Socioeconomic Inequality in Health at Later Ages: An Artefact of Mortality Selection

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Abstract

Study on the effect of mortality selection on socioeconomic inequalities in health over age is limited in developing countries. Therefore, firstly, using panel data from wave-1 of Study on Globing Ageing and Adult Health (2006-07) the study examined socioeconomic inequality in health over ages. If there is a convergence, then using follow-up data from wave-2 (2014-15) the study will examine whether convergence in health inequality is real or an artefact of mortality selection. Effect of mortality selection will be examined using hierarchal logit model and pseudo variable approach. Self-reported health, functional impairment and chronic illness were used to measure health outcomes. Preliminary finding shows that socioeconomic inequality in health was more in early adulthood and converges at latter ages. Results of logistic regression analysis also shows that protective effect of being in higher socioeconomic group on health outcome were declined with age. Further, the effect of mortality selection on health convergence will be examined after release of wave-2 data of SAGE

Background

A recent strand of research on health inequalities addresses how and why age modifies the association between socioeconomic status and health. Conversely, how socioeconomic status modifies the association between age and health (Williams & Collins, 1995). With few exception, cross-sectional studies shows that socioeconomic inequality in health are largest in early adulthood (Kunst & Mackenbach, 1994; Mustard, Derksen, Berthelot, Wolfson, & Roos, 1997) or middle ages (Antonovsky, 1967; Kitagawa & Hauser, 1973) and smaller again at older ages. In order to understand the complexities of SES inequalities in health more generally, it is necessary to gain an understanding about why and how the size of health inequalities varies over life course.

A major hypothesis about what causes the apparent convergence in health differentials in later life is selective survivorship. The selective survivorship thesis is rooted in the racial mortality cross-over debate where research finds that the survival advantage enjoyed by whites become a mortality disadvantage at the oldest old ages. Markide and Machalek (1984) proposes that racial mortality cross-over results from early high mortality, which removes less hardy blacks in early and mid-life. In turn, this leaves in late life a disadvantaged (i.e, black) group of robust

survivor relative to the advantaged (i.e, white) subpopulation (Markides & Machalek, 1984). Subsequently, selective survivorship has been applied to account for the narrowing of health and mortality differentials by SES (Robert & House, 1994).

The only way to address the issue of mortality selection is through the use of panel study so that the differential rates of mortality can be identified and adjusted for. Therefore using longitudinal data from wave-1 and wave-2 of SAGE conducted in India during 2006-07 and 2014-15, firstly, the study will examine whether socioeconomic based gap in health converges with age. If it converges with age, then study will further examine whether mortality selection (higher mortality among disadvantage group) is responsible for convergence in health inequality.

Data and Methods

The data for this analysis will used from wave 1 and 2 of SAGE. Firstly, the study examined whether socioeconomic based gap in health converges with age. In order to answer this question, study examined whether the impact of age on health is conditional on socioeconomic condition. This is modelled by using cross-sectional data (Wave-1) by an interaction between age and socioeconomic status. For this study follow an approach similar to that used by Ross and Wu (1996) to test the functional forms of age and socioeconomic status on health.

Second, the study will use hierarchical logit models to estimate the probability of death or loss to follow-up using longitudinal data. These models provide insight as to the potential size and direction of selection due to mortality and loss to follow-up interviews.

Finally, using longitudinal data, study describe the age pattern of socioeconomic differences in health in 2006-07 and 2014-15 among people who are in the sample at follow-up and access the sensitivity of these results to inclusions of people out of the sample size due to death or loss to follow-up. Further, study will use a modified pseudo variable approach to impute the health status at follow-up of respondents. In the first step, the study will estimate logit models in which the health condition and functional impairment in 2006-07 and 2014-15 will be predicted by sex, race, age, age squared, education and age squared by educations interactions and 2003 health status. Second applying the estimated coefficients obtained from the observed 2006 and 2014-15 samples to the out of sample subjects to obtain their predicted health scores in 2006 and 2014-15 respectively had they been in the sample. Third, we access the sensitivity of our results to sample selection by showing how the results differ from following contrasts: (1) respondent in 2006 sample, (2) in sample respondent and decedents and (3) in sample respondents, decedent and loss to follow-up (LTF) respondents.

