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Social gradients in self-reported health and well-being among adults aged 50 and over in Pune District, India

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Background: India's older population is projected to increase up to 96 million by 2011 with older people accounting for 18% of its population by 2051. The Study on Global Ageing and Adult Health aims to improve empirical understanding of health and well-being of older adults in developing countries.

Objectives: To examine age and socio-economic changes on a range of key domains in self-reported health and well-being amongst older adults.

Design: A cross-sectional survey of 5,430 adults aged 50 and over using a shortened version of the SAGE questionnaire to assess self-reported assessments (scales of 1–5) of performance, function, disability, quality of life and well-being. Self-reported responses were calibrated using anchoring vignettes in eight key domains of mobility, self-care, pain, cognition, interpersonal relationships, sleep/energy, affect, and vision. WHO Disability Assessment Schedule Index and WHO health scores were calculated to examine for associations with socio-demographic variables.

Results: Disability in all domains increased with increasing age and decreasing levels of education. Females and the oldest old without a living spouse reported poorer health status and greater disability across all domains. Performance and functionality self-reports were similar across all SES quintiles. Self-reports on quality of life were not significantly influenced by socio-demographic variables.

Discussion: The study provides standardised and comparable self-rated health data using anchoring vignettes in an older population. Though expectations of good health, function and performance decrease with age, self-reports of disability severity significantly increased with age, more so if female, if uneducated and living without a spouse. However, the presence or absence of spouse did not significantly alter quality of life self-reports, suggesting a possible protective effect provided by traditional joint family structures in India, where older people are social if not financial assets for their children.

Keywords: *ageing*; *self-reported health*; *well-being*; *quality of life*; *INDEPTH WHO-SAGE*

Access the supplementary material to this article: INDEPTH WHO-SAGE questionnaire (including variants of vignettes), a data dictionary and a password-protected dataset (see **Supplementary files** under **Reading Tools** online). To obtain a password for the dataset, please send a request with 'SAGE data' as its subject, detailing how you propose to use the data, to global.health@epiph.umu.se

India's population is rapidly moving towards an older age structure consequent on declining mortality and high fertility in the twentieth century, followed by a rapid decline in fertility and access to better health care in recent times as successively larger cohorts step into old age. The 2001 Census accounts for 7.5% of the population being aged 60 years and over i.e. more than 76 million, a sharp increase from 25 million (5.63%) in 1961; 33 million (6%) in 1971; 43 million (6.49%) in 1981; and 57 million (6.76%) in 1991 (1). Life expectancy at birth

has likewise increased from 50.5 in 1971 to 60.8 years for males (49 to 62.5 years for females) in 2001. Kerala and Maharashtra amongst others have taken the lead in ushering in this demographic transition in India (2). This demographic evolution seen in recent decades has major consequences on the economy, disease burden facing society and important implications for governmental health, economic and social policies such as health care for the elderly, retirement benefits, old age homes, food and personal security, economic growth, etc. Elderly women face a double burden – not only because of their advancing age and the prevailing societal gender differential, but also because they survive without their life partners (approximately 50% widows amongst elderly women compared to 15% widowers amongst elderly men).

India's older population is projected to increase to 96 million (8.2%) by the next census in 2011, with older people accounting for approximately 18% of its population by 2051. This calls for a shift from demographically based programmes and policies to economically oriented policies and programmes which would take care of the economic, health and social security and quality of life concerns of older people, so that they can lead a dignified life in their closing years without adding to the millions below the poverty line (3).

The Madrid International Plan of Action on Aging 2002 prioritises Advancing Health and Well-being into old age as a central theme. There is not enough evidence to say whether longer life expectancy is accompanied by improved health or simply more years of poor health – especially in the context of changing familial norms towards small families and altered social and personal support systems (4).

Of the different patterns of living among older people such as living with a spouse, or with children or in old age homes, living alone or with a spouse tends to be most stable for those aged 65 years and over, whereas living with a child or grandchild is the most stable living arrangement for the oldest old (5). Financial dependence has increased, leisure time and social cohesion have decreased, and life styles have changed for older people with a gradual breakdown of the traditional joint family system (6–8).

