Health service use, out-of-pocket payments and catastrophic health expenditure among older people in India: The WHO Study on global AGEing and adult health (SAGE)

Ethel Mary Brinda,[1] Paul Kowal,[2,3] Jørn Attermann,[4] Ulrika Enemark[1]

[1]Section for Health Promotion and Health Services Research, Department of Public health, Aarhus University, Aarhus, Denmark
[2]Department of Health Statistics and Information Systems, World Health Organization, Geneva, Switzerland
[3]Research Centre for Gender, Health and Ageing, University of Newcastle, New South Wales, Australia
[4]Section of Epidemiology, Department of Public Health, Aarhus University, Aarhus, Denmark

Correspondence to
Dr Ethel Mary Brinda, Section for Health Promotion and Health Services Research, Department of Public Health, Aarhus University, Building 1260, Bartholins alle 2, 8000 Aarhus C, Denmark; ebam@soci.au.dk

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ABSTRACT

Background Healthcare financing through out-of-pocket payments and inequities in healthcare utilisation are common in low and middle income countries (LMICs). Given the dearth of pertinent studies on these issues among older people in LMICs, we investigated the determinants of health service use, out-of-pocket and catastrophic health expenditures among older people in one LMIC, India.

Methods We accessed data from a nationally representative, multistage sample of 2414 people aged 65 years and older from the WHO's Study on global Ageing and adult health in India. Sociodemographic characteristics, health profiles, health service utilisation and out-of-pocket health expenditure were assessed using standard instruments. Multivariate zero-inflated negative binomial regression models were used to evaluate the determinants of health service visits. Multivariate Heckman sample selection regression models were used to assess the determinants of out-of-pocket and catastrophic health expenditures.

Results Out-of-pocket health expenditures were higher among participants with disability and lower income. Diabetes, hypertension, chronic pulmonary disease, heart disease and tuberculosis increased the number of health visits and out-of-pocket health expenditures. The prevalence of catastrophic health expenditure among older people in India was 7% (95% CI 6% to 8%). Older men and individuals with chronic diseases were at higher risk of catastrophic health expenditure, while access to health insurance lowered the risk.

Conclusions Reducing out-of-pocket health expenditure among older people is an important public health issue, in which social as well as medical determinants should be prioritised. Enhanced public health sector performance and provision of publicly funded insurance may protect against catastrophic health expenses and healthcare inequities in India.

INTRODUCTION

The demographic and epidemiological transitions associated with population ageing present many new challenges for low and middle income countries (LMICs). Increased healthcare expenditures, chronic disease burden and absence of social security systems[1] have adverse consequences for the growing ageing populations and also the economies of LMICs.[2] Establishing health equity[3] in health systems by fair distribution of healthcare resources remains a considerable challenge in LMICs.[4] The influences of affordability and accessibility in determining health service use in LMICs[5] have placed their older populations at additional risk of poor health.[6] Studies have shown that as the need for out-of-pocket health expenditure on health services increases, there is a corresponding decrease in the use of such services in LMICs.[7 8] Inequities in access to health service, health payments and distribution of healthcare are important public health issues in Asia.[1 9] Healthcare financing through out-of-pocket payments results in catastrophic health expenditure and impoverishment in many Asian countries, with India prominent among them.[8 10]

India has the second largest number of older people aged over 65 years (70 million)[11] after China. However, the gross domestic product (GDP) spent on the health sector in India is only 3.7% compared to 11.9% of GDP spent in high-income countries. India also has a high share of private health expenditure, at 72% of total health expenditure, of which 86% is comprised of out-of-pocket health expenditure.[12] Lack of comprehensive insurance schemes,[13] higher levels of out-of-pocket payments in public health sectors[14] and increased choice of healthcare seeking in private health sectors affect healthcare equity in India.[1 15] Earlier LMIC studies reported healthcare evading behaviour among older people with disability and chronic disease.[16 17] Insufficient financial resources and lack of risk pooling mechanisms to protect against catastrophic health expenditures are barriers to accessing essential health services.[7 18] The relationship between disparities in observed demand and access to health service in LMICs are codified by the inverse care law, which states that vulnerable people[19] with greater healthcare needs receive the least healthcare. Theoretical understanding of the factors involved in healthcare use and expenditure is based on Andersen's behavioural model,[20] which invokes predisposing factors, enabling factors and need for healthcare components, as the major determinants of an individual's predisposition to utilise or spend on healthcare.[21 22]

