Gender Disparities in Health Outcomes of Elderly Persons in India

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Abstract

This paper uses data from India's National Sample Survey (NSS), relating to respondents' health outcomes between January and June 2014, to quantify a particular form of gender inequality: inequality in self-rated health (SRH) outcomes between men and women aged 60 years or over. In so doing, it makes five contributions to the existing literature. The first is in terms of analytical technique: this study contains a more detailed and nuanced exposition of the regression results than in previous studies. Second, it controls for environmental factors - like poor drainage, lack of toilets, or ventilation in the kitchen - which might adversely impact on health and, in particular, affect the health of women more than that of men. Third, it takes account of interaction effects by which the effect of a variable on an elderly person's SRH differed according to whether the person was male or female. Lastly, it examines whether SRH is correlated with objective health outcomes. In particular, this study answers two central questions: Did men and women, considered collectively, have significantly different likelihoods of 'poor' SRH *between* the different regions/income classes/social groups/education levels? Did men and women, considered separately, have significantly different likelihoods of a 'poor' SRH *within* a region/income class/social group/education level?

Key words: India, NSS Health Survey, health outcomes, gender, disparity

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1. Introduction

Shasti Poorthi in Sanskrit refers to a person reaching the age of 60 (*Shasti*: 60; *Poorthi*: completion) and for Hindus in India – who comprise 85 percent of India's population –this provides an occasion for congratulatory celebrations for *men* who reach this age. Although *shasti poorthi* continues to be important in Hindu life and ritual, it is no longer remarkable as an event – indeed, for both men and women, being alive at the age of 60 has become somewhat commonplace in modern India. Between 2001 and 2011, India's population of persons aged 60 or more (hereafter, 60+ population) increased from 76.6 million to 103.8 million in 2011. Although, by Western standards, the share in 2015 of India's 60+ population in its total population, at 8.6 percent, was low - compared to, say, Canada's 22.3 percent or Germany's 27.6 percent - this proportion is expected to rise to 19.4 percent by mid-century and to 34.1 percent by the end of the century (United Nations Population Division, 2015).

As a consequence of this growth, buttressed by the political pressure exerted by over 100 million 60+ aged voters, it is likely that pressure to provide good health services to its elderly population will grow in India. Such services encompass many aspects of the health of the elderly: *inter alia* oral health (Shah, 2004); cancer care (Yabroff *et. al.*, 2008); mental health (Patel and Prince, 2001); emergency care (Sanders, 1992); end-of-life care (Detering *et. al.*, 2010); care homes (Kalavar and Jamuna, 2011); and expenditure on health care (Fuchs, 1999).

Overlaying the issue of health care provision to the elderly, however, is concern about gender discrimination arising from the fact that such provision is markedly inferior for women than for men. Agewell (2015), from a sample survey of 50,000 persons in India aged 60+ years, found that 86 percent of respondents thought that the health status of women was poor because of gender bias and that their general illnesses were often ignored by family members. According to this report, elderly women in many households were responsible for house work and for caring for their grandchildren and this was both a reflection and a consequence of the fact, that compared to elderly men, their social life was restricted, they had a lower status within the family, they were often taken for granted, and their sentiments and views were not taken seriously.

Disparity in the health status of elderly women vis-à-vis elderly men has attracted a considerable amount of academic interest. The starting point is the relevant measure of health status. The five options (Ziebarth, 2010, Cramm *et. al.,* 2015) are: (i) self-rated health (hereafter, SRH) status based on a question like "what is your perception about your current state of health?" being answered in terms of a point on a spectrum ranging from (say) excellent/very good to poor with intermediate categories interposed between these extremes; (ii) generic health measures generated from self-reported questions which cover various health dimensions and are aggregated into a single index; (iii) vignette-based measures by which respondents rate their own health and those of fictitious individuals from which their "true" health is inferred; and (iv) objective health measures like grip strength or lung capacity (v) functional health measures through assessing the degree of dependence in activities of daily living (ADL).[1]

Of these, as Ziebarth (2011) observes, SRH is the most popular measure and, since most studies on health inequalities rely on it, it has become the norm in health-related surveys. A reason for its popularity might be that, as Cramer *et. al.* (2015, p. 247) note, "SRH has repeatedly been proven to be a powerful and independent predictor of diverse health outcomes and a stronger predictor of mortality than physician-assessed health".[2] However, on the downside, there is a striking lack of correlation between SRH and objective measures (Cramm *et. al.* 2015 for grip strength and lung function; Goverover *et. al.* (2005) for persons with multiple sclerosis; Betrand and Willis (1999) for Alzeihmer patients; and Sager *et. al.* (1992) for older hospital patients).

This suggests that although SRH can provide information about health that cannot be measured using an objective evaluation tool – and thus reflect a state of health that cannot be captured by a single objective measure - it may not mirror actual health performance based on specific parameters. As Maddox and Douglass (1973) concluded, "self-rating of health cannot serve as a substitute for epidemiologic diagnoses. These ratings clearly measure something more - and something less - than objective medical ratings. However, our data demonstrate that self-assessment

[1] Help in washing, getting dressed, walking etc.
[2] See also Maxwell and Douglass (1973) and Idler and Benyamini (1997).

of health is not random but is persistently and positively related to objective evaluations of health status" (p.92).[3]

With this background, there have been since the start of the millennium at least four major academic studies of gender disparity in the health outcomes of elderly persons in India. Using National Family Health Survey data for 1991-92, Sengupta and Agree (2002) focused on disparities in eye and limb impairments between the northern and the southern states of India in the context of differences between the respondents in their gender and marital status. Their central finding was older women in the north were more likely to report eye and limb impairments than their counterparts in the south even after controlling for socioeconomic characteristics. In both regions, moreover, marriage was associated with lower levels of impairment than being widowed.

Batra *et. al.* (2004) focused on health expenditure on cancer patients in the Indian state of Odisha and concluded that expenditure of female adults was significantly lower than that for adult males and, moreover, that 73 percent of the difference between male and female expenditure could be attributed to gender differences and only 27 percent to differences in non-gender attributes. [4]

Cramm *et. al.* (2015) studied , using data for 2010, the health elderly men and women in India in terms of grip strength and lung function (capturing deviations from a norm considered to be 'healthy') and ADL dependence (a functional indicator capturing the inability to perform certain tasks) and complemented this by also examining gender differences in SRH. That they were able to do so was due to the richness of their data (Longitudinal Aging Study in India, pilot wave) which permitted heath to be measured using a variety of indicators. Their most striking conclusion was that there was a lack of correlation between subjective and objective indicators, discussed above. There were a high proportion of elderly persons in India with low grip strength and poor lung capacity but this was not reflected in a corresponding SRH status. In their view this indicated that subjective and objective measures refered to different 'parts' of mortality and morbidity.

[3] Sen (2002), however, cautions that SRH may understate the poor health of those lower down the socio-economic ladder since they may accept as normal ailments that their betters would regard as a health problem.
[4] In the UK, more than half of new cancers to men are prostate, lung, or bowel while more than half of new cancers to women are breast, lung, or bowel (Cancer Research UK, http://www.cancerresearchuk.org/health-professional/cancer-statistics/incidence/common-cancers-compared, accessed 2/8/2016.

Singh *et. al.* (2013) examined gender differences in SRH among the elderly in India using data from the 60th Round of the National Sample Survey (NSS) pertaining to the period January-June 2004. Their results pointed not just to gender disparities in SRH but also to disparities in SRH between religions (with elderly Muslims being particularly badly off compared to their counterparts from other religions), between castes (with the elderly from the Scheduled Castes being singularly affected), and between location (with the rural, compared to the urban, elderly being worse off).

This study, based on an analysis of data from the 71st Round of the National Sample Survey (NSS) pertaining to health outcomes for the period January-June 2014 also examines gender disparity in health outcomes of the elderly but, set against the background of existing studies, it makes several original contributions. The *first* is in terms of analytical technique. All the above studies are based on logistic regression which is predicated on a binary divide of the dependent variable: for example, as in Singh *et. al*. (2013), poor health versus not poor health; or, as in Cramm *et. al.* (2015), abnormal versus normal lung function or low versus normal grip strength; or, as in Sengupta and Agree (2002), eye or limb impairment versus no impairment. By contrast, this study uses ordered logit to examine outcomes across a multi-outcome spectrum. *Second*, existing studies ignore environmental factors – poor drainage; lack of toilets or ventilation in the kitchen all of which might impact health adversely but which, in particular, could affect the health of women more than that of men. This study controls for such environmental factors. *Third*, existing studies do not take account of gender interaction effects through which the effect of a variable on an elderly person's SRH differs according to whether the person is male or female. *Fourth*, this study contains a more detailed and nuanced exposition of the regression results than in previous studies. Specifically, the results are explicated in terms of the underlying probabilities (and not in terms of odd ratios), and hypotheses relating to marginal probabilities are statistically tested (made possible by the use of a suite of options associated with the powerful *margin* command in STATA v14.0). [5] This is in contrast to the comparatively discursive presentation of results in earlier papers. *Lastly*, it examines in some detail whether SRH correlates

[5] These options, which are only available from STATA 13.0 onwards, are very demanding of computing power: in spite of using a PC with 32GB RAM, it took several hours for the calculations to be completed.

with objective health outcomes, in particular with health expenditure. In doing so, it asks if there is gender bias to such expenditure.