Ageing research in India has focused mostly on disease states and risk factors. Evidence on elderly health, physical performance and disability is limited to understanding the psycho-social or socio-behavioural risk factors (9–13). There is a shift from the traditional assessment of health based on risk factors, mortality and utilisation of health care services to an assessment that focuses on functioning and disability in multiple health and related domains of daily life (14). Self-rated health (SRH) has often been used in large survey settings to rapidly assess health status, and has been shown to be

related to impending morbidity and mortality. However, health valuation is multi-faceted and influenced not only by disease experience and disease perception but also by health expectations which in turn are influenced by the socio-cultural context of the individual (15). Consequently, there arises a need to standardise the ways in which individuals report their health status, as people from varying socio-cultural backgrounds may rate their health differently. As self-assessments of health play an increasing role in measurement of health outcomes, an approach using 'anchoring vignettes' can improve the utility of SRH by addressing issues of comparability amongst individuals and populations.

The Study on Global Ageing and Adult Health (SAGE) aims to improve the empirical understanding of health and well-being of older adults, and ageing, in developing countries. This paper explores the socio-demographic gradients of older people's health with a focus on physical performance and function, using the short SAGE version implemented at the Vadu, India, Health and Demographic Surveillance System (HDSS).

Methods

Study area and study sample
The SAGE is designed as a longitudinal data platform in six countries including India, based on methodological advances created by the WHO's World Health Survey programme (16). The shortened version of SAGE has been implemented by the INDEPTH Network in eight of its member DSS sites (Agincourt in South Africa, Ifakara in Tanzania, Nairobi in Kenya, Navrongo in Ghana, Filabavi in Viet Nam, Matlab in Bangladesh, Purworejo in Indonesia and Vadu in India), each site having an initial enrolment target of 5,000 adults (except the urban slum-based site of Nairobi with a target of 2,000) aged 50 and over. Of these, Agincourt, Navrongo and Vadu implemented both the shorter and longer version to complement the national SAGE implementation in their respective countries. The Vadu HDSS monitors demographic trends in its population of some 80,000 people spread over 22 villages in Pune district in Maharashtra, India. The SAGE short version was administered in 2007 by trained graduate field-based researchers, to a randomly selected sample of 6,000 individuals aged 50 and over.

SAGE tool
The SAGE tool has been adapted from the WHO's World Health Survey implemented in 70 countries, from 16 other cross-sectional and longitudinal studies on ageing including the US Health and Retirement Study and English Longitudinal Study on Ageing, and cognitive testing of the draft tool in South Africa and Viet Nam in

2004. The resulting SAGE tool was piloted in India, Ghana and Tanzania in 2005.

The long SAGE tool comprises three main questionnaires: household, individual and proxy (http://www.who.int/healthinfo/systems/sage/en/index1.html). The household questionnaire includes the household roster, and details of housing, family support networks and transfers, household assets and income and household expenditure. The individual questionnaire includes socio-demographic characteristics, and information on work history and benefits, health state descriptions, anthropometry, physical and cognitive performance tests and biomarkers, risk factors and preventive health behaviours, chronic conditions and health service coverage, health care utilisation, social cohesion, subjective well-being and quality of life, and impact of care giving on older people. The proxy questionnaire was for a proxy respondent if the interviewer felt that the subject selected did not possess the cognitive ability to complete the individual questionnaire.

The shortened version of the SAGE instrument, used for this study, includes only the salient two to four self-assessment ratings per domain from the longer SAGE tool, and covers eight different health domains of mobility, self-care, pain and discomfort, cognition, participation in interpersonal activities, sleep/energy, affect and vision. The shortened version comprises three main sections – the first section is a self-assessment of health state descriptions, function and disability in these eight domains supplemented by summary self-assessment ratings of overall health and function. The second section is a self-assessment of overall subjective well-being and quality of life. The third section includes four sets of 20 vignettes each, applied in rotation to different respondents. Each vignette set covers two of the eight health domains; with five vignettes for each domain question.

For each self-assessment question, the respondent is asked to rate his/her own health, function and disability on a 5-point categorical scale (1 to 5) where the score 1 denotes the best health (categories range from very good to very bad) or least difficulty in a function or the least disability (categories range from none to extreme difficulty or cannot do). The SRH measurement is supplemented by age, sex, education, socio-economic status quintiles, and marital status information collected on all individuals every 6 months as part of routine demographic surveillance in the Vadu HDSS site.