Out-of-pocket payments among older people without financial protection increase the risk of catastrophic health expenditure.[10] The WHO defines health expenditure as catastrophic when it exceeds 40% of the effective income remaining after basic subsistence expenditure.[23] Recognising the population at risk of catastrophic health expenditure is important to provide targeted preventative health interventions and financial protective interventions through prepayment schemes.

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Moreover, exploring social and health indicators may facilitate targeted interventions and reduce modifiable disparities in healthcare use. However, the nature of healthcare utilisation and out-of-pocket and catastrophic health expenditure in the older population in India remains vaguely defined. We have previously defined chronic medical diseases, infectious diseases, illiteracy and poor sanitation as major determinants of out-of-pocket and catastrophic health expenditure among older individuals in a rural Indian community.[24] As prior studies have not investigated nationally representative samples,[7 24] we extend this study to a larger, nationally representative sample to investigate factors associated with health service utilisation, out-of-pocket and catastrophic health expenditures among older people in India.

MATERIALS AND METHODS

Study design

Cross-sectional data from the WHO Study on global AGEing and adult health (SAGE) India was used to evaluate the study objectives. SAGE India Wave 1 was implemented between April 2007 and June 2008. Individual response rate was over 85%.[25] The SAGE background, instruments and methodology are described in detail elsewhere.[25]

Study sample

The SAGE survey adopted a multistage, stratified random sampling design to generate a nationally representative sample of adults aged 50 years and older.[25] The states of India were classified into six regions, based on geographic location and level of development.[26] From the stratified urban or rural regions, 374 primary sampling units of towns or villages were selected, followed by systematic selection of 10 424 households as secondary sampling units and 12 198 participants aged above 18 years, as tertiary sampling units. In younger households, only one participant aged between 18 and 49 years was selected per household. In older households, all individuals aged above 50 years were invited to participate in the study. A total of 5048 adults aged between 18 and 49 years and 7150 individuals aged 50 years and older participated in the study. For this study, a subsample of 2414 older people aged 65 years and above was included.

Assessment

Individual data were obtained from the participants using face-to-face interviews after obtaining informed consent. Structured questionnaires were employed to obtain sociodemographic characteristics, insurance status, preventative health behaviours and anthropometric measurements. The questionnaires also included validated information on self-reported medical diagnoses of chronic diseases and tuberculosis with treatment history of 12 months prior to the study. The annual per capita household income was estimated from reported wages, earnings from trading and rental properties, as well as interest from savings. In addition, the questionnaires included information on health service utilisation over the previous 12 months. This included number of outpatient visits and inpatient stays at public or private hospitals, charity/voluntary healthcare facilities, and visits to traditional healers. Out-of-pocket health expenditure included healthcare provider's fees, medications, laboratory tests and transportation expenses.

The following standardised measures were used to assess different aspects of health: The *12-item World Health Organization Disability Assessment Scale 2* (WHODAS-2) was used to measure disability on a 1–5 Likert scale, spirometry tests were conducted to assess chronic pulmonary disease, a validated automated sphygmomanometer[27] was used for blood pressure assessments to diagnose hypertension and the *Rose questionnaire*[28] was used to assess the prevalence of angina pectoris. A recent validation study on the Rose questionnaire elicited moderate sensitivity of 53% but high specificity of 89% to detect coronary heart disease in Bangladesh.[29] The WHODAS-2 was validated earlier in India[30] and the total score was transformed to a scale of 0–100 using a WHO scoring algorithm.[31]

Variable specification

Based on Aday and Andersen's behavioural model,[20] we specified the intrinsic variables from the survey data for the theoretical construct of health service utilisation and out-of-pocket health expenditure determinants. The variables were classified as follows: (1) predisposing factors: age, sex and widowhood; (2) enabling factors: education, pension, per capita household income and insurance status and (3) need factors: various chronic and infectious diseases.

