Incidence of Non-Communicable Diseases and Out-of-Pocket Expenditure among Senior Elderly of five Districts in Kerala

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KEYWORDS

Non-communicable diseases, Out of Pocket Expenditure, Kerala, old-elderly.

ABSTRACT

Background: The nation's healthcare system, which is already struggling with constraints, faces a significant challenge from India's growing elderly population. As the prevalence of non-communicable diseases (NCDs) rises among this demographic, concerns mount over the strain on healthcare services. Objective: the study's primary aim was to evaluate the incidence of NCDs and the financial burden of out-of-pocket expenses associated with hospital stays for the middle-aged and older segments of the population. Methods: The referenced study, employing a systematic random sampling method, sought to gather pertinent data within Kerala—a state in southern India. Conducted across five specific districts. Results: The findings from a sample of 500 individuals revealed that 45% were afflicted with NCDs. Notably, a significant majority of these patients, irrespective of their economic status, opted for private healthcare providers, accounting for 60.5% of the respondents. This preference underscores the perceived or actual disparities in the quality of care between private and public healthcare institutions. Conclusions: The study's insights are crucial in understanding the healthcare dynamics at play and could serve as a catalyst for policy reform, aiming to enhance the accessibility and affordability of healthcare for India's aging population. It also highlights the urgent need for a robust healthcare system that can accommodate the complex needs of the elderly, particularly in managing chronic conditions that require long-term care and substantial financial resources. Way ahead: Utilising frontline staff (ANMs and ASHAs) can assist in putting NCD interventions into practice at the community level.

1. Introduction

Globally health and welfare systems face significant difficulties because of the rapid demographic changes brought about by ageing populations. In low- and middle-income nations, the proportion of older persons in the population is currently between 6 and 9%, with an average annual increase of 2.1% in low-income nations and 1.3% in lower to middle- income nations (LMIC) [1, 2]. With the decrease in the birth rate, the base of the age pyramid has started shrinking, and the upper part has started widening. This scenario is seen in most of the developed and the LMIC also. Life expectancy in India rose from 32 years in 1947 to 68 years in 2011, and the country's total fertility rate decreased from 5.2 in 1971 to 2.3 in 2014 [3,4].

The prevalence of chronic diseases and resulting disabilities underscores the necessity for enhanced healthcare services for the elderly in low-income nations. In addition to ageing, behavioural variables like smoking cigarette, physical inactivity, excessive alcohol use, and a poor diet raise the risk of Non-communicable Diseases (NCDs) and NCD-related mortality [5,6]. On an annual basis, 71% of fatalities worldwide are caused by NCDs. In nations with low or middle incomes, these deaths account for three-fourths of all cases. Globally, there are more people who have multimorbidity, which is the existence of at least two chronic diseases. India and other low- and middle-income nations face numerous health issues brought on by NCDs and an ageing population [7]. Many studies show that NCDs that appear differently in the wealthy and the poor are significant indicators of premature mortality and variations in longevity among older persons [8]. As per the 2019 data of national health portal more than six millions of eldelry die beacause of NCDs in India[9]. Changing life style, increased urbanization are contributing to increase in NCDs among senior citizens in India. The ageing of India's population significantly affects health outcomes, leading to an epidemiological transition where chronic diseases have supplanted infectious diseases. Concurrently, the widespread occurrence of various chronic conditions and age-associated health issues imposes a considerable burden on the healthcare system[10]. The rising rates of morbidity, comorbidity, and multimorbidity among the elderly population are a concerning trend noted in

numerous low- and middle-income countries, significantly impacting India. Multimorbidity of non-communicable diseases in these regions is a major public health challenge, with a prevalence that increases with age and is associated with factors such as gender, socioeconomic status, and urban residency.

With the increase of the senior population, there has been a corresponding surge in the utilization of health services, overall health expenditure, health budgets, and per capita health spending [11]. Elderly persons with high needs and limited resources are particularly vulnerable to catastrophic health expenditures, which are those that consume more than 40% of household income [12].

