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# Socioeconomic Determinants of Health Inequalities among the Older Population in India: A Decomposition Analysis

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# Socioeconomic Determinants of Health Inequalities among the Older Population in India: A Decomposition Analysis


## Abstract

This study is one of the first attempts to quantify and decompose health inequalities and examine whether these inequalities vary for younger old and oldest old populations of India. The initial investigation begins with a bivariate and multivariate analysis to assess the socioeconomic differentials in terms of poor health status of the older population. Subsequently, concentration index is used as a measure of health inequality, which is further decomposed into their determining factors to find out the relative contribution of different socioeconomic predictors. Decomposition estimates suggest that poor economic conditions stand to be the dominant contributor to health inequalities in older population followed by illiteracy and rural place of residence. Comparative assessment suggests that socioeconomic inequality is critical for health inequality in younger old population than oldest old population.



**Keywords**

Older population, socioeconomic determinants, health inequalities, decomposition


### Introduction

The disquieting feature of population ageing in developing countries is that ageing is taking place at lower levels of socioeconomic status and the gap in health related outcomes between the rich and the poor is widening. In addition, in the absence of appropriately well-designed affirmative policies and programmes for the older population (60+), the existing socioeconomic inequalities has a strong impact on the health and well-being of the older people (National Research Council of the National Academies, 2011).

India has and continues to experience a rise in average life span from 32 years in 1951 to 65 years in 2001, and is expected to cross 76 years by 2031 (Ranjan & Kumar, 2003). The shift in the age structure has pertinent social and health implications, particularly for the older population (HelpAge India, 2010). Currently, the size of the older population in India is more than the population of mid-sized European countries. Tracing by the projection estimates, the proportion of the older population in India which had increased from six percent in 1950 to eight percent in 2001, is further expected to increase to 20% by 2050 (United Nations, 2009).

Alongside, the older population is also growing at an annual rate of more than 3%.However; the stark reality is that the socioeconomic status of elderly in India is much lower than that in many other economically advanced countries (Alam and Mukherjee, 2005; Rajan , 2006).

The current aging scenario has given rise to growing need in many aspects of elderly care. This can be segmented down to an area of priority such as financial, health and shelter for the older population. At the same time, the imminent concern is the rise in the number of older persons, who spend a large proportion of their "added years" in poor health and prolonged illness (Kumar, 2003; Alam and Mukherjee, 2005; Mishra, 2005; Devi, 2005; Mini, 2009; Chen and Mahal 2010; Husain and Ghosh 2011). The growing number of oldest old population (80+) will pose a greater challenge for the existing health system. The reason being, tipped on the scale of importance for the different age group among the older population, the oldest old emerge as the challenge area as the chronic functional disabilities peaked in this age and demand care in terms of managing simple daily chores. (National Research Council of the National Academies, 2011).

The issue of socioeconomic inequalities in health has attracted considerable research interest (Marmot and Wilkinson, 1999; Gwatkin, 2000; Leon & Walt, 2001; Wagstaff, 1991, 2002c; Kawachi, 2002; Roy, Kulkarni and Vaidehi, 2004; Subramanian et al., 2006, 2008 O'Donnell et al., 2008; Warnecke et al., 2008, Swabramanyam *et al*, 2010). There are researches undertaken to examine whether basic socioeconomic associations that have implications for health can be extended to the older population (Berkman & Gurland, 1998; Huisman et al., 2003; Matthews et al., 2006). This question has global significance, given the scenario of the aging of a global population and subsequent increase in the proportion of health care costs incurred by the aged population worldwide. Studies in developed countries have point towards the consequences of income inequality when it is extended to older population (Grundy & Sloggett, 2002; Huisman et al., 2003)

However, there is still limited literature in India on the subject. Existing studies do not throw much insight on the underlying contributory factors that create an imbalance of the health status of older population (Kumar, 2003; Alam & Mukherjee, 2005; Mishra, 2005; Devi, 2005; Rajan, 2006; Mini, 2009). Despite the fact that India occupies the second place in terms of its older population in absolute terms, who mostly live in a poverty-stricken environment, A test of association between socioeconomic inequality and health among the younger old (<80 years) and the oldest old (>80 years) was never undertaken with improved tools of health inequality assessment. The objectives of the present study are, firstly, to

estimate the effect of socioeconomic inequality on health of older population and the relative contribution of the key socioeconomic predictors. Secondly, the study aims to compare the inequalities among the younger old and oldest old populations of India.