The anchoring vignette serves to describe a concrete level in a given health domain that the respondent evaluates using the same question and response categories used for self-assessment on that domain. The vignettes are 'fixed' across all respondents so that any variation in self-assessment can be attributed to differences in response category cut-points that reflect the respondent's

expectations for health – in the same way that the self-ratings do for the respondent's own levels of health (17).

The average score for each health domain for each respondent was calculated. As an example, if the respondent had mild difficulty in washing/bathing or dressing (score of 2) and no difficulty in taking care of or maintaining general appearance (score of 1) and mild difficulty in staying by himself for a few days (score of 2), then the average score for the respondent for the self-care domain was calculated as 1.67. Though the self-assessment ratings were categorical, the summary score average becomes a continuous variable with a narrow range from 1 to 5. As a result, most of these average scores did not have normal distributions and hence the average summary score was re-coded as categorical (1 to 5) with cut points 0–1, 1.1–2, 2.1–3, 3.1–4 and 4.1–5.

A mean WHO Quality of Life score was calculated based on eight self-assessment ratings addressing satisfaction with various health domains. The mean WHO-QoL score ranges from 1 to 5 (where 5 indicates poor satisfaction with quality of life) and this was transformed into a 0 to 100 scale, in which a higher score indicates a higher quality of life.

A WHO Disability Assessment Schedule (WHODAS) index was calculated based on standard weights applied to 12 self-assessment ratings of limitations of function in various health domains. The index ranges from 0 to 100 (where 100 indicates extreme disability), and was then inverted into a score designated WHODASi, with a range from 0 to 100 in which a higher score indicated a higher functional ability.

Health status scores were derived using Item Response Theory (IRT) parameter estimates in Winsteps, a Rasch measurement software. IRT uses Maximum Likelihood Estimation (MLE) which combines the pattern of responses as well as the characteristics of each specific item for the multiple health questions (each with multiple response categories) to produce the final health scores (18).The health status score was then transformed to a scale of 0 to 100, with higher scores representing better health status.

These three 0 to 100 scores thus represent different aspects of self-reported health, but all follow a 0 to 100 scale in which higher scores represent better outcomes.

The distribution of self-reported responses to each of the health domains was compared across age groups, sex, marital status, socio-economic status quintiles and educational levels for significant differences between the lowest and highest categories of the function and performance-rating variables (Kolmogorov Smirnov equality of distribution test).

Results

We analysed data on 5,430 individuals aged 50 and over, with adequate cognitive ability to complete the survey,

Table 1. Socio-demographic profile of 5,475 adults aged 50 and over in Vadu, India

	Males (*n* = 2,850)	Females (*n* = 2,625)	Test of significance
	51.6%	48.4%	NS
Mean age (SD) years	63.1 (8.9)	62.5 (8.9)	NS
Age group (years)			
50–59 (%)	39.5	39.7	NS
60–69 (%)	36.1	38.9	
70–79 (%)	19.1	16.5	
80 and over	5.1	4.8	
Education			$\chi^2 = 632.8$
No formal education (%)	36.9	8.1	$p < 0.001$
≤ 6 years (%)	55.6	79.6	
> 6 years (%)	7.5	12.2	
Marital status			
Now single (%)	9.5	35	$p < 0.001$
Socio-economic status			
Poorest quintile (%)	10.5	12.7	NS
Second quintile (%)	15.6	15.1	
Third quintile (%)	21.2	22.7	
Fourth quintile (%)	22.3	19.7	
Least poor quintile (%)	30.2	29.6	
Mean number of household members (SD)	6.9 (3.5)	6.8 (3.6)	NS
Mean number of people aged 50 years and over in household (SD)	1.77 (0.78)	1.77 (0.78)	NS

and who could be linked to the DSS database. Table 1 gives the socio-demographic profile of subjects. As expected, older women were significantly less educated than younger ones. A significantly higher proportion of older women were widows (35%) compared to older men as widowers (9.5%). There was no significant sex differential for any other socio-demographic variable.

