Levels, Trends and Mortality Differentials in Two Major States in India: A Comparative Analysis

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Citation

Abstract
During the last few decades mortality rates have been halved in India. The levels of mortality of the society is closely linked to the health, health care facility and well-being of the people. A society with health care facility at the gross root level is more likely to experience low mortality. The Sample Registration System (SRS) data provided profound information on age-specific mortality in India. The study is aimed to investigate the age specific mortality differentials by sex and place of residence during 1981-85 to 2006-2010. However, the results documented both states mortality rates significantly decline over the period. In West Bengal infant and child mortality rate significantly decline as compared to Uttar Pradesh and Nation too. The result also shows both states have the same improvement in life expectancy at birth ($e_0$) during study period. Furthermore, in the rural area age-specific mortality rates comparatively high in both states. The slow decline in age-specific mortality rates in India calls for new approaches that go beyond disease and its representation the health infrastructure, utilization health care facility, health policy and programs. However, country with limited resources that attain lower than expected mortality levels due to poor distribution health facility, cultural factors and institutions and programs that alleviate against the consequences of poverty in remote areas.

1. Introduction

The population has tended to shift over the period from being with characterized by high fertility and mortality level to low fertility and mortality level. Generally this process people acknowledged as the demographic transition, which is the fundamental component of development of the any country that occurs often, but not always, in tandem with economic development (Dyson, 1984 & 1991). Mortality is one of the basic components of the population change and related data are very important for the researcher, policy maker to the study of demographic studies and public health administration. Age-specific mortality rate is an indicator of every step of health circumstances and economic development of any nation. Child mortality trends, differentials, and determinants in India have been the subject of many studies. During past decade have many countries across the world witnessed of magnificent improvements in public health services in terms of accessibility, affordability and availability of health care service and improvement in life expectancy (Dyson, 1991 and Dreze, et al. 2002).

According to the United Nations 2005 (Revision of the World Population Prospects) life expectancy at birth for the world’s population significantly increased from 48 years to 68 years during 1950-55 to 2005-10. However, the population longevity has improved
in virtually all of the worlds but progress in some regions has outpaced that in others. Some part of the world are required more attention for controlling mortality and improving life years. In Asia life expectancy at birth increased 43 to 69 years during 1950-55 to 2005-10 it account 26 years in expected surviving life. Furthermore during the same period Africa life expectancy at birth improved from 38- 55 years it’s added only 17 years. In 1998, the under - five years child mortality rate very high (about 2.5 million child death) in India which was very highest than other countries in the world (United Nation, 2005; Mathers & Loncar 2006). Together with declining fertility rate and improvements in life expectancy; both are a marker of a population’s progress through the demographic transition. Susceptibility to mortality from the various causes of death varies so prominently by age, and it is reasonable to presume that the age structure of a population correlates with the distribution of deaths by cause. The place of residence is an important indicator of the performance of health indicators. Many studies have shown, a clear difference in mortality by region and demographic division which is reflected by almost all demographic indicators such as infant and child mortality (Dyson & Moore, 1983). The levels of child mortality have declined during the last three decades. Sex differentials in child mortality actually worsened during the 1980s and 1990s compared with the 1970s in many countries of Asia; China and India are major contributors to mortality in this continental (Popkin & Horton, et al. 2001).

2. Literature Review

Mortality trends have been declining all over the world, due to economic development and advance medical knowledge and technology as well as improvement in living conditions. The high rate of infant and child mortality rates indicates the degree of poverty and deprivation of the society (Hill 1989). Infant and child mortality rates are determined by the biological and endowment of children at birth and their environment after/post birth. Due to biological and behavioural reasons, mortality depends greatly on the age and sex of individuals (United Nations 1988; IIPS 2007). In developing countries, background characteristics like, mother’s literacy, place of residence, place of delivering, sex of the child are likely to affect a child’s health at birth as well as its environment, thus all factors are leading to infant and child mortality (Hobcroft et al. 1984; Mosley and Chen 2003; United Nations 1955).

The female infant and child mortality rate are higher in rural India and its states (RGI, 2009). Infant mortality rate and child mortality rate are considered as one of the most sensitive indicators of health status in the society. Socio-economic and demographic characteristics are highly associated with infant and child mortality (Arokiasamy 2004). Infant, child and adult mortality rate are very important indicators of global health and it should be prioritized. All indicators of mortality are directly associated with development and poverty across the world. The low status of the women, low education, and high dowry explain sex differentials in mortality (Dyson & Moore 1983). In some part of rural India, cultural and traditional factors also responsible for child mortality. While Infant and child mortality rates have declined significantly, inequalities have not declined commensurately. Very dreadful health condition, lack of potable water and sanitation infrastructure are a major cause of infant and child mortality in rural areas (Victoria et al. 2003; Dholakia et al. 2004).

