An Assessment of the Public Health Inequalities in Purulia District of West Bengal

Mukunda Mishra

Assistant Professor, Department of Geography, Dr. Meghnad Saha College, Itahar, Uttar Dinajpur – 733128 West Bengal (India)

1. Introduction

Health is a complex, multidimensional concept that is usually measured in terms of the absence of physical pain, physical disability, or an acute morbid condition that is likely to cause death. Health is a state of emotional and mental wellness of the human being to become capable of adequate social functioning. The most universally used definition of health was developed by the World Health Organization (WHO) in 1946 where health was defined as ‘a state of complete physical, emotional and social wellbeing, and not merely the absence of disease or infirmity’. This broad definition of health also includes the concept of wellbeing. Hence, a good health is seen as more than just the absence of disease, and depends upon a range of complex and mutually interacting factors, with location taking the lead. Poor countries tend to be unhealthy, and unhealthy countries tend to be poor. Across the broad swath of history, improvements in income have come hand-in-hand with improvements in health (Bleakley, 2010). All these stylized facts lead to a natural question: does bad health condition hold back development? In context with the present discussion, health may be treated as a kind of human capital as well as an input to produce other forms of human capital. Unhealthy state of physique or mind depresses the ability to work productively and/or affects the ability and incentives to invest in human capital. Hence, the discussion related the measurement of human development inevitably linked with the analysis of the health status of the population as well as status of access of population to satisfactory level of healthcare services. The World Health Organization, in the Ottawa Charter for Health Promotion (1986), stated that health is a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Overall the concept of health needs to acknowledge that it is the complex state or process towards ensuring human wellbeing.

The district of Purulia is located at the extreme west of the State of West Bengal in India was selected as the study area. The district lies between 22.70295° N to 23.71335° N latitude and 85.82007° E to 86.87508° E longitude, covering a total area of 6259 sq. km and accommodates 2,930,115 inhabitants with an average population density of 468 persons per km² (Census of India, 2011). The district has achieved a marginal level of development in health, education and income – the three basic dimensions of Human Development (West Bengal Human Development Report 2009). The constraints such as unfertile soils, extreme climates and the lack of irrigation opportunity restrict the district to achieve an agricultural yield beyond the subsistence level. Regarding the level of educational attainment, the rural and urban literacy rates are 62.73 and 76.18 percent in the district, respectively. Moreover, the literacy rate amongst urban females is 67.15 per cent and it has yet to reach the 50 per cent ‘benchmark’ in the rural areas (District Statistical Handbook 2013). The present study tries to assess spatial and non-spatial disparity in public health status in this district.

2. Materials and Methods

2.1. Primary datasets and sampling design: The present study uses the primary data collected through household surveys constructed using a pre-printed survey schedule. The district of Purulia is constituted with 20 Community Development Blocks (i.e. C.D. Blocks) and a total of 170 Gram Panchayats (GPs) within the administrative jurisdiction of these blocks. There are also three urban municipalities in the district. The survey was designed to estimate simple proportions without any cross-classifications in a large population by collecting the samples randomly from each C.D. Block, provided that the sample is distributed at least one census village in each of 170 GPs and one municipal ward of each of three urban municipalities of the districts ensuring the representation of the entire study area.
2.2. Secondary datasets utilized: The datasets of Census of India 2001 and 2011 has been utilized for the present study. Besides, the block level datasets from the Report of Demographic and Health Survey Program (DHS), funded by the U.S. Agency of International Development (USAID) is also used for assessing spatial pattern of health status in the district.

2.3. Software: The statistical analysis has been operated with MS Excel v2007 (Microsoft Corporation) and SPSS v17.0 (IBM Analytics). Maps are prepared in QGIS v2.8 software platform.

2.4. Methods: Preparation of life table and calculation of age specific death rate to get the life expectancy at different age is an old practice in demographic studies. As per the available reports, the life expectancy at birth has been used as a measure of the health status of the population of England and Wales since the 1840s. It was employed in some of the earliest reports of the Registrar General of Great Britain to illustrate the great differences in mortality experienced by populations in different parts of the country (Fifth Annual Report of the Registrar General, 1843). The life expectancy at birth is the average number of years that a newborn could expect to live, if he or she were to pass through life subject to the age-specific death rates of a given period (WHO, 2014). Life expectancy at birth is a summary indicator of mortality conditions and, proxy to health conditions. It summarizes mortality risks and trends across all age groups, including older people. Measurement of life expectancy at birth also allows reporting of life expectancy at other ages to track health improvements for specific age groups in populations. Life expectancy is included as a basic indicator of health and social development in, among others, the Minimum National Social Data Set endorsed by the United Nations Statistical Commission and the OECD/DAC core indicators. Life expectancy at birth is frequently used as a health indicator by using mortality risks as proxies of the health status of the population (Egidio and Spizzichino, 2008). This approximation is often criticized as less satisfactory for low mortality countries as the health transition has deeply modified the structure by cause of death and, in general, the health risks there (Frenk et. al., 1991; Robine, 1996). But, for the present study area, there is appropriate cause to accept the life expectancy at birth to be approximated with the health status.

