

The Cost of Illness and the Rural Elderly People: A Case Study of Bhadrak District in Odisha, India

Satrughan Behera¹, Aditi², Dr. Sachitananda Sa³, Dr. Rathi Kanta Kumbhar⁴

^{1,2}Research Scholar, Department of Economic Studies and Policy, Central University of South Bihar, Gaya, India

³Assistant Professor, P.G Department of Social Science, Fakir Mohan University, Balasore, Odisha, India

⁴ Professor, Department of Economic Studies and Policy, Central University of South Bihar, Gaya, India

Corresponding Author: Satrughan Behera

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ABSTRACT

This study examined the direct and indirect costs of illness among elderly people and households in Bhadrak district, Odisha. Conducted from May to July 2020, the research included elderly individuals aged 60 years and above using a multi-stage random sampling technique. The study found that during illness, accompanying persons lost more working days than elderly patients, with males experiencing higher income and working day losses compared to females. Scheduled caste individuals were most affected due to their dependence on daily labor and agriculture. The study area also suffered substantial losses of livestock, jewelry, and land, with self-help groups being the main source of loans in rural areas. The direct cost burden of illness was higher than the indirect cost burden for elderly individuals and their families. Medical costs were primarily spent on medicines (29.2%), while non-medical costs were mainly allocated to lodging (15.8%). These findings highlight the need for a reassessment of current public health policies in light of the significant impacts on the elderly and their households.

Keywords: Cost of illness, Rural, Elderly, Odisha

JEL Code: I10, I18, J14

INTRODUCTION

In India, during the period 2001-2011, approximately 68.8% of the total population resided in rural areas, while 31.2% lived in urban areas. Rural populations struggle with significant health challenges due to issues like unhygienic conditions, inadequate sanitation, and poor healthcare services. Studies indicate that the health of the rural poor is notably worse compared to the rest of the population, sometimes comparable to urban health conditions (Vaishnavi and U. Dash, 2009).

India's elderly population also has notable characteristics. Around 7.5% of the population comprises elderly individuals, with nearly half of them residing in villages

and having a low socioeconomic status (Lena et al., 2009). The majority of India's elderly (70%) are women, with about half of them being dependent, often due to widowhood, divorce, or separation (Ranjan, 2001). A minority (2.4%) of older individuals live alone, with more women (3.49%) than men (1.42%) in this group (Ranjan and Kumar, 2003).

Consequently, most elderly people in India live in rural areas, belong to low socioeconomic backgrounds, and rely on their households for support. The National Sample Survey Organisation defines infirmities as illness, sickness, injury, or poisoning. An analysis of morbidity patterns by age highlights that the elderly faces a

higher burden of ailments compared to other age groups.

In current economic analysis, the concept of opportunity cost holds significant importance, referring to the idea of giving up the next best alternative when making a choice. However, the concept of the opportunity cost of illness differs from that of other economic commodities and services as it imposes a dual or two-way cost burden on affected elderly individuals or households (Nag et al., 2015). During the period of illness, both senior individuals and household members not only lose out on employment but also incur expenses on treatment, which could have been used for consumption, savings, or other goals (Ettner, 1996). This often compels them to borrow, mortgage, or sell valuable assets, exacerbating the financial strain. Many families find it challenging to afford healthcare services, leading to additional out-of-pocket expenses, particularly for impoverished individuals who already face numerous obstacles in accessing medical help (Dreze and Sen, 1999). Even minor healthcare costs can push low-income families into extreme poverty or worsen their financial situation (Gilson and McIntyre, 2005). Illness can further lead to poverty through income loss, treatment expenditures, and asset depletion. Hence, investing in health services that benefit the poor is crucial for poverty alleviation and achieving the Millennium Development Goals (WHO, 2002; World Bank, 2004).

Many of the previous studies tend to estimate the cost of illness of different sections of society but they did not give attention to the information regarding elderly patients and accompanying persons. Due to elderly's health issues, both the working days and income are lost in the case of elderly patients and the accompanying persons. The majority of household-level research on health spending is based on responses from either rural (Berman et al. 1987, Sauerborn et al. 1995) or urban areas (Rout 2006, Vaishnavi and Dash 2009). Studies on the healthcare

spending trends of elderly rural residents are quite rare. The present study attempts to proceed in this direction by selecting samples from the rural elderly people in the Bhadrak district of Odisha. The specific objectives of the study are to estimate the direct and indirect cost of illness of the rural elderly people and the accompanying persons.

