Extended Abstract

Rich-Poor Gap in infant and under five mortality in urban India, 1992-05

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1. Introduction

Among the many reasons for the study of mortality is its valus as an indicators of socioeconomic well-being. It is an outcome rather than a cause, and hence directly measure results of the distribution and use of resourses within the society. Infant and child mortality have frequently been used as such indicators (Haines, M. R. 1995). Moreover the study of infant and under five mortality often serves as a key development indicator, reflecting the combined effects of economic development, technological change, including health interventions, and the sociocultural environment.

In 2003, about 2.2 million children under age 5 died in India which is the highest total of any country and about 20 percent of all child deaths globally. Recent years have shown a slowing down in the decline in infant mortality rates in India, resulting in a departure from the longer-term trends (Claeson, Bos, et al 1999, 2000). The rates of decline in infant mortality rate (IMR) and underfive mortality rate (U5MR) are leveling off and departing from the rate of decline that is required for India to hit the Millennium Development Goal. However, there are marked variations in between and within states as well as among socioeconomic groups, in both levels and rates of child mortality trends.

Moreover the urban and rural gap in infant and under 5 mortality is getting smaller. Child mortality rates in rural areas are still higher than in urban areas, but child mortality decline in urban areas has been slower than in rural, and as a result urban – rural mortality differentials have become smaller (Claeson, Bos 2000; Pandey 1998). The challenge of reaching urban poor is a growing concern in many large cities. Urban poor children are consistently at a disadvantage compared with children born to better off families (Wagstaff, Bustreo et al, 2004). They are more exposed to risks including inadequate water and sanitation, indoor air pollution, crowding and exposure to disease vectors. They are more likely to be undernourished and therefore at greater risk of severe disease, and they are more likely to suffer from more than one disease when ill. They are less likely to have access and use preventive and curative interventions, and those who do receive treatment are less likely to receive appropriate quality services. As a result, poor children are more likely than their better off peers to die in childhood. An analysis of DHS data, estimating the proportion of deaths that would be prevented by improving equity, shows that if every child in India had the same mortality level as the richest 20% quintile, the overall under five death rate would be halved (Victora et al, 2003).

2. Need of the study

The first challenge in such study starts with how to define urban poor? In India, the NSSO provides the estimates of urban poor based on consumption expenditure data on a periodical basis. However, these estimates are often debated and revised. Also, the health domain covered under the various NSS rounds of survey is limited. Alternatively, the data obtained from the DHS (in India known as NFHS) are useful to

understand the health situation of urban population. The DHS data set provides a set of proxy indicators to assess the economic status at the household level (Montgomery et al., 2000; Filmer and Pritchett 2001 ;). The composite index based on economic proxy broadly captures the economic differentials in different domain, it has certain limitations.

The first two rounds of NFHS in India provided the composite wealth index, known as standard of living index (SLI) based on arbitrary scoring of the selected household assets and amenities (IIPS and ORC Macro, 1992, 2000). In NFHS 3, the wealth index based on 33 variables was computed using the Principle Component Analysis (PCA) and divided into five quintiles (IIPS & ORC Macro, 2005). However, the wealth index so constructed is subject to limitations such as: *i)* it index gives equal weights to rural and urban areas in spite of large differentials in economic status in urban and rural areas *ii)* Some of the variables used in the wealth index are questionable.

As a departure, a unique wealth index is constructed for the urban India as well as selected states.

In addition a number of literatures documented an urban-rural dichotomy in child health and survival in developing countries (Madise and Diamond 1996, Stephenson 1998). Further, health programmes and policies have been directed for the upliftment of health status and utilization of primary health care of rural poor. For example, the National Rural Health Mission was initially planned for rural India and excludes the urban India. While India's urban population is experiencing rapid increase in recent decades along with rapid urbanization. It is estimated that 80.8 million populations in urban areas live below the poverty line. The urban poor rarely get benefited from the health facilities in urban areas; as a result the health of the urban poor is considerably worse off than the non-poor. Moreover urbanization in India are characterized by poor housing, overcrowding, lack of water and sanitation, pollution, exposure to infectious diseases and lack of infrastructural facilities, which make the urban population quite diverse with respect to economic, social and health status. Therefore inequity in health poses a major challenge to achieve the Millennium Development Goals, particularly those related to child mortality and maternal health as existing programs are often not able to reach the neediest. Considering the need assessment of rich-poor gap in child health particularly infant and under 5 child mortality receives priority.

3. Objective of the study

The main objective of this paper is to examine the trend in rich-poor gap in infant and under 5 mortality as well as to find out its determinants in urban India and states of Maharashtra and Uttar Pradesh in last 13 years (1992-06).

