



The Geriatric Health Care Financing within the Health Care Policy in Kerala

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Authors' contributions

This work was carried out in collaboration between both authors. Author NG designed the study, collected field data, and drafted the manuscript. Author KPS supervised the study, contributed to the analysis, and revised the manuscript. Both authors read and approved the final manuscript.

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Abstract

Background: According to United Nations, one of the major concerns that the world economy faces is population ageing. With India being the most populous country in the world, the share of elderly population in the country is also rising tremendously. Compared to other States, Kerala has the highest share of elderly population. As elderly are succumbed to health deteriorations and illnesses, their well-being is a major concern. With a strong health care system, demand for health care has increased through past years, in the state.

Objectives: Thus, the study aims to look into the health care financing, including health expenditure, health insurance coverage, financial catastrophe and coping mechanism of elderly population in Kerala.

Methodology: The study is based on Minimum Standard Approach, popularized by WHO and employs Multistage Random Sampling technique. Study area has been divided into three regions and a district from each region has been selected based on size of elderly population. Selected districts are Thiruvananthapuram, Ernakulam and Kozhikode. Sample size calculated using Krejcie

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and Morgan table and is estimated as 400 elderly households. Tools of analysis include descriptive and inferential statistics like Analysis of Covariance (ANCOVA).

Results: Results reveal that 92% of the surveyed households reported presence of Out-of-pocket (OOP) healthcare expenditure, with significant disparity in health spending, and catastrophic expenditures are prevalent among the studied group. Mean expenditure was observed to be 3412.35 Rs. Purchase of medicines was observed to be the most important component of OOP expenditure, followed by diagnostic tests and travel expenses. Determinants of OOP health expenditure were analysed using ANCOVA and coefficients like use of private health care, chronic diseases and the number of elderly were observed to have a significant effect on OOP health expenditure.

Conclusion: In spite of wide health insurance coverage, gaps exist and there is a need for more inclusive policies among the low-income category. A heavy reliance on income, savings and family members, as coping mechanism have been observed.

Keywords: Geriatric health; health financing; health care demand; elderly population.

1. Introduction

World population is rising considerably and has reached about 8.2 billion in 2024 (United Nations., 2024). Since 1950, the geriatric population has been rising and people above 60 years is expected to reach 2.1 billion by 2050 and those above 80 years is expected to triple and reach 426 million (United Nations., 2022). The old age dependency ratio has been rising over the years according to United Nations and is expected to increase further in the coming years. It was observed to be 11.3 in 2005 and 11.7 in 2010. This ratio is expected to touch 18 by 2030. It has been observed that since 1950 the geriatric population has tripled. This process is high in the developed nations and is growing faster in developing nations. Although ageing may be considered as a worldwide issue with certain countries being identified as 'demographic outliers' by UN, Europe and Asia are identified as regions with more nations experiencing later phases of demographic ageing.

1.1 Indian Scenario

India, as a developing country, is experiencing rapid ageing. The share of population above 60 years of age was 8 percent in 2005, 10.5% in 2022 and is anticipated to reach 20.8 % by the year 2050 (UNFPA., 2023). The World Health Organization expects the proportion of people aged 60 and above to rise from 12% to 22% (WHO, 2018). In India, the process of aging is progressing swiftly resulting in a surge in the percentage of adults within the nation. The number of individuals is increasing by 2.7% annually with their count escalating from 77 million during the census conducted in 2001 to

reaching up to about 153 million by 2023 (Rajan and Mishra., 2020).

The trend of growth is expected to continue at a rate of 3.6%, per year as noted by the Government of Kerala in 2009 and research by Irudaya Rajan and others in 2020. In India, the proportion of elderly people compared to the working age population was observed to be 14.2% during the 2011 Census, with Kerala showing a ratio of 19.6% mainly due to an increase in life expectancy from birth (Government of Kerala, 2017).