Cost of illness studies:

The cost of illness is unpredictable and often comes as a shock. In general, no one wants to become ill. When the elderly person becomes ill or contracts an illness, the effects are felt not just by him but also by the entire household, which bears the cost. Individuals perceive the costs of health care differently (Dranove and White, 1996). Costs of illness can be divided into two categories at the household level i.e., (1) The direct cost of illness, (2) The indirect cost of illness.

The direct cost of illness: Direct costs are incurred by the households for their members in the time of illness for getting treatment. The direct costs consist of both medical and non-medical charges. The medical expenses are consultation fees, medicines, hospitalization, pathological testing, etc., and the non-medical expenses are transportation costs, nutritious foods, expenditures on accompanying or elderly patients, etc. Determining the direct costs of an illness can be challenging as it requires accurate data on the use of health care services, as well as the costs associated with those services. Additionally, the direct costs of an illness may vary depending on the severity of the condition and the elderly people's personal circumstances (Segel, 2006).

Direct costs of illness can have a significant impact on elderly people and their families, particularly those with low incomes or limited access to health care. They can also have a significant economic impact, as they can contribute to increased health care spending and decreased productivity.

Understanding the direct costs of illness is important for policy-makers and health care providers, as it can inform the development of effective strategies to reduce the burden of illness and improve health outcomes.

Table 1: Medical and non-medical expenditures on elderly people and their households.

Direct Cost of illness	
Medical costs	Percentage
Consultation fees	8.3
Hospitalization	11.7
Pathological Testing	20.8
Medicines	29.2
Non-Medical costs	
Transportation	10.8
Lodging	15.8
Nutritious Foods	3.3
Total	100.0

Source: Survey data

Table 1 shows the illness-related medical and non-medical expenditures of elderly people and the accompanying person of the household. In the above table, the direct cost of illness consists of two parts. One is medical cost and the other is non-medical cost. In the medical cost, 29.2 per cent is the highest expenditure on medicine and 8.3 per cent is the lowest on consultation fees. And hospitalization and pathological testing are 11.7 per cent and 20.8 per cent respectively. Another part is non-medical costs expenditure where lodging cost is the highest at 15.8 per cent followed by transportation at 10.8 per cent and nutritious foods at 3.3 per cent respectively.

The indirect cost of illness: Indirect costs are the income losses or working days losses by the patients during the period of illness as well as the income loss after the illness because of a person's inability to work normally till the full recovery. When a family member suffers from an illness, the household often has a twofold financial burden due to the indirect cost of lost productive labour time. since it has a lower earning potential at a time when it needs more money to pay for treatment (Russel 2004).

Indirect costs can be divided into two categories:

- **Productivity costs:** These are costs associated with the loss of income or productivity due to illness, such as lost wages from missed work days, or reduced ability to work.
- **Quality of life costs:** These are costs associated with the impact of the illness on an elderly people's overall well-being and quality of life, such as the cost of additional caregiving or the impact of the illness on mental health.

Indirect costs of illness can be difficult to quantify, as they are often not captured in traditional medical billing or health care data. However, they can have a significant impact on the elderly, families, and society as a whole. For example, lost productivity due to illness can have a significant economic impact, while the reduced quality of life can have a significant impact on elderly's overall well-being.

Indirect costs are often ignored in economic evaluations of health interventions and policies, but they are essential for a comprehensive understanding of the overall burden of illness on society. Understanding the indirect costs of illness is important for policy-makers and health care providers, as it can inform the development of effective strategies to reduce the burden of illness and improve health outcomes.

MATERIALS & METHODS

The current study uses both primary and secondary data, however, primary data is used to the greatest extent to materialise the issues as stated above. Secondary data was taken from various research publications as per the requirement of the study. For the collection of primary data, the study used a multi-stage random sampling method. Primary data for the study was acquired from rural old persons in the Bhadrak district of Odisha particularly focussing on the aged 60 and above. According to the 2011 census, Bhadrak district is divided into seven blocks: Bhadrak, Basudevpur, Bhandaripokhari, Bonth, Chandabali, Dhamnagar, and Tihidi. Two blocks such as Basudevpur and Dhamnagar were chosen at

random. For the study, a total of 120 older people were chosen from two blocks consisting of 60 people from each block and out of those sixty respondents, 30 members of each of male and female category were selected from each Block. Villages were selected using probability proportion to sample size (PPS). At the village level, a sampling framework was prepared separately for male and female respondents (Banjare & Pradhan, 2014).