Adult mortality has not reduced uniformly throughout the world. The levels of mortality define fitness, survival and growth of a population and it is an important component of demography transition. Adult mortality is also an excellent indicator of living status and economic development (Bhasin & Nag 2002; RGI 2009). During last four decades, adult mortality rate has been significantly reduced in developing countries. Significant variations in levels and trends of adult mortality are found across different states of the country. Though adult mortality has been declining consistently, the pace of decline differs from state to state (Bhat 2001). Understanding the trends and pattern of mortality is an important component of the study of mortality. As we know health planning, it is a very important factor for any country to consider the effect of population age composition and its interrelationship with mortality because budgetary allocation for intervention is limited (Leela 1985; and Chen 1982).

2.1. Population of India

The India is a most populated country in the world. It has much diversity across the nations like socio-economic and geographic all factors direct/indirect associated with demographic differentials. The demographics of India are inclusive of the second most populous country in the world, with over 1.21 billion population (Census of India 2011), more than six country population of the world. India is contributing 17.5 percent of the world's population and it's projected to be the world's most populous country by 2025, surpassing China. The India population will be reaching about 1.6 billion by 2050.

2.2. Profile of Uttar Pradesh

Uttar Pradesh has been one of the most highly populated states in India for a long time now. The census over the years has put the state at the pinnacle in terms of population. Uttar Pradesh (U.P.) is the most populous state in the country and accounting for 16.4 percent of the country’s population. The total population of the state was 8.8 billion in 1971. It increased to 11.1 billion in 1981 and then reported to be 13.9 billion in 1991. The increase, in population in these two decades, was almost identical at 25 percent. As against this, the national population showed a declining trend from 25 percent in 1971-81 to 23.8 percent
The state has a population of about 190 million according to the Uttar Pradesh Census 2011. As per details from Census 2011, Uttar Pradesh has the population of 19.98 billion, an increase from the figure of 16.62 billion in 2001 census. The growth rate of the population of Uttar Pradesh is about 20% which is alarming among the highest growth rates in the country. The under-five year’s child mortality rate is higher. Among all major Indian states, Uttar Pradesh has the highest less than five mortality rate, the second-highest crude death rate and the third lowest life expectancy stature.

2.3. Profile of West Bengal

West Bengal is an eastern state, which according to the West Bengal (W.B.) Census 2011 is the fourth most populated state in the world. The population of West Bengal has been increasing especially over the past decade. As per details from Census 2011, West Bengal has the population of 9.13 Billion, an increase from figure of 8.02 Billion in 2001 census. The total population of West Bengal as per 2011 census is 91,276,115 of which male and female are 46,809,027 and 44,467,088 respectively. In 2001, total population was 80,176,197 in which male were 41,465,985 while female were 38,710,212. The total population growth in this decade was 13.84 percent while in previous decade it was 17.84 percent.

The West Bengal is an eastern state, which according to the West Bengal Census 2011, is the fourth most populated state in India. In fact, it is considered the ninth most populated state in the world. This state has been always known for its rich culture and heritage. Right from literature to politics, the population of West Bengal has always been known to produce world renowned writers and political thinkers. West Bengal has population of 9.13 billion, an increase from figure of 8.02 billion in 2001 census. The population of West Bengal forms 7.54 percent of India in 2011. In 2001, the figure was 7.79 percent. Literacy rate in West Bengal has seen an upward trend and were 76.26 percent as per 2011 population census. Of that, male literacy stands at 81.69 percent while female literacy is at 66.57 percent. In 2001, the literacy rate in West Bengal stood at 68.64 percent of which male and female were 77.02 percent and 59.61 percent literate respectively. Sex Ratio in West Bengal is 950 i.e. for each 1000 male, which is below national average of 940 as per census 2011. In 2001, the sex ratio of female was 934 per 1000 male in West Bengal (Census of India 2011).

3. Methodology

The most representative and reliable data on mortality rates by age and sex in India come from the Sample Registration System (SRS) which has been in operation for several decades. The SRS data has continued to provide reliable demographic data for estimating varying mortality measures it has also provided data for measures of fertility rate at higher geographical levels since its inception. The Sample Registration System (SRS) forms the backbone of the database for vital rates in India (Preston, Heuveline and Guillot, 2001). This data source has provided profound information on age-specific mortality by sex and place of residence. For fulfil the objective the Sample Registration System data during 1981-85 to 2006-10 have been used. To examine the age-specific mortality by sex and place of residence probability of death \( n q_x \) and mortality Index model are used. Data analyzed in MORTPACK 4.3 version software and MS Office Excel 10.