Outcome variables

The study uses three indicators of health: self-reported health, functional impairment and chronic illness. Response categories for self-reported health were examine by asking how satisfied you with your health: very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied and very dissatisfied. Respondents who reported neither satisfied nor dissatisfied, dissatisfied and very dissatisfied were considered as poor health. Functional impairment was measured using five Activities: moving, vigorous activities, bathing/washing and clothing. If respondents reported that they face moderate, severe and extreme were considered as a functional impairment. The chronic illness referred to the person who have any kind of disease such as: arthritis, stroke, angina, diabetes, chronic lung disease, asthma and hypertension.

Key exposure variables

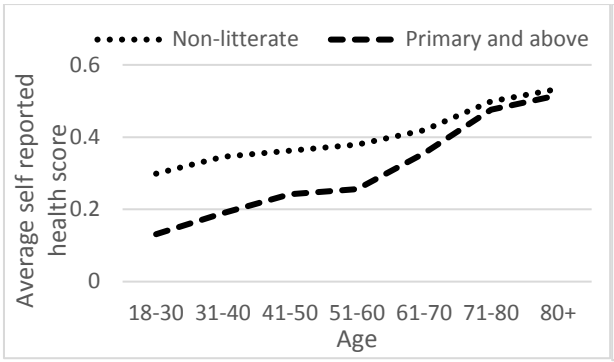
The socioeconomic status were measured by Educational status (non-literate, below primary, completed primary, primary and above), wealth index (poorest, poor, middle, rich, richest) and caste (scheduled tribes, scheduled caste, others).

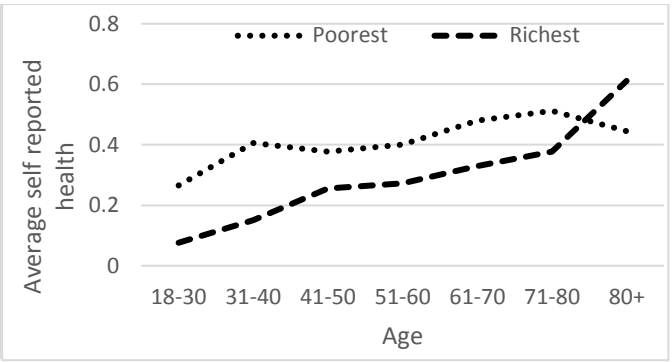
Results

Descriptive statistic of selected variables in wave-1 are presented in **table 1**. Table shows the mean age of the respondent was 46.2 (ranges from 18 to 106 in wave-1). About 30.3% individual reported poor health. Moreover, 28.5% individuals reported that they had one functional impairment, 7.5% individuals were reported that two impairment and 3.0% reported that three are more impairment. Similarly, 60.3 % were reported that one chronic illness, 13.7% were reported two chronic illness and three or more chronic illness was reported by 5.3% individuals.

The association between socioeconomic status and three indicators of health outcomes: self-reported health, functional impairment and chronic illness over age are shown in Figure 1, Figure 2 and Figure 3 respectively. Higher score represents the poor health of individuals. Figure 1 represents how association between socioeconomic status and health varies over age.

Figure 1. Association between socioeconomic status and self-reported health changes over age in SAGE 2006-07, India





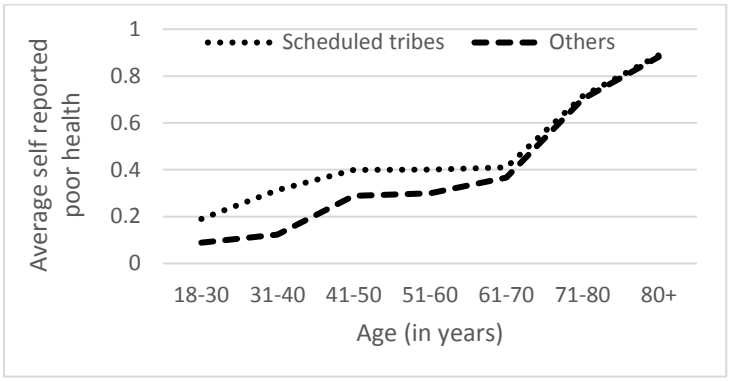


Figure 1 shows that the average self-reported poor health score was higher among non-literate than individuals who completed primary and above, i.e, non-literate individuals have more poor health than individuals belongs to primary and above education. Finding further shows that, the gap between health among non-literate and primary and above was highest during early adulthood and started to converge after age 40 and almost no difference in health score were observed after age of 70. Similarly, individuals from poorest and those belongs to scheduled tribes were lower health status than individuals from richest and other caste respectively. Moreover, results shows that heath between disadvantages groups (poorest and scheduled tribes) and advantages groups (richest and other caste) were declined with age and no difference in health were observed at very old ages (70 and above).