In particular, this study answers two questions which are not fully addressed in existing studies:

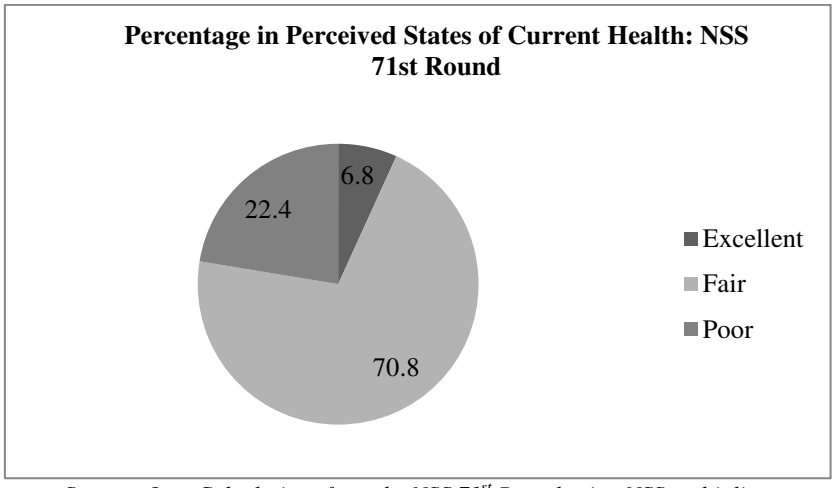
1. Did men and women, considered collectively, have significantly different likelihoods of 'poor' SRH *across* the different regions/income classes/social groups/education levels? So, for example, was a Scheduled Caste person (or a person who was illiterate) more likely to report poor SRH compared to an upper caste person (or a person who was a graduate)?
2. Did men and women, considered separately, have significantly different likelihoods of 'poor' SRH *within* a region/income class/social group/education level? For example, within the Scheduled Castes, were women more likely than men to report poor SRH?

The raison d'être of this paper is in its ability to provide clear and rigorous answers to these two generic questions.

2. The Data

The data for this study were from the 71st Round (January-June 2014) of the specialist Health module of India's National Sample Survey (NSS) which surveyed 65,975 households and selected persons therein (hereafter NSS 71st Round). The NSS 71st Round asked persons, 60 years of age and over, to self-rate their current health (SRH) by asking them to categorise it as: excellent/very good; fair; poor. Figure 1 shows that 22.4 percent of all respondents 60+ years regarded their health as poor; 70.8 percent regarded their health as fair; and 6.8 percent thought they were in very good/excellent health.

Figure 1: Health Perception, All Persons 60+ years



Source: Own Calculations from the NSS 71st Round using NSS multipliers

The NSS also categorised persons by four social groups (Scheduled Tribes (ST); Scheduled Castes (SC); Other Backward Classes (OBC); and 'Others' and simultaneously by eight religion groups (Hindus; Islam; Christianity; Sikhism; Jainism; Buddhism; Zoroastrianism; 'Other'). Combining the NSS 'social group' and 'religion' categories, households were subdivided in this paper into the following groups which are used as the basis for the subsequent analysis:[6] The following figures were calculated after grossing up the sample using the NSS provided multipliers

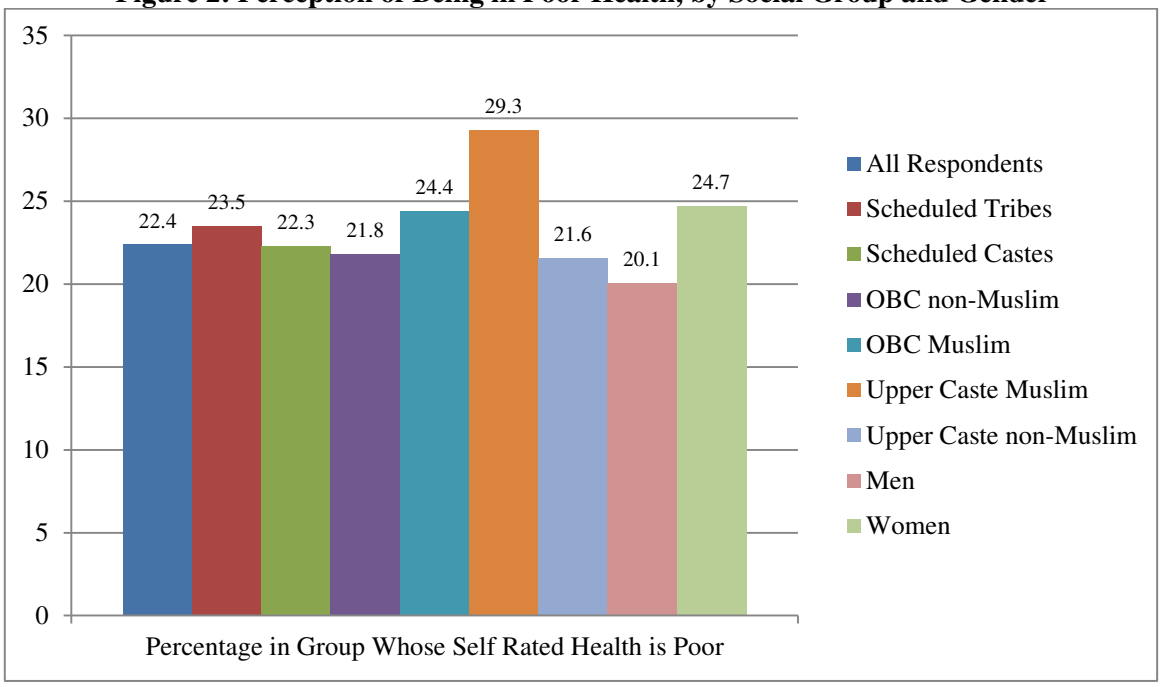
1. Scheduled Tribes (ST). They comprised 9.3 percent of the households in the NSS 71st Round: approximately 85% of these households were Hindu and 10% were Christian. [7]
2. Scheduled Castes (SC). They comprised 18.8 percent of the households in the NSS 71st Round and of the 73,640 households: 94% households in this category were Hindu.[8]
3. Non-Muslim Other Backward Classes (NMOBC). They comprised 36.8 percent of the households in NSS 71st Round: 97 percent of the households in this category were Hindu.
4. Muslim Other Backward Classes (MOBC). They comprised 7.7 percent of the households in the NSS 71st Round.[9]

[6] The fact that Muslims, too, have their 'backward classes' and 'forward' classes, with a conspicuous lack of inter-marriage between the two groups, meant that it was sensible to separate Muslims into two groups: Muslims from the OBC (MOBC) and Muslims from the 'upper classes' (MUC).
[7] Figures relate to the NSS 71st Round. This category also included a few Muslim households. Since Muslims from the ST are entitled to reservation benefits, these households have been retained in the ST category.
[8] This category also included some Muslim households. Since Muslims from the SC are not entitled to SC reservation benefits, these Muslim SC households were moved to the Muslim OBC category.
[9] Including Muslim SC households (see previous footnote).

5. Muslim Upper Classes (MUC). They comprised 6.1 percent of the households in the NSS 71st Round.
6. Non-Muslim upper classes (NMUC). They comprised 21.4 percent of the households in the NSS 71st Round: 93 percent of the households in this category were Hindu.

Figure 2 show differences between men and women and between persons in the different social groups, in their SRH. This shows that there was a gender divide in terms of poor health: 20.1 percent of men, and 24.7 percent of women, rated their health as poor. Muslims, both OBC and upper class, had poor SRH: 29.3 percent of Muslims from the upper class (MUC) had a poor SRH while persons from the non-Muslim upper class (NMUC) had the lowest proportion of poor SRH (21.6 percent).