Fig. 1 shows an example comparing self-ratings with anchored vignettes (ordered in increasing levels of difficulty) for two mobility questions. There was good response consistency in ratings of the five vignettes used for describing different levels of difficulty in mobility for both the mobility questions, thus validating the use of anchoring vignettes for comparison of self-ratings of mobility between individuals. The average self-rating of mobility by older adults aged 50 and over lay somewhere between the level of mobility described by vignette 1 ('xxx has no problems with walking, running or using her hands, arms and legs. S/he jogs 4 kms twice a week') and 2 ('XXX is able to walk distances of up to 200 metres without any problems but feels tired after walking 1 km or climbing up more than one flight of stairs. S/he has no problem with day-to-day physical activities such as carrying food from the market').
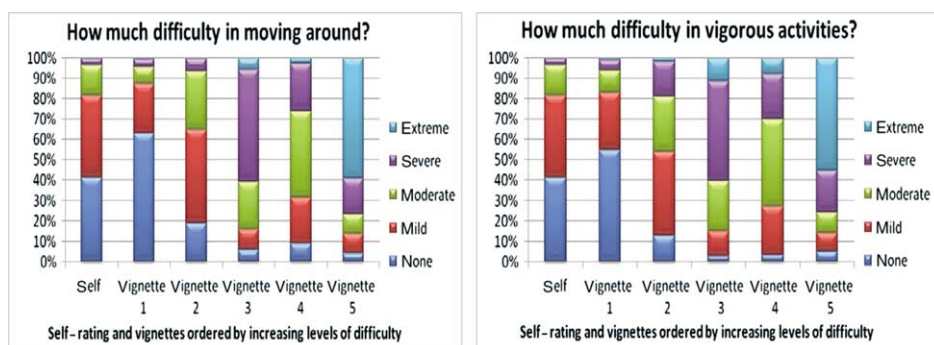
Fig. 1. Self-assessments and vignette ratings for two mobility questions among 5,475 adults aged 50 and over in Vadu, India.
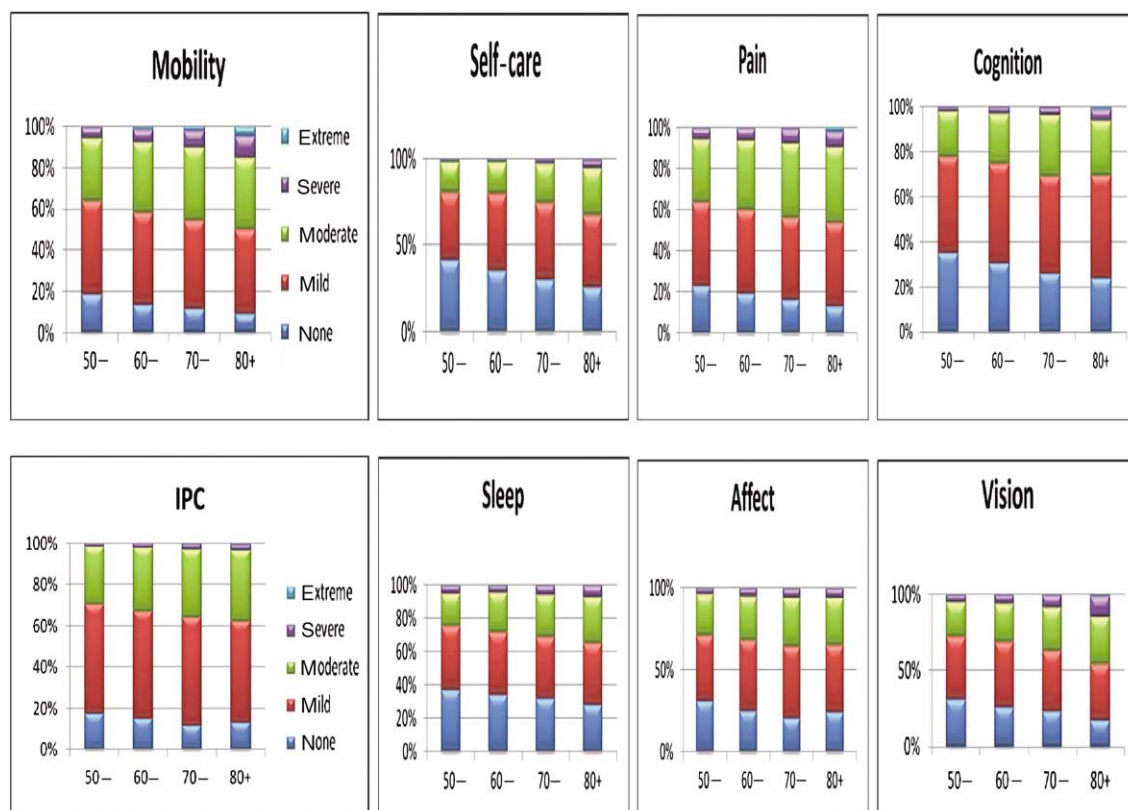
Fig. 2. Age differentials in self-ratings in different health domains among 5,475 adults aged 50 and over in Vadu, India.