The association between socioeconomic status and average functional impairment over age are presented in **Figure 2**. Likewise socioeconomic status and self-reported health, the functional impairment was also higher among individuals having no education, belongs to poorest economic status and those who are scheduled tribe as compare to individuals with primary and above education, belongs to richest wealth quintile and those who are from other caste categories respectively. Moreover, finding shows that the functional impairment score between disadvantage group (non-literate, poorest, scheduled tribes) and advantage group (primary and above, richest, other caste) were converges over age.

Figure 2. Association between socioeconomic status and functional impairment over age in SAGE 2006-07, India

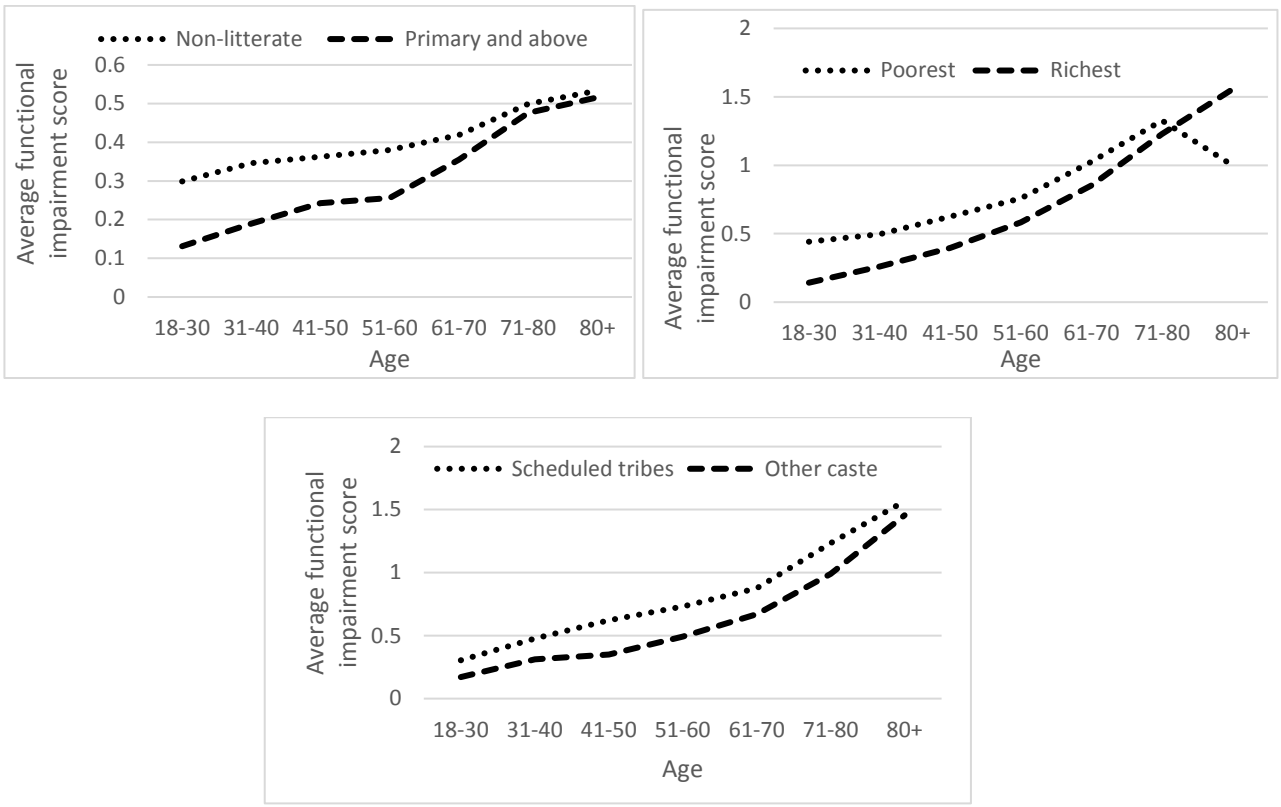
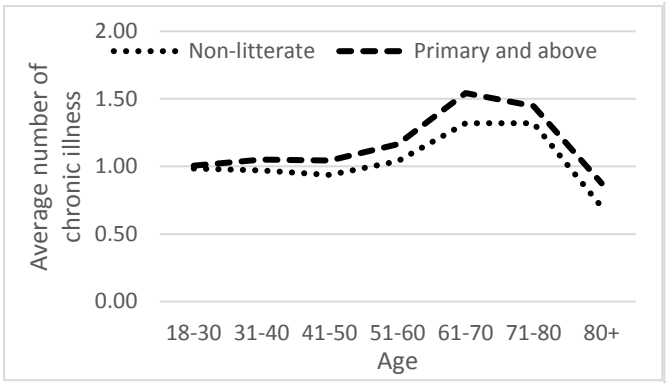
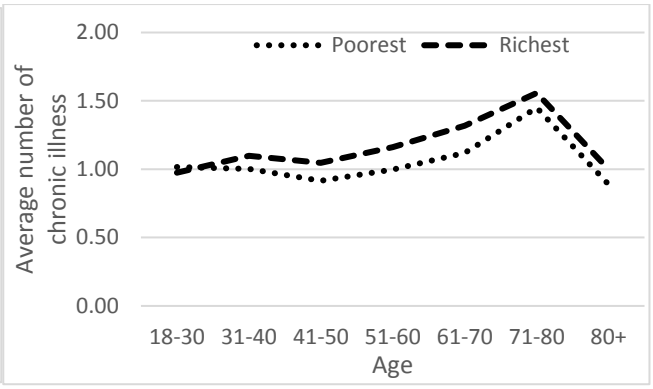
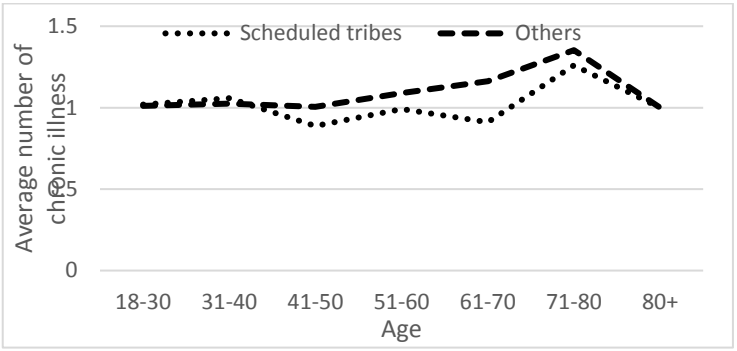