1.2 Elderly in Kerala

Kerala is one of the most aging states and achieved below replacement level fertility much before other states. The elderly population in Kerala is growing faster than the rest of the nation. As per the Census of 2011, Kerala had a total population of nearly 3.36 crores with 12.6 percent individuals aged 60 years and higher. Since 1981, every year one million elderly people are added to Kerala's population (Government of Kerala., 2017). Old age dependency ratio was 26.1 in 2021 and expected to increase to 34.3 percent in 2031 (India Ageing Report; 2023). Studies suggest that population ageing in Kerala is leading to increased health care demand and expenditures, particularly for long-term care, and is necessitating improvements in social and health infrastructure to address the health issues prevalent among the elderly (Kutty., 2000).

2. Need for the Study

The aging population are succumbed to life style diseases like diabetes, high blood pressure, cholesterol and non-communicable diseases like

cancer, arthritis, hypertension, cataract and are on the rise in the recent years. Several studies have identified various types of disabilities associated with ageing relating to vision, speech, hearing, mobility and mental health that limits the daily functioning of elderly. Kerala's has a robust healthcare system that involves strong community participation (UNPF., 2013). There has been an increased demand for health care services due to the prevalence of chronic illnesses and improved accessibility to medical services in Kerala (Kutty., 2000). Age, occupation, level of education and marital status play an important role in the health seeking behaviour of elderly in rural Kerala and most of them seek medical assistance for chronic conditions (Rajeev. K et al., 2023). While challenges such as rising lifestyle diseases and an aging population remain, it becomes important to look into the financing of health care by the aged. Thus, this research article progresses with the following objectives:

1. To analyse health care expenditure of the elderly in Kerala.
2. To verify the extent of health insurance coverage among the elderly and
3. To examine their health care financing methods and coping mechanism.

3. Methodology

Study employs primary survey, with data collected from the elderly households of the State. Multistage random sampling technique has been used and the state has been divided into North, Central & South regions. Based on the density of elderly population, one district from each region has been selected. The selected districts were Kozhikode, Ernakulam and Trivandrum. A taluk from each district was selected and an urban and rural ward have been selected from each taluk. Households with at least one member exceeding 60 years of age has been considered as the primary sampling unit. Given the total households of selected wards, sample size has been determined using probability proportional to size method. Sample size obtained was 400 households and has been calculated using the formula:

$$n = \frac{N \cdot x}{((N-1) e^2 + x)}$$

Where

n: sample size.

N: The total population size.

e: The margin of error (expressed as a decimal, e.g., 0.05 for 5%).

x: A factor that incorporates the confidence level

3.1 Theoretical Framework

Minimum Standard Approach popularized by Wagstaff and Doorslaer (2001;2003) has been used as theoretical framework for obtaining insights into the intensity of health spending and catastrophism in out-of-pocket health spending. This approach requires that health care payments do not exceed a pre-specified share of household income or drive households into poverty. Various methodologies have been proposed for measuring catastrophic health care expenditures within the minimum standard approach. Catastrophic Payment Headcount (H_{cat}) has been used to determine the proportion of households experiencing catastrophic health expenditure relative to their income.

$$H_{cat} = \frac{1}{N} \sum_{i=1}^N E_i$$

- N is the sample size.
- $E_i = 1$, if $\frac{X_i}{Y_i} > Z$ (where X_i is the out-of-pocket expenditure by household i , Y_i is the income of household i , and Z is the catastrophic threshold), and =0 otherwise.

The choice of threshold values for defining catastrophic expenditures varies across studies. A threshold limit of 10% of household income being a widely accepted standard.

3.2 Tools of Analysis

In order to get a detailed insight into the health preferences and health expenditure, various analytical tools have been used in the study. Along with the descriptive statistics, tools of inferential statistics used in the study are:

3.2.1 Analysis of Covariance (ANCOVA)

ANCOVA is an extension of Analysis of variance (ANOVA) and is used when independent variables are both quantitative and qualitative. The ANCOVA equation used in the study is:

$$OOPE = f(\text{Social Security Benefit, Health Insurance, Income, Location})$$

4. Results and Discussion

This section explores the critical issue of healthcare financing methods used by the

elderly, with a focus on out-of-pocket expenses, which remain the dominant form of healthcare funding in many developing regions. Additionally, the section examines the coping strategies elderly households employ to manage the financial strain of healthcare costs that exceed their regular income.

