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ORIGINAL ARTICLE

Comparative Study of Morbidity Patterns and Sociodemographic Factors among Elderly in Old Age Homes and Residences, Puducherry

A. M. Arun Vineeth,[1,*] D. Arunachalam,[2] T. Vignesh[3] and K. Sevvanthi[4]
[1]*Postgraduate, Department of Community Medicine, Aarupadai Veedu Medical College and Hospital, Puducherry*
[2]*Professor, Dept of Community Medicine, Aarupadai Veedu Medical College and Hospital, Puducherry*
[3]*Associate Professor, Dept of Community Medicine, Aarupadai Veedu Medical College and Hospital, Puducherry*
[4]*Statistician, Dept of Community Medicine, Aarupadai Veedu Medical College and Hospital, Puducherry*

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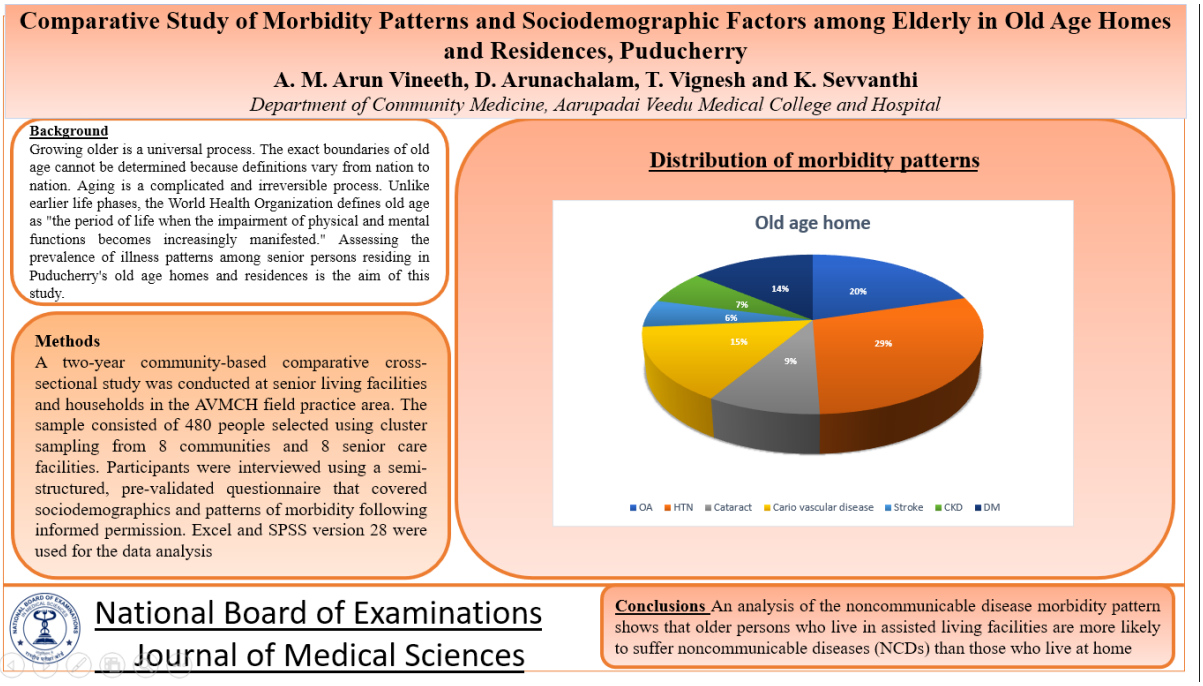
Abstract

Introduction: Growing older is a universal process. The exact boundaries of old age cannot be determined because definitions vary from nation to nation. Aging is a complicated and irreversible process. Unlike earlier life phases, the World Health Organization defines old age as "the period of life when the impairment of physical and mental functions becomes increasingly manifested." Assessing the prevalence of illness patterns among senior persons residing in Puducherry's old age homes and residences is the aim of this study. **Methods:** A two-year community-based comparative cross-sectional study was conducted at senior living facilities and households in the AVMCH field practice area. The sample consisted of 480 people selected using cluster sampling from 8 communities and 8 senior care facilities. Participants were interviewed using a semi-structured, pre-validated questionnaire that covered sociodemographics and patterns of morbidity following informed permission. Excel and SPSS version 28 were used for the data analysis. **Results:** Among the 480 participants in the study, 36% were women and 64% were men. 37.9% of research participants were between the ages of 70 and 80. About 64.4% of people had at least one chronic condition, with 75.4% of those people living in an assisted living facility. 51.5% of the elderly had hypertension, the majority. The majority of sociodemographic variables were found to be important in relation to non-communicable diseases. **Conclusion:** An analysis of the noncommunicable disease morbidity pattern shows that older persons who live in assisted living facilities are more likely to suffer noncommunicable diseases (NCDs) than those who live at home. Most sociodemographic factors were found to have a significant impact on the morbidity pattern of a number of NCDs, including diabetes mellitus, hypertension, cardiovascular disease, chronic kidney disease, stroke, visual impairment, and osteoarthritis.

