Infant Mortality Rate as a Tool to Improve Rural Health

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Abstract

Children are considered to be an important asset of a nation; therefore reduction in infant mortality rate is likely to be the most important objective of the millennium development goals. Infant Mortality Rate reflects a country's level of socio economic development and quality of life and is used for monitoring and evaluating population, health programs and policies. The paper discusses the trends and patterns in infant mortality rate (IMR) over the period 1995 to 2012 across various selected states within India. Simple regression model under Ordinary Least Square method is used to find out the relationship between infant mortality rate and factors influencing IMR. Though the National Population Policy (NPP) 2000, aimed at achieving infant mortality rate of 30 by the year 2010 actual rate achieved during that period was 47. The case is even worse in rural India. There seems to be a little progress made over the years in bridging the gap. But the gap only seems to be widening by the day. This paper also focuses on finding out the gap between rural and urban infant mortality rates in India. This paper argues as to how infant mortality rate can be used as a tool to improve health conditions in India, especially in rural India.

Keywords: Infant Mortality rate, rural area, education, gender gap, women

Introduction

Children are important assets of a nation; therefore reduction in infant mortality rate is likely the most important objective of the millennium development goals. Infant mortality refers to deaths of young children, usually those less than one year of age. It is measured by the infant mortality rate (IMR), which is the number of deaths of children below one year of age per 1000 live births. Infant Mortality Rate reflects a country's level of socio economic development and quality of life and is used for monitoring and evaluating population, health programs and policies. It is an outcome rather than a cause and hence directly measures results of the distribution and use of resources, Haines (1995). Infant mortality rates act as an accurate indicator of health status and also perform as information providers for programs concerning pregnancy education, counselling and technological advances. The health and well-being of children and families through the globe are measured by infant mortality rates. Since infant mortality rate is widely accepted and relatively ease in calculating annual rates, it has resulted in being used commonly for comparisons across regions, populations and time periods. Such comparisons of infant mortality rates are used commonly for need assessments and for the evaluation of the impact of public health programs.

Though the National Population Policy (NPP) 2000, aimed at achieving infant mortality rate of 30 by the year 2010 actual rate achieved during that period was 47. Infant mortality rate is not only seen as a measure of the risk of infant death but it is used more broadly as a crude indicator of i.) Community health status; ii.) Poverty and socioeconomic status levels in a community; iii.) Availability and quality of health services and medical technology (State Infant Mortality Toolkit, AMCHP).

While studies show that there has been a significant decline in the infant mortality in India since late 1980's, its performance with respect to other countries in South East Asia is not very impressive. To be specific, the variation in the reduction of IMR between rural and urban India is not very significant. The socio-economic census data (2011) reveals that almost 73 percent of the households were in rural areas. On a contrary, most of the development projects are urban centric. Rural Statistics show that almost three fourths of the rural households live below that of the basic standards of the urban households. Taking poverty into account, poverty line is showing a decrease in rural areas but the decrease is not as significant as it is in the urban areas. The Rangarajan Committee estimates are also indicative of the fact that rural poverty is higher than urban and stands at approximately 31 percent in 2011-12. Though there seems to be a little progress made over the last seven decades in bridging the gap. The gap only seems to be widening by the day (Mukunthan Athreya, 2015)

Data and Methodology

Data from various government databases like Socio-economic census data, World Bank report, Central Statistical Organization, National Rural Health Mission, Ministry of Health and Family Welfare, Annual Health Surveys, Census of India etc are used for a time period 1990-2012. Infant mortality rate is taken as the dependant variable - health expenditure, gross per capita national income and labour force participation of females are taken as the independent variable. The research uses simple regression model to analyse and interpret relationship between these variables. Descriptive analyses in the form of charts, tables, line graphs are also used to explain the data.

Objectives

The objective of this article is:

i) To find out the trends in infant mortality rate of India.

ii) To analyse the gap between rural and urban infant mortality rates in India

iii) To determine the factors that influence IMR (health expenditure, GNI, labour force participation of women)

Literature Review

In the journal "An analysis of Levels and Trends in Infant and Child Mortality Rates in India" published by the National Institute of Public Cooperation and Child Development , New Delhi 2014, trends in infant mortality and maternal mortality rates are analysed. The journal talks about interstate disparities with respect to socio economic groups. Importance of infant mortality rate as a crude indicator of population measure is explained making it obvious that infant and child mortality are considered as sensitive indicators of living and socio economic conditions. The journal elucidates policies and initiatives taken by the Government to reduce the growing infant deaths and improve child survival conditions. It is observed that there exist a mild gender gap in child mortality rates throughout the country particularly more in the less developed and slow performing states. The journal on the whole summarizes the various factors or determinants that help in tumbling mortality rates which act as key pointers for improving the country human development.