Statistical analyses

We initially analysed all variables using descriptive statistics. We analysed differences between socioeconomic characteristics and health service use as well out-of-pocket health expenditure using χ^2 and Mann-Whitney U tests for statistical significance. Our first outcome variable, number of health service visits over the 12 months prior to interview was a count outcome with overdispersion and excess zeroes. As such, a survey zero-inflated negative binomial regression model was employed to explore the factors associated with number of health service visits and specified co-variates, while accounting for the complex sample study design.

Our second outcome variable, out-of-pocket health expenditure was characterised by excess zeroes corresponding to individuals who reported no health expenditure in the past 12 months. Ordinary least square regression models are invalid to control for this potential sample selection.[32] The Heckman model includes a two-stage procedure, with a selection equation including the probability of attending a health service in the first stage. The second equation predicts the model's outcome variable. We employed a survey Heckman sample selection model to control for sample selection bias and complex sample design.

To calculate the final outcome variable, catastrophic health expenditure, we defined the capacity to pay as the net effective household income remaining after expenditure on essential goods and services.[18] We estimated the per capita capacity to pay by adjusting for the equivalent household size. We defined catastrophic health expenditure as occurring when the fraction of total out-of-pocket health expenditure exceeded 40% of per capita capacity to pay. We employed a survey Probit regression model with Heckman selection to account for those who made a health service visit and had increased probability of experiencing the outcome event. We used the *svy heckprob* command (STATA, V.12.1, College Station, Texas, USA) to explore the determinants of catastrophic health expenditure. We performed two multivariate regressions for each outcome variable. Model 1 adjusted the specified variables for only socioeconomic variables and the second model included socioeconomic variables and need factors. All statistical analyses were performed using STATA V.12.1 and SPSS V.21.

RESULTS

Participant characteristics

The sociodemographic characteristics and selected health outcome variables of the 2414 participants aged 65 years and older are presented in table 1. The median per capita annual

household income was US$109.8 (IQR=US$151.3). The mean body mass index was 20.6 (SD=14.8). The median WHODAS-2 scores among women and men were 27 (IQR=13) and 23 (IQR=13), respectively.

Health service utilisation and out-of-pocket health expenditure

In total, 1957 (81%) participants made at least one healthcare visit in the 12-month period preceding the interview, with a median number of two visits (IQR=3) per participant. About 271 (11%) older participants were hospitalised at least once within the past 12 months. The median out-of-pocket health expenditure in the previous 12 months was US$4.60 (IQR=US $19.10). Out-of-pocket health expenditure was significantly higher among those with pension support (median=US$6.30) compared to those without pension support (median=US$4.60) (Mann-Whitney U=374 386.5, z=−3.3, p=0.001). The highest mean out-of-pocket health expense categories were medications (US$10.10, SD=US$46.10), healthcare provider fees (US$4.10, SD=US$ 52.20), laboratory tests (US$2.90, SD=US$28.30) and transportation (US$1.10, SD=US$ 4.60).

Utilisation of private health services and related out-of-pocket health expenditure

The majority of healthcare visits were to private health centres (n=1450, 60%) followed by public health centres (n=493, 20%) and other health centres (n=14, 0.6%). The median out-of-pocket health expenditure in private health centres (US $11.80, IQR=US$32.90) was significantly higher than that in public or other health centres (US$1.00, IQR=US$0). Neither age (U=721 661.0, z=−0.3, p=0.8) nor sex (χ^2=0.03, p=0.9) of the participant was associated with use of private healthcare. Compared with public health service utilisation, there was a higher frequency of private healthcare use by participants with diabetes (68.9%, χ^2=4.3, p=0.04), hypertension (60.3%, χ^2=3.9, p=0.04) or arthritis (48.6%, χ^2=10.9, p<0.001).

