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**ORIGINAL ARTICLE**

# SOCIO-DEMOGRAPHIC PROFILE OF INFANT MORTALITY BY VERBAL AUTOPSY IN URBAN AREA OF BHAVNAGAR, GUJARAT

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**ABSRTACT**

**Objectives:** To study socio-demographic profile of all registered infant deaths in Bhavnagar city.
**Materials and Method:** This was a community based retrospective analytical study carried out in municipal corporation area of Bhavnagar city for which list of all registered infant deaths from 1st January 2009 to 31st December 2009 from municipal corporation, Bhavnagar was obtained. Data collection was carried out between January to May 2010 at respondent's house with help of restructured verbal autopsy questionnaire developed by WHO.
**Result**: Out of 96 total verbal autopsies 73(76%) infant deaths were in neonatal period chiefly focus in early neonatal period (62.5%). Male infant were 57.3% & 42.7% were female. Average family size was 4.9%. 61.5% from socio-economic class IV and 38.5% from classV. Poor housing was reported in 90% cases. Mother age less than 20 years at time of birth of the baby was in 15%. >1/3rd infant deaths in gravida & parity one. In 53.9% cases birth spacing was <2years.
**Conclusion:** By studying verbal autopsy, this study shows how important it is to correctly identify socio-demographic factors responsible for infant deaths. The present study concluded highest chances of infant deaths in ENP( Early Neonatal Period) mainly within one hour with significant male infant deaths in ENP. Most deaths were in lower socio-economic strata & first gravida/parity with birth spacing less than two years.

**Key words**: Infant mortality, early neonatal deaths, verbal autopsy.

## INTRODUCTION

Infant Mortality Rate (IMR) is regarded as an important and sensitive indicator of the health status of a community. It also reflects the general standard of living of the people and effectiveness of interventions for improving maternal and child health in a country. Compared to other indicators like crude birth rate, maternal mortality rate and under-five mortality rate etc, this indicator has always been accorded greater importance by the public health specialists because infant mortality is the single, largest category of mortality. Moreover, deaths during infancy are due to a particular mix of diseases and conditions to which the adult population is less exposed and less vulnerable. Changes in specific health interventions affect IMR more rapidly and directly and consequently it may change more dramatically than crude death rate in a population. This is clearly demonstrated in a developing country like India[1]. There are wide variation seen in different parts of the world (2/1000 LB in developed countries like Singapore & Switzerland to 89/1000 LB in sub-Saharan Africa)[2]. Same way wide variation is

seen within India ranging 12/1000 LB in Kerala state to 70/1000 LB in Madhya Pradesh in year 2008 as per SRS Bulletin Oct.2009[3].

The method used for analysis of socio-demographic factors responsible for infant deaths in the study was verbal autopsy which is defined as an investigation of train of events, circumstances, symptoms and signs of illness leading to death through an interview of relatives or associates of the deceased[4]. Similar type of method also used in other studies[5,6]. It is hoped that valid and reliable data of infant death shall be available to policy makers and planners which is an absolute vital for strategy making, health sector planning, monitoring and assessment of health programs, field research evaluation and epidemic consciousness.

## MATERIALS AND METHOD

This was a community based retrospective analytical study carried out in municipal corporation area of Bhavnagar city for which list of all registered infant deaths from Municipal Corporation Bhavnagar was obtained. Total 147 infant deaths were registered from 1st January 2009 to 31st December 2009 included in the study out of these verbal autopsy of 96 cases of infant deaths became possible due to various reasons like house could not be traced due to incomplete address or respondent refuses to give information or knowledge of person giving information is not enough or migration of the family. Field based data were collected between January to May, 2010 at respondent's house in the language they could understand for interview. The child's mother was selected as respondent wherever possible. In her absence or non-availability, father or foster parents who used to take care of the child were selected as respondent. Before starting interview, I introduced myself and explained all the reasons for the study & took informed verbal consent of every participant before interview.

**Study tool:** The tool used in this study was designed verbal autopsy questionnaire prepared with the help of the standard Verbal Autopsy questionnaire developed by WHO restructured to address the local need and requirements based on other studies.

**Ethical concern**: The Institutional Review Board, Government Medical College, Bhavnagar approved the study. Informed verbal consent in the local language was obtained from the respondent during household visit & maintained confidentiality concerning the cause of death arrived at throughout verbal autopsy.