4. Materials and Methods

This study uses the data of three successive rounds of National Family Health Survey conducted during 1992-06. The analysis will be carried out for urban India as well as states of Maharashtra and Uttar Pradesh. The selection of states has been done on the basis of proportion of urban population in the state. More over these two states are quite different in terms of development indicators and represent the demographic and socioeconomic scenario of north-south India.

The following methods will be used in the analysis:

1) **Principle Component Analysis (PCA) -** is used to create a poverty index for urban area
2) **Bivariate Analysis-**is used to understand the differentials in infant and under 5 mortality by poverty status
3) **Cox proportional hazards model-** will be used to understand the determinants of infant and under 5 mortality
4) **Decomposition analysis-**will be used to understand the contribution of different socioeconomic and demographic factors in infant and under 5 mortality

5. Preliminary results

As a preliminary analysis, first the poverty index has been created for urban India as well as two selected states and secondly the differentials in infant and under 5 mortality are examined across the quintiles for country as well as selected states. Results are presented below following sections.

a) Creating poverty index for urban India

In order to creating the poverty index for urban areas, as a first step a composite index has been computed based on selected variables for urban India for 2005-06. The weights derived from the Principal Component Analysis (PCA) were used to generate the index. The variables used in computation of composite index are based on theoretical rationale and statistical significance. The theoretical rationale refers to the sensitiveness of the variables to poor. For example, the variables like cot or bed, mattress, watch differs largely in quality and price. Further the variable of ownership of agricultural land is not included in the analysis because of limited utility urban areas.

Same technique has been applied for all three rounds of NFHS. The scoring factors of the principle component analysis and summary statistics of the selected variables for urban India, 2005-06 is given in table1. Each variable is dichotomous, so the mean and standard deviations range between 0 and 1.Under the first column there is a pattern in the factors score. The variables which reflect the better economic possession of household are assigned high positive scores, while the variables which reflect poor economic status of household are assigned low or negative weights. For instance, positive and higher score are assigned to pucca house, safe water, flush toilet, households that have color television, refrigerator and mobile phone and households with covered window. On the other hand low or negative scores are assigned to kaccha house, pit or no toilet, unsafe water, and household that has uncovered or no window.

As a second step the individuals within households are ranked on the basis of their factor scores derived from the PCA. Then, the individuals within the households are divided into five quintiles ranging from the lowest 20 percent (poorest quintile) through the topmost 20 percent (richest quintile) and termed as poverty index. Quintile wise mean distributions of the variables are given in table 2. If the index significantly reflects the household poverty status, we expect that the households of the richest quintile (topmost 20 percent) having the highest mean values for those variables that scored higher on the index and this distribution should progressively decrease as one moves from the richest to poorest quintile (Bawah A. & Zuberi T.). The results presented in table 2 are in expected direction.

b) Differentials in Infant and Under 5 mortality by poverty index

The differentials in infant and under 5 mortality across the poverty status are given in table 3. The analysis has been carried out for India and selected states. Results indicate that both the infant and under five mortality sharply declines from poorest quintile to richest quintile in India. Moreover it is higher in poorest strata of urban area than the rural total i.e. 62 and 82 (not shown) respectively for infant and under five mortality (IIPS & ORC Macro, 2005). Similar results are observed for the states of Maharashtra and Uttar Pradesh. Among the states the infant and under five mortality rate is higher for Uttar Pradesh than Maharashtra.

The rich-poor ratio which is derived by dividing the richest quintile with poorest quintile indicates the extent of inequality in infant and under five mortality among richest and poorest strata of urban areas. The value of rich poor ratio ranges from 0 to 1, where value tending to 1 indicates lower gap in outcome variables and vice-versa. Rich-poor gap is large in case of both infant and child mortality for India as well as states. But the gap is lower for Uttar Pradesh than Maharashtra and country as whole.

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Table 1 Scoring factors of principle component analysis and summary statistics of household characteristics and possession for urban India, 2005-06