Table 1 Sociodemographic and selected health characteristics of participants aged 65 years and older in India (n=2414), Study on global AGEing and adult health India Wave 1

Variables	N (%)
Sex	
Men	1319 (54.6)
Women	1095 (45.4)
Education status	
No formal education	1371 (56.8)
Primary education completed	624 (25.8)
Secondary education completed	327 (13.6)
Graduation/postgraduation completed	92 (3.8)
Past occupation as unskilled manual labourer	1401 (58.0)
Health insurance	96 (4.0)
Receives pension support	418 (17.3)
Has angina	161 (6.7)
Has diabetes mellitus	164 (6.8)
Has chronic lung disease	332 (13.8)
Has hypertension	416 (17.2)
Has history of stroke	71 (2.9)
History of tuberculosis within the past 1 year	37 (1.5)

Socioeconomic and health inequalities among older people

Women reported higher levels of disability (U=575 638.0, z=−8.5, p<0.001), yet made significantly fewer visits to healthcare services than men (U=687 172.5, z=−2.1, p=0.03). Moreover, women also had significantly lower rates of pension support (χ^2=127.7, p<0.001) and education (χ^2=348.2, p<0.001) than men. Annual per capita household income was significantly higher among former skilled labourers (U=665 901.0, z=−2.6, p=0.01), as well as those treated for diabetes (U=164 530.0, z=−2.3, p=0.02) and hypertension (U=380 181, z=−2.7, p=0.01). Disability was inversely correlated with per capita annual household income (Spearman's ρ=−0.12, p<0.001) and was positively correlated with out-of-pocket health expenditure (Spearman's ρ=+0.11, p<0.001). Out-of-pocket health expenditure was significantly higher (U=680 022.0, z=−2.6, p=0.01) in individuals who were in the top quartile of disability (WHODAS score >32) and also in the lower quartile of per capita annual household income (<US$64.1).

Correlates for health service visits and out-of-pocket health expenditure

Table 2 shows results of the multivariate analyses for the factors associated with the number of healthcare service visits. Model 1 shows that insurance support increased the probability of health service visits after the control for predisposing and enabling factors. Non-communicable and infectious diseases were both significantly associated with increased healthcare service visits among older people, in model 2.

The determinants of out-of-pocket health expenditure are shown in table 3. Predisposing factors such as female sex and lack of formal education had significant inverse associations with out-of-pocket health expenditures in bivariate analysis. In

Table 2 Factors associated with the number of health visits within the past 12 months among older people in India, Study on global AGEing and adult health India Wave 1

	Model 1*		Model 2†	
Explanatory variables	Adjusted IRR‡ (95% CI)	p Value	Adjusted IRR (95% CI)	p Value
Age in years	1.0 (0.9 to 1.1)	0.41	1.0 (0.9 to 1.1)	0.57
Women	1.1 (0.8 to 1.3)	0.61	1.1 (0.9 to 1.3)	0.50
No formal education	1.0 (0.7 to 1.2)	0.82	1.1 (0.8 to 1.4)	0.29
Widowed or separated	1.0 (0.8 to 1.2)	0.83	1.0 (0.8 to 1.2)	0.77
Receiving pension support	0.9 (0.6 to 1.3)	0.51	0.9 (0.7 to 1.3)	0.69
Health insurance	1.6 (1.1 to 2.4)	0.02	1.5 (0.9 to 2.2)	0.08
Annual per capita income	1.0 (0.9 to 1.0)	0.35	1.0 (0.9 to 1.1)	0.24
Angina	–		1.5 (1.1 to 2.1)	0.01
Chronic lung disease	–		1.4 (1.1 to 1.8)	0.01
Diabetes mellitus	–		1.7 (1.3 to 2.1)	<0.001
Hypertension	–		1.7 (1.4 to 2.0)	<0.001
Stroke	–		1.1 (0.8 to 1.6)	0.48
Tuberculosis§	–		1.8 (1.2 to 2.7)	0.002

*Model 1 adjusted for (predisposing and enabling factors) socioeconomic variables.†Model 2 adjusted for socioeconomic and need variables.
‡Multivariate survey zero-inflated negative binomial regression with total health service visits in the past 12 months as dependent variable.
§Diagnosed and treated with antituberculosis treatment within 1 year.
IRR, incident rate ratio.