A qualitative research-survey was conducted amongst six states of Andhra Pradesh, Tamil Nadu, Maharashtra, Rajasthan, Uttarakhand and Haryana on child mortality rates. The article talks about the major factors that play a role in influencing infant mortality rates. Key findings include medico – clinical causes, socio economic factors like household income, female education, access to health services and immunization programmes act as important determinates to assess status of infant mortality. The article "A study on the Socio-Economic determinants behind Infant Mortality and

Maternal Mortality" is a research study conducted by the Indian Trust for Innovation and Social Change. It explains how the education of the mother is considered important for the health outcome of children. The empirical evidence and health statistics do show that the educated mothers are usually healthier and give birth to healthier babies.

The article "Socioeconomic determinants of infant mortality: A worldwide study of 152 low, middle and high income countries" by Carl Otto Schell, Marie Reilly, Hans Rosling, Stefan Peterson and Anna Mia Ekstrom discusses about how socio economic determinants play a relative important role in determining infant mortality rate which is used as a population health measure. The researchers have used multivariate linear regression analyses of five socioeconomic predictors of IMR: public spending on health, GNI/capita, poverty rate, income inequality and young female literacy rate. Global level stratified data on low, middle and high income countries were used to perform the analysis. The researchers concluded that GNI/capita, young female literacy rate and income inequality played major role in bringing a variation in the national IMR.

Analysis

I) Trends in Infant Mortality Rate

Mortality rate is one of the basic components of population change. Infant mortality rate (IMR) is the number of deaths of children less than one year of age per 1000 live births. The rate for a given region is the number of children dying under one year of age, divided by the number of live births during the year, multiplied by 1,000.

In Figure 1, the red line indicates infant mortality rate of India for the period 1990-2012. The infant deaths were about 114 per thousand live births in 1980. Since 1990, IMR has declined from 80 in 1991, to 42 in 2012. It has seen a steady decline of 2-3 points every year since 1991. Recent data postulates that India has accomplished the target of achieving the Millennium Development Goal (MDG) on infant mortality, reaching the listed target of reducing infant deaths by two-third between 1990 and 2015 (Tandon Aditi, 2016). The latest government data on child health indicators shows that India's Infant Mortality Rate is now (2016) at 39 per 1,000 live births as against 40 the previous year 2015. Initiatives taken by the Government of India acted as key factor in reducing the mortality rates from high level to achieving the targeted levels.

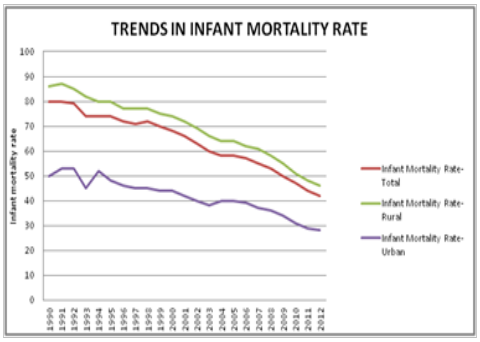

Figure 1: Trends in IMR, Urban- Rural Gap

II) Urban- Rural Gap in Infant Mortality

The gap in infant mortality rate between rural and urban India is also given in the above graph. The green line shows the IMR for rural India and blue line indicates the IMR for urban India for the same time period (1990-2012). It is seen that infant mortality rate of rural areas is higher than that of India's average infant mortality rate. Due to lack of awareness and inadequate medical facilities, rural areas are prone to increased infant deaths. Gender inequality is also a main reason for increased IMR in rural areas. Considering urban infant mortality rate, it is much below that of the country's average. Urban areas are well developed with proper and easy access to medical facilities, educated population, awareness on health conditions, less gender inequality etc., All these factors act as inducers for the reduced infant death rates in urban areas. IMR for urban India has reduced from 50 per thousand live births in 1990 to 28 per thousand live births in 2012. Whereas IMR for rural India has reduced from 86 per thousand live births to 46 per thousand live births. Though infant deaths are found to be high in rural areas, the decrease is found to be significant down the years. Infant Mortality Rates are high, especially in rural areas mainly owing to hindrances in household characteristics. Among environmental factors, safe source of drinking water, electricity, and quality of housing materials turn out as the most important contributors for this condition. Community

characteristics together with the existence of a health facility within the community act as other factors inincreasing bad health conditions especially among women. The effect of disadvantageous environmental conditions such as limited electricity and water supply derives both from a lack of community-level infrastructure and from the inability of some households to exploit it when available (Ellan Van De Pol). Functioning of policies at both household and community level is needed to ensure betterment and correct these shortages.

In 2005, the National Rural Health Mission (NRHM) was launched by the Government of India as an initiative to address and improve the accessibility and quality of available health care. Benefitting rural poor women and children predominantly. As it is evident that infant mortality is significantly high in rural areas compared to that of urban, the policy program focuses on rural India. NRHM focuses the health needs of 18 states that had been identified as having weak public health indicators. Their major focus is on the north eastern states as these states are socio-economically backward compared to the other states of the country. The Major goals of the mission are to reduce the Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR), improve universal access to public health services such as women's health, child health, water, sanitation and hygiene, immunization and nutrition; and enhance the prevention and control of communicable and non-communicable diseases (National institute of Public Cooperation and Child Development, 2014).

