rural Gujarat[12]showed 79 percent households had no toilet facilities, 37.6 percent had hand pump and well as source of water and boiling as measure of purification of water was found only in 1.7 percent cases. Studies from elsewhere[14-15] have demonstrated association of access to safe water and sanitation with infant mortality. Overcrowding was present in 27.1 to 87.5 percent cases according to different criteria. Another study[16] has described greater risk of neonatal mortality for overcrowded homes.

History of previous infant death in family was present in 4 (8.4%) infant deaths. A study[17] from Bombay noticed that infant mortality was approximately one and half times more among the infant born to mothers who have had a previous infant death as among those born to mothers without a previous infant death. A study from Nepal[18] also reported association of infant mortality with previous history of infant death. Mothers had habit of tobacco use during pregnancy in form of Gutakha among 5(10.4%) infant deaths. Katz et al[18] observed cigarette smoking among 28 percent mothers and alcohol use among 9% mothers and were associated with higher mortality in the first week of life. In present study height less than 145 cm was taken as cut off to identify at risk mothers and accordingly 17.5 percent mothers had high-risk pregnancies. A mean height for women in Gujarat was 152 cm.[12]Various studies[19-21] described higher risk of perinatal and neonatal mortality among short stature mothers. Only in 27.1 percent cases, mothers were enrolled in Anganwadi and amongst them only half received food supplementation. It reflects poor functioning of ICDS system and lack of awareness on the part of beneficiaries. As a whole, system is unable to reach to those who need it most. Higher risk of early neonatal morbidity and infant mortality among mothers with poor nutritional status is documented by other studies as well.[22-23]

Regarding vaccination, only 37.5 percent infants were fully vaccinated, which was very low compared to other[5] (91.7%). In rural Gujarat and Surat district, fully vaccinated children of age group 12-23 months are 48.7 percent and 62.6 percent respectively.[12, 24]A study from western India[22] used multivariate analysis and stated the positive influence of vaccination on infant mortality.

Limitation of our study is that no control group was taken for comparing results. So we cannot attribute or quantify the role of various attributes on infant mortality.

Conclusion: Present study revealed that in most of infant deaths, housing standard were of low quality, environmental sanitation was poor and full vaccination was comparatively low. So, importance of these factors in preventing infant deaths should be emphasized in health education programmes to increase awareness in such community. Role of anganwadi in supporting mother and child health was also questionable, as enrollment in anganwadi itself was less. Anganwadi workers should be sensitized regarding their work and its significance, as they are the grass root workers and improvement in quantity and quality of their performance are essential to reduce infant deaths.

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