## Materials and Methods

### *Data Source and Sample*

This paper uses data from the 60th round of National Sample Survey (NSS) conducted by National Sample Survey organization (NSSO) during 2004-05. NSSO, an organization in the Ministry of Statistics and Programme Implementation of the Government of India, is the largest organization conducting regular NSS surveys. The survey provides state level information of demographic and health indicators as well as information about a range of socioeconomic and programme perspective, which are critical for bringing about the desired change in demographic and health parameters. The 60th round of NSS focus on'morbidity and health care' includes several questions related to key health indicators like the problems of aged persons. However, in this study, we are using the questions related to key socioeconomic and health attributes to estimate the socioeconomic status based health inequalities among the older population of India.

A stratified multi-stage design is adopted for the 60th round of National Sample Survey. The First Stage Units (FSU) was the 1991 census villages in the rural sector and Urban Frame Survey (UFS) blocks in the urban sector selected with Probability Proportional to Size with Replacement (PPSWR). The ultimate stage units (USU) are households in both the sectors. The sample size of the older population for the present study is 34, 831, out of which 26,855 belong to the younger old population (<=70 years) and 7,976 to the oldest old population (>70 years). The study sample is not organized based on the conventional classification of defining older population , that is , the younger old population (< 80 years) and oldest old population (>80 years).The reason being India is yet to achieve the average life expectancy of 80 years. Considering the standard classification will render very less sample in the oldest old category that will not be enough to carry out any robust estimation. Therefore, in this study, age 70+ is considered as the oldest old population and less than 70 years as the younger old.

### *Definition of Variables*

This section describes the definition of the variables constructed and used in the analyses. A conventional issue in the literature on health inequality is whether all inequalities should be

measured or exclusively the ones which show some coherent association with indicators of socio-economic standing be measured (Gakidou et al., 2000; Wagstaff 2002c; Wagstaff et al., 2003; Warnecke et al., 2008; Subramanian et al., 2006, 2008; Joe et al., 2009; Pradhan & Arokiasamy, 2010; Arokiasamy & Pradhan, 2011). Based on an exhaustive literature review (Kumar, 2003; Alam & Mukherjee, 2005; Mishra, 2005; Devi, 2005; Mini, 2009; Joe et al., 2009; Pradhan and Arokiasamy, 2010; Subramanyam and Subramanian ,2011.), in this study, the predictor variables are, therefore, are specifically chosen that can be considered as critical determinants of health and can systematically explain a major part of inequalities. Further, in order to carry out decomposition analysis, the variables must be in two categories (dichotomized), hence variables are redefined as:

**Health variable/Dependent**

- **Poor self rated health status** (Yes=1, Otherwise=0): In the NSS surveys, there are information's collected on the current health status of older people. The response is purely perception based information. Hence, the respondents who reported their self health as poor are classified as having poor self rated health status (*yes)* and conversely for others (*no*) indicates good health status. Commenting on the reporting pattern of health status on the Data of NSS, A study by Chen and Mahal (2010) showed that except region other socio economic factor such as education, place of residence, gender do not have much bearing on the reporting pattern of health status.
- **Physical Immobile** (Yes=1, Otherwise=0)**:** For the aged persons the ability to move is an important indicator of their physical condition of health and also indicates the degree of their dependence on others for movement and performing their daily routine. In the NSS survey, information is collected for the aged persons who cannot move around and are confined to their home or who cannot move at all and are confined to bed being classified as physically immobile where yes indicate physical immobile and otherwise no.

Both the dependent variables are disaggregated by two broad age groups of older population: Older population less than 70 years of age and older population 70 years or more.

**Predictive variables** (Yes=1, Otherwise=0) where *yes* indicates older population in disadvantaged socioeconomic group. The socioeconomic status of individuals in India is basically dependents on not only on their position in economic and educational status, but also on their place of residence, caste, religion, marital and gender affiliations. Based on this perspective, we have selected following predictor variables:

- Place of residence: Rural/Urban
- Sex: Female/Male
- Economic status (based on MPCE): Poor/Non-poor

  Household income is highly associated with the health of the household members as well as to the extent of health care received by them. However, it is difficult to collect reliable income data; hence, the NSSO collects data on consumption expenditure in its surveys. "MPCE is a supplementary classificatory variable for correlative study of the main theme of the round; data was collected through a short set of 5 questions rather than a detailed listing of consumption items that is used when household consumption expenditure is the main theme of the survey" (National Sample Survey Organization, 2005). This procedure is known to underestimate the level of MPCE in comparison with the detailed schedule but expected to provide a reasonable proxy for relative ranking of the households according to level of living" (National Sample Survey Organization, 2004-05).
- Education: illiterate and literate