4.1 Health Care Expenditure

Analysing health care expenditure involves a deeper insight into concepts like out-of-pocket health expenditure (OOP), catastrophic health expenditure and coping mechanism. With higher share of OOP health expenditure, households may become indebted and many times such payments become catastrophic and lead the households into debt trap. OOP health expenditures are a critical concern due to their potential to drive households into poverty. Studies indicate that, globally, millions of people each year are pushed below the poverty line due to medical expenses (Xu et al., 2007; Flores et al., 2018). In addition, studies also reveal that OOP expenditures constitute a major component of total health expenditure, disproportionately affecting low-income households and rural populations (Berman et al., 2010). This eventually leads to financial catastrophe and debt trap. Hence, a deeper understanding about these concepts is discussed in the following sub sections.

4.1.1 Out of Pocket Health Expenditure

The OOP health expenditure of the elderly households in Kerala is analysed, with the extent of OOP health expenditure and descriptives being given in Fig. 1 and Table 2. It can be observed that around 92 percent of the surveyed elderly households reported presence of OOP health expenditure and median OOP expenditure amounts to 2000 Rs and mean expenditure amounts to 3412.35 Rs. The confidence interval for mean has been constructed.

The extent of OOP expenditure is regarded as an inevitable component in analysing health care utilisation as well as financing. Out-of-pocket health expenditure, or the direct spending by households on healthcare, on the other hand significantly impacts elderly households, often burdening them financially.

With the extent of OOP expenditure being 92 percent among the studied group, there is high possibility for the presence of financial burden

and catastrophe, especially among elderly households falling in the lower income strata.

The descriptive statistics of OOP Expenditure given in Table 2 reveals that the OOP expenditure on health is highly skewed. Normality test statistics like Kolmogorov-Smirnov and Shapiro-Wilk tests, further confirms the result. The null hypothesis that OOP health expenditure is normally distributed, is rejected as both the test statistics are significant.

4.1.2 Components of OOP Health Expenditure

Out-of-pocket health expenditure for elderly households is comprised of multiple components that reflect the varied healthcare needs associated with aging. The study observed the most important component of OOP expenditure among the elderly households. The result is summarized in Fig. 2. Purchase of medicines was observed to be the most important component of majority of the households, with 291 households opting for the same. This is followed by diagnostic tests and travel expenses with 10.45 percent and 9 percent of the households considering it as the most important component in their OOP health expenditure respectively.

The findings of the study is consistent with several other studies (Wagstaff & Doorslaer., 2003; Doorslaer et al., 2007), which observes that share of expenditure on medicines forms a higher portion in total health expenditure especially among poor and rural households.

4.1.3 Determinants of OOP Health Expenditure

Researches have emphasized various factors like age, size of family, location, number of elderly in households, income, health insurance coverage, presence of chronic diseases, use of private healthcare and social security benefits as potential determinants of OOP health expenditure (Mohanty, K.S et al., 2023; Garg C.C and Karan A.K, 2009). Based on these observations, the present study tries to analyse the determinants of OOP health expenditure by taking into consideration factors like, social security benefits, health insurance coverage, income, location, size of the family, number of elderly, presence of chronic illnesses, average age and use of private health care.