**Table 1:** Distribution of infant deaths according to various family based characteristics

| Family based Characteristics (N=96) | | No.(%) |
|---|---|---|
| Family Type | Nuclear | 33 (34.4) |
| | Joint | 49 (51.0) |
| | Three generation | 14 (14.6) |
| Family Size | 1-5 | 64 (66.7) |
| | 6-10 | 30 (31.2) |
| | More than 10 | 2 (2.1) |
| Education of Mother (N=74) | Illiterate | 27 (36.5) |
| | Up to Primary | 41 (55.4) |
| | Up to higher secondary | 5 (6.8) |
| | Graduate & above | 1(1.4) |
| Mother's Age of Marriage | 15 – 18 | 50 (52.1) |
| | 19 – 21 | 38 (39.6) |
| | 22 – 24 | 6 (6.3) |
| | ≥ 25 | 2 (2.1) |
| Mother's Age at Birth of Deceased Child | 16 – 18 | 6 (6.3) |
| | 19 – 21 | 28 (29.2) |
| | 22 – 24 | 35 (36.5) |
| | ≥ 25 | 27 (28.1) |
| Education of Head of Family | Illiterate | 43 (44.8) |
| | Up to Primary | 39 (40.6) |
| | Up to higher secondary & above | 14 (14.6) |
| Occupation of Head of Family | Unemployed | 34 (35.4) |
| | Unskilled Worker | 59 (61.5) |
| | Semiskilled worker | 2 (2.1) |
| | Other | 1 (1.0) |
| Socioeconomic Class | Upper & Upper middle I & II | - - |
| | Lower Middle III | - - |
| | Upper Lower IV | 59 (61.5) |
| | Lower V | 37 (38.5) |
| Birth Spacing | < 2 yrs | 29 (53.7) |
| | ≥2 yrs | 25 46.3) |

**Data analysis:** Data analysis was done in epi info 3.2 software & applied suitable statistical test [Z, $\chi^2$] to the various determinant of the study wherever required.

**Limitation**: (i) As this study test assumptions in urban area, so we purposely selected such areas (convenient sampling). Therefore, the study does have selection bias. (ii) Consciously we have not commented on IMR in the area, as sample size was small. (iii) There was no control group for comparing results. So, study cannot quantify the role of various attributes on infant mortality. (iv)Information gathered relied totally

on recall of events by the informants, therefore, recall bias might have influenced the results.

## RESULT & DISCUSSION

Total 96 respondent were interviewed for verbal autopsy among them 73(76%) of total infant deaths in neonatal period with highest (62.5%) focused during early neonatal period & 13% occurred during late neonatal period [Figure I] which is similar to various studies[6-8]. NHFS-3 data of India and Gujarat[9] shows neonatal mortality of around 68.4% and 67.4% of total infant mortality rate respectively which is little less as compared to our study.

There was consistent preponderance of male deaths 55(57.3%) in overall infancy as compared to female 41(42.7%). This difference was statistically significant in early neonatal deaths particularly deaths occurred immediately (within one day) which indicates higher chances of deaths in male in one day and if we compared deaths within one hour it was more in female[Figure I]. A study done in urban slum of Tamil Nadu[10] also shows 54.7% male and 45.3% female infant deaths. Another study[11] in which 53% infant deaths in female and 47% death in male infant reversed as compared to our study. Considering NFHS-3 data[9] as a whole, it is seen that IMR is marginally higher in females (58%) than males (56%). However, in the neonatal period, like elsewhere, mortality in India is lower in female (37%) than male (41%) same as our study. In Gujarat mortality is more in male (63.1%) as compared to female (62.5%). As children get older, female are exposed to higher mortality than males in the post neonatal period which was also revealed in our study with 26.8% female died in postnatal period whereas 21.9% in case of male infant deaths.

