Socioeconomic Inequalities in Child Health in India

Satvika Chalasani
Doctoral Candidate, Sociology and Demography
The Pennsylvania State University

Abstract

It has been argued that the unprecedented economic growth experienced by India in the 1990s left the poor of India behind. To the extent that the production of health is a function of economic variables, this suggests the possibility that the unequal income growth lead to unequal improvements in health as well. Data from three Demographic and Health Surveys from 1992-93, 1998-99, and 2005-06, are used to examine levels and trends in economic inequalities in child health. Three different inequality measures are employed (the relative index of inequality, the concentration index, and the achievement index) to analyze household wealth-based inequalities in child mortality, anthropometric indicators, prenatal care usage, and vaccination coverage. Apart from an all-India analysis for all children, the inequality indices are calculated separately for each state, for urban and rural areas, and for boys and girls. The basic hypothesis is that within-year economic inequalities in child health generally increased, albeit at differential rates by state, urban/rural residence, and gender.

Introduction

It is estimated that more than 10 million children die annually around the world before they reach the age of 5. While most of these deaths are from preventable causes, most of them also occur in poor countries that often lack the resources to prevent them. 50% of all child deaths occur in just 6 countries: India, Nigeria, China, Pakistan, Democratic Republic of Congo, and Ethiopia. 90% of all deaths occur in 42 countries, all of which are in Asia or Africa except for Brazil and Mexico. In 2000, India alone accounted for more than 2.4 million of child deaths, which is almost thrice as large as the total of the next largest contributor, Nigeria (with 834,000 deaths per year). And it's not just the absolute numbers that are staggering. In India, more than one in 18 children dies within the first year of life, and more than one in 13 dies before reaching age five (IIPS and Macro International, 2007). In addition, 45% of children under age three were stunted (low height-for-age), 23% were wasted (low weight-for-height), and 40% were underweight (low weight-for-age).

However, these high numbers mask recent progress in child health in India. For example, the under-five mortality rate (U5MR) in India has been declining steadily. In the five year period preceding the third National Family Health Survey (NFHS), the U5MR was 74 deaths per 1,000 live births, down from the NFHS-2 estimate of 95 deaths per 1,000 live births and the NFHS-1 estimate of 109 per 1000. But this progress in turn masks another facet of the issue, namely inequalities in child health.

In India, there is evidence of child health inequalities along several dimensions: by parents' education level, caste, religion, urban/rural residence, state, and region. For example, according to NFHS-3, among mothers with no education, the U5MR was 94.7 per 1,000 live births, while among mothers with 12 years of education or more, it was only 29.7. As another example, the percentage of children aged between 12 and 23 months that had received all the basic vaccinations varied between 80.9% in the state of Tamil Nadu, and 21.0% in Nagaland. Starting with this observation of cross-sectional inequalities, we move on to examining trends in inequalities. In this paper, I focus on economic inequalities in child health. The idea for examining trends in wealth-based

health inequalities comes from the observation of the unequal income growth that accompanied the major macroeconomic changes of the 1990s, commonly referred to as the "liberalization" of the Indian economy. Several scholars have argued that during this period, while poverty levels showed modest declines in line with earlier trends, economic inequality along several dimensions increased substantially: between-state inequalities in per capita consumption, within-state inequalities, rural-urban inequalities at the all-India and state level, and within-rural and within-urban inequalities. (Deaton and Dreze 2002). The facts on rising economic inequalities beg the question of whether health inequalities followed suit. This forms the basis of my central hypothesis: *To the extent that the production of health is a function of wealth, there should have been a concurrent rise in wealth-based inequalities in health.*

Some Past Findings

In 1992-93, the infant mortality rate (IMR) or deaths under 12 months per thousand births, was about 2.5 times higher in the lowest wealth quintile compared to the highest quintile (Gwatkin et al 2000). In 2005-06, that number was about 2.1 indicating a decline in the poor/rich ratio of IMR (International Institute for Population Sciences and ORC Macro 2000). A similar comparison of poor/rich ratios in the U5MR shows a minor decline from 2.9 to 2.8. There are also persistent urban-rural differentials in child survival. In 1992-93, the poor/rich ratio in U5MR was 2.8 in urban areas, but only 2.4 in rural areas indicating greater variance in urban areas. In 2005-06, those numbers were 2.8 and 2.8 indicating an increase in the wealth-based gap in health in rural areas. In the case of immunizations, in 2005-06, 71% of children aged 12-23 months in the wealthiest quintile received all basic vaccinations by the time of survey compared to only 26% of children from the lowest quintile. In 1992-93, those numbers were 65% and 17%. The rich had excess coverage of 47% in 2005-06, a minor decline from the 48% of 1992-93. Clearly, significant differentials have persisted despite greater percentage gains in immunization coverage for the poor.

In my work, I will be making many more useful comparisons, using inequality measures other than the poor/rich ratio and health outcomes other than mortality and immunization.

Contributions of This Research

The trouble with the current literature is that firstly there are no comprehensive studies examining socioeconomic inequalities in child health in India. One study is devoted to wealth-based inequalities but is limited to anthropometric measures, 4 states, and the 1998-99 NFHS (Davey Smith et al 2003). A second study analyses socioeconomic inequalities in several health outcomes (including child mortality) but it is limited to the 1992-93 NFHS (Gwatkin et al. 2000).

The second issue is that even piecing together the various studies, there are only a handful of results that are comparable across years. Different authors have either used different inequality measures, socioeconomic measures, or health measures when discussing inequalities in health. The only source for comparing across the three surveys is the DHS final report for each year. But the trouble with these is that they have been inconsistent in their tabulations. For example, in 1992-93, they did not present differences by wealth levels. In 1998-99, they used a collapsed, 3 category version of the continuous, absolute standard of living index. In 2005-06, they presented tabulations based on relative wealth quintiles. These reports also changed their caste groupings, and do not break down most results by child's gender.