![Figure 1. Trends of Infant and Child mortality rate by sex in India, 1981-85 to 2006-10.](image)

4. Results

The figure 1 showed trends of infant mortality rate (IMR) and child mortality rate (CMR) during last three decades (1981-2010) in India. There was no significant improvement in infant mortality rate in both sex (Male and Female) during the study period. The gap between IMR and CMR was continued to increase, but the rate of mortality have declined during last three decades. The slope of IMR and CMR are during 2001-05 to 2006-10 was radically turn down as compare to an earlier period. The child mortality rate was a significantly higher decline as compared to the infant for both sex during the last three decades (Singh et al. 2011). The child mortality rate dramatically increased during 1986-90 in...
West Bengal among both sex (figure 2). The sex differentials in IMR and CMR have been remarkable declined in Uttar Pradesh during study period have been observed in figure 3. The male and female differentials in IMR and CMR are high in Uttar Pradesh than West Bengal through last thirty years. The situation is very worse in case of IMR and CMR in Uttar Pradesh. Both states are continuous performance decline in IMR and CMR in last three decades (Jain 1985; Rawat 2014).

Levels of life expectancy at birth depict in figure 4 for the both selected states in India. The life expectancy at birth was high in West Bengal and lowest in Uttar Pradesh during 1981-85 to 20006-10. West Bengal state has to lead Uttar Pradesh and India over time periods (figure 5). The male life expectancy at age five in West Bengal have more than national average life expectancy as compared to their counterpart. Uttar Pradesh state has the lower level of life expectancy at birth than West Bengal and Nation (Arokiasamy 2004). Same results are found in figure 6 for the female life expectancy at birth.
Table 1 shows sex differentials in life expectancy at age 5 for the West Bengal and Uttar Pradesh by rural-urban. During the study period, male life expectancy increased from 58.8 – 64.7 years about six years but female grew 59.8 – 68.3 years about 8 years in rural West Bengal. In urban area life expectancy at age 5 significantly increase among women about 4 years as compared to male 3 years. In Uttar Pradesh, female life expectancy at age 5 increased about 7 years which is relatively high for the male. The gap between rural and urban decreased in Uttar Pradesh at life expectancy at age five (table 1). In rural areas, life expectancy at age 5 substantially increased in the rural area as compared to the urban area during last three decades (Cai & Chongsuvivatwong 2006). Table 2 depicts age-specific mortality Index by age group during over study time. The mortality Index shows survival ship by age group during specify time periods. During age group 1-4 years (4 years) the survival ship probability of the child increased about 95 to 98 percent in India (Bhat 2001). The results illustrate the survival likelihood of the person higher age group from 5-14 to 15-49 years. However, the age
group 60 years and above survivorship is relatively low has been found during the study period (Saikia et al. 2011). Table 2 give us clear picture about in which age group mortality is high and which age group mortality relatively low have been found in the study. The Million Death Study Collaborators (2010 have been supported the result findings in India. The mortality rate whether IMR, CMR or adults are significantly decline over time period but in rural area it comparatively low (Rawat 2014).

### Table 2. Age specific mortality Index for West Bengal, Uttar Pradesh and India, 1981-85 to 2006-10.

<table>
<thead>
<tr>
<th>Years</th>
<th>1-4</th>
<th>5-14</th>
<th>15-49</th>
<th>60 +</th>
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<tr>
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<td></td>
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<tr>
<td>1981-85</td>
<td>3.86</td>
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<td>9.88</td>
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<td>11.58</td>
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<tr>
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<td>9.93</td>
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<td>15.10</td>
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<tr>
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<td>3.96</td>
<td>9.94</td>
<td>33.68</td>
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<td>15.99</td>
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<td>41.83</td>
<td>14.78</td>
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### 5. Conclusion

India has been experiencing a significant growth in the economy during last three decades; economic growth resulting significant change in mortality at all age group. Major two Indian states such as West Bengal and Uttar Pradesh have mortality differentials at many level. Although empirical studies have shown that there is a huge regional variation in mortality in India, with the Northern, Central and Western part of the country having high infant and child mortality while the South and west regions have a relatively low child mortality rate. The general views on the differences between female and male mortality are that they are in favour the female in most states at all ages and that the exceptions normally involve the productive years of life. Traditional, social, cultural, and health conditions related to the low status of women have a negative impact on child survival. Improving female education and nutrition, and increasing the use of health services during pregnancy and delivery would further lower child mortality. Furthermore, overall results shows life-span seems 4-5 years in favour of women throughout the analysis. The elementary aspects of human development, to potential survive healthy and long life. Malnutrition and childhood diseases among Indian children are very prevalent and are an underlying and contributing factor to mortality due to numerous causes. Fourth and fifth goal of millennium development goal has targeted to reduce less than five mortality and maternal mortality, its frame work nationally acceptable for development. The study would like to draw attention of policy maker, leaders and related authority to provide basic health infrastructure and make accessibility, availability, affordability to all society at gross root level.

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### References