III) Factors Influencing Infant Mortality Rate in India

One of the most important indicator or index of socio-economic development of a country or region is infant mortality rate. There are many factors that act as stimulant in reducing mortality rates like literacy rates, poverty rate, income inequality etc., In this section of the article, three independent variables namely health expenditure, gross per capita income (GNI) and percentage of female in labour force participation are regressed with the dependant variable (i.e.) infant mortality rate to see if they have significant influence in reducing infant mortality rates. Double log model has been used to find the relationship between the variables.

H0: There is no statistically significant relationship between infant mortality rate, GNI/ per capita, health expenditure and labour force participation.

Since double log model is used, the variables are converted into natural logarithm and thus the result gives infant mortality rate elasticity with respect to explanatory variables (i.e) the beta coefficient gives elasticity.

Ln IMR = βo + β1 LnHE + β2 LnGNI + β3 LnLFP + Ui

LnIMR = 5.93 + 0.50 LnHE – 0.42 LnGNI + 0.41 LnLFP

t stat = (11.94) (3.47) (-17.59) (3.95)

Sign = (9.98) (0.003) ** (0.000006) ** (0.00) **

Interpretation

Since R Square is 0.985 it is said that 98 percent of the variation in infant mortality rate is determined by the other three variables. The P Value of all three independent variables found to be below 0.01; hence health expenditure, gross per capita income and labour force participation have significant impact in reducing the infant mortality rate in India.

H1: Since P value is found to be less than 0.01 for all the variables, health expenditure, gross per capita income and labour force participation of females have significant influence in reducing infant mortality rates in India.

Summary Output

Regression Statistics	
Multiple R	0.992654554
R Square	0.985363063
Adjusted R Square	0.982226576
Standard Error	0.023543814
Observations	18

ANOVA

	df	SS	MS	F	Significance F
Regression	3	0.522429554	0.174143	314.161421	4.49336E-13
Residual	14	0.007760356	0.000554		
Total	17	0.53018991			

	Coefficients	Standard Error	t Stat	P-value
Intercept	5.932542276	0.496905551	11.93897	9.98566E-09
Ln HE	0.501473117	0.144354142	3.473909	0.00372338
Ln GNI	-0.424971175	0.02415853	-17.5909	6.07919E-11
Ln LFP	0.411425399	0.104117766	3.951539	0.001447377
	0.104117766		0.001447377	

A 1% increase in health expenditure reduces infant mortality rate by 0.50%. Since there is a positive relationship between health expenditure and infant mortality rates, any expansion made in the health expenditure by the government will lead to an improvement in the health status of individuals. This is because advancement in health care and investment in healthcare facilities have been a key factor in reducing infant mortality rates throughout the country. Government has increased its expenditure outlay towards health significantly as they yield beneficial results.

Similarly a 1% increase in gross per capita income and labour force participation of females has reduced infant mortality rates by 0.42% and 0.41% respectively. Though gross per capita income has a significant negative relationship on infant mortality rate, income does have influence on reducing mortality rates. Rise in the per capita income leads to a higher purchasing power to the individual's household. Furthermore increased household income leads to good living condition, access to medical facilities, better infrastructure and proper education. This acts as a tool in improving women's health condition especially in the rural areas thereby reducing the number of infant deaths. Increased labour force participation is a key indicator in substantiating improved empowerment of women. Empowerment of women leads to decision making power, awareness, improved education etc. In rural areas women are denied most of the powers and are not included in decision making process. The above interpretation of data shows that, over the years participation of women in workforce has increased which has significantly condensed the number of infant deaths.

Thus all the three above variables have been important in reducing the mortality rates in the country. Any advancement made in these factor variables will furthermore help in reducing the infant mortality rates. Government should focus on raising its health expenditure, concentrate on policies and plans focussing women and mothers create more gender friendly society giving equal rights and opportunities to all.

Findings and Conclusion

India is a country where more than half of its population lives in rural areas. For development progress to be undertaken, rural areas have to be given more focus. Mortality rates are used as one of the major indictors in determining a country's human development. This above research shows that despite the trends showing a decrease in infant deaths, it is not comparable with that of the advanced countries. Disparities in terms of region and gender still exist. When equating urban and rural infant mortality rates, rural areas have a very high percentage in comparison to that of urban areas. This has to be removed by improving access and awareness to health facilities in the rural areas. Also cultural discrimination acts as a major factor to the significant male-female gap in infant deaths. Educating the population, especially the rural population will help in reducing this gender gap in infant deaths.

Though there are many factors that influence the reduction of mortality rates, this research paper concludes that an increase in the expenditure made by the government towards health, increase in gross per capita income and increase participation of females in the labour force have statistical significance in reducing infant mortality rates. Thus it is the role of the government to introduce more policies and programmes like the National Rural Health Mission, Single Girl Child etc., and focus on improving them as they will help in reducing infant mortality rates especially in the rural areas as rural population happen to be the more vulnerable.

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