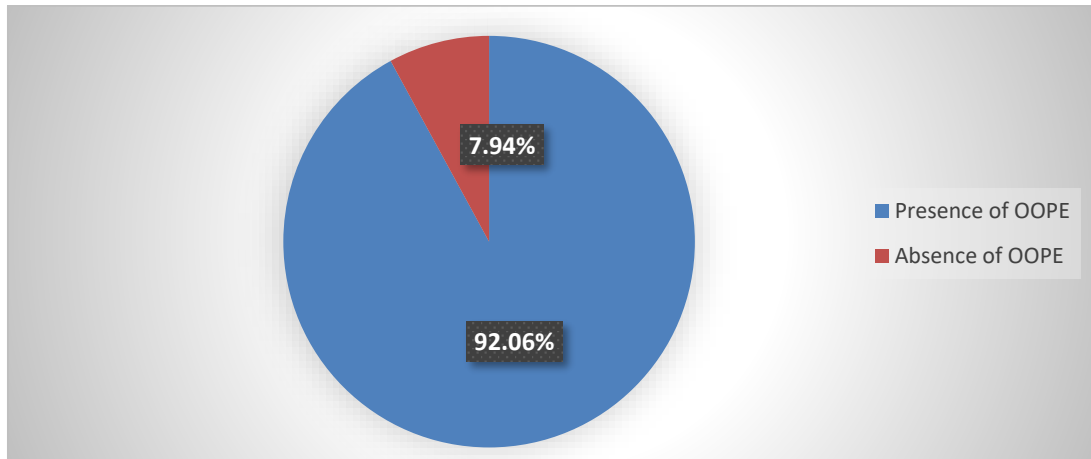


Fig. 1. Extent of Out-of-Pocket Expenditure

Source: Primary Survey

Table 1. Normality Test of OOP Health Expenditure

	Kolmogorov-Smirnov Test			Shapiro-Wilk Test		
	Statistic	d.f	Sig.	Statistic	d.f	Sig.
Out-of-pocket expenditure.	0.245	402	0.000	0.638	402	0.000

Table 2. Descriptive Statistics of OOP Health Expenditure

Mean	3412.35	
Standard Deviation	4947.09	
Skewness	3.83	
Median	2000.00	
95 percent C.I for Mean	Lower	2927.28
	Upper	3897.41

Source: Primary Survey

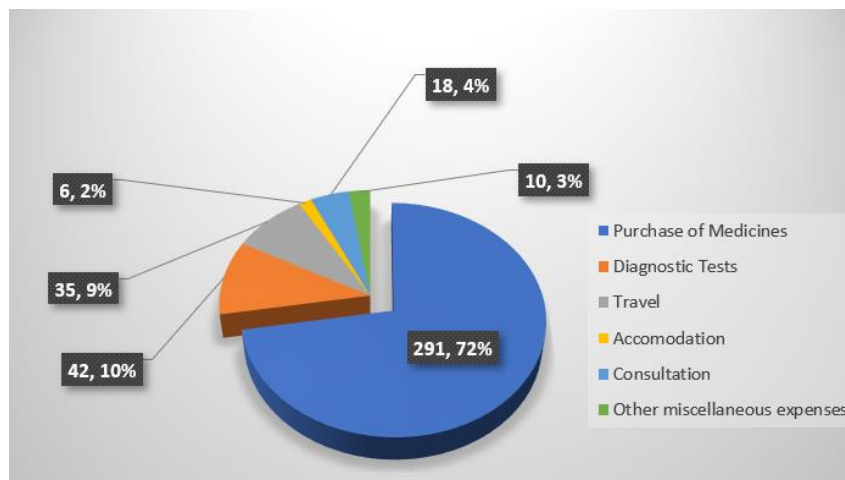


Fig. 2. Important Components in OOP Health Expenditure

Source: Primary Survey

In order to examine whether the determinants are significant or not, the study makes use of Analysis of Covariance (ANCOVA). This method

is used for testing the effects of interaction of categorical variables on continuous dependent variable. The effects of other selected variables

that vary with the dependent variable is controlled. The result of ANCOVA analysis, with continuous variable, OOP health expenditure as dependent variable and other factors as independent variables, is summarized in Table 3.

