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ORIGINAL ARTICLE

Self-rated health status and its correlates among the elderly in India

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Abstract

Aim Population ageing is emerging as a major demographic issue for India with wide socio-economic implications. This study examines the self-rated health status of the elderly and its correlates in India.

Subject and methods Data from the 'Building a Knowledge Base on Population Ageing in India (BKPAI)' survey conducted in seven Indian states in 2011 was used for analysis ($n = 9852$). Logistic regression analysis was performed to estimate the effect of covariates on self-rated health.

Results Fifty-five percent of the elderly self-rated their health as poor. Age, education, marital status, religion, occupation, chronic diseases, functional status, and routine medical check-ups were significant correlates of self-rated poor health. The elderly with three or more chronic diseases were four times more likely to rate their health as poor than those without any chronic diseases. Those who faced more difficulties in daily living were more likely to rate their health as poor than those who faced fewer problems. The elderly who went for routine medical check-ups were more likely to assess themselves as having poor health than those who did not.

Conclusion This study found a sizeable number of elderly with self-rated poor health along with extensive disparity by socio-economic and demographic characteristics. Chronic disease, functional limitations and routine medical check-ups were strong predictors of self-rated health. Given the higher proportion of poor self-rated health among the elderly, and the increasing size of the ageing population in India, this study indicates the need to strengthen health care services and social security programs for the elderly.

Keywords Self-rated health · Elderly · Correlates · India

Background

Self-rated health is a measure by which a person expresses perceptions about his/her health status. A self-rated measure directly depends on personal social experience because it is primarily based on an individual's assessment of their health (Sen 2002). However, these measures also have face validity in the public health literature, particularly due to their relationship with socio-economic status (Subramanian et al. 2009). Most of the surveys that assess self-rated health ask questions using a four- or five-point scale from poor to excellent (Shields and Shooshtari 2001). It is a comprehensive as well as a reliable measure to predict changes in health (Zimmer et al. 2000), and is sensitive to a person's perception of health as well as correlating highly with other more specific measures of health (Hirve et al. 2012). Knowledge about and the determinants of self-rating of health could contribute to a better understanding and control of the processes by which health perception influences health and illness behavior (Garrity et al. 1978).

Ageing is an inevitable process, and, as it progresses, people face many challenges, particularly in the area of health. The increase in life expectancy due to advancements in medicine combined with a marked fall in fertility rates is leading to the rapid ageing of populations around the world (World Health Organization 2015), including in India where the number of persons aged 60 and above rose from 19.6 million (5% of the total population) in 1951 to 103.8 million (9% of the total population) in 2011

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(Registrar General and Census Commissioner of India 2013), and is expected to increase to 335 million (20% of the total population) by 2050 (United Nations, Department of Economic and Social Affairs 2013). Ageing has its implications which include the higher expenditure on pensions, the need for proper health care, and so on. A shrinking workforce due to decreasing populations as well as the ageing population, will further result in a shortage of active persons who can support a dependent older generation (Kalavar and Jamuna 2011). Also, after the epidemiological transition, the burden of disease profile changes from being dominated by infectious diseases to non-communicable diseases (Omran 2005). The socio-economic differentials in morbidity are another growing concern in developing countries (Case and Paxson 2005; Husain and Ghosh 2011). Health is affected by socio-economic determinants which include education, income, and employment, as well as by behavioral determinants such as smoking, obesity, and physical immobility (Denton et al. 2004). Ageing, too, is proposed as a strong predictor of poor health (Singh et al. 2013).

Many studies emphasize that lifestyle factors and health-related behaviors such as smoking, alcohol consumption, and chewing tobacco, as well as physical inactivity, can affect the health of the elderly. Moreover, lifestyle factors together with chronic disease are stronger predictors of self-rated health (Harrington et al. 2010). Lower levels of education of the elderly are also associated with poor health (Subramanian et al. 2009). Elderly women are more likely than men to report poorer health outcomes (Agrawal and Arokiasamy 2010) and poor self-rated health (Hirve et al. 2012), often due to unfavorable socio-economic conditions (Nimako et al. 2013). Also, the Global report 'Ageing in the Twenty-first century' (2012) highlighted that the elderly in India, particulary women, face multiple discrimination, which includes inadequate access to jobs and health care, subjection to abuse, denial of the right to own and inherit property, and a lack of basic minimum income and social security [United Nations Population Fund (UNFPA) and HelpAge International 2012].