  In the Sixtieth round of NSSO, there are questions on the general educational level of the individuals in 13 categories (for details see National Sample Survey Organization, 2004-05). However, for the effective comparison between different categories of the level of education, the levels of education are classified into four broad categories: Illiterate, Primary, Secondary, and Higher & above. For the purpose of decomposition analysis again these four categories are narrowed down to two: illiterate and literate
- Religion: Muslim/others

  The information on religion is collected in eight categories of religion in India. We have grouped these eight religions into three (Hindu/Muslim/Others) in bivariate analyses and two categories (Muslim/others) in decomposition analyses. The number of studies established that Muslims religion in India is disadvantageous not only in terms of socioeconomic but also in public health indicators (Basant, 2007; IIPS and Macro International 1992-2006; Government of India, 2006).

- Caste: Scheduled Castes/Scheduled Tribes/others

  The caste system in India is a social institution where social stratification of communities is defined by several endogamous inherited groups called Jatis. The castes in modern India can be classified into four classes: scheduled castes/scheduled

tribes, Other Backward Castes (OBCs) and other castes. Number of studies provides evidence for caste based inequalities and foster that scheduled castes/scheduled tribes are socioeconomically backward compared to other castes (e.g. Srinivasan, 1957; Dumont, 1970; Subramanian et al. 2008; Desai, 2008).

- Marital status: Currently married/others

  The currently married woman includes other than never married, widowed and divorced/separated women.

***Statistical Analyses***

In the first stage of statistical analyses, socioeconomic differentials in the health status of the older population are assessed. In the second stage, the effect of socioeconomic determinants on the health status of the older population is estimated by using binary logistic regression. Third, concentration indices (CIs) are estimated as inequality measures. Finally, the CIs are decomposed to find the percentage contribution of different socioeconomic predictors to total health inequality. All the statistical analyses in this paper are carried out using STATA 10.1 (STATA crop LP, College Station, Texas, USA) and Microsoft excel program.

*Method of decomposing socioeconomic inequalities in health.* Previous studies have assessed the level of socioeconomic inequalities in health using Lorenz curve, CIs and concentration curve (Berkman & Gurland, 1998; Hiusman et al., 2003). Though the values of CIs show the degree of economic inequality, it does not highlight the pathway through which inequality occurs. Decomposition of inequalities is, therefore, critical to explore the prominent contributory factors that lead to socioeconomic inequalities in health status of the older population (Wagstaff et al., 2003; Hosseinpoor et al., 2006; O'Donnell et al., 2008; Sundmacher et al., 2011).

After reviewing a series of inequality measures, the inequality decomposition measure proposed by Wagstaff et al., (2003) is used for assessing the health inequalities among the older population. The decomposition analysis enables one to estimate how proportionally the socio-economic determinants contribute to inequality (the gap between poor and rich) in a health variable.

*Steps in inequality decomposition analysis.* In the first stage of analysis, the study used the CIs to measure inequalities in the older population's health status. The CI is computed as twice the (weighted) covariance of the health variable, and a person's relative rank in terms of economic status, divided by the variable mean according to equation 1. The value of CI

can vary between -1 and +1. A negative value implies that the outcome of the variable is concentrated among disadvantaged people while the opposite is true for its positive values. The value of CI will be zero when there is no inequality (Wagstaff and van Doorslaer, 1991).

$$C = \frac{2}{\mu} \mathrm{cov}_w(y_i, R_i) \quad (1)$$

Where $y_i$ and $R_i$ are, respectively, the health status of the $i^{th}$ individual and the fractional rank of the $i^{th}$ individual (for weighted data) in terms of *the index of household economic status*, μ is the (weighted) mean of the health variable of the sample and $\mathrm{cov}_w$ denotes the weighted covariance.

In the second stage, by using Wagstaff et al., (2003) method, socioeconomic inequality among the older population was decomposed into its determinants which allows one to estimate how the determinants proportionally contribute to inequality (the gap between the poor and the rich) in a health variable. For any linear regression model linking the health variable of interest, y, to a set of k health determinants, $X_{ki}$:

$$y_i = \alpha + \sum \beta_k X_{ki} + \varepsilon_i \quad (2)$$

Where **ε** *is* an error term, given the relationship between $y_i$ and $X_{ki}$ in equation, the concentration index for y (C) can be written as:

$$\sum \left(\frac{\beta_k X_k}{\mu}\right) C_k + \frac{GC_\varepsilon}{\mu} = C_y = \frac{GC_\varepsilon}{\mu} \quad (3)$$

Equation (3) shows that C is made up of two components; deterministic or 'explained' component, equal to a weighted sum of the CIs of the regressors, where the weights are simply the elasticities [elasticity is a unit-free measure of (partial) association, that is, the percentage change in the dependent variable (older population health variables) associated with percentage change in the explanatory variables] and the residual or 'unexplained' component $(GC\varepsilon/\mu)$, which reflects the inequality in the health of the older population that cannot be explained by systematic variation in the $X_k$ across social groups.