Table 3 Factors associated with out-of-pocket health expenditures among older people in India, Study on global AGEing and adult health India Wave 1

Explanatory variables	Model 1* β‡ (95% CI)	p Value	Model 2† β (95% CI)	p Value
Age in years	−0.1 (−1.0 to 0.9)	0.91	−0.1 (−1.0 to 0.9)	0.91
Women	−15.2 (−28.1 to −2.4)	0.02	−13.9 (−26.7 to −1.30)	0.03
No formal education	−15.5 (−29.5 to −1.6)	0.03	−9.7 (−23.7 to 4.3)	0.17
Widowed or separated	−4.5 (−20.7 to 11.6)	0.58	−5.8 (−21.3 to 9.8)	0.47
Receiving pension support	25.1 (1.4 to 48.9)	0.03	19.7 (−1.4.1 to 40.9)	0.07
Health insurance	−3.2 (−30.8 to 24.4)	0.82	−6.3 (−36.5 to 23.9)	0.68
Angina	–		39.1 (0.6 to 77.6)	0.04
Chronic lung disease	–		33.8 (4.9 to 62.8)	0.02
Diabetes mellitus	–		48.6 (15.5 to 81.7)	0.004
Hypertension	–		26.1 (6.8 to 45.5)	0.01
Stroke	–		54.0 (−16.4 to 124.4)	0.13
Tuberculosis§	–		75.4 (−19.2 to 170.1)	0.12

*Model 1 adjusted for (predisposing and enabling factors) socioeconomic variables.
† Model 2 adjusted for socioeconomic and need variables.
‡Multivariate survey Heckman sample selection model with total out-of-pocket health expenditure in US dollars as dependent variable with health service visits as selection variable with *WHO Disability Assessment Scale* total disability score and annual per capita income as a function of health visits.
§Diagnosed and treated with antituberculosis treatment within 1 year.

model 1, the inverse association between illiteracy and out-of-pocket health expenditure turned insignificant after adjusting for the effect of pension status. Chronic illnesses such as diabetes mellitus, hypertension, angina and chronic pulmonary disease were significantly associated with higher out-of-pocket health expenditure, in model 2.

Correlates for catastrophic health expenditure

The prevalence of catastrophic health expenditure was 7% (95% CI 6% to 8%). The coefficients of explanatory variables estimated for the probability of incurring catastrophic health expenditure are shown in table 4. Older men had an increased risk of catastrophic health expenditure, even after adjusting for socioeconomic and need variables. Tuberculosis was associated with an increased risk of catastrophic health expenditure among individuals who lacked formal education (β=1.4; 95% CI 13.3 to 124.7; p=0.004). Furthermore, catastrophic health expenditure was associated with depression (OR=3.5; 95% CI 1.5 to 7.5; p=0.004) and debt incurred due to healthcare payments (OR=1.6; 95% CI 1.1 to 2.4; p=0.03). Chronic diseases such as diabetes, hypertension, stroke and chronic pulmonary disease increased the risk of catastrophic health expenditure, while health insurance statistically decreased this risk.

DISCUSSION

Our study has shown that sociodemographic factors and medical illness play important roles both in health service utilisation and out-of-pocket health expenditure among older individuals in India.