Keywords: Elderly, Old age home, Residence, Morbidity patterns, Non Communicable Disease

*Corresponding Author: A. M. Arun Vineeth
Email: a.m.arunvineeth@gmail.com

Graphical Abstract



Introduction

The process of aging is universal. According to a quote by Sir James Ross, "You can't heal old age; you have to protect, promote, and extend it." The world population has shifted from a pattern of high birth and death rates to low birth and death rates due to developments in modern medicine and technology, which has resulted in the greying of the population. The process by which the percentage of senior citizens in a society rises is known as “population ageing” [1].

India's population is aging as a result of improved public health and medical facilities, which have reduced fertility and raised life expectancy, respectively. The exact boundaries of old age cannot be determined because definitions vary from nation to nation. In January 1999, the Indian government developed a “National Policy on Older Persons.” According to the regulation, a person is considered a "senior citizen" or "elderly" if they are 60 years of age or older [2]. The process of aging is complex and irreversible [3].

Aging is caused by the cumulative effects of biological damage to molecules and cells. At the physiological level, "aging" refers to the bodily changes caused by a decline in the body's capacity to operate correctly. Numerous chronic illnesses, poor health, issues with vision and hearing, memory loss, trouble eating and digesting food, and an inability to regulate particular physiological processes can all be brought on by these alterations. Ageing is also linked to other life transitions, such as retirement, moving to a more suitable home, and losing friends and companions, in addition to biological changes. Longer life expectancies have been attributed to a number of factors, including improved living conditions, food security, nutritional status, and medical services.

The range of diseases has shifted from communicable to non-communicable due to the prolonged lifespans of the elderly. In terms of morbidity, 50% of India's older population has chronic illnesses, 6% is immobile, and vision and hearing problems are common [5]. In addition to physiological factors, behavioral choices made by individuals and families, genetically inherited health traits, living environment, and changes in socioeconomic status all have an impact on an individual's post-retirement lifestyle, health status in general, and morbidity in particular among the elderly. Therefore, rather than being a random occurrence, factors at the home and community levels influence illness in the elderly [6].

Objectives

1. To examine the differences in morbidity between Puducherry locals and elderly individuals residing in assisted living facilities.
2. To identify the sociodemographic characteristics that affect the pattern of non-communicable disease morbidity among senior citizens residing in Puducherry's old age homes and residences.

Materials and Methods

The elderly residents of AVMCH's field practice areas and those over 60 residing in old age homes participated in a community-based comparative cross-sectional study. According to the inclusion and exclusion criteria, 480 study participants were chosen using the cluster sampling technique, 30 from each hamlet and senior living facility. The sample size, which was 480 (240 in each group), was calculated using the statistical procedure to compare two independent proportions. Morbidity rates for senior adults residing in old age homes were estimated to be 0.80 and 0.90, respectively. It was assumed that the significance and power levels were 80% and 5%, respectively. For reference, LS George et al. [9] conducted a related investigation.

After applying the design effect, we got the sample size of 480 with 240 in each group.

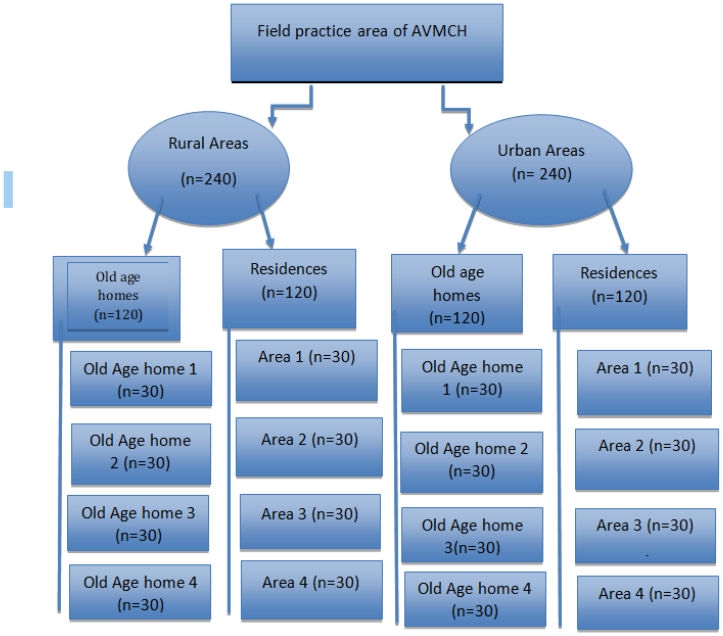


Figure 1. The flowchart of the sampling technique.