The decomposition analyses were carried out based on the following steps

- Regress the health variables against its determinants through an appropriate model for finding the coefficients of the explanatory variables ($\beta_k$).
- Calculate the mean of the health variables and each of its determinants (μ and $X_k$).
- Calculate the CIs for the health variable and for the determinants (C and $C_k$) using equation (1) ---- as well as the generalized concentration index of error term (GCε)

where, $y_i$ and $\mu$ are the value of the determinants for the $i^{th}$ individual and the determinant mean, respectively.

Finally, the pure contribution of each determinant included in the model to the inequality in the health variable can be quantified through the following steps:

- Calculate the absolute contribution of each factor by multiplying the health variable elasticity with respect to that determinant and its CI---- $(\beta_k X_k/\mu)\, C_k$.
- Calculate the percentage contribution of each factor by dividing its absolute contribution by the CI of the health variable $(\beta_k X_k/\mu)\, C_k/C$.

## Results

### *Description of Study Population*

In order to understand the inequalities in the health status of the older population, it is imperative to understand the distribution of older people across various socio-economic groups. The socioeconomic, demographic and health profile of the older population covered in the study is described in Table 1 (weighted percentages and unweighted sample size) based on the $60^{th}$ round of NSS data. In order to understand the socioeconomic and health profiles by oldest old and younger old population, the sample is divided into two age groups- younger old population aged below 70 years constituting three-fourth of the sample and oldest old population aged 70 years and above comprising one-fourth of the sample. Almost one fifth of the younger old population have poor health status, and the percentage increases to 38 among the oldest old. With regard to the functional limitation, physical immobility is almost four times higher among the oldest old in comparison to the younger old population; however, the overall percentage is less than one tenth.

Percentage distribution of the older population by socioeconomic groups depicts the same patterns as the general population distribution in India. Majority of older population in sample of this study belongs to Hindu religion and resides in rural areas. By socioeconomic status, oldest old population have a slightly higher level of education but has a lower level of Monthly Per capita Consumer Expenditure (MPCE); however, the gap between rich and poor increases with the increase in age. Overall, approximately 60% of the older population is married; however, there is a gap of around 20 % in the proportion of married older population in younger old (62.8%) and oldest old (46.4%) population. Unweighted sample distribution presented in table 2 shows that sample size in all the sub categories of population are sufficient to carry out any robust estimates.

### *Socioeconomic Differentials in the Health Status of the Older Population*

The socioeconomic and demographic characteristics have a bearing on the health outcome in the way an individual perceives his/ her health and the care required to maintain health depends on his/her socioeconomic status largely. The socio-economic and demographic differentials of self-reported poor health status and physical immobility of elderly population are reflected in Table 2. The results show that there is a considerable proportion of the oldest old population having poor health and functional limitations as compared to the younger old population. In comparison to only 5% of physical immobility among the younger old population, 19 % of the oldest old population suffer from the same problem. Similarly, 38% of the oldest old population suffer from poor health as compared to only 20 % of the younger old population. Such differences are reflected across socioeconomic and demographic characteristics as well. The poor health status and physical immobility are more predominant among females than males. By educational status, in both the age groups, the older population with higher education have better health status and lesser functional limitations in comparison to their less-educated counterparts. In both the age groups of the older population, the bivariate estimates by MPCE (Mothly Percapita Consumption Expenditure) tertile suggest that the higher the MPCE, the better is the health outcome.

### *Effects of Socioeconomic factors on the Health Status of the Older Population*

In order to describe the adjusted socioeconomic differentials of health, the paper has modelled binary logit regression analyses. Further, the logit model helped in selection of critical predictors that is included in decomposition analyses. Table 3 display the results of binary logit regression analyses for poor health status and physical mobility in the older population. For the younger old population, the results indicate that the likelihood of having poor health status among those with higher education, higher income and currently married are significantly lower compared to their counter groups. However, the magnitude and level of significance are varying across socioeconomic characteristics. Estimates for the oldest old population, suggest that though overall health status is worse, the health differentials by socioeconomic characteristics are lower than the younger old population. A similar pattern is also observed with binary logit estimates for physical mobility. In comparison to poor health status, the logit regression estimates for physical mobility are show less socioeconomic

disparity in health outcomes and the estimates are statistically less significant. Hence, the estimation and decomposition of socioeconomic inequality in health of older population is restricted to self-reported poor health status only.