Population ageing is emerging as a major demographic issue in India, with wide implications for the economy and for society in general. Evidence on the assessment of self-rated health among the Indian elderly is scarce. The few studies available have only considered a demographic nucleus, and ignored the potential effect of diseases, functional limitations, and medical check-ups, as well as personal risk factors. The present study examines the self-rated health status of the elderly and its correlates in India. The findings might prove useful for health planners and policymakers, especially for those promoting geriatric health in countries subject to rapid health transition like India.

Methods

Data source

The data used in the study were obtained from the Building a Knowledge Base on Population Ageing in India (BKPAI) survey conducted by UNFPA India. BKPAI is a multi-cohort study of persons aged 60 years and older, designed primarily to measure changes in health, functional status, living arrangements and health service utilization. BKPAI is comprehensive in its coverage of information on a wide range of indicators that have been considered central to the study of self-rated health status, including demographic and socio-economic characteristics, and personal risk factors such as smoking, alcohol consumption and tobacco chewing, and health-seeking history. It was carried out in seven states, namely Himachal Pradesh, Punjab, West Bengal, Odisha, Maharashtra, Kerala and Tamil Nadu, representing different regions and income groups in various stages of demographic transition in 2011. A probability proportional to size sampling design was adopted to select the respondents, and the details of the design can be ascertained from the report (United Nations Population Fund 2012). Informed consent was taken before interviewing the participants. The findings were based on the data of 9852 people aged 60 years and above residing in the sample households as a usual resident.

Outcome variable

Self-rated health (SRH) Respondents were asked: 'How do you rate your general health condition?'. The question had five response categories: excellent, very good, good, fair and poor. We categorized the response into two groups: 'Good', which included excellent, very good and good, and 'Poor', which included fair and poor to facilitate more meaningful interpretation of the findings.

Explanatory variables

Demographic variables Information on the following demographic variables was available and included in the analysis: age (60–69 years, 70–79 years, and 80 years and above), categorized as 'youngest-old' (60–69), 'old-old' (70–79), and 'oldest-old' (80 and above); gender (male or female); and marital status (currently married, widowed, and never married/divorced/separated).

Social variables The social variables included were educational attainment (no schooling, up to 5 years, 6–10 years and 10+ years), religion (Hinduism, Islam, Sikhism and other), caste/tribe [other, other backward classes (OBCs), scheduled caste, scheduled tribe, and no caste/tribe], family composition (living with spouse, living with spouse and others including

relatives and non-relatives, and living alone), and place of residence (urban and rural).

Economic variables Economic variables considered were average total income per year (no income, ≤ 370 US$ and > 370 US$) and working status of elderly measured as the main occupation (not working/household work, skilled, semi-skilled, and unskilled).

Chronic diseases Individuals were asked: "Has a doctor or nurse told you that you have any of the following ailments?" from a list including: 1. Arthritis, rheumatism or osteoarthritis; 2. Cerebral embolism, stroke or thrombosis; 3. Angina or angina pectoris (heart disease); 4. Diabetes; 5. Chronic lung disease; 6. Asthma; 7. Depression; 8. High blood pressure (hypertension); 9. Alzheimer's disease; 10. Cancer; 11. Dementia; 12. Liver or gallbladder disease; 13. Osteoporosis; 14. Renal or urinary tract infections; 15. Cataract; 16. Loss of all natural teeth; 17. Accidental injury; 18. Injury due to fall; 19. Skin disease; and 20. Paralysis. A composite chronic disease condition indicator was developed from all chronic diseases and classified into four categories: 'No chronic disease', 'One chronic disease', 'Two chronic diseases', and 'More than two chronic diseases'.