	Factor Scores	Mean	Std. Dev. (SD)	Factor Scores/SD
Pucca House	0.205	0.751	0.432	0.473
Semi-pucca House	0.186	0.869	0.337	0.552
Kaccha House	0.157	0.900	0.299	0.524
No Window	-0.204	0.194	0.395	-0.517
Window without cover	-0.074	0.222	0.416	-0.178
Window with cover	0.226	0.584	0.493	0.459
Own house	0.039	0.787	0.410	0.096
2 Person per room	0.104	0.129	0.335	0.310
2 to 4 Person per room	0.074	0.484	0.500	0.148
5 and more	-0.147	0.387	0.487	-0.302
Has Kitchen	0.223	0.567	0.496	0.450
Safe water[a]	0.179	0.474	0.499	0.358
Unsafe water[b]	-0.122	0.205	0.404	-0.301
Other water[c]	-0.086	0.322	0.467	-0.184
Fuel type (gas/electric)	0.264	0.515	0.500	0.527
No toilet	-0.225	0.216	0.412	-0.547
Pit toilet	-0.061	0.057	0.232	-0.262
Flush toilet	0.240	0.727	0.446	0.538
Pressure cooker	0.245	0.669	0.471	0.520
Motorcycle	0.228	0.284	0.451	0.507
Electric Fan	0.192	0.818	0.385	0.497
Sewing machine	0.165	0.310	0.463	0.356
Television	-0.051	0.288	0.453	-0.112
Television color	0.257	0.454	0.498	0.516
Refrigerator	0.249	0.276	0.447	0.557
Mobile phone	0.232	0.322	0.467	0.497
Landline phone	0.212	0.202	0.402	0.527
Computer	0.120	0.044	0.204	0.586
Car	0.128	0.045	0.208	0.614
Bank account	0.201	0.496	0.500	0.401

a-Piped water into dwelling, piped water into yard/plot, Tanker truck water and bottled water
b-Public tab, cart with small truck
c-Tube well water dug well water, surface water, rain water etc.

Table 2 Mean distributions of variables within households by quintiles of their socioeconomic index for urban India, 2005-06

	Poorest Quintile	Poorer Quintile	Middle Quintile	Richer Quintile	Richest Quintile
Pucca House	0.277	0.703	0.870	0.926	0.979
Semi-pucca House	0.504	0.890	0.965	0.990	0.997
Kaccha House	0.628	0.920	0.975	0.983	0.996
No Window	0.637	0.213	0.085	0.030	0.005
Window without cover	0.251	0.379	0.287	0.154	0.041
Window with cover	0.111	0.408	0.628	0.816	0.954
Own house	0.759	0.741	0.752	0.814	0.869
2 Person per room	0.039	0.053	0.085	0.155	0.312
2 to 4 Person per room	0.320	0.422	0.514	0.572	0.593
5 and more	0.641	0.525	0.401	0.273	0.096
Has Kitchen	0.171	0.306	0.556	0.824	0.975
Safe water[a]	0.108	0.299	0.534	0.646	0.781
Unsafe water[b]	0.386	0.314	0.190	0.104	0.030
Other water[c]	0.505	0.387	0.276	0.250	0.189
Fuel type(gas/electric)	0.029	0.187	0.533	0.849	0.977
No toilet	0.729	0.274	0.066	0.010	0.002
Pit toilet	0.113	0.092	0.048	0.027	0.006
Flush toilet	0.159	0.635	0.886	0.963	0.991
Pressure cooker	0.142	0.475	0.784	0.947	0.998
Motorcycle	0.015	0.045	0.137	0.393	0.831
Electric Fan	0.402	0.807	0.929	0.969	0.985
Sewing machine	0.053	0.177	0.261	0.419	0.639
Television	0.283	0.404	0.403	0.235	0.117
Television color	0.030	0.152	0.366	0.750	0.972
Refrigerator	0.007	0.023	0.077	0.363	0.909
Mobile phone	0.024	0.060	0.192	0.490	0.845
Landline phone	0.002	0.015	0.068	0.235	0.691
Computer	0.000	0.000	0.004	0.021	0.192
Car	0.000	0.000	0.003	0.013	0.210
Bank account	0.162	0.287	0.421	0.705	0.906

a-Piped water into dwelling, piped water into yard/plot, Tanker truck water and bottled water
b-Public tab, cart with small truck
c-Tube well water dug well water, surface water, rain water etc.

Table 3 Differentials in Infant and under five mortality within households by poverty index in urban India and selected states, 2005-06

	India		Maharashtra		Uttar Pradesh	
	IMR	U5M	IMR	U5M	IMR	U5M
Poorest Quintile	68.1	89.4	49.6	64.8	83.5	121.4
Poorer Quintile	54.3	69.0	42.3	49.7	103.4	135.6
Middle Quintile	50.1	59.1	37.9	45.1	95.0	118.8
Richer Quintile	38.3	42.1	28.1	33.6	79.7	109.3
Richest Quintile	23.8	27.1	20.0	22.6	69.7	79.4
Total	**45.7**	**55.8**	**35.4**	**43.0**	**68.9**	**87.2**
Rich-Poor Gap*	**0.35**	**0.30**	**0.40**	**0.35**	**0.83**	**0.65**

IMR-Infant Mortality Rate U5M-Under five mortality
* Is calculated by dividing the richest quintile with poorest quintile