***Socioeconomic Inequalities in the Health Status of the Older Population***

Although the above table 2 & 3 clearly reflected the socioeconomic differences in poor health status of the older and the oldest old population in India but it is not a sufficient condition to explore the health inequalities prevailing in this sub group of the population. There is a need for a statistical tool that can quantify the socioeconomic status based health inequalities across the population sub-groups. Hence, in this section, the magnitude of difference in terms of socioeconomic inequalities measured by Concentration Indices (CIs) is discussed. Figure 1 display the values of CIs for the poor health status of the younger old population and oldest old populations. The values of concentration indices are negative which confirm the prevalence of inequalities among those who belong to the lower wealth quintile. The closer the value of CI to zero the lesser would be the inequalities. The age wise comparative estimates of CIs demonstrate that the magnitude of inequality is greater among the younger old population than the oldest old population, that is -0.0943 compared with -0.0821. The difference in the values of CIs is, though less in absolute numbers, but reflects greater persistence of inequalities among the younger old population.

***Decomposition of Socioeconomic Inequalities in Health of the older population***

Several studies have estimated the concentration indices and have shown that considerable socioeconomic inequalities exist in health status of women and children (Joe *et al*, 2009; Pradhan and Arokiasamy, 2010). However, critical pathways and the magnitude of contribution from different socioeconomic predictors to health status of older population have not yet been explored. Therefore, the decomposition analysis has been carried out separately in this study for the younger old population and oldest old population to throw light on the mechanisms and pathways that lead to health inequalities. The results of decomposition analyses of poor health status are presented in table 4 and table 5 for the younger old population and oldest old population respectively.

The estimates of table 4 indicate that seven selected socioeconomic predictors explain the major part of inequalities in the poor health status of the younger old population, that is, the variables explain 91 % of total inequality in poor health status (-0.08529 out of -0.0943). The

remaining 9% constitute the unexplained residual. From the results of CIs, it is evident that the poor health status is greatly concentrated among the older population living in households with poor economic status. The results of marginal effect reveal that except SC/ST, all other covariates are positively associated with poor health status of the older population. The absolute level of association is greater between poor health status and poor economic status, which is followed by illiteracy and poor health status. As a whole, poor economic status makes the largest contribution to total inequalities in poor health status of the younger old population, that is, 56 % followed by illiteracy and residing in a rural area which contribute to 20 % each respectively.

Table 5 presents the results of decomposition analysis for the oldest old population. Similar to inequality decomposition estimates for the poor health status of younger old population, the estimates for the oldest old population also reveals that seven selected socioeconomic indicators explain the major part of inequalities (-0.06862 out of -0.082). The unexplained part in the model is only -0.01336 out of the total CI (-0.082) in the poor health status of the oldest old population. Though, direction of inequality decomposition results for the younger old and the oldest old population are same, the magnitude in terms of level of concentration indices, marginal effect, and resulted contribution of socioeconomic covariates to poor health status varies considerably.

The CI estimates reveal that among the oldest old population, overall inequality in poor health status is smaller than that among the younger old population. The estimates of marginal effect for the poor health status of the oldest old population by their socioeconomic characteristics reveal that except female and currently married all other covariates are positively associated with the health variable. However, for poor health status among the oldest old population, the absolute level of association is greater with poor economic status, followed by illiteracy. As a whole, the poor economic status makes the largest contribution (57%) to the total inequalities in poor health status of the oldest old population followed by illiteracy (23%).

For oldest old population, the decomposition outcomes demonstrate that 84 % of the inequalities are explained by selected socioeconomic predictors in the model, that is, the place of residence, sex, religion, caste, marital status, education and the wealth status. Inequality decomposition estimates also suggest that the health inequalities primarily arise from inequality in economic status, educational attainment, and place of residence as they majorly contribute to total health inequality.