Functional status Participants were asked: "To what extent do you require help with your daily living activities?". Six activities of daily living (ADLs) (bathing, dressing, toileting, mobility, continence and feeding) were queried to form a functional status composite indicator comprising three categories: Ability to perform all ADLs, Difficulty with 1 or 2 ADLs, and Difficulty with 3 or more ADLs.

Acute disease Two questions were asked: "Were you sick for any time during the last 15 days without hospitalization?" and "What is the status of your ailments?'. The response was classified into one of three categories: 'Not sick during the last 15 days', 'Sick, started earlier than or within 15 days and is continuing', 'Sick, started earlier than or within 15 days and has ended'.

Routine medical check-ups The elderly were asked: 'Do you go for routine medical check-ups?' and 'How frequently did you go for medical check-ups in the past year?'. Response were categorized as: 'Yes, within past two weeks', 'Yes, monthly', 'Yes, yearly or half-yearly', 'No check-ups'.

Personal habits Responses to the question: 'Have you ever smoked, consumed alcohol or chewed tobacco?' were classified into three categories: 'Ever used and used in last month', 'Ever used but not used in last month', 'Never used'.

The previous literature has supported all these explanatory variables as key determinants of perceived health status among the elderly (Agrawal and Arokiasamy 2010; Harrington et al. 2010; Hirve et al. 2012; Singh et al. 2013; Pandey and Ladusingh 2015).

Statistical analysis

Descriptive analysis was used to examine the elderly's self-rated health status. First, univariate analysis was applied to determine respondents' socio-demographic characteristics. Second, bivariate analyses were used to examine the nature of the association between self-rated health and selected socio-economic and demographic characteristics using the chi-square test of significance. Lastly, to investigate which factors best explain and predict self-rated health, a multivariate logistic regression model was applied. During the process of analysis, multi-collinearity was assessed. As none of the variables was highly correlated, the variables used for bivariate analysis were retained in the logistic regression. For the entire statistical test, p values of, <0.01, <0.5, and <0.1, were considered for statistical significance. All statistical analyses were carried out with STATA v.12.0.

Results

Table 1 reveals the percentage distribution of the socio-economic and demographic factors of the elderly population. The overall mean age was 68 years, range 60–102 years. The majority (62%) belonged to the youngest-old group (60–69 years). About half (53%) were females. Respondents from rural areas (74%) outnumbered those from urban areas (26%). About half had not attended school at all, while only 6% had 10 years of schooling. The majority were currently married (61%). Religion-wise distribution showed that most of the elderly were Hindus (78%). About one-third (36%) were from the OBCs or 'other' castes, followed by scheduled caste (21%), and no caste or tribe (2%). Seventy-eight percent were living with their spouse and other family members (relatives or non–relatives). More than one-third (36%) did not engage in paid work or did unpaid household work, and more than two-fifths (43%) had no income. More than three-fifths (64%) had at least one chronic disease, 7% had difficulties with at least one ADL, 13% had been sick with acute diseases during the last 15 days prior to the survey, and 77% had not gone for any routine medical check-ups in the past year. Fifteen percent had ever smoked, 8% had ever consumed alcohol and 22% had ever chewed tobacco.

Table 1 also shows bivariate findings of the self-rated health status of the elderly by socio-economic and demographic characteristics, chronic disease, ADLs, acute disease, routine medical check-ups and selected lifestyle factors. More than half (56%) rated their health as poor. A significantly higher proportion of those aged 80 and above (71%) reported poor health as compared to those aged 60–69 years (50%). A

Table 1 Profile of the elderly and percentage distribution of self-rated health status of the elderly according to background characteristics, India, 2011