Health economists have differing views on the best way to calculate the financial burden of sickness. The human capital method, the friction cost method and the willingness to pay method are the three main methods used by Segel (2006) to estimate indirect costs. The only production losses that are measured by the friction cost technique are those that occur while a sick worker is being replaced. The willingness to pay technique calculates how much a person would be prepared to spend to lower their risk of contracting an illness or experiencing morbidity and mortality. The human capital method calculates the value of an elderly patient's or caregiver's lost output in terms of lost income. For mortality or permanent disability costs, the approach multiplies the earnings lost at each age by the probability of living to that age (Nag et al, 2015). However, Scitovsky (1982) argues that although the human capital approach has been employed in the majority of cost-of-illness estimations to date, the willingness to pay approach is more promising theoretically and has been used less frequently in practice.

Using the human capital method, we have made an effort to estimate the cost of illness in this study (Rice, 2000). The direct and indirect costs of disease have been measured using a variety of techniques in various research. Costs for both medical and non-

medical expenses have been taken into account in studies by Russell and Gilson (2006), Babu, et al. (2002), and Attanayake, et al. (2000). When estimating direct costs, Makinen, et al. (2000) only considered medical costs and left out non-medical costs like transportation and specialized foods. Similar to direct cost measurement, indirect cost measurement spans a wide range of studies. Some authors have calculated how much time patients and accompanying persons spend looking for care as well as how much time they lose from working because of illness. A few studies have increased the assessment to include the loss of lifetime income due to mortality (Russel 2004). But, when defining the opportunity cost of illness, the current study took into account both the direct and indirect expenses of illness but left out the intangible or psychological costs. Indirect cost or income loss is calculated by taking the productive working days of the earning persons (for both patients and accompanying persons) multiplied by their current wage rates (Nag et al, 2015).

RESULT AND DISCUSSION

Based on the perspectives of the respondents, Table 2 shows the prevalence of various diseases among elderly people in the study region. The three most prevalent medical conditions among elderly people in rural areas were cataracts (10.83%), high blood pressure (15.83%), and arthritis (18.33%). In Basudevpur block, hypertension significantly affected the elderly population, whereas arthritis was noticeably widespread in Dhamnagar block. In the research area, diabetes was less common, affecting 5.83% of elderly people. Furthermore, 3.3% of senior adults in both blocks did not disclose any ailments.

Table 2: Types of ailments prevalent among the elderly people in the study area.

Ailments		Block of the HH		Total
		Dhamnagar	Basudevpur	
Has a doctor or nurse ever told you that you have any of the ailments	No ailments	2 (3.33)	2 (3.33)	4 (3.33)
	Arthritis	15 (25)	7 (11.66)	22 (18.33)
	Stroke or Thrombosis	2 (3.33)	2 (3.33)	4 (3.33)
	Angina (heart disease)	2 (3.33)	1 (1.66)	3 (2.5)
	Diabetes	2 (3.33)	5 (8.33)	7(5.83)
	Chronic lung disease (COPD)	1 (1.66)	1 (1.66)	2 (1.66)
	Asthma (allergic respiratory disease)	2 (3.33)	2 (3.33)	4 (3.33)
	Depression	1 (1.66)	2 (3.33)	3 (2.5)
	High blood pressure (Hypertension)	10 (16.66)	9 (15)	19 (15.83)
	Cancer	1 (1.66)	1 (1.66)	2 (1.66)
	Dementia/ Alzheimer's	3 (5)	1(1.66)	4 (3.33)
	Gall bladder illness	1 (1.66)	1 (1.66)	2 (1.66)
	Osteoporosis	3 (5)	1 (1.66)	4 (3.33)
	Renal or Urinary Tract infections	1 (1.66)	4 (6.66)	5 (4.16)
	Cataract	6 (10)	7 (11.66)	13 (10.83)
	Loss of all-natural teeth	3 (5)	2 (3.33)	5 (4.16)
	Injuries that occur by chance	2 (3.33)	1 (1.66)	3 (2.5)
	Falling Injury	1 (1.66)	1 (1.66)	2 (1.66)
	Skin disease	1 (1.66)	2 (3.33)	3 (2.5)
	Paralysis	1 (1.66)	3 (5)	4 (3.33)
Impaired hearing	0	2 (3.33)	2 (1.66)	
Gastric	0	2 (3.33)	2 (1.66)	
Gangrene	0	1 (1.66)	1 (0.83)	
Total		N= 60	N=60	N= 120