The result reveals that coefficients like use of private health care, chronic diseases and the number of elderly are significant, which implies that these are the factors that have a significant effect on OOP health expenditure. The sign of the coefficients gives the relationship between dependent and independent variables. The result gives an F value of 4.211, which is not very large, refuting the possibility of collinearity. This result obtained is consistent with studies conducted by Pandey A (2018), Garg C.C and Karan A.K (2009), Damme et al. (2004), Kei Kawabata et al (2002), Panda B.K and Mohanty S.K (2022) and others.

4.1.4 Catastrophic Health Expenditure

The prevalence of OOP health expenditure leads the study into examining catastrophic effect of

health payments. The impoverishment effect of health expenditure has been looked into by using measures from Minimum Standard Approach. The approach considers OOP health expenditure and income of the households. It requires that health expenditure shall not exceed a specified limit or threshold income. Generally, threshold level is specified at five, ten, fifteen, twenty or twenty five percent. Household expenditure on health should remain in a specified threshold of income. If the household OOP health expenditure goes beyond this set limit, health expenditure is classified as catastrophic. As catastrophic health payments disrupt the over-all financial condition of households, there is possibility that such payments push the households into impoverishment.

An important measure discussed in Minimum standard approach is the catastrophic head count that measures the financial catastrophe of households. Head count considers the proportion of households that crosses the threshold limit, which, in the present study, is five, ten, fifteen, twenty and twenty five percent. Table 4 gives the detailed description of the analysis.

Table 3. Analysis of Covariance

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
(Constant)	1485.941	2934.897		.506	.613	-4284.122	7256.004
SocialSB	-402.221	593.348	-.034	-.678	.498	-1568.754	764.313
HI	-716.875	561.357	-.062	-1.277	.202	-1820.514	386.764
Y	-.005	.006	-.038	-.728	.467	-.017	.008
Lctn	365.798	557.323	.036	.656	.512	-729.910	1461.505
Family size	72.265	166.636	.023	.434	.665	-255.344	399.874
Number of elderly	968.233	464.005	.106	2.087	.038	55.991	1880.476
Chronic diseases	2913.955	650.629	.218	4.479	.000	1634.806	4193.103
Average age	-54.623	41.913	-.065	-1.303	.193	-137.025	27.780
Use of Pvt Health Care	734.726	231.878	.166	3.169	.002	278.849	1190.603

a. Dependent Variable: Out-of-Pocket Expenditure (OOPE)

Table 4. Catastrophic head count

Threshold Level	Number Of Households	Catastrophic Headcount
5 percent	153	38.06
10 percent	50	12.44
15 percent	16	3.99
20 percent	28	6.97
25 percent	14	3.48

Source: Primary Survey

The table reveals the headcount, which refers to the catastrophic measure of health care. Around 38.06 percent of elderly households fall in the lowest threshold limit of five percent and spend in excess of five percent threshold. Around 12 percent of elderly households spend more than 10 percent of their income on health care and incurs catastrophic payment. As the threshold level is further raised to 15, 20 and 25 percent, the incidence of catastrophic health payment falls.

Several studies on catastrophic expenditure reveals similar results as observed above. Ghosh (2011) observed that at 10 percent threshold level, the catastrophic head count is 32.42 percent. The study utilized NSSO data. Similarly, George (2005) in his study observes catastrophic headcount for rural Kerala as 26.64 percent, whereas for urban Kerala this stands at 20.90 percent. Incidence of catastrophe is higher among elderly households.

4.2 Health Insurance Coverage

Health insurance plays a crucial role in healthcare financing by enhancing the equity of healthcare access and protecting households

from the financial devastation caused by significant medical expenses. Enrolling in health insurance can lead to increased utilization of healthcare services, as families feel more secure in seeking medical treatment without the fear of high costs.

This section evaluates the reach and utilization of such health insurance schemes among the elderly people. The analysis focuses primarily on the penetration of available health insurance schemes among the elderly. Table 5 gives detailed description of the insured and uninsured families.