Healthcare inequity in India

Consistent with the inverse care law, our study identified lower rates of healthcare utilisation among older people with high needs. Study participants with higher socioeconomic status, in

Table 4 Factors associated with catastrophic health expenditures among older people in India, Study on global AGEing and adult health India Wave 1

Explanatory variables	Model 1* β‡ (95% CI)	p Value	Model 2† β (95% CI)	p Value
Age in years	−0.003 (−0.02 to 0.01)	0.66	−0.01 (−0.03 to 0.02)	0.63
Men	0.3 (0.1 to 0.5)	0.01	0.4 (0.1 to 0.6)	0.003
No formal education	−0.02 (−0.2 to 0.2)	0.87	0.1 (−0.2 to 0.4)	0.53
Widowed or separated	−0.1 (−0.3 to 0.2)	0.63	−0.1 (−0.4 to 0.2)	0.66
Receiving pension support	0.3 (−0.01 to 0.5)	0.06	0.3 (0.001 to 0.6)	0.05
Health insurance	−0.7 (−1.1 to −0.1)	0.02	−0.9 (−1.7 to −0.1)	0.03
Angina	–		0.1 (−0.4 to 0.5)	0.72
Chronic lung disease	–		0.4 (0.1 to 0.7)	0.01
Diabetes mellitus	–		0.6 (0.3 to 0.8)	<0.001
Hypertension	–		0.5 (0.2 to 0.7)	0.001
Stroke	–		0.6 (0.1 to 1.0)	0.01
Tuberculosis§	–		0.9 (0.3 to 1.5)	0.002

* Model 1 adjusted for (predisposing and enabling factors) socioeconomic variables.
†Model 2 adjusted for socioeconomic and need variables.
‡Multivariate survey Heckman sample selection model with survey Probit regression with Heckman sample selection model with catastrophic health expenditure as dependent variable; Health service visits as selection variable with comorbidity and *WHO Disability Assessment Scale* total disability score determining the selection equation.
§Diagnosed and treated with antituberculosis treatment within 1 year.

terms of education, income and past skilled occupation, had better access to health insurance and pension support, which in turn enhanced their healthcare use and healthcare financing options, respectively. Disabilities were more prevalent among lower socioeconomic groups and increased the financial burden on these individuals. Persistent need for high out-of-pocket health expenditure may force disabled, poor, older people to either forego or underuse healthcare.[17] The inequalities in utilisation of health services on the basis of sex, education, occupation and income that we observed in this study are typical of countries in transition.[33 34] Inequalities in health outcomes and healthcare access or use among older individuals in such countries are determined by a diverse set of factors,[35] including low resources, lack of financial protection and lack of social security.[9] We suggest greater attention to public investment in social welfare and social security to reduce socioeconomic disparities in health service use and payments among vulnerable older people in India. This could be in the form of increased efforts to improve awareness of existing systems that target vulnerable populations (such as the Aarogyasri and Rashtriya Swasthya Bima Yojana programmes)[36] and also universal coverage of the health system.

High costs of chronic illnesses

Healthcare needs among older individuals are multifaceted, relating to functional disabilities and physical conditions. Consistent with previous studies,[24 37] older participants in our study who have chronic diseases have significantly higher health service utilisation and expenditure. The impact of chronic diseases on older people was substantial and indicated a higher prevalence of disease and financial burden among these older individuals. The prevailing emphasis in health systems on curative models over preventative measures has led to increased out-of-pocket health expenditure in the ageing Indian population.[38] Moreover, the commitment of government health system resources in LMICs to the control of infectious diseases and focus on maternal and child health[39] has resulted in systems ill-equipped to manage the growing burden of chronic diseases in these countries. This may push individuals to seek private health-care services, thereby contributing to increasing costs and catastrophic health expenditures among older people. Secondary or tertiary preventative strategies for age-related conditions such as stroke, cognitive impairment and functional disabilities are needed, but require training and planning as part of public health and medical systems.[40]