## Conclusions

With reference to India, one important thing that is needed to plug the critical gap in the research of aging and public health studies is to quantify the socioeconomic inequalities in health status of older population and to examine how they vary for younger old and the oldest old population. Accordingly, the decomposition model for health inequalities is a novel tool to address the socioeconomic inequality in health and their pathways. The systematic investigation of socioeconomic inequalities in health status of the older population in India has provided some important findings:

1). The socioeconomic inequalities in health status are comparatively less among the oldest old population than among the younger old population. This may be due to the diminishing physical strength, which is a common phenomenon for all at oldest old age, irrespective of their socioeconomic status.

2). In both categories of older populations, the relative proportional contributions to health inequalities by key socioeconomic predictors suggest that some predictors contribute more to health inequality than others do. In order of their importance, the poor economic status and illiteracy of older population, place of residence in rural areas emerged as key predictors for the health inequalities. However, being Muslim as a religion and marital status also indicates significant contributions to the total health inequalities in older population of India.

3). Hence, the critical pathways of health inequalities are the existing inequalities in economic education status and place of residence of older population that led to unequal distribution of health among the older population.

Finally, the results of this paper have not only helped in understanding the health status of older population but also produce a suggestive number of insights for health policy. Based on our findings, we envisaged that in order to provide better health status for the older population, the main challenge will be meeting the need of the most isolated and marginalised group such as poorest of the poor and the illiterate older population. Not undermining the effort of the government such as the social and economic protection programmes and policies, yet even after many years of initiation, sliding down on the socio economic scale of the older people with increasingly dismal health status remains a concern.

India needs to strengthen the existing public health related schemes especially in the perspective of increasing older adults and the oldest old population in India. Depending heavily on private sector for health has led greater forgoing of health care utilization among disadvantageous groups of older population. Unless public sector come out with major structural changes, it may not possible to meet the care needs of disadvantageous groups of older population. Putting it plainly, there is still a long way to go to achieve equity in terms of health of older population in India. A battle on health inequalities involves action on critical social determinants of health.

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**Figure1.** Wealth based Concentration Indices for Poor Health Status among the Older Population of less than 70 years and 70 years and above age group, NSSO 60th Round (2004-05)