Figure 2: Perception of Being in Poor Health, by Social Group and Gender

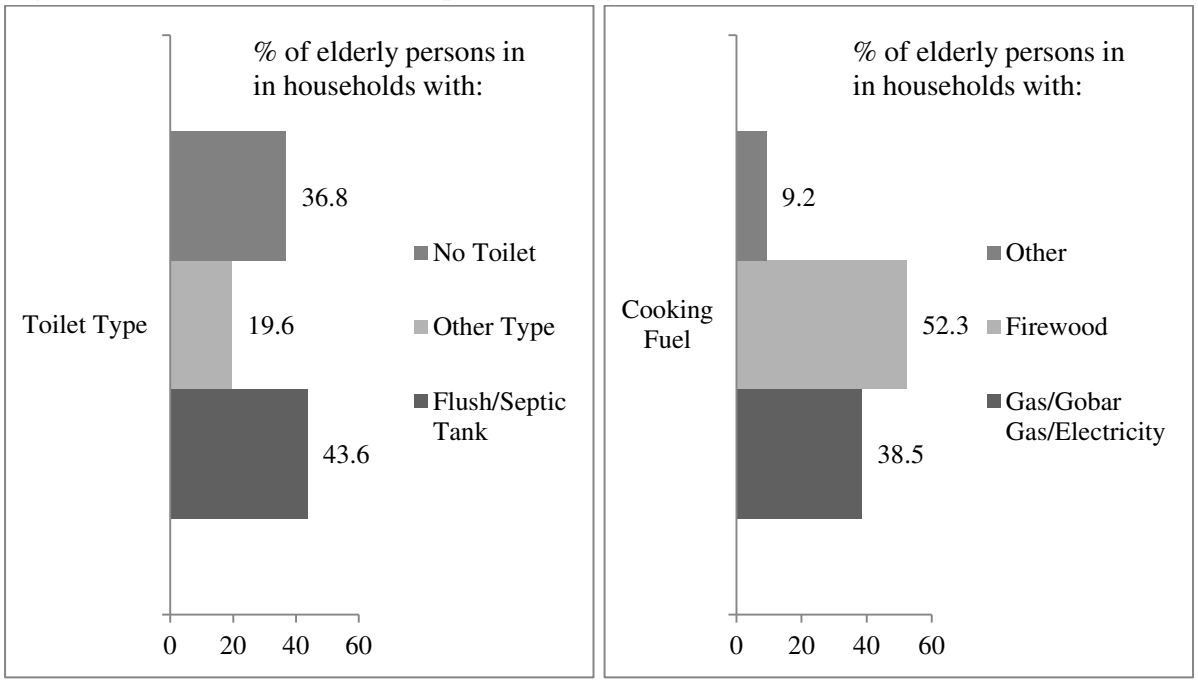


Source: Own Calculations from the NSS 71st Round using NSS multipliers

In addition to information about SRH, the NSS 71st Round also provided information about households' living conditions in terms of the quality of toilets, drains, drinking water, and cooking fuel. The subsequent econometric analysis examined two aspects of living conditions , the quality of

toilets and type of cooking fuel.[10] Figure 3 shows the percentage of elderly persons living in households with different qualities of toilets and using different types of fuel. This shows that 36.8 percent of elderly persons lived in households without a toilet and 52.3 percent lived in households which used firewood as the cooking fuel.[11]

Figure 3: Quality of Toilets and Type of Cooking Fuel in Elderly Persons' Households



Source: Own Calculations from the NSS 71st Round using NSS multipliers

Since 36.8 percent of elderly persons in the NSS 71st Round sample lived in households that did not have toilets (Figure 3), it is reasonable to suppose that most of them would have had to defecate in the open. This practice of defecating in the open affected women more adversely than it did men. For fear of prying eyes, women could only defecate in the open during the hours of darkness with the result that it was not uncommon for women in toilet-less households to rise before sunrise to use the fields and then abstain until sunset.

Kankaria *et. al*. (2014) emphasise the importance for health of indoor air pollution and the degradation of indoor air quality by harmful chemicals. They estimate that indoor air pollution results in approximately 2 million premature deaths of which 44 percent are from pneumonia and 54 percent

[10] The current BJP government has emphasised the building of toilets under its *Swach Bharat Abhiyan* (Clean India Programme).

[11] The 'other' toilet type was usually a pit and the 'other' fuel type was mostly cow dung cakes.

from chronic pulmonary obstructive disease. A prime culprit here is cooking fuel and the use of unclean fuels like firewood and charcoal was associated with acute lower respiratory tract infection. Results from a study of elderly persons show higher prevalence of asthma in households using biomass fuels (coal, wood) than cleaner fuels (Johnson *et. al*., 2011). As Kankaria *et. al.* (2014) observe, the health burden of using biomass fuel falls disproportionately on women who do most of the cooking.

For the econometric analysis, described in the following sections, the variable "toilet" was assigned the value 1 if it was a flushing toilet or emptied into a sceptic tank; and 0 otherwise. Similarly, the variable "cooking fuel" was assigned the value 1 if it was gas, *gobar* gas, kerosene, or electricity; and 0 otherwise.

The NSS 71st Round also provided information on the age and marital status of persons,[12] their educational level, and their monthly household per-capita consumption expenditure (HPCE) and their household type defined by their main occupation. From information on HPCE, each elderly person was placed in a HPCE quintile from Q5 (highest quintile of HPCE) to Q1 (lowest quintile of HPCE). The information on household type categorised households as 'casual labourer' households (those working as casual labourers in agriculture or in non-agriculture, in rural or in urban areas) and 'non-casual labourer' households (self-employed or in regular wage/salary employment The education level of elderly persons was categorised as: illiterate; literate without formal schooling; primary and middle school; secondary and higher secondary (including higher secondary equivalent diplomas); graduate level (including graduate equivalent diplomas) and above.

On marital status, the evidence is that married persons experienced lower morbidity and mortality (Robles *et. al*., 2014; Kielcot-Glaser and Newton, 2001) than persons who were single, widowed, or divorced. The two major hypotheses for this outcome are 'selection' and 'protection': healthier persons are more likely to get married and, after marriage, both spouses are likely to take care of the other. However, while marriage promotes better health habits, Umberson (1992) notes that these benefits are likely to be larger for men since wives are more inclined to control their husbands' health habits than *vice-versa*.

[12] Marital status was defined in this paper as: married; or single, widowed, divorced.

The relationship between a person's income, education, and type of work done and health outcomes draw their rationale from the 'social gradient' to health. The publication of the Black report (Black *et. al.*, 1980) spawned a number of studies in industrialised countries which examined the social factors underlying health outcomes. The fundamental finding from these studies, particularly with respect to mortality and life expectancy, was the existence of "a social gradient" in mortality: "wherever you stand on the social ladder, your chances of an earlier death are higher than it is for your betters" (Epstein, 1998). The social gradient in mortality was observed for most of the major causes of death: for example, Marmot (2000) showed that, for every one of twelve diseases, the ratio of deaths (from the disease) to numbers in a Civil Service grade rose steadily as one moved down the hierarchy.

Lastly, the NSS 71st Round provided information on whether the person concerned lived in a rural or an urban area and the state in which the person lived. Sengupta and Agree (2002) observed that the "northern and southern regions [of India] have distinct kinship systems that lead to differences in the status of women …these sociocultural advantages enjoyed by south Indian women relative to north Indian women are likely to result in better health outcomes for the former" (p.316). In order to take account of regional variations in the health of the elderly - and, in particular, sociocultural based gender disparities in health - information about the state of residence was used to create five regions: North, Central, East, West, and South.[13]

3. Self-Rated Health Status

This section explores the factors that influence people's SRH (in particular, 'poor' SRH). In order to do so, it estimates an *ordered logit* model, on observations for persons who answered the SRH question, in which the dependent variable took the values: 1, if a (elderly) person reported his/her health as 'excellent/very good'; 2, if the person reported his/her her health as 'fair'; 3, if the person reported his/her her health as 'poor'. The ordered logit model is described in an Appendix to this paper and the variables which determined the values assumed by the dependent variable were

[13] North (Jammu & Kashmir; Delhi; Haryana; Himachal Pradesh; Punjab; Chandigarh; and Uttaranchal); Central (Bihar, Chhattisgarh; Madhya Pradesh; Jharkhand; Rajasthan; Uttar Pradesh); East (Assam; Manipur; Meghalaya; Manipur, Mizoram; Nagaland; Sikkim; Tripura; Orissa; West Bengal); West (Daman and Diu; Dadra and Nagar Haveli; Maharashtra; Gujarat; and Goa); South (Andhra Pradesh, Karnataka, Kerala, Puducherry, and Tamil Nadu). The two islands, Lakshadweep and Andaman and Nicobar, were omitted.

discussed in the previous section: (i) social group; (ii) casual labourer/non-casual labourer household types; (iii) rural/urban households; (iv) households in the different regions; (v) the quality of toilets/cooking fuel; (vi) the age/marital status/educational level of elderly persons.