As age increased, self-ratings of difficulty with mobility increased significantly (Fig. 2). Increasing difficulty in ratings for self-care, pain, cognition, sleep and vision were also seen as age increased. However, there was no statistically significant change in participation in inter-personal activities or affect with increasing age.

Older males rated higher levels of difficulty in performing functions and tasks in all health domains compared to older females. Similar statistically significant trends were seen for older men or women who had lost their spouse compared to their married contemporaries (Fig. 3), with the single elderly female widow rating the most difficulty in performing tasks in any of the health domains.

Education was directly related to function in all health domains. At lower educational levels, the self-ratings for difficulty in performing functions in all health domains were higher (Fig. 4). Self-ratings of function and disability were similar across all quintiles of socio-economic status.

Table 2 shows that males self-reported significantly less disability, and significantly better overall health than their female contemporaries. However, there was no significant difference in self-reported quality of life across age groups and sex.

Multivariate analysis showed that males self-reported better health status compared to females; self-reports of poorer health status increased as people became older;

older people without any formal education were signifi-cantly more likely (70%) to self-rate their health status as poor compared to their more educated contemporaries; and older people without a spouse were marginally more likely to rate poor health status compared to those living with their spouse (Table 3). Socio-economic status did not appear to influence self-reports of health.

Self-reported quality of life was not significantly influenced by age, sex or education. The elderly popula-tion belonging to the lowest SES quintiles, as well those without a living spouse, rate poorer quality of life than their better off counterparts and those with a living spouse