Note: Figures in brackets are percentages of the total in each column.
Source: Survey data

The elderly people who are sick not only miss work but also have to spend money on medical expenses that could be used for saving, consuming, or other things. Again, if they lack past savings or sufficient income to pay for the treatment of elderly people or

household members, they are obliged to borrow, mortgage, and sell important commodities. Therefore, elderly people or household members lose their income or working days at a time when they need more money to pay for medical treatment.

Table 3: Loss of working days by elderly patients and accompanying person

Loss. Of working days (In a year)	Loss of working days by		Total
	Patient	Accompanying Persons	
No working days loss	7	16	23
less than 1month	13	17	30
1 Month-5 Month	10	21	31
5 Months and above	15	21	36
Total	45	75	120

Source: Survey data

The table-3 portrays the working days loss by the elderly patients and the accompanying person. The accompanying person lose more working days than the elderly patients.

Table 4: Area wise working days loss due to illness

Loss of working Days (In a year)	Block				Total	
	Dhamnagar		Basudevpur		Frequency	Percentage
	Frequency	Percentage	Frequency	Percentage		
No working days loss	8	13.33	10	16.67	18	15
less than 1 month	26	43.33	13	21.67	39	32.5
1 Month-5 Month	15	25	17	28.33	32	26.67
5 Month andabove	11	18.34	20	33.33	31	25.83
Total	60	100	60	100	120	100

Source: Survey data

Table 4 presents the working days loss by households due to illness in both Dhamnagar and Basudevpur blocks. In Dhamnagar block, 43.33% of households

experienced a working days loss of nearly less than one month due to illness, 25% lost their working days for a period ranging from one month to five months, 18.34%

faced a loss of five months and above, and only 13.33% of households did not lose any working days due to illness. In Basudevpur block, 21.67% of households lost their work for nearly less than one month, 28.33% experienced a working days loss of one to five months, 33.33% faced a loss of five

months and above, and only 16.67% of households did not lose any working days due to illness. Both blocks witnessed a significant number of households losing their work due to illness, but the Basudevpur block had a higher working time loss compared to Dhamnagar block.

Table 5: Gender wise working days loss due to illness.

Loss of working Days (In a year)	Gender				Total	
	Male		Female		Frequency	Percentage
	Frequency	Percentage	Frequency	Percentage		
No working days loss	6	10	24	40	30	25
less than 1 month	16	26.67	15	25	31	25.83
1 Month-5 Month	17	28.33	12	20	29	24.17
5 Month and above	21	35	9	15	30	25
Total	60	100	60	100	120	100

Source: Survey data

Table 5 illustrates the gender-wise working days loss by households due to illness. Among total male households, 35% experienced a working days loss of nearly five months and above, 28.33% faced a loss ranging from one month to five months, 26.67% lost their work for nearly less than one month, and only 10% of households did not lose any work due to illness. Among total female households, 40% did not

experience any working days loss due to illness, 25% faced a loss of nearly less than one month, 20% experienced a loss ranging from one month to five months, and only 15% of households lost their work for nearly five months and above due to illness. Male households had higher working days loss than female households due to illness in the study area.

Table 6: Caste-wise working days loss due to illness.

Loss of working Days (In a year)	Caste						Total	
	SC		OBC		General		Freq	Percent
	Freq	Percent	Freq	Percent	Freq	Percent		
No working days loss	6	11.53	9	20.46	8	33.33	23	19.17
less than 1 month	10	19.24	13	29.54	7	29.17	30	25
1 Month-5 Month	14	26.92	12	27.28	5	20.83	31	25.83
5 Month and above	22	42.31	10	22.72	4	16.67	36	30
Total	52	100	44	100	24	100	120	100