Out-of-pocket expenditure (OOPE) by households on healthcare has always been a significant factor in India's overall health expenses. According to a World Health Organisation (WHO) research from March 2022, high OOPE on health is predicted to cause the annual impoverishment of 55 million Indians, with over 17% of households experiencing catastrophic levels of health expenditures [13]. Data derived from the National Health Accounts of India, shows that the OOPE percentage has decreased over time from 69.4 percent in 2004-2005 to 48.21% in 2018-2019, but it is still high. People could be severely pushed into poverty because of this catastrophic expenditure [14].

Women constitute most of the population aged 60 and above, with a significant number being widowed. It is projected that by 2025, nearly 20% of the population will be over the age of 60, underscoring the critical need for comprehensive legislation, social security systems, and related measures. A 2015 national survey revealed that 65% of the elderly in Kerala suffer from morbidity. The trend of relocating the elderly to old age homes in Kerala is on the rise, due to the migration of the younger demographic. In Kerala, there are currently 4.2 million individuals aged 60 and above, with those 80 years and older constituting 13% of this demographic, marking it as the most rapidly expanding segment among the elderly population. Additionally, women constitute a majority within the group of those aged 60 and over [15].

Plans for policy and social security systems are desperately needed, as the population ages. These systems ought to include social services, health care, and financial assistance to guarantee the welfare and standard of living of the senior citizens. The younger generation's migration is one of the factors contributing to the rise of senior living facilities. Economic opportunities in other areas may be the cause of this situation, depriving senior family members of enough assistance. To tackle this problem, methods for preserving cross-generational relationships and support networks are needed.

Compared to communicable diseases, the amount of money spent on treating noncommunicable diseases is more. They have a significant effect on national and individual healthcare expenditures, productivity, and economic growth. The most effective solution to tackle this challenge is a comprehensive and coordinated effort led by national governments. Utilizing NCD services provided by public facilities can help in reducing out-of-pocket expenditures for non-communicable diseases.

2. Objectives of the Study

The main objective of this research is to examine the prevalence of non-communicable diseases (NCDs) and the out-of-pocket expenses (OOPE) associated with hospitalisation among the middle-aged and elderly populations living in five districts of Kerala state in South India.

3. Materials and methods

3.1 Sampling methodology

A cross-sectional survey focusing on ageing was carried out in the districts of Thiruvananthapuram, Alappuzha, Ernakulam, Kozhikode, and Kannur in the state of Kerala. This study utilized a sample from the ongoing panel survey on ageing initiated in 2004 by the Centre for Development Studies in Thiruvananthapuram. The initial sample for the first panel was derived from the Centre's second Kerala Migration Survey conducted in 2003. This migration survey adopted a stratified multistage random sampling method, dividing all fourteen districts into rural and urban strata. It was decided to randomly select one thousand families from each stratum. The migration survey encompassed 10,000 households and 47,830 individuals. In 2004, the Kerala Ageing Survey commenced, involving visits to all elderly residents within these households throughout Kerala. This survey continued to monitor the selected older adults until their passing. The most recent, sixth wave of the survey, was carried out in 2019.

3.2 Study Environment

The methodology involved randomly selecting one thousand families from each demographic stratum for the migration survey, which covered 10,000 households and 47,830 individuals. Initiated in 2004, the Kerala Ageing Survey aimed to visit all elderly residents within these households across Kerala, tracking the health and demographics of these older adults until their demise. The latest, the sixth wave, was conducted in 2019. The districts included in the study were Thiruvananthapuram, Alappuzha, Ernakulam, Kozhikode, and Kannur. The district Thiruvananthapuram was chosen due to its status as the capital, having the highest proportion of elderly (10.25% above the state average) and the densest population as per the 2011 census. Ernakulam was noted for its significant female demographic. In May 2019, a standardized questionnaire was administered to 500 elderly individuals across five regions.

3.3 Data collection

A structured questionnaire was administered to gather information on sociological, demographic, daily living, morbidities, chronic illness, health seeking behaviour, monthly expenditure for treatment, out-of-pocket expenditure for hospitalization etc of the elderly.

