



## SOCIAL AND DEMOGRAPHIC FACTORS AFFECTING INFANT MORTALITY RATE IN GUJARAT

### Abstract:

*Infant and maternal mortality rate are most important indicator or index of social and economical development of any country or region. It is generally observed that in backward country both infant and maternal mortality rate is high compare to development country. Especially Infant mortality rate (IMR) shown as good index of development and healthiness of any country or regions community. The problem of infant mortality is most important as social science field, economic development, health, social development etc. Hence the international and nation government has included in millennium development goal (MGD 4 & 5) to reduce Infant death and to enhance the level of child development. The infant mortality rate is affected by a large number of social and economical factors.*

*The state Gujarat is economically developed state but infant mortality rate is found in the Gujarat state higher in comparison to some other development state of India. Here an attempt has been made to find out the different social and economical factors affecting the infant mortality rate of the Gujarat state. In this paper analyses regarding the IMR in Gujarat highlight the different factors affecting the infant mortality rate. Also find out the trend of IMR in Gujarat by using of graphical representation and find out or estimate the IMR by using linear equation model for year 2016 to 2018 in Gujarat. Here we are make some suggestion to reduce the intensity of factors affecting the IMR in Gujarat so, that infant mortality may be reduce to a certain extend in the state of Gujarat.*

**Keywords:** *IMR, ASDR, Mortality, Fertility.*

### 1.1 Introduction:

Infant mortality is the most sensitive index to measure social development, economical development and the quality of life. According to Barclay ' Infant are define in demography as an exact age group, namely, age 'zero' or those children in the first year of life, who have not reached age one'.

A formula of infant mortality is defined as:

$$IMR = \frac{D_0}{B} * 100$$

Where  $D_0$  = Number of deaths among children of age 0 to 1 year

B = Number of live births.

In the age specific death rate numerator and denominator both are same age group for number of infants. As we know that infants are grossly under enumerated in a population census. As such ASDR tend to highly overstated. Moreover, estimates of population by are rarely obtainable annually. The IMR can be computed for any population and for any time period, if available only number of infant and the number live birth are available. This type of computation not possible in case of ASDR, in case of small area and estimate population of age 0 to 1 year for in most countries the great risk of death under the age one year is not equaled any other part of live span, except at very old age. But unlike death at very old age, infant deaths are highly responsive to improvement in environmental and medical conditions. The IMR provide as good index of general healthiness of the community.

The infant mortality rate is generally computed by the ratio of death of children under the one year of age and total number of live birth for the registered in same calendar year. This rate is the approximated measure of the true risk of death between birth of baby and its first birthday, there is no adjustment made that infant, who die in the year considered, were born in the preceding year. The infant mortality rate is specially important of mortality rate analysis because of the IMR important for the computation of all death, especially for those countries health condition are poor. The study of IMR is important because of mortality during the first year of life is invariably high for all countries, irrespective of whether the overall levels of mortality may be high or low.

Child or infant mortality is a fundamental measurement of a country's level of socio-economic development as well as the quality of life especially of the mothers. Under-five mortality rate represents the probability of a child who survives to age one, dying between age one and age five (Adlakha & Suchindra 1984; National Population Commission and ICF Macro, 2009; World Health Organization (WHO), 2011). The issue of infant mortality prejudiced international as well as national government to intensify their efforts to reduce the IMR and to increase the level of child survival. There are many country committed to reducing the infant mortality rate and growth of population through various family planning programmers, different type of health scheme etc. If we want to reduction of infant and child mortality rate to a low level is a necessary precursor for achieving rapid reduction in fertility level also.

### **1.2 Objective of the study:**

- A) To study the social and economical factor affecting infant mortality rate in Gujarat.
- B) To estimate the infant mortality for future year and high-light the trend of IMR in Gujarat.

### **1.3 Methodology:**

The study is based on the analytical research which has to use available fact and regarding information. The research done on the basis of the secondary data which have been collected from the different research work or paper, journal, magazine, and internet sources.

## **2. Factors affecting infant mortality:**

A various factors affecting to infant mortality are usually classified as biological and social-economical or environmental factors. The reduction in mortality was considerably greater in the younger age group than in the older age group. In general, it may be said the low level of infant mortality appears to be associate with the low level of general mortality.

The level of mortality is very high in the first few hours, day and week of the life. The reason for infant death at earlier and later stage of infancy differ to certain extent. Hence the study of infant mortality grouped in the two categories according to the age of death. The first category consist infants dye before they complete four weeks of life. Then other one is consist to infants who dye between 28 days to 365 days of their life. The rate of first period called neo-natal mortality rate, while second period called post neo-natal mortality rate. Factor affect to the fatal and neo-natal mortality is known as endogenous, while factor affect to the post-neo-natal is known as exogenous.