Background characteristics	Percentage of respondents	Self-assessment of health		*n*
		Good health	Poor health	
Age (years)***				
60–69	61.9	50.2	49.8	6239
70–79	27.3	37.5	62.5	2601
80+	10.9	29.3	70.7	1012
Mean age	68.0			
Gender***				
Male	47.4	47.8	52.2	4672
Female	52.6	41.5	58.5	5180
Locality***				
Rural	73.6	43.0	57.0	5138
Urban	26.4	48.6	51.4	4714
Schooling***				
10+ years	6.0	59.2	40.8	831
6–10 years	22.3	55.4	44.6	2437
Up to 5 years	20.4	43.2	56.8	1996
No schooling	51.3	38.6	61.4	4533
Marital status***				
Currently married	60.7	48.3	51.7	5886
Widowed	37.3	38.8	61.2	3768
Never married/divorced/separated	2.0	32.4	67.6	192
Religion***				
Hinduism	78.3	47.1	52.9	7781
Islam	8.3	32.7	67.3	804
Sikhism	9.2	34.5	65.5	826
Other	4.2	40.6	59.4	440
Caste/tribe***				
Scheduled caste	20.5	40.1	59.9	1898
Scheduled tribe	5.5	52.9	47.1	485
Other backward classes	36.1	46.6	53.4	3353
Other	36.3	44.2	55.8	3866
No caste/tribe	1.6	34.6	65.4	167
Family composition***				
Living with spouse	16.2	50.0	50.0	1468
Living with spouse and others	77.7	43.5	56.5	7770
Living alone	6.1	42.9	57.1	612
Occupation***				
Not working/household work	36.4	42.1	57.9	3586
Skilled	4.1	58.4	41.6	571
Semi-skilled	24.7	51.9	48.1	2412
Unskilled	34.8	40.1	59.9	3237
Annual income in US$***				
≤370 US$	30.2	38.0	62.0	2691
>370 US$	26.5	57.0	43.0	2897
No income	43.3	41.4	58.6	4264
Number of chronic diseases***				
None	35.5	59.2	40.8	3495
One	32.1	44.7	55.3	3165
Two	18.3	35.1	64.9	1805

Table 1 (continued)

Background characteristics	Percentage of respondents	Self-assessment of health		*n*
		Good health	Poor health	
More than two	14.1	20.4	79.6	1387
Functional status***				
Ability to perform all ADLs	92.5	46.9	53.1	9114
Difficulty with 1 or 2 ADLs	3.9	19.7	80.3	387
Difficulty with 3 or more ADLs	3.6	9.7	90.3	351
Acute disease in last 15 days***				
Not sick	86.8	47.3	52.7	8625
Started earlier than or within last 15 days and continuing	7.1	22.5	77.5	674
Started earlier than or within last 15 days and over	6.1	30.0	70.0	553
Routine medical check-ups***				
No check-ups	77.1	48.3	51.7	7487
Yearly/half-yearly	5.1	33.3	66.7	511
Monthly	13.8	34.8	65.3	1458
Within past two weeks	4.1	19.4	80.6	396
Smoking*				
Smoked in past month	10.9	44.0	56.0	977
Smoked, but not in past month	4.4	38.3	61.7	416
Never smoked	84.8	44.9	55.1	8459
Alcohol consumption***				
Consumed in past month	3.9	53.7	46.3	393
Consumed, but not in past month	3.6	40.8	59.2	353
Never consumed	92.5	44.3	55.7	9106
Chewing tobacco***				
Chewed in past month	18.6	46.0	54.0	1774
Chewed, but not in past month	3.1	26.0	74.0	270
Never chewed	78.4	44.9	55.1	7808
Total	100.0	44.5	55.5	9852