Figure 3 shows the association between socioeconomic status and average chronic illness over age. Unlike the association of self-reported health and functional impairment with socioeconomic status, the association between socioeconomic status and chronic illness shows no difference in chronic illness in educational status, wealth quintile and caste during early adulthood. Moreover, results shows that at latter ages individuals from disadvantage group have lower chronic illness than individuals from advantage group.

Figure 3. Association between socioeconomic status and chronic illness changes over age in SAGE 2006-07, India







Further, using data from first wave of SAGE and logistic regression analysis study examined adjusted effect of age, socioeconomic status and interaction of age with socioeconomic status on each of three indicators of health outcomes. Results using logistic regression analysis also shows the linear effect of age is positively associated with probability of reporting poor health for each of three outcome variables (Table not shown). Moreover, results shows that individuals from disadvantage group were more likely to report functional impairment and poor self-reported health. Interaction of age with education also indicate that protective effect of education on self-reported health and functional impairment declines with age.

Further, using data from wave-2, the study will examine whether convergence in health over age among different socioeconomic group is real or an artefact of mortality selection. Notably, the data of wave-2 is not available in public domain to use but likely to available shortly. Once the data will release, the study will examine the effect of mortality selection on convergence of health inequality in latter ages.

Table 1. Descriptive statistics of selected characteristics in wave-1, 2006-07

Characteristics	Mean or Percent (%)	Sample (N)
Mean age	46.2	8009
Self-reported Health		
Good	69.7	5,584
Poor	30.3	2,424
Functional Impairment		
No Impairment	61.0	4,868
One Impairment	28.5	2,269
Two impairment	7.5	599
Three or more impairment	3.0	239
Chronic Illness		
No illness	20.6	1,652
One illness	60.3	4,833
two illness	13.7	1,098
Three or more illness	5.3	426
Education		
Non-literate	39.1	3,128
Below primary	10.4	831
Complete primary	16.3	1,302
Above primary	34.3	2,747
Caste		
Scheduled tribes	6.8	542
Scheduled caste	17.5	1,393
Others	75.7	6,018
Wealth Index		
Poorest	20.1	1606
Poor	19.9	1594
Middle	19.9	1596
Rich	20.1	1607
Richest	20.0	1605

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