Catastrophic out-of-pocket payments

Catastrophic health expenditure was highly prevalent, with adverse associations with depression and debt among study participants. Extrapolated to the 70 million people aged 65 years and older in India, the prevalence of catastrophic health expenditure in our study (7%) corresponds to 4.9 million older individuals. In addition, the growing older adult population and the absence of active measures to reduce catastrophic out-of-pocket payments will further increase the number of older people falling into poverty and poor health. Lack of a financial safety net and risk pooling provided by insurance coverage is an important determinant of catastrophic expenses. Accordingly, effective social protection schemes are required to prevent impoverishment in older people who seek healthcare and to facilitate access for those resource-poor older people who otherwise avoid needed healthcare services.[41] The elevated risk of catastrophic health expenditure among older men in India has been attributed to differences in health-seeking behaviour, expenditure pattern and morbidity profiles.[24 42] Moreover, inequalities in access to financial resources for older women due to lack of social and economic independence[42] might reduce their ability to access healthcare services and subsequent out-of-pocket payments. Even though reducing catastrophic health expenditure remains a neglected issue, the factors contributing to this expenditure are largely modifiable.

Need for public health financing

Despite the availability of free or low-cost public healthcare services, the majority of individuals in our study used private healthcare services. This is consistent with previous studies reporting high rates of private health service utilisation and consequent high health expenditures in India.[1 14 15] Prominent deficits in the accessibility of public health services, long waiting hours, poorly equipped health units and inadequate infrastructure have escalated the trend in seeking private healthcare service in India.[14 43] Explicit emphasis placed by private healthcare sector on curative care, as opposed to the primary preventive care typical of public health services, contributes to the reduced long-term health prospects among individuals who underuse public services. Although the current public healthcare system in India has been often criticised for unequal provision of health services,[43] there are considerably few qualitative studies evaluating the normative reasons for the deficits in health services and health outcomes. In this context, collaboration between public and private health services,[44] often debated as a means of improving the coverage of health services, is needed to widen their support to vulnerable older people.

Strengths and limitations

The methodological strengths of the study included a larger sample size representative of the older Indian population with detailed social and medical information, and health financing profiles. SAGE achieved high standards in sampling, collection of data and response rates, which are comparable to similar ageing surveys in high-income countries.[25] Heckman regression models were used to handle the selection bias among individuals with zero health expenditures. Analysis of individual cross-sectional survey data may include several limitations such as potential recall bias and information bias. Self-reported diseases such as diabetes, stroke and tuberculosis lacked standard indicators and clinical diagnosis to assess their validity and reliability. Reporting the estimates of income and health expenditure are known to be sensitive topics, often leading to under-reporting, and health profiles are susceptible to response bias. Moreover, the cross-sectional design of this study prevented us establishing any causal associations.

CONCLUSIONS

The goal of equitable and affordable healthcare services demands reduction of catastrophic health payments as an important priority in national health policies. The provision of publicly funded social security, health insurance and improving the quality of public health centres, can collectively reduce the catastrophic health expenditures prevalent among the ageing Indian population. Such a goal demands a concerted effort from the health sector, social welfare and public health services, to eliminate the financial burden on the older population.

What is already known on this subject

- The greater need for out-of-pocket health payments and the lack of social security net increase health inequities in low and middle income countries.
- Catastrophic health expenditure is an over-arching problem among older people in countries in economic transition.
- Recognition of determinants of health service utilisation and health expenditures are essential for targeted health financing policies to establish equitable healthcare delivery.

What this study adds

- Chronic non-communicable illnesses and infectious diseases both increase the need for health service visits and out-of-pocket health expenditure among older people in India.
- Despite higher disability levels, older women and those who lack formal education spend less on their health.
- Prevalence of catastrophic health expenditure among older people in India was 7% (95% CI 6% to 8%). Older men are at higher risk of catastrophic health expenditure.
- Health insurance schemes protect against catastrophic health expenditure among older people in India.

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Contributors EMB, JA and UE were involved in formulating the research question. EMB developed the research question, performed the statistical analyses and drafted the manuscript. JA and PK contributed to the data analysis, interpretation of results and manuscript revisions. UE supervised the study design and manuscript revisions. All authors read and approved the final manuscript.

Competing interests None.

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