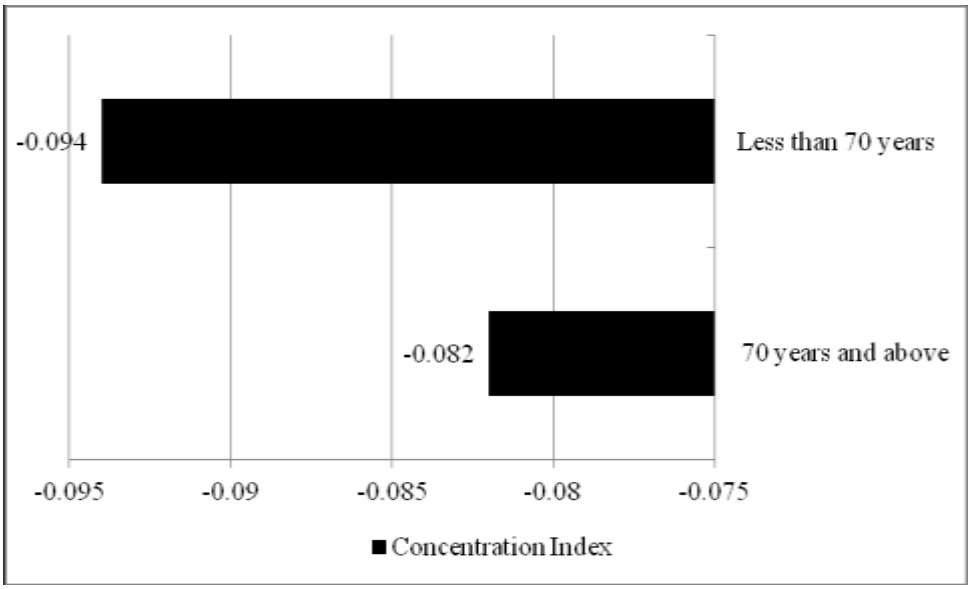

**Table 1.** Descriptive Statistics for Older Population Sample, India NSSO 60th round (2004-05)

| Variable | Total (n=34831) | n[a] | Less than 70 years (n=26855) | n[a] | 70 years and above (n=7976) | n[a] |
|---|---|---|---|---|---|---|
| **Health status** | | | | | | |
| Poor self-rated health | 23.6 | 8216 | 19.7 | 5302 | 37.7 | 2914 |
| Physical immobile | 8.1 | 3224 | 5.1 | 1614 | 18.8 | 1610 |
| **Sex** | | | | | | |
| Male | 50.0 | 17750 | 49.3 | 1351 | 52.4 | 4237 |
| Female | 49.0 | 17081 | 51.0 | 13696 | 48.0 | 3828 |
| **Place of residence** | | | | | | |
| Rural | 75.7 | 22265 | 77.0 | 17544 | 71.1 | 4721 |
| Urban | 24.3 | 12566 | 23.0 | 9311 | 28.9 | 3255 |
| **Educational attainment** | | | | | | |
| Illiterate | 67.6 | 22027 | 68.6 | 17166 | 63.8 | 4861 |
| Primary | 17.9 | 6692 | 16.9 | 4935 | 21.2 | 1757 |
| Secondary | 10.3 | 4170 | 10.1 | 3223 | 10.7 | 947 |
| Higher &above | 4.3 | 1926 | 4.3 | 1520 | 4.3 | 406 |
| **Marital status** | | | | | | |
| Currently married | 59.2 | 20959 | 62.8 | 17201 | 46.4 | 3758 |
| Others | 40.8 | 13872 | 37.2 | 9654 | 53.6 | 4218 |
| **Religion**[c] | | | | | | |
| Hindu | 84.3 | 27959 | 84.2 | 21507 | 84.9 | 6452 |
| Muslim | 9.3 | 3660 | 9.6 | 2898 | 7.9 | 762 |
| Others | 6.4 | 3209 | 6.2 | 2447 | 7.2 | 762 |
| **Social Group** | | | | | | |
| ST | 6.6 | 3257 | 7.1 | 2698 | 4.6 | 559 |
| SC | 17.4 | 5274 | 18.7 | 4344 | 13.1 | 930 |
| OBC | 39.8 | 12948 | 40.0 | 10061 | 39.0 | 2887 |
| Others | 36.2 | 13343 | 34.1 | 9743 | 43.3 | 3600 |
| **MPCE Tertile** | | | | | | |
| Poor | 40.7 | 11656 | 42.1 | 9374 | 35.5 | 2282 |
| Middle | 32.5 | 11501 | 32.7 | 8968 | 31.7 | 2533 |
| Rich | 26.9 | 11672 | 25.2 | 8511 | 32.8 | 3161 |
| ***Total*** | 100.0 | 34831 | 78.1 | 26855 | 21.9 | 7976 |

Note: [a] Unweighted Sample Size

**Table 2.** Bivariate Associations between Socioeconomic Status and Health Indicators, India, NSSO 60th Round (2004-05)

| | Less than 70 years | | 70 years and above | |
|---|---|---|---|---|
| **Background variables** | **Poor health status** | **Physical immobile** | **Poor health status** | **Physical immobile** |
| **Sex** | | | | |
| Male | 17.5 | 4.4 | 35.2 | 15.5 |
| Female | 22.0 | 5.8 | 40.3 | 22.4 |
| **Place of residence** | | | | |
| Rural | 20.6 | 5.2 | 39.5 | 18.7 |
| Urban | 16.9 | 4.9 | 33.3 | 19.0 |
| **Educational attainment** | | | | |
| Illiterate | 21.6 | 5.7 | 41.9 | 20.5 |
| Primary | 17.9 | 4.1 | 33.5 | 17.7 |
| Secondary | 13.7 | 3.2 | 26.3 | 13.6 |
| Higher &above | 12.8 | 4.2 | 21.6 | 11.0 |
| **Marital Status** | | | | |
| Others | 23.3 | 6.7 | 40.8 | 22.8 |
| Currently Married | 17.6 | 4.2 | 34.0 | 14.2 |
| **Religion** | | | | |
| Others | 19.4 | 6.1 | 36.1 | 21.0 |
| Muslim | 28.0 | 6.3 | 51.5 | 25.4 |
| Hindu | 18.9 | 4.9 | 36.5 | 18.0 |
| **Social Group** | | | | |
| ST | 15.6 | 4.9 | 42.0 | 18.3 |
| SC | 22.8 | 5.7 | 45.9 | 19.5 |
| OBC | 19.7 | 4.9 | 38.6 | 18.4 |
| Others | 19.1 | 5.1 | 34.0 | 19.1 |
| **MPCE Tertile** | | | | |
| Poor | 22.3 | 5.4 | 45.7 | 20.2 |
| Middle | 19.4 | 5.3 | 36.5 | 17.9 |
| Rich | 16.0 | 4.3 | 30.4 | 18.2 |
| **Total** | **19.7** | **5.1** | **37.7** | **18.8** |