Since the primary variable of interest in this study was gender, a natural question to ask is whether the effects of the determining variables, listed in (i)-(vi) in the preceding paragraph, on SRH varied according to whether the person was male or female. In order to answer this question, we estimated a model in which all the determining variables were allowed to interact with the gender of the person concerned, the gender variable taking the value 1 if the person was female, 0 if male. These *interaction effects* allowed the estimated coefficient on each variable to be different for men and women.

Following the advice contained in Long and Freese (2014), the results from the estimated equation are presented in this paper in the form of the predicted probabilities from the estimated ordered logit coefficients and not in terms of the estimated coefficients themselves (which are reported in an Appendix to this paper). This is because the ordered logit estimates *per se* do not have an easy interpretation – they exist mainly as a basis for computing more meaningful statistics and, in this case, these are the predicted probabilities of the SRH categories: excellent/very good; fair; poor. In order to keep the presentation manageable, the results are presented only in terms of the predicted probability of *poor* health (hereafter, 'predicted PPH'), derived from the ordered logit estimates.

The twin objectives of the paper, as set out in the introductory section, were to:

(i) Examine, for men and women collectively, the differences in their predicted PPH *across* the various categories of the conditioning variables and to test whether these differences were statistically significant. These results are shown in Table 1.

(ii) Examine differences in the predicted PPH, *between* men and women, for every category of the conditioning variables and test whether these gender differences (*within* every category) were statistically significant. These results are shown in Table 2.

The second column of Table 1 shows the predicted PPH, for every category of the conditioning variables. This shows that, *after controlling for other variables*, Muslims had the

highest predicted PPH (Table 1: 25.9 percent for MUC persons and 24.2 percent for MOBC persons) and persons from the Scheduled Castes had the lowest predicted PPH (Table1: 1.9 percent). [14]

The predicted PPH for persons in a particular social group were computed by assuming that *all* the 25,943 persons in the estimation sample were from that social group (say, MUC) and applying coefficient associated with the MUC to the attributes of *all* these 25,943 persons *with the values of all other variables remaining unchanged at their sample values*. This yields a predicted PPH for every one of the 25,943 persons in this synthetic sample and the average of these values is shown in the second column of Table 1, against the row 'Muslim Upper Class', as 0.259. The predicted PPH for persons from the other groups were computed similarly. Since, in performing this exercise, the *only* factor that was different between these six scenarios was the social group of the 25,943 persons (ST, SC, NMOBC, MOBC, MUC, and NMUC), differences between these six predicted PPH were entirely the result of differences in the social group to which they belonged.[15]

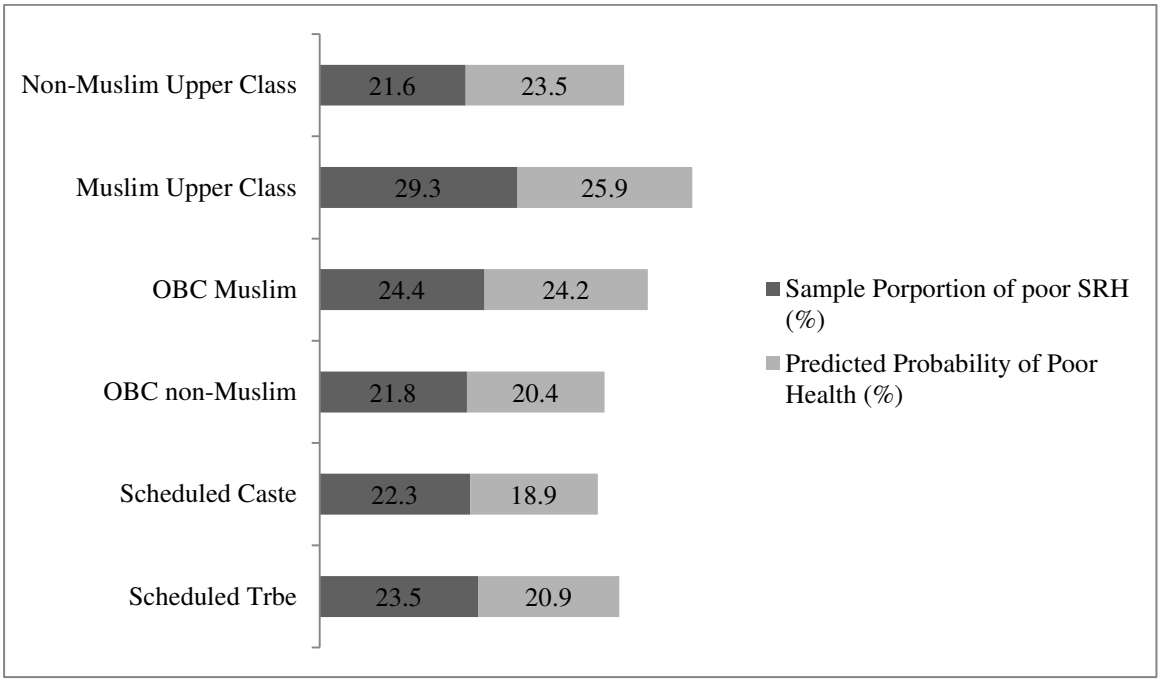
The predicted PPH for the social groups shown in Table 1 are different from the average (sample) proportions of persons in the different groups whose SRH was 'poor' (as shown in Figure 2). This is because the predicted PPH for a social group is obtained by isolating the social group effect under a *ceteris paribus* assumption , as described above, while the sample proportion for a social group obtains from an amalgam of social and non-social group effects. These differences between the predicted PPH for the social groups and the social groups' sample proportions of poor SRH are compared in Figure 4. This comparison shows clearly that, for the ST, SC, and the MUC, attributes not related to social group (location, region, living conditions etc.) raised their proportions with poor SRH *above* their predicted PPH. In that sense, these groups suffered from 'attributes disadvantage':

[14] The fact that Muslims are more likely to report poor self-reported health has been discussed by Singh *et. al.* (2013) and is ascribed to the social isolation of the Muslims in India and their low educational and economic achievements. The Sachar Committee (2006) in its report to the government of India quantified and highlighted the backwardness of Indian Muslims. This Report drew attention to a number of areas of disadvantage: *inter alia* the existence of Muslim ghettos stemming from their concern with physical security; low levels of education engendered by the poor quality of education provided by schools in Muslim areas; pessimism that education would lead to employment; difficulty in getting credit from banks; the poor quality of public services in Muslim areas. In consequence, as the Committee reported: one in four of Muslim 6-14 year olds had never attended school; less than 4% of India's graduates were Muslim, notwithstanding that Muslims comprised 13% of India's population; only 13% of Muslims were engaged in regular jobs, with Muslims holding less than 3% of jobs in India's bureaucracy.

[15] It should be emphasised that in computing the predicted PPH all the relevant interaction effects were taken into account.

had persons from these groups possessed better attributes, their average proportions with poor SRH would have been lower. By contrast, persons from the non-Muslim upper classes enjoyed an 'attributes advantage': had persons from these groups possessed worse attributes, their average proportions with poor SRH would have been higher.

Figure 4: Poor SRH and Predicted Probabilities of Poor Health (PPH), by Social Group



The marginal probabilities, shown in column 3 of Table 1, under the heading 'Social Group', are the *differences* between the predicted PPH of the ST, SC. NMOBC, MOBC, and MUC households and that of (the reference) NMUC households; dividing these marginal probabilities by their standard errors (column 4 of Table 1) yields the z-values (column 5 of Table 1). These z-values show that the marginal probabilities for the SC and the non-Muslim OBC in the NSS 71st Round were negative and significantly different from zero. In other words, in 2014, the predicted PPH for the SC and the non-Muslim OBC was significantly lower than for persons from the NMUC. There was, however, no significant difference between the predicted PPH of persons from the ST and of Muslims (whether OBC or upper class) and that of those from the NMUC.

In addition to enabling a statistical comparison between the average predicted PPH of persons in the reference social group (the NMUC) and that of those in the other social groups, the methodology, outlined above, allows permits a direct comparison between persons in the non-

reference groups in terms of their average predicted PPH. The test results showed that there was no significant difference in the predicted PPH between: (i) OBC and Upper Class Muslims; (ii) the ST and the SC; (iii) the SC and the non-Muslim OBC; (iv) The Muslim and non-Muslim OBC.

The results of Tables 1 show that the predicted PPH was higher, but not significantly so, for those in 'casual labour' households than for persons in 'self-employed/regular wage/salaried' households (Table 1: 23.2 versus 21 percent) while the predicted PPH of persons in urban areas was higher, but not significantly so, than that of those in rural areas (Table 1: 22.3 versus 21.1 percent). In terms of regions, the predicted PPH of persons was lowest for persons in the West (Table 1: 10.5 percent) and highest for persons in the East (Table 1: 27.8 percent). Compared to the North as the reference region, the predicted PPH of persons in the Central region, East, and South was significantly higher and the predicted PPH of persons in the West was significantly lower.