Discussion

The 20th century challenged us with population growth – the 21st century challenge is to cope with ageing. India is home to one of the world's largest populations which is ageing rapidly. It is projected that by 2030 about 45% of the health burden in India, largely due to non-communicable diseases, will be borne by the older adults (19). To cope with an ageing India, policy makers need to be informed with evidence on interrelated domains including work and retirement benefits, private wealth and income security, the implications of family and societal level transfer systems, health and well-being of the ageing population. As populations age, the social and economic demands on
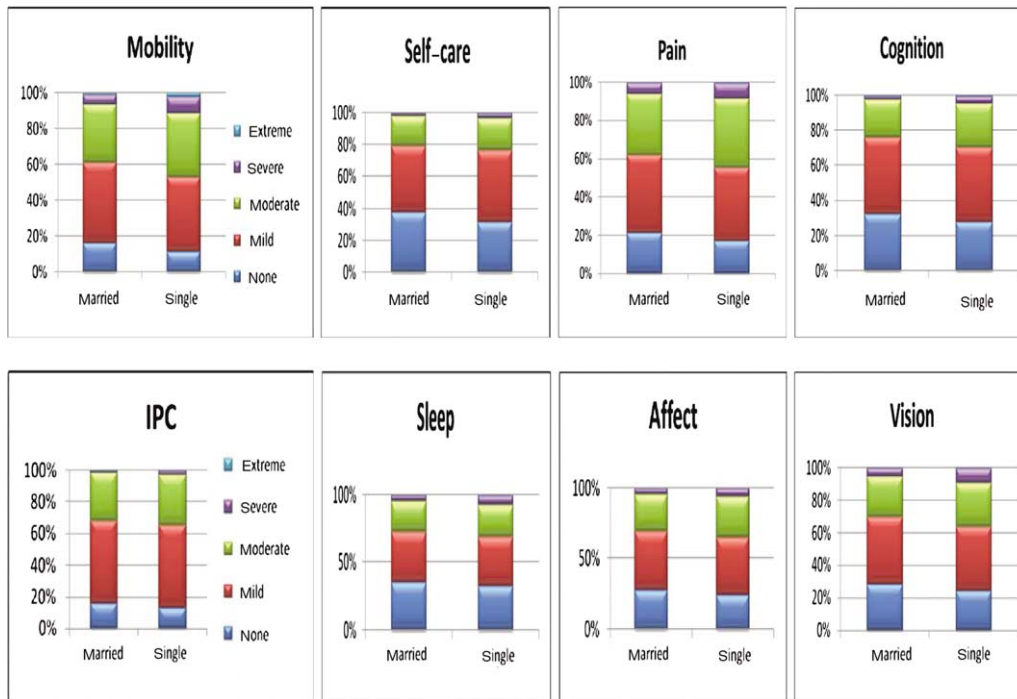
Fig. 3. Differentials in self-ratings of health domains by marital status among 5,475 adults aged 50 and over in Vadu, India.
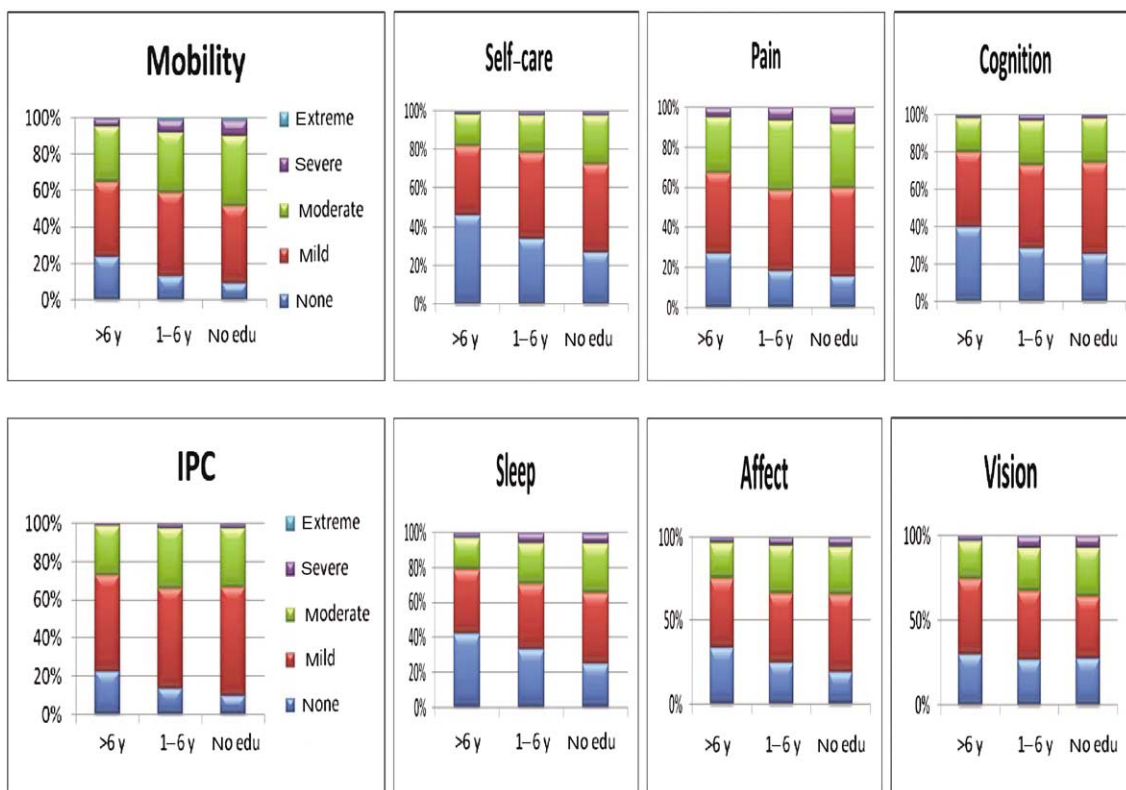

Fig. 4. Differentials in self-ratings of health domains by education level among 5,475 adults aged 50 and over in Vadu, India.