ADL Activity of daily living

*$p < 0.01$, ***$p < 0.1$

higher proportion of females (59%) than males (52%) reported poor health. Fifty-seven percent in rural areas considered their health to be poor compared with 51% of those in urban areas. Sixty-one percent of those with no education classified their health as poor as against 41% of those who had 10 and more years of schooling. A higher proportion of the never married/divorced/separated (68%) reported poor health followed by the widowed (61%) and currently married (52%). A higher proportion of Muslims (67%) reported poor health compared with Hindus (53%). Self-rated poor health was significantly higher among those living alone (57%) compared to those living with a spouse (50%). A higher percentage of those engaged in unskilled work (60%) self-rated poor health compared to those engaged in skilled work (42%). A significantly lower proportion with an annual income more than 370 US$ (43%) reported poor health compared to those with an annual income less than 370 US$ (62%). Eighty percent with more than two chronic diseases reported poor health compared with 41% of those without any chronic disease. The percentage of those who reported poor health was significantly higher among those facing difficulties in performing 3 or more ADLs (90%), compared to those who were able to carry out all ADLs (53%). Poor self-rated health was higher among the elderly who were sick from acute disease at the time of the survey or during the last 15 days prior to the survey (78%) compared to those who were not or had not been sick (53%). A higher percentage of those who had received routine medical check-ups within the past two weeks prior to the survey (81%) rated their health as poor compared to those who had not received any routine medical check-ups in the past year (52%). Sixty-two percent of those who had ever smoked, but not in the last month, reported poor health as against 55% for

those who had never smoked. A higher percentage (59%) of those who had ever consumed alcohol, but not in the last month, reported poor health as compared to those who were currently consuming alcohol (46%). About three-fifths (74%) of those who had ever chewed tobacco, but not in the last month, reported poor health compared with those who had never chewed tobacco (55%).

Table 2 presents the results of the logistic regression estimate to examine the association between selected socio-economic and demographic variables, chronic and acute diseases, functional status, routine medical check-ups and personal risk factors, and self-rated health. Three models were used for the analysis. The first model contained the socio-economic and demographic variables. In the second model, the variables chronic and acute diseases, functional limitations, and routine medical check-ups were added. In the third model, the variables smoking, alcohol consumption, and chewing tobacco were added. Almost all variables except gender and family composition were significant in models 1, 2, and 3. The reduction of the odds ratios in most of the variables, however, indicated that variables such as chronic disease and functional status were the most important predictors of self-rated health. Our analyses found that the elderly aged 80 years and above were twice as likely and those aged 70–79 years were 1.5 times more likely to assess themselves as having poor health than those aged 60–69 years. Those who had up to 5 years of schooling (OR = 1.48) and no schooling at all (OR = 1.61) were more likely to report poor health than those with more than 10 years of schooling. The likelihood of reporting poor health was significantly higher among the never married/divorced/separated (OR = 1.48) compared to the currently married elderly. Those who belonged to Islam, Sikhism and other religions were 1.7, 1.6, and 1.2 times, respectively, more likely to report poor health compared to followers of Hinduism. Those engaged in unskilled work were more likely to assess their health as poor (OR = 1.23) compared to those who were not working or engaged in household work. The likelihood of poor self-rated health was significantly lower among those with an annual income up to 370 US$ (OR = 0.90) compared to those with an annual income of more than 370 US$.

The elderly who had one, two, or more chronic diseases were 1.45, 2.03, and 3.88 times, respectively, more likely to report themselves as having poor health compared to those without any chronic diseases. Those who had difficulties in performing 3 or more ADLs were 3.8 times more likely to assess themselves as having poor health compared to those who did not have such difficulties. Those who were currently sick or had been sick at some time during the 15 days prior to the survey were more likely to report poor health (OR = 1.84) than those without any sickness during that period. Those who had undergone fortnightly or weekly, monthly, and yearly or half-yearly routine medical check-ups in the past year were 2.28, 1.23, and 1.66 times, respectively, more likely to assess themselves as being in poor health compared to those who never went for routine check-ups. Those who had ever smoked, but not during the past month of the survey, were 1.23 times more likely to report poor health than those who had smoked during the past month of the survey. On the other hand, those who had ever consumed alcohol, but not during the past month of the survey, were 0.79 times less likely to assess themselves as having poor health compared to those who consumed alcohol during the past month of the survey. Those who had never chewed tobacco were 1.39 times more likely to assess themselves as being in poor health compared to those who had chewed tobacco in the past month.