In terms of environmental factors, the evidence was that having a flush/septic-tank toilet, compared to latrines of other types (including no toilet) had zero impact on the predicted PPH (Table 1: 21.4 percent) but cooking with clean fuels (mostly gas), compared to cooking with other fuel types (mostly firewood), significantly reduced the predicted PPH (Table 1: 19.3 versus 22.7 percent).

In addition to these *household* level factors – social group, region of residence, type of cooking fuel – some of the the *personal* attributes of a person were also important in determining his/her predicted PPH. The predicted PPH was affected by a person's marital status: married persons had a significantly lower predicted PPH than their counterparts who were single, widowed, or divorced (Table 1: 20 versus 23.9 percent)

The educational level of men and women also had a significant effect on their predicted PPH. Compared to the reference category of persons who were graduates or above, persons with lower educational levels had significantly higher predicted PPH: for example, Table 1 shows that the predicted PPH of illiterate persons was 23.3 percent and this was significantly higher than the predicted PPH of 14.5 percent for graduates.

The HPCE quintile to which a person belonged did not exercise a significant effect on his/her predicted PPH, probably because the effects of economic status were already accounted for by the 'casual labour' variable and the educational variables (discussed above). Lastly, the age of a person

had a significant effect on his/her predicted PPH: this rose from 16.4 percent for persons in the age band 60-69, to 28.6 percent for those aged 70-79 years, to 45.7 percent for those aged 80+ years.

Table 1: Predicted Probability of Persons Being in Poor Health from the Estimated Ordered Logit Equation, NSS 71st Round

71st Round (**January-June 2014**)*					
1	2	3	4	5	6
Conditioning Variable	Probability of Being in Poor Health	Marginal Probability	SE	z value	Pr>|z|
By Social Group of Household					
Scheduled Tribe	0.209	-0.026	0.023	-1.1	0.25
Scheduled Caste	0.189	-0.046	0.019	-2.4	0.02
Non-Muslim OBC	0.204	-0.031	0.015	-2.0	0.04
Muslim OBC	0.242	0.006	0.024	0.3	0.79
Muslim Upper Class	0.259	0.024	0.028	0.9	0.39
Non-Muslim Upper Class [R]	0.235				
Household Occupation					
Labourer Household [R]	0.232				
Non-Labourer Household	0.210	-0.022	0.015	-1.5	0.13
Household's Location					
Rural[R]	0.211				
Urban	0.223	0.012	0.015	0.8	0.40
Household's Region of Residence					
North [R]	0.167				
Central	0.234	0.067	0.017	3.9	0.00
East	0.278	0.111	0.020	5.6	0.00
West	0.105	-0.061	0.016	-3.9	0.00
South	0.223	0.056	0.018	3.1	0.00
Household Living Conditions: Latrine					
Flush or Septic Tank [R]	0.214				
Other Type of Latrine (including no latrine)	0.214	0.000	0.015	0.0	1.00
Household Living Conditions: Cooking Fuel					
Gas, *Gobar* Gas, Electricity, Kerosene [R]	0.193				
Other Fuels	0.227	0.034	0.016	2.1	0.04
Household Per-capita Consumption Expenditure Quintile					
Bottom Quintile	0.223	0.010	0.021	0.5	0.65
Second Quintile	0.201	-0.013	0.019	-0.6	0.52
Third Quintile	0.221	0.007	0.020	0.4	0.73
Fourth Quintile	0.210	-0.004	0.020	-0.2	0.85
Top Quintile [R]	0.214				
Person's Marital Status					
Married [R]	0.200				
Single, Widowed, Divorced	0.239	0.039	0.014	2.8	0.01
Person's Education Level					
Illiterate	0.233	0.088	0.022	4.1	0.00
Literate without Formal schooling	0.242	0.098	0.048	2.0	0.04
Primary	0.200	0.055	0.021	2.6	0.01
Secondary & Higher Secondary	0.157	0.012	0.022	0.5	0.60
Graduate and Above [R]	0.145				
Age Band					
60-69 years	0.164				
70-79 years	0.286	0.122	0.013	9.4	0.00
80+ years	0.457	0.293	0.029	10.2	0.00

*Estimated on data from the NSS 71st Round for 25,943 persons, aged 60 or over, on the basis of their self-rated current state of health, using NSS multipliers

R=Reference category

Source: Own Calculations from the NSS 71st Round using NSS multipliers

Table 2, which addresses the issue of gender disparity by examining differences in predicted PPH between (elderly) men and women for every category of the conditioning variables, shows that the predicted PPH for women was, almost without exception, numerically higher than that of men (Table 2: columns 2 and 3); however, the relevant question was whether these differences (shown in column 4) were statistically significant. The computed standard errors of these differences are shown in column 5 and, dividing the difference in predicted PPH by its standard error yields the z-value shown in column 6.

The first row of Table 2 records the overall predicted PPH of women (22.4 percent) and men (20.6 percent). The predicted PPH for women was computed after assuming that all the 25,943 persons in the estimation sample were women, and so applying the women's coefficients to the (as observed) attributes of the 25,943 persons: this yielded the predicted PPH of 22.4 percent. The predicted PPH for men was computed after assuming that all the 25,943 persons in the estimation sample were men, and so applying the men's coefficients to the (as observed) attributes of the 25,943 persons: this yielded the predicted PPH of 20.6 percent. However, as the z-value of 1.5 shows, this difference of 1.9 points between the female and male predicted PPH was not significantly different from zero.

The detailed results, presented in subsequent rows of Table 2, show that while, in many instances, numerical differences between the genders in their predicted PPH were not statistically significant, there were some instances in which the predicted PPH of men and women were significantly different from each other. Notable among the latter cases was that, for both Muslim and non-Muslim persons from the OBC, the predicted PPH for women was significantly higher than that for men.[16] Similarly, in the East of the country, women had a significantly higher PPH than men.

Earlier it was observed that marriage offered protection against ill health but that, in this regard, men were likely to be more advantaged by marriage. The results support both propositions. Table 1 showed that the predicted PPH of married persons was significantly lower than that for those single/widowed/divorced (20 versus 23.9 percent). Table 2 shows that the predicted PPH of married

[16] The fact that Muslim women are more likely to report poor SRH is consistent with the findings of Alam (2006). The fact that non-Muslim OBC women are more likely to report poor SRH relative to their male counterparts is possibly due to patriarchy amongst the OBC (Menon, 2009).

women was significantly higher than that for married men (21.1 versus 18.8 percent). However, the predicted PPH of unmarried elderly women, mostly widows, was not significantly higher than that of unmarried elderly men, mostly widowers (24.5 versus 23.3 percent).

It was also observed that unclean fuels (mostly firewood) would affect the general health of elderly persons in the household but would have a disproportionate effect on the health of elderly women who might be more exposed to smoke in the kitchen. Again, the results support both propositions. Table 1 shows that the predicted PPH of elderly persons in households cooking with gas was significantly lower than that for those cooking with firewood (19.3 versus 22.7 percent). Table 2 shows that, in households cooking with firewood, the predicted PPH of elderly women was significantly (at the 10% level) higher than that for elderly men (24.1 versus 21.4 percent).

Table 2: Gender Differences in the Predicted Probability of Being in Poor Health: NSS 71st Round (January-June 2014)*