For the present study, the life expectancy at birth is calculated from abridged life table. The steps involved in the calculation are mentioned below:

i. Width of the interval (n): The number of years in each age interval; for the present study, for all age groups (including 85+), n = 5 years.

ii. Average proportion of the year lived by those who die (x`:alpha:`): Usually it is assumed that death occurs uniformly across time and that on average people will live 0.5 of the interval before death. However, there are some cases where it is known that death does not occur uniformly across time within age groups.

iii. The probability of dying (x`q`): This is calculated using the Greville’s (1943) method with the following formula:

\[
\hat{x}q = \frac{n + xM}{1 + n (1 - \hat{x}xM) * xM}
\]

Where, \(xM\) is the age-specific death rate.

iv. The probability of surviving (x`p`): This is calculated by simply subtracting the probability of dying from 1:

\[
xp = 1 - \hat{x}q
\]

v. Number of persons alive at the start of the interval (lx): This is a hypothetical population, in this case 100,000 alive/born at age 0.

\[
l_x = (l_{x-n}) * (x-n)p
\]

Where, \(l_{x-n}\) is the probability of surviving the previous interval and \((x-n)p\) is the population alive at start of previous interval.

vi. Number of deaths during interval (xd):

\[
\hat{x}d = [l_x - l_{x+n}]
\]

Where, \(l_{x+n}\) is the population alive at start of next interval.

vii. Number of person years lived through the interval (xL):

\[
xL = n[l_{x+n} + x`:alpha:` * x`:delta:`]
\]

At the age 85+, everybody dies during the interval; so an adjustment has been made. Whatever is used as an estimate of the number of years lived has little impact on overall life expectancy; however, it is usual to use the following estimate:

\[
L_{85+} = \frac{L_{85}}{M_{85+}}
\]

viii. Total number of person years lived after the interval (xT): This is the ‘number of person years lived through the interval’ column summed from the bottom.

\[
xT = [T_{x+n} + xL]
\]

ix. Expectation of life (Ex): This is the number of years a person aged x can be expected to live.

\[
Ex = \left(\frac{T_x}{I_x}\right)
\]

Where, \(T_x\) is total number of person years lived after the interval and \(I_x\) is number of person years alive at the start of the interval.

3. Results and Discussion

3.1. Unequal life expectancies across economic strata:

The greater income figure is likely to lead to low probability of the burden of disease and premature death (Davey, Bartley & Blane, 1994). Empirical studies in many
countries show that people who are worst off as far as their socioeconomic position is concerned, are also worst off when it comes to health (Fox, 1989; Blackburn, 1991). There are ample of studies which conclude that across income levels, irrespective of the fact whether it is in developed or developing countries, the economically weakers are also weaker in longevity of lives than that of the peoples at higher economic strata (Quick & Wilkinson, 1991; Braveman, 2010). Studies also proved that not only the income (the earnings and other money acquired each year) is associated with better health, but wealth (net worth and assets) also affects health as well (Pollack et. al, 2013).

The unequal distribution of per capita income in this district has been examined by the author (Mishra, 2017) which has motivated the present discussion to look into the inequality of health condition of the population across different income groups. All the sample households, for this purpose, have been split into four income classes on the basis of the quartile values of annual household income (Fig. 1) and the members of the households of the four quarters have been disaggregated to calculate life expectancies separately for the sample in each economic strata.

Fig. 1 Distribution of sample households by income and the splitting of households into quarters of income by the quartiles.

Fig. 2 Age-sex pyramid for the people in sample households with annual household income (A) below first quartile and (B) above third quartile
The age-sex pyramid of the population demonstrates some primary information about the health condition of the population as the shape of the pyramid is determined principally by the fertility and mortality of the population which are well recognized as the proxy of health status of the population. Though, in a district level study, much of the differences is simply not possible to be reflected by the age sex pyramids of the population of different economic strata but a sensible difference is observed between the pyramids of the population belongs to sample households above third quartile of annual income and that of below the first quartile (Fig. 2). The pyramid of population from sample households at lowest quarter of income shows a wider base than that of the highest quarter of income, indicating the higher incidences of birth at the lower strata of economy. The higher birth rate, at one hand, put surplus population pressure on readily low income of the households and also indicates the non-functioning of family planning, owing to low level of health awareness at the lower economic strata of the study area. Contrastingly, the population of higher income strata have, naturally, the capability of purchasing health and health-care services other than free public health and health-care services sponsored by the government. A better level of health awareness and access to health related information also determine the good health status of the higher economic strata. If the top of the pyramids of both the economic strata are observed, there are also basic differences observable clearly. The pyramid of highest income strata shows considerably more number of people (2.25% of the males and 2.62% of the females) survived at the age of 75 years and above in comparison to (only 0.07% of males and 0.11% of females of) the lowest income quarter. In the district, the better economic condition is found associated with the longer survival of the people, indicating a better health condition.