3.4 Calculation of expenditure

Using a bottom-up methodology, the entire cost of disease for all NCDs was estimated as reported by the respondent. The sum of the direct and indirect expenditures was used to determine the overall cost. Direct expenditures are directly related to the care provided to patients during a diagnosis or treatment. The expenditures associated with prescription drugs and lab testing are referred to as direct medical costs. Travel and eating expenses on the way to the hospital are included in the direct non-medical charges.

4. Analysis and Discussion

The preliminary analysis showed that mean age of the participants was 81.4 and median age was 80.5. Out of the 500 elderly, 25.8% were from the district of Ernakulam, 22.8% were from Thiruvanthapuram district. 61% were females and 39% were males, 77% were of the age group 74-84 age group. 43% of the respondents own a house, 20% of them reported to receive pension (Table 1).

Table 1: Socio-Economic And Demographic Profile of Elderly

	%
District Name	
Thiruvananthapuram	22.8
Alappuzha	19.2
Ernakulam	25.8
Kozhikode	16.2
Kannur	16.0
Gender	
Male	39.0
Female	61.0
Age	
74-84	77.6
85+	22.4
Religion	
Hindu	68.8
Muslim	11.2
Christian	20.0
Caste	
General	45.0
OBC	22.2
SC	26.2
ST	6.6
House ownership	
Self	43.6
Spouse	30.2
Joint ownership	5.2
Others	20.8

Receives Pension	
Yes	20
No	80
Pension amount	
No Pension	80.0
Rs<2500	7.4
Rs 2500-5000	9.4
Rs >5000	3.2

To determine the morbidity of chronic diseases, the respondents were asked to list out their current morbidity or diseases for which they are under any treatment. Nevertheless, the results were not compared with any prescriptions or clinical data. The study encompassed a range of chronic non-communicable diseases (NCDs), namely cancer, hypertension, cataracts, diabetes, pulmonary diseases, cardiovascular diseases, paralysis, depression, Alzheimer's disease, cerebrovascular accidents, dementia, and arthritis.

More than 45% of the elderly reported that they are having more than one chronic ailment, and 21.9% said they do not have any chronic problem. These chronic ailments are as reported as those they are undergoing any kind of medical treatment. Elderly were asked about having any kind of illness faced by them in last one month, to understand the incidence of illness and expenditure (table 2).

Table 2: Incidence of NCD among older adults

	Chronic illness (%)	Self-reported morbidity (%)
No illness	21.9	31.4
At least one	26.4	28.4
More than one	49.9	15.6
More than 2	1.8	24.6

Age and gender wise distribution of NCD shows that 179 elderly reported they are suffering from Diabetes, 273 from high blood pressure, 67 reported having heart ailments. Female elderly (55.3%) reported diabetes compared to 44.7% of males. Similarly, incidence of 61.2% female reported having heart problems, 62.6% of them suffer from high blood pressure (table 3).

Table 3: Gender and Age-Wise Distribution of Incidence of NCD among older adults

	Male (%)	Female (%)	75-84 (%)	84+ (%)
Arthritis(n=39)	28.2	71.8	79.5	20.5
Asthma(n=52)	40.4	59.6	75.0	25.0
Alzheimer's disease(n=10)	50.0	50.0	60.0	40.0
Cancer(n=10)	40.0	60.0	80.0	20.0
Diabetes (n=179)	44.7	55.3	78.8	21.2
Dementia(n=17)	47.1	52.9	64.7	35.3
Heart problems(n=67)	38.8	61.2	77.6	22.4
Hypertension/ High Blood Pressure(n=273)	37.4	62.6	78.4	21.6
Liver or gall bladder illness (n=6)	50.0	50.0	83.3	16.7
Osteoporosis(n=27)	40.7	59.3	81.5	18.5
Renal/Urinary tract infections(n=23)	69.6	30.4	69.6	30.4
Respiratory problems(n=32)	46.9	53.1	87.5	12.5
Thyroid(n=16)	12.5	87.5	87.5	12.5
Any other (n=84)	35.7	64.3	79.8	20.2

Most of the elderly reported having joint pains (197), in which 62.9% were females and 37.1% males. Having no energy, being forgetful were some of the other self-reported health problems among senior citizens in the study (Table 4). Comparison of gender and age-group proportions do not differ significantly from each other at the .05 level.