	Predicted Probability of Being in Poor Health					
1	2	3	4	5	6	7
Conditioning Variable	Women	Men	Difference	Standard Error of Difference	z value	Pr>|z|
Overall	0.224	0.206	0.019	0.012	1.5	0.13
By Social Group of Household						
Scheduled Tribe	0.226	0.192	0.033	0.031	1.1	0.29
Scheduled Caste	0.193	0.187	0.006	0.022	0.3	0.78
Non-Muslim OBC	0.224	0.184	0.039	0.018	2.2	0.03
Muslim OBC	0.291	0.188	0.103	0.037	2.8	0.01
Muslim Upper Class	0.251	0.271	-0.020	0.064	-0.3	0.75
Non-Muslim Upper Class	0.225	0.249	-0.024	0.021	-1.1	0.26
Household Occupation						
Labourer Household	0.234	0.233	0.001	0.028	0.0	0.98
Non-Labourer Household	0.222	0.199	0.023	0.013	1.8	0.07
Household's Location						
Rural	0.215	0.209	0.006	0.014	0.4	0.68
Urban	0.250	0.197	0.053	0.019	2.8	0.01
Household's Region of Residence						
North	0.184	0.148	0.037	0.024	1.6	0.12
Central	0.249	0.218	0.031	0.020	1.5	0.12
East	0.306	0.247	0.059	0.028	2.1	0.04
West	0.111	0.100	0.012	0.015	0.8	0.42
South	0.214	0.235	-0.021	0.019	-1.1	0.28
Household Living Conditions: Latrine						
Flush or Septic Tank	0.225	0.205	0.020	0.019	1.0	0.30
Other Type of Latrine (including no latrine)	0.224	0.206	0.018	0.015	1.2	0.23
Household Living Conditions: Cooking Fuel						
Gas, *Gobar* Gas, Electricity, Kerosene	0.196	0.191	0.005	0.020	0.3	0.79
Other Fuels	0.241	0.214	0.027	0.016	1.7	0.09
Household Per-capita Consumption Expenditure Quintile						
Bottom Quintile	0.234	0.213	0.021	0.024	0.9	0.38
Second Quintile	0.210	0.193	0.017	0.023	0.8	0.45
Third Quintile	0.225	0.219	0.006	0.023	0.3	0.79
Fourth Quintile	0.209	0.214	-0.005	0.021	-0.3	0.81
Top Quintile	0.242	0.184	0.058	0.024	2.4	0.02
Person's Marital Status						
Married	0.211	0.188	0.023	0.012	1.9	0.06
Single, Widowed, Divorced	0.245	0.233	0.013	0.025	0.5	0.61
Person's Education Level						
Illiterate	0.245	0.223	0.022	0.016	1.3	0.19
Literate without Formal schooling	0.234	0.255	-0.020	0.083	-0.2	0.81
Primary	0.212	0.190	0.023	0.021	1.1	0.29
Secondary & Higher Secondary	0.160	0.156	0.004	0.030	0.1	0.89
Graduate and Above	0.148	0.144	0.004	0.034	0.1	0.91
Age Band						
60-69years	0.179	0.149	0.029	0.013	2.3	0.02
70-79 years	0.289	0.285	0.004	0.024	0.2	0.87
80+ years	0.445	0.473	-0.028	0.055	-0.5	0.61

* Estimated on data from the NSS 71st Round for 25,943 persons, aged 60 or over, of whom 13,036 were men and 12,907 were women, on the basis of their self-rated current health, using NSS multipliers.

Source: Own Calculations from the NSS 71st Round using NSS multipliers

4. Self-Rated Health, Social Experience, and Observed Health Status

Although the evaluation of health status based on SRH is widely used in social statistics, Sen (2002) cautioned that a person's assessment of health may "be seriously limited by his or her social experience" (p. 860). In turn, social experience may understate the poor health of those living in communities with many diseases and inadequate health infrastructure since they may be "inclined to take certain symptoms for 'normal' when they are clinically preventable" (p.860).

The NSS 71st Round data offer mixed evidence for Sen's (2002) contention. Elderly persons from the SC lived in considerably poorer households than elderly persons from the NMUC: the HPCE of elderly persons from the ST, SC and the NMUC were, respectively, ₹5,697, ₹6,397 and ₹11,380. However, compared to the richer elderly from the NMUC, 21.6 percent of whom had a poor SRH, the elderly from the ST and the SC had similar proportions of poor SRH (respectively, 23.5 and 22.3 percent). This finding would seem to support to Sen's contention that a person's socio-economic position might influence his/her SRH.

Sen (2002), however, provided evidence for his contention in terms of Indian states arguing that Kerala, with some of the highest levels of literacy and longevity in India, had also among the highest rates of reported morbidity while Bihar, at the other extreme in terms of social development, had some of the lowest rates. It is true that, according to the NSS 71st Round, 29 percent of elderly respondents in both Kerala and in Bihar reported poor SRH. However, if one divides states into two groups, 'forward' and 'backward' states, then 19.3 percent of elderly respondents in forward states, compared to 24.5 percent of elderly respondents in the 'backward' states, reported poor SRH providing evidence of an inverse relationship between prosperity and reported morbidity. [17]

The tension, of course, lies in the fact that health facilities are better in forward states (than in backward states) and so elderly people there report lower rates of poor health because they receive better health care; on the other hand, according to Sen's (2002) thesis, greater awareness of their

[17] *Forward States* were Himachal; Punjab; Chandigarh; Haryana; Delhi; Sikkim; West Bengal; Gujarat; Daman & Diu; Dadra & Nagar Haveli; Maharashtra; AP; Karnataka; Goa; Kerala; TN; Pondicherry; Telangana; *Backward States* were: Uttaranchal; Rajasthan, UP, Bihar; Arunachal; Nagaland; Manipur; Mizoram; Tripura; Meghalaya; Assam; Jharkhand; Odisha; Chhattisgarh; Lakshadweep; A&N Islands.

health and symptoms could lead them to report higher rates of morbidity than people in backward states who might regard these symptoms as "normal". The evidence on this is mixed. The results for social groups, discussed above, would support Sen's (2002) hypothesis; however, the data for forward versus backward states suggests that it is better health care that leads the elderly in forward states to have lower rates of poor SRH.

A related but separate question is whether SRH is a good indicator of observed health. Cramm *et. al*. (2015) found only weak correlation between those 'at risk' on SRH and those at risk on objective indicators and suggested, as had been done earlier by Maddox and Douglass (1973), that the two sets of measures "reflect different 'parts' of mortality and morbidity" (p. 256). However, in arriving at this conclusion Cramm *et. al.* (2015) used three specific objective health outcomes – grip strength, lung capacity, and the degree of dependence in ADL.

The NSS 71st Round offers an opportunity to test the subjective-objective relation using a more general measure of a person's objective health status – his/her expenditure on healthcare. After controlling for other variables – income as measure of ability to pay; education as measure of information; age as an indicator of declining health; and region as an indicator of the available quality of healthcare – one can test whether there was a significant relation between such expenditure and SRH.

The NSS 71st Round provided details of expenses incurred in the past 365 days on the treatment of persons as in-patients in medical institutions and, in the past 15 days, expenses incurred as out-patients either within or outside medical institutions. Of the elderly persons who had incurred in-patient expenditure, 41.3 percent had poor SRH, 53.9 had fair SRH, and 4.8 had excellent/very good SRH. Of the elderly persons who had incurred out-patient expenditure, 26.8 percent had poor SRH, 67.5 percent had fair SRH, and 5.8 percent had excellent/very good SRH.

Table 3 shows that the mean in-patient and out-patient expenditure of elderly men and women, considered collectively, whose SRH was 'poor' was, respectively, ₹30,107 (median: ₹9,630) and ₹852 (median: ₹550) while the mean in-patient and out-patient expenditure of elderly men and women, considered collectively, whose SRH was 'fair' or 'very good' was, respectively, ₹24,701 (median: ₹9,635) and ₹800 (median: ₹450). There was clear gender bias in health expenditure with

respect to men and women irrespective of their SRH. The mean total in-patient expenditure of men and women with *poor SRH* was, respectively, ₹33,396 and ₹23,710 (median, respectively ₹10,500 and ₹8,075) while the mean total out-patient expenditure of men and women with poor SRH was, respectively, ₹902 and ₹768 (median: respectively: ₹570 and ₹491). Similarly, the mean total in-patient expenditure of men and women with fair or very good/excellent SRH was, respectively, ₹27,869 and ₹16,653 (median, respectively, ₹10,030 and ₹8,800) while the mean total out-patient expenditure of men and women with fair or very good/excellent SRH was, respectively, ₹860 and ₹651 (median, respectively, ₹450 and ₹400).

Table 3: Mean [Median] Expenditure on Health in ₹ by Persons 60+ years of Age: 71st NSS

	Self-Rated Health is Poor		Self-Rated Health is Fair or Very Good	
	In-Patient Expenditure	Out-Patient Expenditure	In-Patient Expenditure	Out-Patient Expenditure
All Persons	30,107 [9,630]	852 [550]	24,701 [9,635]	800 [450]
Male	33,396 [10,500]	902 [570]	27,869 [10,030]	860 [450]
Female	23,710 [8,075]	768 [491]	16,653 [8,800]	651 [400]

Source: Own Calculations from the NSS 71st Round

In the econometric analysis, reported below, we focus on median, rather than mean, expenditure because the latter can be greatly distorted by extreme expenditure by individuals; in order to do so, we use the technique of *quantile regression* which passes the regression line through the sample median instead of, as in ordinary least squares, through the sample mean (Borooah, 2005). In-patient expenditure by the 3,752 persons, 60+ years of age, who incurred such expenditure, was not significantly affected by their SRH; however, out-patient expenditure by the 8,472 persons, 60+ years of age, who incurred such expenditure, was significantly affected by their SRH. [18]

Table 4 shows that the predicted out-patient expenditure for elderly persons was ₹451 for those with fair/very good SRH and ₹582 for those with poor SRH: this difference of ₹131 was significantly different from zero.[19] Breaking these results down by gender, Table 4 also shows that the predicted out-patient expenditure for elderly men with fair/very good SRH was ₹445 and, for elderly men with poor SRH, it was ₹600: this difference of ₹156 was significantly different from zero.