**Table 3.** Odds Ratio for Binary Logistic Regression Models of Association between Socioeconomic Status and Health Outcomes, India, NSSO 60th Round (2004-05)

| Background variables | Less than 70 years | | 70 years and above | |
|---|---|---|---|---|
| | Poor health status | Physical mobility | Poor health status | Physical mobility |
| **Sex** | | | | |
| Male ® | | | | |
| Female | 1.11*** | 1.05$^{ns}$ | .95$^{ns}$ | 1.13$^{ns}$ |
| **Place of residence** | | | | |
| Rural | | | | |
| Urban | 0.86*** | 0.93$^{ns}$ | .92$^{ns}$ | 1.06$^{ns}$ |
| **Educational attainment** | | | | |
| Illiterate ® | | | | |
| Primary | 0.88*** | 0.84** | 0.81*** | 0.87* |
| Secondary | 0.76*** | 0.80** | 0.71*** | 0.73*** |
| Higher &above | 0.60*** | 0.71** | 0.63*** | 0.66** |
| **Marital Status** | | | | |
| Others ® | | | | |
| Currently Married | 0.85*** | .67*** | .76*** | .61*** |
| **Religion** | | | | |
| Others ® | | | | |
| Muslim | 1.51*** | 1.11$^{ns}$ | 1.32** | 1.13$^{ns}$ |
| Hindu | 1.06$^{ns}$ | 0.92$^{ns}$ | 0.91$^{ns}$ | 0.94$^{ns}$ |
| **Social Group** | | | | |
| ST® | | | | |
| SC | 1.67*** | 1.08$^{ns}$ | 1.59*** | 0.95$^{ns}$ |
| OBC | 1.44*** | 1.04$^{ns}$ | 1.34*** | 0.89$^{ns}$ |
| Others | 1.47*** | 1.11$^{ns}$ | 1.41*** | 1.02$^{ns}$ |
| **MPCE Tertile** | | | | |
| Poor ® | | | | |
| Middle | 0.81*** | 1.05$^{ns}$ | 0.78*** | .90$^{ns}$ |
| Rich | 0.70*** | .98$^{ns}$ | 0.64*** | .91$^{ns}$ |

**Table 4.** Effects and contribution of predictor variables based on decomposition analysis for poor health status of the older population aged below 70, India, NSSO 60th Round (2004-05)

| Predicted variables | Mean | Marginal effect | CI | Contribution to CI | % Contribution |
|---|---|---|---|---|---|
| Rural place of residence | 0.65329 | 0.029437 | -0.1799 | -0.01694 | **19.9** |
| Female sex | 0.49682 | 0.018531 | -0.0052 | -0.00023 | **0.3** |
| Poor economic status | 0.34909 | 0.042861 | -0.6509 | -0.04769 | **55.9** |
| Illiterate | 0.63947 | 0.036926 | -0.1483 | -0.01715 | **20.1** |
| Muslim religion | 0.10792 | 0.006257 | -0.0537 | -0.00185 | **2.2** |
| SC/ST caste | 0.26231 | -0.002494 | -0.1661 | 0.00053 | **-0.6** |
| Currently married | 0.64051 | 0.029104 | -0.0215 | -0.00197 | **2.3** |
| **Poor health status** | **0.20424** | | **-0.0943** | **-0.08529** | **100** |
| | | | **Residuals =** | **-0.00897** | |

**Table 5.** Effects and contribution of predictor variables based on decomposition analysis for poor health status of the older population aged 70 and above, India, NSSO 60th Round (2004-05)

| Predicted variables | Mean | Marginal effect | CI | Contribution to CI | % Contribution |
|---|---|---|---|---|---|
| Rural place of residence | 0.5919 | 0.03558 | -0.212 | -0.01164 | **17** |
| Female sex | 0.46878 | -0.01158 | 0.0102 | -0.00014 | **0.2** |
| Poor economic status | 0.28611 | 0.07385 | -0.7139 | -0.03932 | **57.3** |
| Illiterate | 0.60984 | 0.06684 | -0.1455 | -0.01546 | **22.5** |
| Muslim religion | 0.09554 | 0.00899 | -0.0671 | -0.0015 | **2.2** |
| SC/ST caste | 0.18669 | 0.00443 | -0.2024 | -0.00044 | **0.6** |
| Currently married | 0.47116 | -0.06343 | 0.0015 | -0.00011 | **0.2** |
| **Poor health status** | **0.38357** | | **-0.082** | **-0.06862** | **100** |
| | | | **Residuals =** | **-0.01336** | |