Table 4: Gender and Age-Wise Distribution of Self-Reported Health Problems

	Male (%)	Female (%)	75-84 (%)	84+ (%)
Fever (n=79)	34.2	65.8	78.5	21.5
Headache (n=49)	32.7	67.3	79.6	20.4
Dizziness (n=23)	47.8	52.2	69.6	30.4
Having no energy(n=68)	32.4	67.6	72.1	27.9
Voice becomes weak(n=35)	37.1	62.9	60.0	40.0
Trembling hand(n=34)	20.6	79.4	67.6	32.4
Forgetfulness/ Loss of memory(n=77)	42.9	57.1	68.8	31.2
Poor attention span (n=37)	32.4	67.6	81.1	18.9
Sleep problems (n=57)	31.6	68.4	77.2	22.8
Chewing problems/Dental problems(n=28)	25.0	75.0	67.9	32.1
Chest pain(n=56)	35.7	64.3	80.4	19.6
Joint pains (n=194)	37.1	62.9	77.3	22.7
Immobility (n=56)	42.9	57.1	71.4	28.6
Incontinence (n=18)	38.9	61.1	50.0	50.0
Skin problems(n=15)	40.0	60.0	73.3	26.7
Allergies (n=23)	43.5	56.5	73.3	26.7
Stomach problems (n=28)	46.4	53.6	64.3	35.7
Foot Problems (n=57)	33.3	66.7	70.2	29.8
Other, specify: (n=18)	55.6	44.4	72.2	27.8

Respondents were asked about expenditure they incurred during last three months for the treatment of the five major NCD's like Diabetes, Hypertension, Heart problems, Asthma and Cancer. Though, the incidence of cancer among the study population is very less, but OOPE incurred was high, that is why it was included in the analysis. The OOPE for cancer treatment was above INR 5000, 0.2% of the elderly reported to have spent that much amount for the same (table 5). Comparison of gender and age-group proportions do not differ significantly from each other at the .05 level.

Table 5: Monthly out-of-pocket expenditure for NCD

Expenditure (INR)	Diabetes (n=179) (%)	Hypertension (n=273) (%)	Heart Problems (n=67) (%)	Asthma (n=39) (%)	Cancer (n=10) (%)
No Expenditure	15.0	9.2	5.4	1.4	0.4
<500	17.8	26.8	2.2	3.4	0.4
501-1500	4.2	4.8	4.4	2.4	0.4
1501-5000	1.8	2.4	1.4	0.6	0.2
5001-10000	0	0.0	0		0.2
Total	38.8	43.2	13.4	7.8	1.6

The mean expenditure for the treatment of diabetes was INR 436 and median was INR 300, for Heart problem mean expenditure was 975, median was 500, for cancer the mean was 7000, and median was 900. Receiving medical attention, the NCDs as an inpatient for at least one day during the preceding 12 months was referred to as hospitalisation. Hospitalisation rates from the NCDs were calculated for the prior year. Mean expenditure for hospitalization was INR 7,300 whereas median expenditure was INR 300. The major outlier here happened because of the expense incurred during cancer treatment (Table 6).