### **I) Endogenous Factors:**

The endogenous factors are biological factors related to the formation of the fetus in the womb. The important factors which affecting foetal and neo-natal mortality rates are the age of mother, the birth prematurely, weight at birth and fact of multiple births. In the study of infant death that foetal and neo-natal mortality rates are higher at younger age of mother (below 19), up to the age of 29 of mother, these mortality rates declined and increase after it.

The maturity of an infant is an important factor affecting neo-natal and infant mortality rate. Similarly, the weight of baby at birth is also important factor affecting neo-natal and post-neo-natal death. According to NFHS Gujarat has the fifth highest rate of neo-natal mortality rate among tribal 56.5 per 1000 birth. The overall neo-natal birth in state is 39.6 per 1000 birth. In 1950, low birth weight was in case of two-thirds of all the neo-natal death in USA. It was also found that the change of survival increased considerably with even a moderate increase in the birth weight- the optimum birth weight ensuring survival being 3501-4000 gms. The still birth and neo-natal mortality rate are high in case of multiple births. Endogenous factors are also known as generic factors.

### **II) Exogenous Factors:**

There is some social, cultural, economical and environment factor affecting the post-neo-natal mortality which is known as exogenous factors. One of the causes for high infant mortality rate in some state or country is lake of availability of medicine for the maternal mothers or new born child in Gujarat. In Gujarat tribal area most of the post-neo-natal deaths are due to only some communicable diseases like diarrhea and pneumonia etc. There also some adverse factors including in case of post-neo-natal death like congestion, insanitation, lack of sufficient sun shine and fresh air. Illegitimacy is also important factor for a high infant mortality. The different between infant mortality rates of

illegitimacy and legitimacy birth is usually found to be quite marked. All above factors which affects the infant mortality during the period of post-neo-natal death.

One interesting feature of the role of endogenous and exogenous factors in determining infant mortality rates is worth noting. In the state or country where infant mortality rate is very low, a higher proportion of infant death occurs during the neo-natal stage, because, being developed, they have been successful in almost completely eliminating the environmental factor responsible for such deaths. The main reason of infant mortality in these states and country is genetics and biological in nature. In state or countries where infant mortality rates are high, the majority of infant deaths occurs after the neo-natal stage and is due mainly to environmental factors.

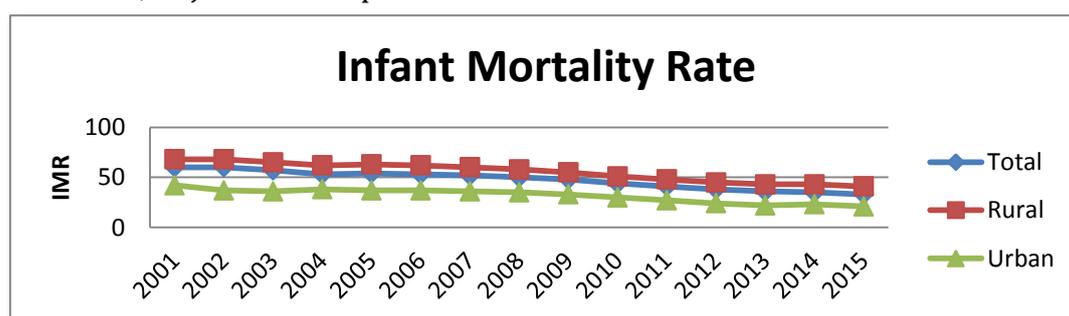
### 3. Trend of Infant Mortality Rates in Gujarat:

The Governments of India has set up the target of infant mortality rate to 30 per thousand live births by 2016. The probability of target stated in National Population Policy 2000 can be accessed from the available data of Socio-Economic Review, Gujarat State, 2016-17 for the state of Gujarat. The 15 year trend may be suggesting that approachability of the target. Following data represent the possibility of set target.

Year	Total	Rural	Urban
2001	60	68	42
2002	60	68	37
2003	57	65	36
2004	53	62	38
2005	54	63	37
2006	53	62	37
2007	52	60	36
2008	50	58	35
2009	48	55	33
2010	44	51	30
2011	41	48	27
2012	38	45	24
2013	36	43	22
2014	35	43	23
2015	33	41	21

**Source:** Socio-Economic Review, Gujarat State, 2016-17

From the above table it is observe that in Gujarat around 33 out of 1000 live birth are bid good bye to their parents before the completing one year of life in the year 2015. It's a half of the comparing IMR in year 2001. It is also good sign for the going toward the achievement of millennium development goal target and National Population Policy 2000. Like all India, the state achieved IMR from 60 in 2001 to 33 in 2015, thus reducing the rate by during the 15 year period. The following chart represents IMR, Gujarat for the period 2001 to 2015.