Table 2. Age and sex differentials in health, disability and quality of life outcomes for 5,475 adults aged 50 and over in Vadu, India

	Males (n =2,850)	Females (n =2,625)	p-value
Mean WHODASi score (SD)			
50–59 years	80.0 (13.1)	77.4 (13.4)	<0.001
60–69 years	78.3 (13.8)	75.4 (13.5)	<0.001
70–79 years	75.4 (14.0)	72.9 (14.1)	0.006
80 years and over	74.9 (15.2)	70.0 (17.7)	0.01
Mean health status score (SD)			
50–59 years	69.8 (11.2)	67.3 (9.7)	<0.001
60–69 years	67.8 (9.8)	66.0 (8.7)	<0.001
70–79 years	65.9 (9.0)	64.6 (8.5)	0.025
80 years and over	65.9 (9.8)	62.6 (8.9)	0.003
Mean WHOQoL score (SD)			
50–59 years	75.3 (4.5)	74.8 (4.5)	0.02
60–69 years	74.8 (4.7)	74.5 (4.5)	0.09
70–79 years	74.1 (5.0)	74.1 (5.2)	NS
80 years and over	74.7 (5.4)	73.3 (6.1)	0.049

Table 3. Factors associated with self-rated poor health and quality of life[a] for 5,475 adults aged 50 and over in Vadu, India

	Poor quality of life OR (95% CI)	Poor health OR (95% CI)
Sex		
Males	1.07 (0.93–1.22)	0.73 (0.64–0.83)
Females	1	1
Age		
50–59 years	1	1
60–69 years	1.01 (0.87–1.17)	1.18 (1.03–1.35)
70–79 years	1.13 (0.95–1.36)	1.53 (1.29–1.83)
80 years and over	1.05 (0.78–1.41)	1.78 (1.32–2.39)
Education		
No formal education	1.04 (0.77–1.44)	1.7 (1.27–2.26)
≤6 years	1.22 (1.03–1.44)	1.39 (1.19–1.63)
>6 years	1	1
Marital status		
Now single	1.19 (1.01–1.41)	1.05 (0.89–1.24)
Currently in partnership	1	1
Socio-economic status		
First quintile	1.56 (1.25–1.95)	1.05 (0.85–1.31)
Second quintile	1.41 (1.16–1.71)	1.36 (1.12–1.64)
Third quintile	1.18 (0.99–1.41)	1.10 (0.93–1.30)
Fourth quintile	1.07 (0.9–1.28)	0.85 (0.72–1.01)
Fifth quintile	1	1

[a]Logistic model controlling for family size.

families, communities and nations will grow with implications for the formal and informal social and medical care systems (20). Well-being, a person's perceived level of satisfaction with his work, his marriage, his health and life as a whole, though hard to measure, continues to be a good measure of success of governmental programmes and policies.

The mobility domain vignette example introduced the concept of vignettes to anchor self-ratings of health in the mobility domain to a concrete level of function or disability. Vignettes have been used in the social sciences since the 1950s (21) and more recently in health and medicine (22, 23). The difference is that we use vignettes as scale anchors rather than as random variants of the same vignette. This means that a vignette describes the same level of function or health status to all respondents. Also, the vignette is anchored to the self-rating through the use of identical questions and response categories. The underlying assumption for anchoring vignettes is that of response consistency (i.e. a person evaluates a hypothetical level of health in the same way s/he would self-assess his/her own health) and vignette equivalence (i.e. the level described by a vignette is understood similarly by individuals independent of age, sex, education or any other characteristic). Hence, the primary purpose of anchoring vignettes linked to self-assessments is to detect and adjust for differences in response category cut-points so as to make categorical self-reports more comparable. This approach allows for studying differences in categorical cut-points between and within

populations across different socio-demographic groups, or within populations over time.

This paper underlines the importance of socio-demographic factors as predictors which influence SRH in various health domains. Despite lowered expectations of function and performance, the self-reports of disability significantly increased with age (biological influence) as well as environment (socio-cultural influence). The older woman, though with a longer life expectancy compared to her male contemporary, is disadvantaged on multiple fronts – due to her advancing age; due to societal norms of being a woman which limit her mobility and function; due to her being less educated, less empowered. This inability to perform and function and the consequent deleterious effect on health, are compounded if the older woman loses her spouse at an early age. The presence or absence of the spouse of an older person significantly altered self-reports on health and quality of life. The lack of significant associations between age, sex, education and quality of life, seen otherwise with health, needs further study to understand the linkages between health and quality of life in its various dimensions.

Late life outcomes are wide ranging. Old age experience is very different for those who are financially secure and educated than for those who are poor and uneducated; those who are healthy than those who are ill; and those who find themselves alone than those who are embedded in strong social networks. Understanding health, disability and well-being in later life has wide implications for informing policy as India matures demographically.

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