Source: Survey data

The table-6 indicates the caste-wise working days loss of the household due to illness. Among the total Schedule Caste households, 42.31 per cent of the household lost their work for nearly five-month and above, 26.92 per cent of the household's loss their work nearly one month to five months, 19.24 per cent of the household's loss their work nearly less than one month due to illness and only 11.53 per cent of the households do not loss their work. 22.72 per cent of the OBC households' loss their work nearly five month and above, 27.28 per cent of the household's loss their work nearly one month to five months, 29.54 per cent of

the household's loss their work nearly less than one month due to illness and only 20.46 per cent of the households do not loss their work in OBC category in the study area. Among the total general people 16.67 per cent of the household's loss their work nearly five month and above, 20.83 per cent of the household's loss their work nearly one month to five months, 29.17 per cent of the household's loss their work nearly less than one month due to illness and 33.33 per cent of the households do not loss their work. Schedule caste people loss more working days than OBC and General category because most of the Sc category

people depends on daily labour and agricultural work. But, most of the general category people are government service

holder so that general people lose fewer working days due to illness.

Table 7: Area wise income loss due to illness.

Loss of Income (In a Year)	Block				Total	
	Dhamnagar		Basudevpur			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
No income loss	11	18.33	7	11.67	18	15
less than 5000	22	36.67	12	20	34	28.33
5000-10000	11	18.33	22	36.67	33	27.51
10000-20000	9	15	13	21.66	22	18.33
20000 and above	7	11.67	6	10	13	10.83
Total	60	100	60	100	120	100

Source: Survey data

The table-7 portrays the area wise income loss of the household due to illness. In the Dhamnagar block, 36.67 per cent of the sampled household loss their income less than 5000 because of illness, 18.33 per cent of the sampled households lost their income ranges between the 5000 to 10000, 15 per cent of the sampled households lost their income ranges between the from 10000-20000, 11.67 per cent of the sampled households lost their income ranges from 20000 and above and 18.33 per cent of the study households do not lose their income due to illness. But, in the Basudevpur block,

36.67 per cent of the study households lost their income ranges from 5000 to 10000, 21.66 percent of the households lost their income ranges from 10000-20000, 20 per cent of the sampled household lost their income less than 5000 because of illness, 10 per cent of the households lost their income ranges from 20000 and above and 11.67 per cent of the households do not lose their income due to illness. Due to illness, Basudevpur people lost their income more than the Dhamnagar people because most of the people in the Basudevpur block working on unorganised sector.

Table 8: Gender-wise income loss due to illness.

Loss of Income (In a Year)	Gender				Total	
	Male		Female			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
No income loss	6	10	20	33.33	26	21.67
less than 5000	20	33.33	11	18.34	31	25.83
5000-10000	17	28.33	14	23.33	31	25.83
10000-20000	10	16.67	9	15	19	15.84
20000 and above	7	11.67	6	10	13	10.83
Total	60	100	60	100	120	100

Source: Survey data

The table-8 shows the gender wise income loss of the households due to illness. Among the total male population of the study, 33.33 per cent of the male are loss their income ranges from less than 5000, 28.33 per cent of the male are loss their income ranges from 5000-10000, 16.67 per cent of the male are loss their income ranges from 10000 to 20000, 11.67 per cent of the male are loss their income ranges from 20000 and above due to illness and only 10 per cent do not lose their income due to illness. Among the total female population in the study area,

33.33 percent do not loss their income due to illness, 18.34 per cent of the female are loss their income ranges from less than 5000, 23.33 per cent of the female are loss their income ranges from 5000-10000, 15 per cent of the female are loss their income ranges from 10000 to 20000, 10 per cent of the female are loss their income ranges from 20000 and above. Male category people loss more income than female category people because most of the female population are home maker in the study area.

Table 9: Caste-wise income loss due to illness.

Loss of Income (In a Year)	Caste						Total	
	SC		OBC		General			
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
No income loss	3	7.31	9	21.42	14	37.83	26	21.67
less than 5000	12	29.27	11	26.20	8	21.62	31	25.83
5000-10000	9	21.96	11	26.20	6	16.22	26	21.67
10000-20000	7	17.06	7	16.66	5	13.51	19	15.83
20000 and above	10	24.40	4	9.52	4	10.82	18	15
Total	41	100	42	100	37	100	120	100