[18] After controlling for income, education, age, and region.
[19] The quantile estimates from which these, and subsequent predictions were obtained, are shown in Table C of the Appendix.

Lastly, the predicted out-patient expenditure for elderly women with fair/very good SRH and with poor SRH was, respectively, ₹465 and ₹544 where this difference of ₹79 was significantly different from zero. So, there is clear evidence that out-patient expenditure by elderly persons – considered collectively and, separately, by gender - was significantly correlated with the severity of their SRH.

Table 4 also suggests that, for elderly persons with poor SRH, there was significant difference, albeit at the 10% level, in the out-patient expenditure incurred by men (₹600) and women (₹544); for elderly persons with fair/very good SRH the gender difference in out-patient expenditure was not significant.

Table 4: Predicted Out-Patient Expenditure from Quantile Regression

SRH: Male + Female	Expenditure (₹)	Difference (₹)	Standard Error	z-value	Pr>|z|
Fair/Good	451				
Poor	582	131	18.3	7.2	0.00
SRH: Male					
Fair/Good	445				
Poor	600	156	22.1	7.0	0.00
SRH: Female					
Fair/Good	465				
Poor	544	79	30.8	2.6	0.01
Gender: poor SRH					
Male	600				
Female	544	56	31.0	-1.8	0.07
Gender: fair/very good SRH					
Male	445				
Female	465	20	22.3	0.9	0.35

Source: Own Calculations from the NSS 71st Round

5. The Ailments of Elderly Persons

The NSS 71st Round asked members of the 65,975 households surveyed, particulars of ailments that they had experienced in the 15 days prior to the Survey. Of the persons who responded to this question, 1,685 men and 1,010 women were (elderly) persons who had poor SRH. Details of these ailments for these 2,695 persons, distinguished by gender, are shown in Table 5.[20]

[20] In order to compute the standard errors associated with the difference between men and women, in their respective differences of being afflicted by a particular ailment (this calculation being necessary for judging whether the gender difference associated with a particular ailment was statistically significant), we estimated a *multinomial logit* in which the dependent variable took values 1to 10, depending on the ailment (see Table 5 for

This table brings out four *significant* differences between the nature of ailments of elderly men and women whose SRH was poor and these are detailed below:

1. Women were significantly more prone to *Cardio-Vascular* ailments than men (at the 10% level of significance): 15.5 percent of men versus 21.7 percent of women. There were two specific ailments in this category: hypertension and heart disease. Women were more susceptible to hypertension (15.8 percent of women, against 10.7 percent of men [all in poor SRH]) while there was little difference between the sexes in their susceptibility to heart disease (approximately 4.9 percent of women and 5.9 percent of men [all in poor SRH]).
2. Men were significantly more prone to *Respiratory* ailments than women: 15 percent of men versus 7.2 percent of women. The important ailment in this category was bronchial asthma/wheezing/breathlessness and 10.7 percent of men against 4.8 percent of women [with poor SRH] suffered from this. This is probably due to the prevalence of smoking among men which exposed them to noxious fumes. Mishra *et. al.* (2016) report that, for India in 2010, the age-related prevalence rate for smoking of men aged 15-69 years was 24 percent, compared to 2.7 percent for similarly aged women.
3. Women were significantly more prone to *Musculo-Skeletal* ailments than men: 13.3 percent of men versus 20.6 percent of women. There were two specific ailments in this category: joint/bone disease and back/body pain. Of these, the first was much more common and 13 percent of women, against 10.6 percent of men, with poor SRH, had joint or bone disease (including swelling in the joints or pus from bones). Of the second, 7.6 percent of women, against 2.7 percent of men, with poor SRH, had back/body pain.
4. Men were more prone to injury-related ailments (at the 10% level of significance): 2.8 percent of men versus 0.8 percent of women with poor SRH had injury-related ailments.

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a list of ailments) and the determining variable was gender. The predicted probabilities from this model were the sample proportions for each category but the estimated model had the advantage of providing the estimated standard errors associated with the difference in proportions since a property of the model is that the category predictions for men and women are the sample means of men and women for the categories.

Table 5: Distribution of Ailments, by Gender, Reported by Persons in Poor Health*

1	2	3	4	5	6	7
Ailment Category	Men (%)	Women (%)	Difference	Standard Error Of Difference	Z value	Pr>|z|
1. Infection	15.8	11.8	4	3.7	-1.1	0.27
2. Endocrine, Metabolic, Nutritional	12.7	14.4	-1.7	3.1	0.55	0.58
3. Psychiatric & Neurological	8.3	5.5	2.8	2.0	-1.43	0.15
4. Cardio-Vascular	15.5	21.7	-6.2	3.5	1.73	0.08
5. Respiratory	15.0	7.2	7.8	2.4	-3.26	0.00
6. Gastro-Intestinal	7.6	4.7	2.9	2.3	-1.21	0.22
7. Musculo-Skelatal	13.3	20.6	-7.3	3.6	2.01	0.05
8. Genito-Urinary	4.9	6.9	-2	2.2	0.94	0.35
9. Injuries	2.8	0.8	2	1.2	-1.72	0.09
10. Other Ailments	4.1	6.3	-2.2	1.6	1.38	0.17
Total	100	100				

*1,685 men and 1,010 women whose perception was of being in poor health and who reported an ailment occurring within the 15 days preceding the interview

Source: Own calculations from NSS 71st Round using NSS multipliers

Another gender difference with respect to ailments was that, compared to elderly men, a larger proportion of such women had *chronic* ailments (71 percent of women compared to 68 percent of men) and, as the first panel of Table 6 shows, this difference was not significant. The proportion of elderly women, for whom the specific ailment had started *more* than 15 days earlier and was *continuing,* was greater than that of similarly placed elderly men (76 percent versus 73 percent) and again, as the first panel of Table 6 shows, this difference was not significant.[21] The second panel of Table 6 shows, however, that when men and women with ailments were considered in their entirety, women were significantly more likely than men to have chronic ailments (55 percent versus 48 percent) and were also significantly more likely than men to have continuing ailments (61 percent versus 54 percent) .

Table 6: Chronic and Continuing Ailments, by Gender

Elderly Persons with Ailments: 5,766 men and 2,744 women						
Ailment Category	Men (%)	Women (%)	Difference	Standard Error	z value	Pr>|z|
1. Proportion of All Ailments in past 15 days that were Chronic Ailments	71.1	67.8	3.3	2.3	1.4	0.15
2. Proportion of all Ailments Continuing for More than 15 Days	73.4	76.1	2.7	2.2	1.2	0.23
All Persons with Ailments: 24,379 men and 12,070 women						
Ailment Category	Men (%)	Women (%)	Difference	Standard Error	z value	Pr>|z|
1. Proportion of All Ailments in past 15 days that were Chronic Ailments	48.1	55.3	7.2	1.2	6.2	0.00
2. Proportion of all Ailments Continuing for More than 15 Days	60.5	54.2	6.3	1.2	5.5	0.00

Source: Own calculations from NSS 71st Round using NSS multipliers

[21] Dividing the difference by the standard error yields the z value

6. Concluding Remarks

Sen (2001) observed that "within every community, nationality, and class, the burden of hardship falls disproportionately on women" and he went on to enumerate the variety of ways in which disparities are created between the life-chances of men and women: natal inequality; mortality inequality; special-opportunity inequality; professional inequality; ownership inequality; household inequality. To this plethora of inequality-creating channels, this paper, standing on the shoulders of earlier studies, points to inequality in the health outcomes of elderly men and women in India: in particular, compared to elderly men, elderly women were more likely to have poor SRH.

In estimating gender differences in SRH, non-gender factors were allowed to interact with gender so that the effect of each factor could be different between men and women. Doing so revealed that the effects of some of the non-gender factors were significantly different between men and women with the predicted PPH being higher for women than for men.

Compared to men, significantly smaller amounts were spent on women with respect to in-patient and out-patient care. These findings applied to elderly men and women and also to men and women considered in their entirety. Moreover, compared to men, women's ailments were more likely to be chronic and also more likely to be continuing ailments.

This paper focused on men and women who were 60 years and over. The richness of the data permits an analysis of differences in health outcomes between men/boys and women/girls of any age in terms of ailments and health expenditure (though not, of course, for SRH since questions relating to this were only asked of elderly persons). Space precludes us from pursuing these themes here and they must remain areas for future research.