Discussion

Our study found chronic and acute disease, functional limitation and routine medical check-ups to be significant correlates of the self-rated poor health of the elderly in India. The adjusted odds ratio of chronic disease, functional status, and routine medical check-ups remained significant and almost unchanged in the various models, including socio-demographic characteristics and personal habits of the elderly. We found the number of chronic diseases and functional limitations to be the principal determinants of self-rated poor health; this finding conforms with many past studies (Arokiasamy and Jain 2015; Harrington et al. 2010). Routine medical check-ups emerged as a significant determinant of self-rated poor health; the adjusted odds ratio was comparatively higher among those who had gone fortnightly for routine medical check-ups in the past year. Also, a previous study that analyzed the frequency of medical consultations found that a higher percentage of subjects making use of health services infrequently, i.e., with no medical check-ups or a maximum of two consultations per year, evaluated their health as good compared to study subjects with more than 10 consultations during the previous 12 months (Pandey and Ladusingh 2015). We also found that age, locality, education status, marital status, religion, caste/tribe, occupation and annual income had significant effects on self-rated poor health. Increasing age has been found to have a linear association with self-rated poor health, as supported by other studies conducted among the elderly in India, as well as in Thailand and Australia (Jylhä 2009; Pandey and Ladusingh 2015; Sibthorpe et al. 2001). Also, age is a universal phenomenon for predicting self-assessed poor health among the elderly (Jylhä 2009), because ageing causes more chronic disease, difficulties in physical mobility and in the inability to carry out basic ADLs independently (Sibthorpe et al. 2001).

The findings revealed that the elderly who resided in urban areas were less likely to have self-rated poor health, probably due to an advantageous position regarding the availability and accessibility of health services. This conforms with another study conducted among older adults in India (Pandey and

Table 2 Adjusted odds ratio (OR) of self-rated poor health status among the elderly according to background characteristics, India, 2011

Background characteristics	Odds ratio		
	Model 1	Model 2	Model 3
Age group (ref: 60–69)			
70–79	1.57***	1.33***	1.32***
80+	2.12***	1.45***	1.44***
Gender (ref: male)			
Female	0.98	0.89	0.90
Locality (ref: rural)			
Urban	0.85***	0.88***	0.88**
Schooling (ref: 10+ years)			
6–10 years	1.15	1.25**	1.24**
Up to 5 years	1.48***	1.57***	1.57***
No schooling	1.61***	1.87***	1.88***
Marital status (ref: currently married)			
Widowed	1.09*	1.06	1.06
Never married/divorced/separated	1.48***	1.52**	1.53***
Religion (ref: Hinduism)			
Islam	1.71***	1.34***	1.30***
Sikhism	1.60***	1.39***	1.43***
Other	1.24**	1.02	1.02
Caste/tribe (ref: other)			
Scheduled caste	1.07	1.12*	1.13*
Scheduled tribe	0.64***	0.76***	0.77**
Other backward classes	0.91*	0.97	0.97
No caste/tribe	1.07	1.30	1.33
Family composition (ref: living with spouse)			
Living with spouse and others	1.13**	1.06	1.06
Living alone	1.01	1.08	1.08
Occupation (ref: not working/household work)			
Skilled	1.10	0.96	0.97
Semi-skilled	0.98	0.94	0.94
Unskilled	1.23***	1.21***	1.20***
Annual income in US$ (ref: ≤370)			
>370	0.56***	0.57***	0.58***
No income	0.90*	0.87**	0.87***
Number of chronic diseases (ref: none)			
One		1.45***	1.44***
Two		2.03***	2.02***
More than two		3.88***	3.82***
Functional status (ref: ability to perform allADLs)			
Difficulty with 1 or 2 ADLs		2.31***	2.30***
Difficulty with 3 or more ADLs		3.80***	3.79***
Acute disease in last 15 days (ref: not sick)			
Started earlier than or within last 15 days and continuing		1.84***	1.82***
Started earlier than or within last 15 days and over		1.43***	1.43***
Routine medical check-ups (ref: no check-ups)			
Yearly/half yearly		1.66***	1.67***
Monthly		1.23***	1.23***
Within past two weeks		2.28***	2.28***