Source: Survey data

The table-9 indicates the caste-wise income loss of the households in the study area due to illness. Among the total schedule caste households, 29.27 per cent of the sampled households lost their income ranges from less than 5000, 21.96 per cent of the households lost their income ranges between the 5000 to 10000, 17.06 per cent lost their income ranges from 10000-20000, 24.40 per cent lost their income ranges from 20000 and above due to illness and only 7.31 per cent of the households do not lose their income due to illness. Among the total OBC households, 26.20 % of the sampled households lost their income ranges from less than 5000, 26.20 lost their income ranges from 5000 to 10000, 16.66 per cent of the sampled households lost their income ranges between the 10000 to 20000 and

only 9.52 per cent of the households lost their income ranges between the, RS 20000 and above due to illness. 21.42% of the households do not lose their annual income due to illness. Among the total general population, 37.83 per cent of the sampled household do not loss their income due to illness, 21.62 % of the sampled households lost their income ranges from less than 5000, 16.22 per cent lost their income ranges from 5000 to 10000, 13.51 per cent of the sampled households lost their income ranges in 10000 to 20000 and only 10.82 per cent of the sampled households lost their income ranges in 20000 and above. The most vulnerable social class people (SC) lose their income more than the OBC and General category.

Table 10: Sources of loan taken by the household for illness.

Sources of loan	Loan amount				Total	
	No Debt.	less than 50000	50000-1 lakh	1 lakh and above	Frequency	Percent
Money Lender	0	3	1	0	4	3.33
Friends and Relatives	0	12	7	4	23	19.17
Banks	0	0	5	3	8	6.66
SHG	0	18	8	6	32	26.67
other	53	0	0	0	53	44.17
Total	53	33	21	13	120	100

Source: Survey data

The table-10 depicts the loan taken by the households from different sources for illness. Among the total sampled households, most of the households (26.67 per cent) are taking loan from self-help groups (SHG), 19.17 per cent of households are taking loan from friends and relatives, 6.66 per cent of the households are taking

loan from the banks and only 3.33 per cent of the elderly households are taking loan from the money lenders in the study area for illness. 44.17 per cent of the households do not take any loan from any source for illness in the study area. Now a days, in the rural area the main source of debt is Self Help Group (SHG).

Table 11: loss of productive assets by the household.

Lost assets	Value of Asset				Total	
	No Asset Loss	less than 50000	50000-1 lakh	1 lakh and above	Freq	Percent
Jewellery	0	14	3	0	17	14.17
Land	0	1	4	6	11	9.16
Livestock	0	17	2	1	20	16.67
Others	72	0	0	0	72	60
Total	72	32	9	7	120	100

Source: Survey data

The table-11 shows the productive asset loss by the households for illness. Among the total study population, most of the people (16.67 per cent) in the study area lost their livestock, 14.17 per cent lost their Jewellery, and 9.16 per cent of the household lost their land due to illness. An average of 60 per cent of the household do not lose any type of productive asset to illness in the research area.

CONCLUSION

The study reveals that the loss of working days for accompanying persons exceeds that of the elderly patients in the research area. Most sample households in both Dhamnagar and Basudevpur blocks have experienced work loss due to illness, with a higher opportunity cost of illness observed in Basudevpur block. Male individuals have lost more working days than females due to illness. Among social categories, Scheduled Caste people have suffered the most working day losses, attributed to their reliance on daily labor and agriculture, while the general category, with many government service holders, experienced fewer working day losses. Basudevpur residents lost more income than those in Dhamnagar, as many in the former block work in the unorganized sector. Male-category individuals also suffered higher income losses compared to females, given the higher number of female homemakers in the study area. Vulnerable social class, such as SC, experienced more income losses than OBC and the general category. A significant percentage of households (26.67%) resorted to loans from self-help groups (SHGs) due to illness, which has become a primary source of debt in rural areas. Among the total study population, 16.67% lost livestock, 14.17% lost jewelry, and 9.16% lost land due to illness. These findings underscore the need for improved health facilities and care services for the elderly in Odisha, urging policy-makers to address these issues. Establishing geriatric units in government hospitals in villages is essential to cater to the distinct needs of the elderly.

Moreover, implementing preventive health care measures and programs specifically targeting the elderly population is crucial.

Declaration by Authors

Ethical Approval: This article is a revised version of the first author's M.Phil. dissertation, which was approved by the Department of Social Science, Fakir Mohan University, Odisha, India in 2021.

Limitations: The study's limitations include generalizing the findings based on limited sample size and relying solely on self-reported cases of morbidity without clinical examinations, potentially leading to variations in results compared to other studies.

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