Table 6: Gender and Age-Wise Distribution of Expenditure towards Hospitalization

Expenditure (INR)	Male (%)	Female (%)	74-84 (%)	85+ (%)
<500 (n=94)	37.2	62.8	78.7	21.3
501-1500 (n=19)	31.6	68.4	78.9	21.1
1501-5000 (n=19)	52.6	47.4	57.9	42.1
5001-10000 (n=36)	41.7	58.3	83.3	16.7
Total (n=167)	39.3	60.7	77.4	22.6

Place and type of treatment plays major role in the OOPE. Out of the 500, interviewed elderly only 200 reported to have hospitalization during last one year. Of these 200, about 32% went to hospital in public sector, around 65% went to private facilities, and remaining went to NGO run facilities. About 45% of them sought allopathic treatment, 35% went for Ayurvedic, 20% took Homeopathic treatment, and remaining went to siddha or alternative therapies. Elderly who got hospitalised more than 80% stayed in paid wards, 18% of general wards, and remaining in NGO run hospitals.

5. Discussion

Noncommunicable diseases (NCDs), including cardiovascular disease, diabetes, chronic respiratory conditions, and cancer, pose significant concerns for the elderly due to factors such as aging, lifestyle choices, and genetic predispositions. These conditions often require long-term medical management and significantly impact the quality of life of the affected individuals.

Results from 1st wave (2017–18) of Longitudinal Ageing Study of India indicated that approximately 32.8% of senior citizens reported having hypertension, while an additional 15.7% reported having arthritis. Furthermore, 9% reported having chronic lung problems and approximately 14 % claimed having diabetes [16]. Findings from present study shows that hypertension was higher, followed by diabetes, arthritis. Proportion of female elderly who suffer from hypertension was 62.6%, followed by 55.3% suffer from diabetes, and 71.8% of female elderly reported they suffer Arthritis. The morbidity calculated here are co-morbidities hence, they will not add to 100%. Looking at their male counterparts 37.4% suffer from Hypertension, 44.7% from diabetes, 46.9% from respiratory problems. Pattern of chronic morbidity is similar in both the sexes.

A study in Bangalore found that older individuals living alone had a higher incidence of tuberculosis (TB) and asthma compared to those residing with family. Additionally, the study observed a greater prevalence among older men than women, and more so in rural areas than urban counterparts [17].

The Thakur et al. (2013) study shows that older men are more likely than older women to have diabetes and heart disease, which is contrary to our study [18]. However, results from other studies are like our study where women are more likely than men to have high blood pressure [18-21].

Research indicates that older people are more likely to develop chronic illnesses and have higher healthcare costs. Kerala's elderly pay for their own medical care and prefer private institutions for more efficient and superior care because the state does not offer adequate healthcare services. Nonetheless, most people who favour government hospitals are from underprivileged and marginalised backgrounds. When it comes to medication, older people frequently favour homoeopathic and Ayurvedic remedies over allopathic ones [22]. Findings from the present study also substantiate these results, more than 55% had sought treatment from Ayurvedic or homeopathic practitioners.

6. Conclusion

It is imperative to make the necessary measures to satisfy the requirements of both urban and rural elders, as well as men and women. Prevention is always better than cure when it comes to communicable diseases, and that is especially true in poor nations like India. Additionally, concentrating on educational interventions for senior citizens may result in some necessary adjustments. These findings emphasize the importance of targeted interventions for NCDs, considering both gender-specific risks and overall prevalence. Addressing risk factors, promoting healthy lifestyles, and ensuring access to quality healthcare are crucial steps in managing NCDs among the elderly population.

In Kerala, the prevalence of noncommunicable diseases (NCDs) like diabetes, cardiovascular diseases, and cancer is increasingly imposing a substantial health burden on the elderly population. OOPE is frequently used to finance NCDs, which can result in uncontrollably high medical costs.

The difference in OOPE illustrates how healthcare infrastructure and economic gaps affect the cost burden that patients and their families bear during hospital stays. Lower mean OOPE per hospitalisation episode in states like Tamil Nadu, which have stronger fiscal policies, indicates a significantly more accessible healthcare system for their residents. This is attributable to increased spending in public health, improved healthcare infrastructure, and the accessibility of vital medications and diagnostic procedures. On the other hand, states like Bihar, which have fewer financial resources, struggle with issues including low public health investment, subpar infrastructure, and a shortage of basic medical supplies and medications. These elements contribute to the greater OOPE that these states' citizens face, furthering their descent into medical poverty.

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