The life expectancy at birth (LEB) is calculated for the samples of different income classes separately. Fig. 3 shows the life expectancy at different age groups of the samples from different economic strata. There is a considerable difference of the age specific probability of survival as well as life expectancies across economic classes. It shows clearly that the LEB is 69.09 years for the people of highest level of household income whereas this is valued as 48.63 years for the lowest level. The LEB of population in second and third income classes is calculated as 51.04 years and 55.72 years respectively. The LEB of population in the highest quarter is at a considerably higher level than that of the other income strata. There is also a noticeable feature found in the age-specific life expectancy of the lowest income quarter – the higher rate of infant mortality is observed among the population within this strata which leads to lowering the life expectancy of the age group of 0-4 years (which is 48.63 years) than that of the next consecutive higher age group of 5-9 years (as 49.85 years). The death rate at the age group of 0-4 years is 25.23‰ in the lowest quarter of income whereas this is recorded as 8.8‰ in the highest quarter. This is, undoubtedly, an alarming indication of the poor health condition, especially the matter of deep anxiety for the child health condition as well as the status of fertility and reproductive health care, among the poorest section of the population in the district and this situation is not observed in any other economic strata.

![Fig. 3 Life expectancy at different age group of the sample population disaggregated into quarters on the basis of annual household income](image-url)

### 3.2. Life expectancy differentials across social classes:

Different studies has been carried out in this district which focused on the comparative backwardness of the tribal population in the district than that of the non-tribal population in terms of secured income and educational attainment (Mishra & Chatterjee, 2017). The relative backwardness of a community in terms of income and education increase the
likelihood of the community to be suffered by bad health condition (Fritzell, Nermo & Lundberg, 2004; Larrimore, 2011).

The age specific life expectancy is calculated separately for population belongs to tribal communities and that of non-tribal. Life expectancy at birth (LEB) for tribal sample population is 47.74 years which is at considerable lower level than that of the LEB of the non-tribal population in the sample (54.32 years). There is also a larger death rate in the age group of 0-4 years (23.3‰) that lowers the LEB for the age group of 0-4 years (48.63 years) than that of LEB of the next higher age group of 5-9 years (49.85 years) (See Fig. 4). The marginalized sources of occupation and income, poor health awareness owing to low level of educational attainment, a social trend of being treated by ‘quacks’ or religious preachers and many other factors cause to lower the health condition of the tribal communities in the district and creates a significant gap between tribal and non-tribal population in the profiles of life expectancy or more specifically the life expectancy at birth.

4. Conclusion

Life expectancy at Birth (LEB), as a proxy to the public health status, unfolds the existence of sharp inequality in health condition between the population groups with different income levels in the district. Higher LEB shows greater likelihood to be associated with higher income figure and poorer population of the district are characterized by lower longevity of lives. The tribal population of the district also suffers from a shorter span of lives than that of the other communities of the district. The capability of the people to spend for healthcare services is key to a longer life.

All the analysis, so far, regarding the health status in the district results into some basic findings regarding the non-spatial and spatial pattern of inequalities in the study area. It is observed that the population belongs to the higher economic strata are found enjoying a longer span of life than that of the lower economic strata. The role of income in general and more specifically, the capability and awareness of adequate expenditure toward purchasing healthcare services, accessories and medicines, quality dietary requirements, health and medical insurance etc lead to providing longevity of lives for the population with better economic standard. On the other hand, the mental stress owing to unsecured income, worse physique due to unhealthy and unsafe dietary practices, higher degree of exposure to occupational hazards, improper family planning with unsafe reproductive health as a consequence of low level of attainment reduces the life expectancy of the population in the lower economic strata. The inequality of health condition between the tribal and non-tribal population are mainly regulated by the sharp economic differences between the two categories of population.

The public healthcare facilitation centers are evenly distributed throughout the districts but the availability of emergency health services and emergency medicines are very limited to district headquarters, urban municipalities and a few block headquarters only. Greater portions of the population, residing in far rural areas have to face compulsion to travel a few miles to avail the basic healthcare services. The situation is rather worse during the time of emergency and critical health situation as those emergency health services and medicines are restricted to some urban based health centers and hospitals only. Settlements with higher degree of isolation have serious health issues than that of the well connected areas.

The antenatal health care, immunization to children, awareness regarding safe birth control and other behavioural health issues are still highly neglected parameters at the lowest economic strata of the population, within tribal communities and the settlements located at far flank rural areas. The flow of updated ideas of safe health behaviour is not carried forward properly through successive
administrative, economic and social orders to reach from district headquarters to the remotest corner of the district. It is one of the major issues of getting a ‘health gradient’, in general, from administrative centers toward the peripheral areas at each and every order of administrative hierarchy.

References