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Appendix
Ordered Logit Models

Suppose there are *N* persons (indexed *i=1…N*). Let the values taken by the variable Y_i represent the health status of these persons such that: $Y_i = 1$ if the person was in 'excellent/very good health'; $Y_i = 2$ if the person was in 'fairly good health'; and $Y_i = 3$ if the person was in 'poor health'. Since these outcomes are inherently ordered – in the sense that the outcome associated with a higher value of Y_i is less desirable than that associated with a lower value – the appropriate method of estimation is that of *ordered logit*.

The idea behind this model (Borooah, 2002) is that the health of a person may be represented by the value of the *latent variable*, H_i, with higher values of H_i representing poorer health. One may consider this latent variable to be a linear function of *K* health-determining factors whose values for individual *i* are: X_{ik}, $k = 1...K$. Consequently,

$$H_i = \sum_{k=1}^{K} X_{ik}\beta_k + \varepsilon_i = Z_i + \varepsilon_i \qquad (1)$$

where: β_k is the coefficient associated with the k^{th} variable and $Z_i = \sum_k X_{ik}\beta_k$. An increase in the value of the k^{th} factor will cause the health of a person to improve if $\beta_k < 0$ and to deteriorate if $\beta_k > 0$.

Since the values of H_i are, in principle and in practice, unobservable, equation (1) represents a latent regression which, as it stands, cannot be estimated. However, what is observable is a person's *health status* (in this study: good; fairly good; poor) and the categorisation of persons in the sample in terms of health status is implicitly based on the values of the latent variable H_i in conjunction with 'threshold values', δ_1 and δ_2 ($\delta_1 < \delta_2$) such that:

$$\begin{aligned} Y_i &= 1, \text{ if } H_i \le \delta_1 \\ Y_i &= 2, \text{ if } \delta_1 < H_i \le \delta_2 \\ Y_i &= 3, \text{ if } H_i > \delta_2 \end{aligned} \qquad (2)$$

The δ_1, δ_2 of equation (2) are unknown parameters to be estimated along with the β_k of equation (1).

A person's classification in terms of his/her health status depends upon whether the value of H_i crosses a threshold and the probabilities of a person being in a particular health status are:

$$\begin{aligned}
\Pr(Y_i = 1) &= \Pr(\varepsilon_i \le \delta_1 - Z_i) \\
\Pr(Y_i = 2) &= \Pr(\delta_1 - Z_i \le \varepsilon_i < \delta_2 - Z_i) \\
\Pr(Y_i = 3) &= \Pr(\varepsilon_i \ge \delta_2 - Z_i)
\end{aligned} \tag{3}$$

If it is assumed that the error term ε_i, in equation (1), follows a logistic distribution then equations (1) and (2) collectively constitute an *ordered logit* model[22] and the estimates from this model permit, through equation (3), the various probabilities to be computed for every person in the sample, *conditional upon the values of the health-determining factors for each person*.

Table A below shows the estimates from the ordered logit model (that is, equations (1) and (2)). These estimates are then used in equation (3) to compute the probabilities shown in Tables 1 and 2.

[22] The assumption that the ε_i are normally distributed results in an ordered probit model.

Table A: Ordered Logit Estimates for the SRH of Elderly Persons Equation

Conditioning Variables	Coefficient Estimate	Standard Error	z-Value	Pr>|z|
Social Group				
Scheduled Tribe	-0.366	0.211	-1.7	0.08
Scheduled Caste	-0.402	0.167	-2.4	0.02
Non-Muslim OBC	-0.424	0.128	-3.3	0.00
Muslim OBC	-0.394	0.175	-2.3	0.02
Muslim Upper Class	0.127	0.245	0.5	0.60
Non-Muslim Upper Class [R]				
Gender				
Female	0.075	0.366	0.2	0.84
Male [R]				
Interaction Social Group & Female				
Scheduled Tribe × Female	0.368	0.246	1.5	0.14
Scheduled Caste × Female	0.195	0.189	1.0	0.30
Non-Muslim OBC × Female	0.414	0.155	2.7	0.01
Muslim OBC × Female	0.767	0.242	3.2	0.00
Muslim Upper Class × Female	0.024	0.367	0.1	0.95
Type of work				
Manual	-0.224	0.135	-1.7	0.10
Non-Manual [R]				
Interaction Type of Work & Female				
Manual × Female	0.152	0.177	0.9	0.39
Education				
Illiterate	0.582	0.230	2.5	0.01
Literate without Formal schooling	0.770	0.379	2.0	0.04
Primary	0.358	0.220	1.6	0.10
Secondary & Higher Secondary	0.100	0.225	0.4	0.66
Graduate and Above [R]				
Interaction Education & Female				
Illiterate × Female	0.080	0.308	0.3	0.79
Literate without Formal schooling × Female	-0.170	0.561	-0.3	0.76
Primary × Female	0.107	0.306	0.4	0.73
Secondary & Higher Secondary × Female	-0.003	0.342	0.0	0.99
Marital Status				
Single	0.295	0.144	2.1	0.04
Married [R]				
Interaction Single & Female				
Single × Female	-0.085	0.167	-0.5	0.61
Household Consumption per Capita				
Lowest Quintile	0.202	0.169	1.2	0.23
Quintile 2	0.065	0.169	0.4	0.70
Quintile 3	0.237	0.168	1.4	0.16
Quintile 4	0.205	0.158	1.3	0.20
Highest Quintile [R]	0.202	0.169	1.2	0.23

Interaction Consumption & Female				
Lowest quintile × Female	-0.247	0.207	-1.2	0.23
Quintile 2 × Female	-0.260	0.210	-1.2	0.22
Quintile 3 × Female	-0.339	0.201	-1.7	0.09
Quintile 4 × Female	-0.411	0.184	-2.2	0.03
Location				
Urban	-0.086	0.126	-0.7	0.49
Rural [R]				
Interaction Location & Female				
Urban × Female	0.297	0.145	2.0	0.04
Region				
Central	0.514	0.171	3.0	0.00
East	0.693	0.179	3.9	0.00
West	-0.475	0.195	-2.4	0.02
South	0.619	0.170	3.6	0.00
North [R]				
Interaction Region & Female				
Central × Female	-0.109	0.208	-0.5	0.60
East × Female	0.013	0.226	0.1	0.95
West × Female	-0.140	0.229	-0.6	0.54
South × Female	-0.425	0.209	-2.0	0.04
Quality of Toilet				
Not Flush-type	0.008	0.126	0.1	0.95
Flush type [R]				
Interaction Toilet Quality & Female				
Not-flush type × Female	-0.013	0.148	-0.1	0.93
Cooking Fuel				
Non-Gas	0.158	0.144	1.1	0.27
Gas [R]				
Interaction Cooking Fuel & Female				
Non-gas × Female	0.121	0.169	0.7	0.47
Age Band				
60-69 years [R]				
70-79 years	0.854	0.106	8.1	0.00
80+ years	1.714	0.187	9.2	0.00
Interaction Age Band & Female				
70-79 years × Female	-0.203	0.148	-1.4	0.17
80+ years × Female	-0.346	0.255	-1.4	0.18
δ_1	-1.712	0.288	-5.9	0.00
δ_2	2.548	0.289	8.8	0.00

Own Calculations from 71st NSS Round using NSS Multipliers

Table B: Quantile Regression Estimates for the Out-Patient Expenditure by Elderly Persons Equation

Conditioning Variables	Coefficient Estimate	Standard Error	z-Value	Pr>|z|
Self-Rated Health				
Poor	155.5	22.3	7.0	0.00
Very Good or Fair [R]				
Gender				
Female	20.9	22.5	0.9	0.35
Male [R]				
Interaction SRH & Gender				
SRH Poor × Female	-78.1	37.6	-2.1	0.04
Household Consumption per Capita				
Lowest Quintile	-256.0	27.7	-9.3	0.00
Quintile 2	-168.1	27.4	-6.1	0.00
Quintile 3	-149.6	26.0	-5.8	0.00
Quintile 4	-118.3	22.8	-5.2	0.00
Highest Quintile [R]				
Education				
Illiterate	102.6	70.3	1.5	0.14
Literate without Formal schooling	9.1	20.1	0.5	0.65
Primary	127.3	25.9	4.9	0.00
Secondary & Higher Secondary	286.0	33.0	8.7	0.00
Graduate and Above [R]				
Region				
Central	-9.1	30.5	-0.3	0.77
East	-141.9	31.6	-4.5	0.00
West	-143.1	34.0	-4.2	0.00
South	-189.1	28.5	-6.6	0.00
North [R]				
Age Band				
60-69 years [R]				
70-79 years	31.4	18.6	1.7	0.09
80+ years	0.5	38.1	0.0	0.99
60-69 years [R]				
Intercept	609.1	32.6	18.7	0.00

*8,475 observations

Own Calculations from 71st NSS Round