Table 2 (continued)

Background characteristics	Odds ratio		
	Model 1	Model 2	Model 3
Smoking (ref: smoked in past month)			
Smoked, but not in past month			1.23**
Never smoked			1.23
Alcohol consumption (ref: consumed in past month)			
Consumed, but not in past month			0.79**
Never consumed			0.78
Chewing tobacco (ref: yes in past month)			
Chewed, but not in past month			0.95
Never chewed			1.39**

ADL Activity of daily living

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Ladusingh 2015). We found that those who had 10+ years of schooling were less likely to report poor health, which is in agreement with past studies among Indian and Thai elderly (Bakshi and Pathak 2010; Haseen et al. 2010; Subramanian et al. 2009). One possible reason is that the educated elderly are more aware of diseases, their consequences, and the utilization of health services compared to the less educated or illiterate elderly (Damian et al. 1999). We also found that the never married/divorced/separated were more likely to report poor health compared to currently married elderly. This finding matches a previous study conducted among elderly in south India (Sudha et al. 2006). The married elderly can help and care for each other and are able to influence health outcomes by mutually enabling access to health care, by the ability to fulfill basic needs and by supporting participation in society.

Elderly Muslims and elderly from the scheduled castes and tribes had a comparatively higher rate of self-rated poor health. In the Indian social strata, Muslims and members of scheduled castes and tribes are generally in a relatively disadvantageous position regarding education and economic status. Past studies have indicated that the higher self-rated poor health of scheduled tribes could be due to lower expectations and the acceptance of a lower actual health status (Sen 1993, 1999). We found that the elderly who lived alone, or with spouse and others, were more likely to report poor health compared to those who were living with just their spouse. In the case of those living alone, this might be because these people have low social participation and lack social and emotional support within the family (Victor and Scharf 2005). In contrast to many past studies (Agrawal and Arokiasamy 2010; Bora and Saikia 2015; Hirve et al. 2012; Rahman and Liu 2000; Singh et al. 2013), we did not find gender to be a significant predictor for self-rated poor health.

The strengths of this study are that it provides an update on self-rated health status and its correlates among the elderly in India. It identified multiple indicators of self-rated health and the findings are of importance for on-going and prospective programs and policies for addressing issues affecting the elderly. The cross-sectional nature of the data, however, limits the scope for ascribing causality to any of the associated factors. There may be other factors influencing self-rated poor health, such as psychological phenomena, which we were unable to consider due to the unavailability of data. The use of income has an inherent weakness as a measure of socio-economic status since income is often self-reported, and as such individuals may be biased in the hope of receiving financial assistance.

Conclusion

This study examined the self-rated health status of an elderly population in India and found a sizeable number of them reporting poor health. There is an extensive disparity in self-rated poor health by socio-economic and demographic characteristics. Chronic disease, functional limitations, and routine medical check-ups were strong predictors of self-rated health. Given the considerable proportion of poor self-rated health among the elderly and the increasing size of the ageing population, this study indicates the need to strengthen health care services and social security programs for older generations. In general, improving the health of the elderly will reduce government spending on health care needs in future. Bearing in mind the identified risk factors, national policy and programs targeting elderly welfare should consider these issues in order to improve the overall well-being of the elderly. It is hoped that this study will pave the way for future explore studies to further the inexhaustible factors that hamper achieving health for the elderly in India using different research approaches. Moreover, in a country without a social security system and lacking affordable health care for the elderly, an integrated

approach is needed to research inequalities in health, as well as to examine social and health policies addressing the elderly.

Authors' contributions SK contributed to planning the study, carried out the statistical analysis and drafted the manuscript. MRP reviewed the manuscript. Both authors read and approved the final manuscript.

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Compliance with ethical standards

Ethical considerations This article is based on the secondary analysis of data which is available to all on demand for research purposes. Hence no compliance with ethical standards was required.

Consent for publication Not applicable.

Competing interests The authors declare that they have no conflict of interest.

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