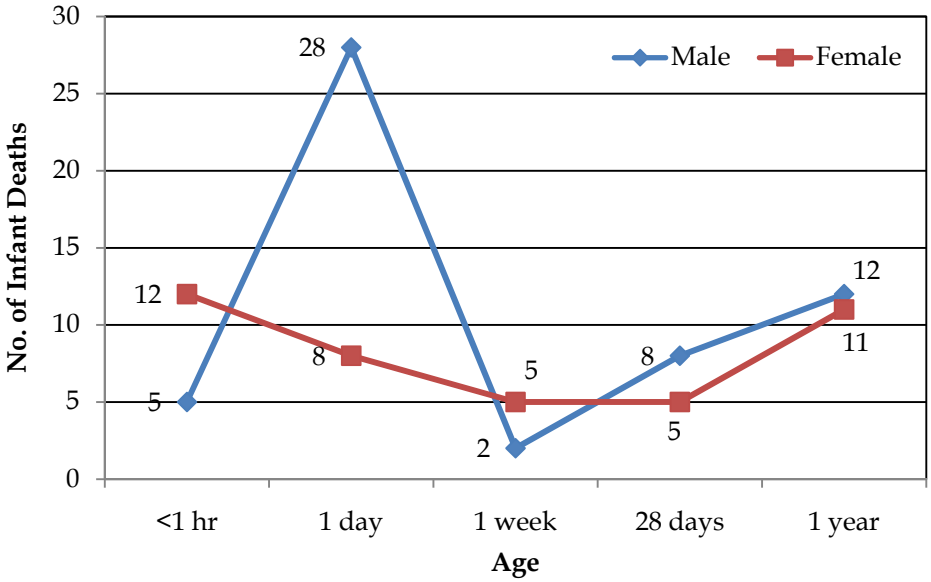


**Fig 1:** Age and Sex distribution of infant deaths

Various family based characteristics were presented in Table 1. Based on family type, it was found that in majority (51.0%) families were of Joint type, 34.4%t families were Nuclear and 14.6% were of Three-generation type of families. It was observed that 66.7% had small family size with members between 1 and 5 while others (33.3%) were with family size more than five. Average family size was 4.9. Out of total respondent mothers, 36.5% were illiterate. Only one mother was educated up to graduate level while 62.8% mothers were educated up to higher secondary level. Considering legal age at marriage (18 years for female) 26.04% mothers got married before attaining the legal age of marriage with mean age at marriage of 18.8 years. According to DLHS-3 (2007-2008)[11] mean age of marriage for girls in Gujarat is 19.8 years and for urban area it is 21.1 years of age which is little higher than our result with mean age of 18.8 years. Girls married before attaining the legal age of marriage (18 years for female) is 18.9% which is less as compared to our study. The proportion of women married before reaching the legal minimum age of 18 is lowest in Goa (11%)[8] with lowest IMR in India

(10/1000LB). In another study done in Manipal[12], average age of marriage was found to be 21.7 years, which is higher as compared to our study. The teenage pregnancy and motherhood brings strain on the girls, who is still maturing and therefore is not capable of withstanding the nutritional and metabolic stresses of these events, thereby affecting infant survival largely. In 15% cases, Mother's age at birth of deceased child was <20 years and in 6.25% cases, it was ≥30 years. Mean age at birth of deceased child was 23.16. A study done by Saksena et al[13], shows distribution of deliveries by age of mother exhibited a sharp increase in perinatal mortality rate (77.3%) from the age group below 20 years. Characteristics of head of family displayed in table 1 shows 44.8% were illiterate, while education up to primary and higher secondary & above in 40.6% and 14.6% respectively. Majority of them (61.5%) were unskilled worker while 35.4% were unemployed and rest (3.1%) included in semiskilled worker and other. So according to Kuppuswamy's socioeconomic classification 61.5% from upper lower social class (class IV), while rest (38.5%) were from the lower (class V) which was comparable with various studies[14,15]. Poor housing, poor environment sanitation, low maternal education, early marriage and pregnancy which are factors affecting infant deaths go hand in hand with poverty that is indicated by social classification which were also seen in our study.

**Table 2:** Distribution of infant deaths according to gravida and parity of mother

| Gravida / Parity | Gravida No. (%) | Parity No. (%) | Birth Order No. (%) |
|---|---|---|---|
| 1 | 33 (34.4) | 37 (38.5) | 42 (43.8) |
| 2 | 31 (32.3) | 31 (32.3) | 30 (31.3) |
| 3 | 23 (24.0) | 19 (19.8) | 18 (18.8) |
| 4 | 6 (6.3) | 8 (8.3) | 6 (6.3) |
| 5 | 3 (3.1) | 1 (1.1) | - |

Table 2 revealed Gravida and Parity status shows little difference as maximum deaths (38.5%) occurred in first parity. Similar finding reported in a study by Aggarwal et al[16] & study done in Nepal[6] which shows highest mortality in primiparous. In our study, most of infant death (85.1%) birth order of child was first or second [Table 2]. It might be consequences of early marriage and teenage pregnancy as mean of age of marriage and first pregnancy of mother was 18.8 years and 19.4 years respectively. Similar finding also reported according to NFHS-3 data showing lowest IMR for birth order 2 or 3 (47%), and higher for first birth order (64%)[8]. Another studies also shows highest mortality in 1st birth order[7,17,18]. Main reason for high infant death for first birth orders were teenage pregnancies, which is also common in lower socioeconomic groups, where mortality tends to be higher. Regarding birth spacing & infant deaths it was found that 53.7% of the deaths were among babies born with a spacing less than 2 years which is comparable with NFHS 3 date showing 65.7% mortality in birth spacing less than 2 years. Other studies[17,18] also revealed similar finding.

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