From the above chart we can say that an infant mortality rate of Gujarat has decreasing trend in rural area, urban area, and total. For the better result we test the IMR trend by using of Mann-Kendall test.

### Mann-Kendall Test:

**H<sub>0</sub>:** There is no Trend **V/S** **H<sub>1</sub>:** There is downward trend.

IMR	Statistic	ASE	p-value
Total	-101	20.158	0.000
Rural	-100	20.133	0.000
Urban	-91	20.091	0.000

From the above table 2 the P-value of IMR for Rural, Urban and Total is 0.000, which is less than 0.05. Therefore we reject null hypothesis. So, conclude that there is downward trend in all three IMR rates.

### Estimate the IMR for year 2016 to 2018:

For the estimation of Infant Mortality rate for 2016 to 2018, we use the method of least square. Here we are estimate Total, Rural and Urban Infant mortality rate by using of linear equation model. In this model we take Infant Mortality as a dependent variable and time as an independent variable. Model equation given as below:

$$Y = a + bx + e$$

$$\text{Infant Mortality Rate} = a + b * (\text{time}) + e$$

### To fitted model for Total IMR:

$$\text{Total IMR} = 63.743 - 2.018 * \text{time} + e \dots (1)$$

For the fitted linear model for the **Total IMR** we obtain that  $R^2 = 0.97$ , its means the fitted model explain 97% variation according to time and p-value of mode found significant. So, fitted model is appropriate.

### To fitted model for Rural IMR:

$$\text{Rural IMR} = 72.295 - 2.104 * \text{time} + e \dots (1)$$

From the above **Rural IMR** fitted model we obtain that  $R^2 = 0.968$ , its mean that model explaining 96.8% variation according to time and model is also significant. So, fitted model is appropriate.

### To fitted model for Urban IMR:

$$\text{Rural IMR} = 43.410 - 1.443 * \text{time} + e \dots (1)$$

From the above **Urban IMR** fitted model we obtain that  $R^2 = 0.90$ , its mean that model explaining 90% variation according to time and model is also significant. So, fitted model is appropriate.

	2016	2017	2018
Total	31.45	29.43	27.41
Rural	38.63	36.52	36.52
Urban	20.32	18.88	17.44

From the above model for Infant mortality rate of Total, Rural and Urban in Gujarat, we found that in year 2016 estimated value of Total, Rural and Urban IMR in Gujarat are 31.45, 38.63 and 20.32 per thousand live births respectively. In the year 2017 estimated value of Total, Rural and Urban IMR in Gujarat are 29.43, 36.52 and 18.88 per thousand live births respectively. In the year 2018 the value of IMR for Total, Rural and Urban are 27.41, 36.52, and 17.44 per thousand live births respectively.

The trend there for suggested that Total IMR may come down to around 27 per thousand live births in year 2018. If there will not affect any social and demographic factors and no extra or any special efforts and are being made to bring down by Govt. of Gujarat and Health ministry.

#### 4. Finding and conclusion:

In the present's days one of the burning problems of the nations in the word is high growth of population, particularly in the developing economics. There are three component for population growth such that fertility, mortality and migration. But contribution of migration is found negligible in the country but it is important state to state migration for the estimation of growth of particular state. The two major factor contribute in the growth of population are fertility (birth rate) and mortality (death rate).

The state, Gujarat is economically developed state and mortality is found to be low in compare to another state but infant or child mortality found high compare to some another economically developed state. So, a study has been undertaken to find out the various cause of infant mortality in the state.

#### The major findings of our analysis are as:

- (1) The infant mortality rate of Gujarat for the year 2000 is 60 per thousand live births; in the year 2015 is 33 per thousand live births. It is approximately half number declining during the 15 years infant mortality rates of overall and Urban area, but in the Rural area still there is high IMR due to lack of facility available for health in the interior areas or forest areas villages.
- (2) From the estimation of Infant Mortality rate we found that, in the year 2018 IMR for the Total, Rural and Urban are 27.41, 36.52 and 17.44 respectively. If there will not affect to IMR major social and demographic factors in future.
- (3) In the rural area one of the major causes of infant mortality rates is still high due to lack of education of female in rural area. It has been found in our study rate of maternal mortality is also higher in case of uneducated female compare to educated female.
- (4) Absence of doctors and nurse is also important factors of high Infant Mortality rate.
- (5) The gap between two births is also one of the major factors of infant mortality.
- (6) Age of the marriage also affected the infant mortality rate. Both under-age and over-age of marriage adversely affected the infant mortality.
- (7) Another important factor finding in the study that vaccination is one of the important factors that affect the infant mortality. It has been found that the infant mortality of vaccinated babies is lower compare to non-vaccinated babies.

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