This paper contributes significantly to the relatively scant literature on child health disparities in India by virtue of having used a comprehensive set of inequality and health measures. Secondly, and perhaps more importantly, these detailed tabulations will then also be comparable across three surveys, allowing us to understand how child health inequalities have changed over a period of increasing economic inequality.

Data

Data for this analysis come from the Demographic and Health Survey series, known as the National Family Health Surveys (NFHS) in India. The key aim of the NFHS was to provide state-level and national-level information on fertility, family planning, infant and child morbidity and mortality, maternal and reproductive health, nutritional status of

women and children, and the quality of health services. Within each state, a two-stage stratified random sampling design was used in rural areas: first villages, then households. In urban areas, a three-stage random sampling design was employed: cities/towns, followed by urban blocks, and then households. Three survey instruments were used, a woman's questionnaire, a household questionnaire, and in rural areas a village questionnaire. Relevant to this study are the data tabulated from responses to the women's and household questionnaire. One of the fundamental aims of these surveys was to obtain reliable estimates of the parameters of interest at various levels of aggregation (states, urban/rural, metropolitan cities), so target sample sizes were determined based on the lowest level of aggregation at which estimates were needed. This meant that ultimately the national sample size was unusually large by survey standards. In 1992-93, interviews were conducted with a nationally representative sample of 88,562 households and 89,777 ever-married women in the age group 13-49, from 24 states and Delhi (which was a union territory then). In 1998-99, the survey again covered a nationally representative sample of about 91,000 ever-married women aged 15-49 from 26 states in India. In 2005-06, more than 230,000 women aged 15-49 and men aged 15-54 were interviewed in the now 29 states of India (http://www.nfhsindia.org). Given that the interviewers document complete birth histories for women, we have an extraordinary number of births to work with.

Measures

Outcomes

I present measures of wealth-based household-level inequalities in several different types of health outcomes for children. The first is a set of mortality measures – neonatal mortality (deaths within 28 days of birth), postneonatal (deaths within 1 year of birth), and early childhood mortality (deaths under the age of 5 years). A second set of outcomes involves anthropometric measures – stunting (height for age), underweight (weight for age), and wasting (weight for height). The third type of measure is one proposed in a seminal work on child health in developing countries (Mosley and Chen, 1984) – a combination of growth faltering (or underweight) and mortality. Lastly, I present

measures of socioeconomic inequality in two inputs to child health – receipt of prenatal care and immunizations.

Inequality indices

For each of the above outcomes, I present three inequality indices for each of three survey rounds. In addition, to the all-India table for boys and girls combined, I present results separately for each state, for urban and rural areas, and for male and female children. Given the documented rise in income inequality over time, I hypothesize increases in the size of the health inequality indices over time. I now present details of the three indices.

1. The relative index of inequality (RII) – The RII is generally used in studying between-group inequalities where there is some natural ordering of the groups (I use wealth quintiles derived from rankings on an asset index). It assumes a linear relationship between wealth and health. It is essentially a summary measure of the differences in mortality experience between all five wealth quintiles, and it can be interpreted as the ratio of the odds of death of a child from the poorest household, to the odds of death of a child from the richest household (Houweling et al 2003).
2. The concentration index (CI) – The CI is similar to the RII but it is used with individual-level data instead. It is easiest to think about it in terms similar to a Lorenz curve. Imagine on the x-axis, cumulative % of children ranked by household wealth status (continuous factor scores on the asset index). Imagine on the y-axis, cumulative % of the mortality/morbidity burden. The CI is essentially twice the area between the pseudo-Lorenz curve and the diagonal.
3. The achievement index (AI) – The AI combines absolute levels of health with a measure of health inequality, thus giving a society credit for achieving higher average health and reducing health inequalities. Achievement is then a weighted average of the health levels of all children, where higher weights are attached to children from poorer families than to those from better-off families (Wagstaff 2002).

The wealth index

The health inequality indices described above are calculated based on the socioeconomic dimension of wealth. The absence of survey questions on household income or expenditures in demographic and health surveys presents a formidable challenge to social scientists that are interested in the role of economic status in a whole range of outcomes. One of the main reasons for the lack of such information is the inherent difficulty of collecting such data in developing countries where the informal sector (with its lack of records) is large, households have multiple sources of income, consumption expenditures and income vary a lot even within short time frames etc. As one solution to this problem, the DHS series collects information on housing characteristics and the assets that a household owns. Entering each of these indicator variables into a regression equation at the same time is problematic because it becomes difficult to disentangle the direct versus indirect effect of things like water source. Filmer and Pritchett (Filmer and Pritchett 2001) recommend creating an index using a principal components analysis approach to weighting the various assets. The asset indicator variables are first standardized to get their z-scores. In the next step, the factor loadings are calculated. While several factors are extracted, only the first factor is used to generate the RWI. Finally, the values on the indicators for each household are multiplied by the loadings. When summed, this yields the household's index value, a standardized score with a mean of zero, and a standard deviation of one.

A succinct way to represent these scores is to use wealth quintiles. The quintiles are calculated based on the distribution of individuals rather than the distribution of households because poor households may contain more people than rich ones for example, thus accounting for a greater share of poor people. First we create a weighted frequency distribution of the households, where the weights are obtained by multiplying the number of members in a household with the sampling weight of that household. Then each individual is assigned the wealth index score of his or her household. Individuals are ordered by that score, and this distribution is divided into 5 sections of 20% each. Households and individuals thus have the same quintile category (Rutstein and Johnson

2004). The three health inequality indices are then indicative of inequalities in the distribution of good health among the wealth quintiles.

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