Enrolment in health insurance scheme is observed to be higher among the elderly households. Around three-fourth of the surveyed households opted for health insurance. The elderly individuals with health insurance coverage in these households accounted for 74.77 percent and those individuals without insurance accounted to be 25.23 percent.

Enrolment of elderly individuals in health insurance schemes has been described in Fig. 3, which explains the type of coverage being opted by the elderly.

Table 5. Insurance Enrolment among Elderly Households

Insured		Uninsured	
Number	Percentage	Number	Percentage
303	75.37	99	24.63

Source: Primary Survey

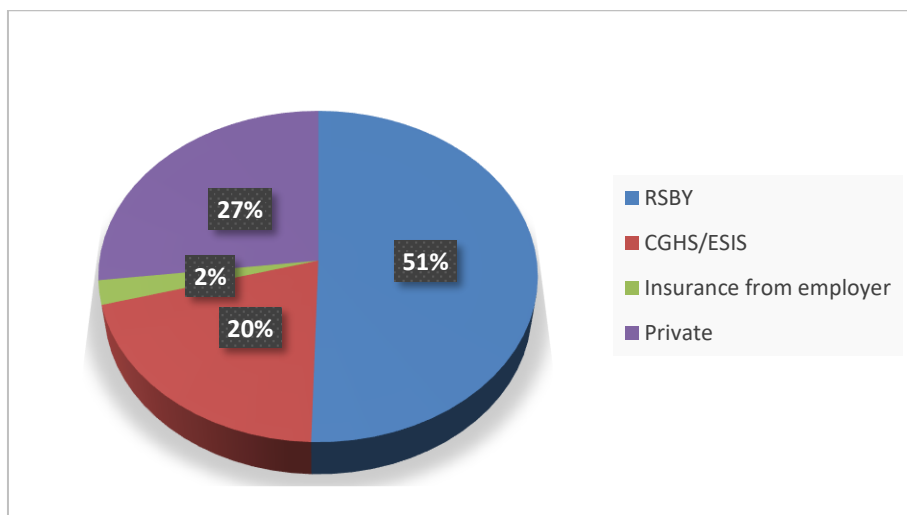


Fig. 3. Health Insurance Coverage of Elderly Individuals

Source: Primary survey

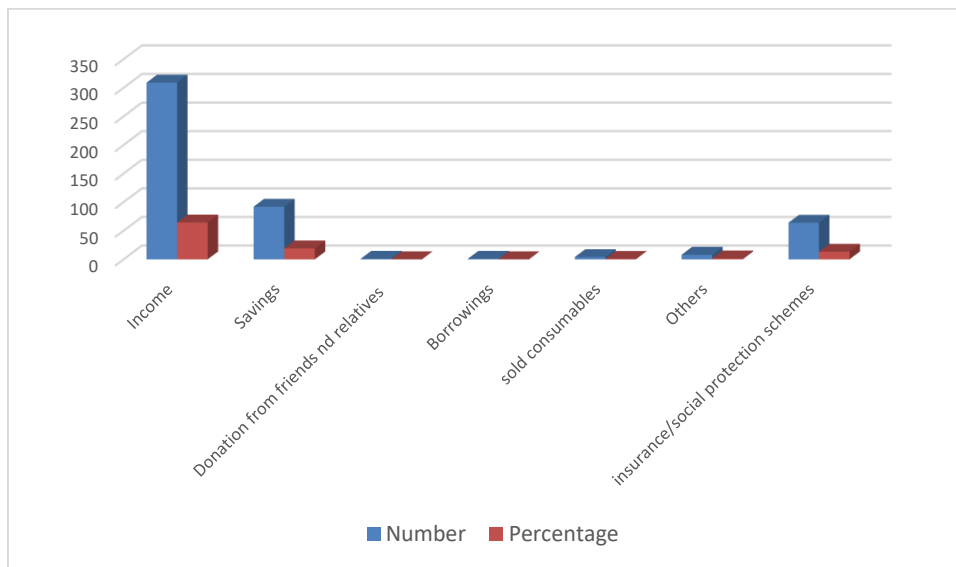


Fig. 4 Coping Mechanism
Source: Primary Survey

It is evident from the data that more than half of the elderly individuals have enrolled in RSBY scheme. The coverage of employer specific health insurance is observed to be meagre. Private health insurance is getting popular among the elderly, especially among elderly falling in middle to higher income category. This statistic is observed to be twenty seven percent, in the study. Health Insurance sector has experienced an upward movement in coverage especially after the pandemic. The study also supports the fact that compared to earlier days health insurance has gained popularity and acceptance among elderly people of the state.

4.3 Coping Mechanism

Coping mechanism refers to the way households deal with the financial burden caused by catastrophic health expenditure. Health care financing poses a significant challenge for the elderly, as they often face increased medical expenses with limited income sources. Coping with these financial demands requires a combination of strategies, including income management, savings, external support, and reliance on social security schemes. By using these mechanisms, elderly individuals aim to ensure access to quality health care while maintaining financial stability and dignity.

One of the primary measures for coping with health care costs is income. For retired individuals, pensions and annuities serve as a steady source of income, helping cover routine

medical expenses. Some elderly individuals seek part-time employment or freelance work to supplement their income. Savings, built over a lifetime, often act as a financial buffer, allowing seniors to manage sudden or recurring health care needs.

Donations or direct financial assistance from loved ones, borrowing, selling assets, social security schemes and senior-specific insurance plans serves as coping mechanism.

Enquiry into these measures in this study reveals that 64.5 percent of the elderly rely on income as coping mechanism followed by savings with a share of 19.2 percent. Insurance and social security schemes constitute 13.36 per cent. Other measures were observed to be negligible in the sample.

5. Conclusion

Out-of-pocket (OOP) healthcare expenditure emerges as a predominant financial burden for elderly households, with 92% of surveyed households incurring such expenses. The data indicates substantial financial strain, as median and mean OOP expenditures are ₹2000 and ₹3412.35, respectively. Moreover, the skewed distribution of OOP expenditure, confirmed by normality tests, highlights significant disparities in healthcare spending. Components like medication purchases, diagnostic tests, and travel costs were identified as major contributors to OOP expenses, emphasizing the multifaceted demands of aging-related healthcare needs.

The study's analysis of catastrophic health expenditure reveals the alarming financial vulnerability of elderly households. Approximately 38.06% of households experience catastrophic spending at the lowest threshold (5% of income), with the proportion decreasing as thresholds rise. Comparisons with previous studies corroborate the substantial impact of healthcare costs, particularly for elderly populations. Catastrophic expenditure not only disrupts household financial stability but also risks pushing families into poverty.

Health insurance plays a critical role in mitigating financial risks, with 75.37% of surveyed households reporting enrolment in schemes such as the Rashtriya Swasthya Bima Yojana (RSBY) and state-specific programs like CHIS. Despite significant progress in health insurance coverage, gaps persist, particularly among low-income households and those without formal employment-linked insurance benefits. The findings underscore the need for expanded coverage and more inclusive policies to reduce financial barriers to healthcare access.

Coping mechanisms employed by elderly households reveal a heavy reliance on income management, savings, and external support, including family assistance and social security schemes. However, the adequacy of these measures is variable, with many households still facing substantial financial challenges. The study highlights the importance of strengthening safety nets and ensuring equitable access to healthcare services.

In conclusion, the study provides a comprehensive understanding of the financial implications of OOP expenditure among elderly households in Kerala. The findings call for policy interventions to enhance health insurance penetration, address inequities in healthcare access, and reduce the financial burden on vulnerable elderly populations. Expanding government support, promoting preventive healthcare, and integrating comprehensive elder-specific policies are imperative to ensure sustainable and equitable healthcare systems for the aging population.

Consent

As per international standards or university standards, respondents' written consent has been collected and preserved by the author(s).

Disclaimer (Artificial Intelligence)

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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Competing Interests

Authors have declared that no competing interests exist.

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