The sample method is shown in Figure 1. The samples were selected using the cluster sampling technique. Based on their viability, villages and senior living facilities in both rural and urban areas of our field practice area were selected as our primary sampling unit. A cluster was defined as four communities and four senior homes in both rural and urban locations. The study included a total of sixteen clusters. The probability proportionate to size (PPS) technique was used to determine how many samples should be selected from each cluster for senior homes and residences. Using PPS as the last sampling unit, the study population was randomly selected from each cluster. 240 samples from residences and senior living facilities were eventually selected, presuming a sample.

Assuming a sample size of 480, 240 samples were selected from houses and senior care facilities. Interviewers pre-designed and pretested a semi-structured, validated questionnaire for the older age group that satisfied the inclusion and exclusion criteria. The survey's first segment contained sociodemographic data. The second section of the questionnaire focused on duration and morbidity patterns. Comorbidity history was assessed by asking about a history of diabetes, hypertension, chronic renal illness, cardiovascular disease, stroke, osteoarthritis, and visual impairment.

The survey was distributed after face validity and pilot testing. Data input was done using Microsoft Excel 2021. Data analysis was conducted using SPSS version 28. Frequency charts and bar graphs were used to illustrate the descriptive variables. To investigate the differences between the categorical variables, the chi square test, independent t test, and fischer exact test were employed. A review of sociodemographic characteristics and morbidity patterns was conducted. For statistical significance, a p-value of less than 0.05 was considered.

Results

Over the course of 15 months, from May 2023 to May 2024, residents of the AVMCH field practice regions and senior adults over 60 residing in assisted living facilities took part in a community-based comparative cross-sectional study. The study comprised 480 older people in total, 240 of whom lived in residences and 240 of whom were in old age homes.

Table 1. Association of Socio-demographic characteristics among the elderly in old age homes and residence areas

Variables	Category	Old Age Home	Residences	Total	χ^2	p- value
		n (%)	n (%)	n(%)		
Age	60-70 70-80 >80	76 (31.7) 99 (41.3) 65 (27.1)	81 (33.8) 91 (37.9) 68 (28.3)	81 (33.8) 91 (37.9) 68 (28.3)	0.564	0.754
Sex	Male Female	157(65.4) 83(34.6)	150(62.5) 90(37.5)	307(64.0) 173(36.0)	0.443	0.506

Marital Status	Divorce	1 (0.4)	9 (3.8)	10 (2.1)	15.578	0.004*
	Married	143 (59.6)	158 (65.8)	301 (62.7)		
	Separated	23 (9.6)	13 (5.4)	36 (7.5)		
	Single	35 (14.6)	18 (7.5)	53 (11.0)		
	widow	38 (15.8)	42 (17.5)	80 (16.7)		
Education status	Graduated	47 (19.6)	14 (5.8)	61 (12.7)	30.299	<0.001*
	High	63 (26.3)	59 (24.6)	122 (25.4)		
	Illiterate	19 (7.9)	42 (17.5)	61 (12.7)		
	Middle	50 (25.4)	70 (29.2)	120 (25.0)		
	Primary	61 (25.4)	55 (22.9)	116 (24.2)		
Occupation	Employed	61(25.4)	88(36.7)	149(31.0)	7.095	0.008*
	Unemployed	179(74.6)	152(63.3)	331(69.0)		
Type of Family	Extended	28 (11.7)	15 (6.3)	43 (9.0)	4.865	0.182
	Joint	101 (42.1)	100 (41.7)	201 (41.9)		
	Nuclear	59 (24.6)	69 (28.7)	128 (26.7)		
	Others	52 (21.7)	56 (23.3)	108 (22.5)		
SES	Class I	135 (56.3)	32 (13.3)	167 (34.8)	140.426	<0.001*
	Class II	58 (24.2)	89 (37.1)	147 (30.6)		
	Class III	22 (9.2)	81 (33.8)	103(21.5)		
	Class IV	8 (3.3)	38 (15.8)	46 (9.6)		
	Class V	17(7.1)	0(0)	17(3.5)		

The sociodemographic traits of the elderly living in assisted living facilities and homes are displayed in Table 1. The majority of elderly people in both old age homes and residences are between the ages of 70 and 80. In both groups, married people make up the majority of the elderly (62.7%). With a total of 25.4%, high school was the most prevalent educational level among research participants in both old age homes and residences. 31% of the elderly were employed, the lowest percentage. Approximately 41.9% of research participants are part of a joint family. The highest percentage of research participants in the upper class (Class I) was around 34.8%.

Sociodemographic traits such as occupation, SES, marital status, and educational attainment varied significantly among the senior population in the old age home and the residential area.

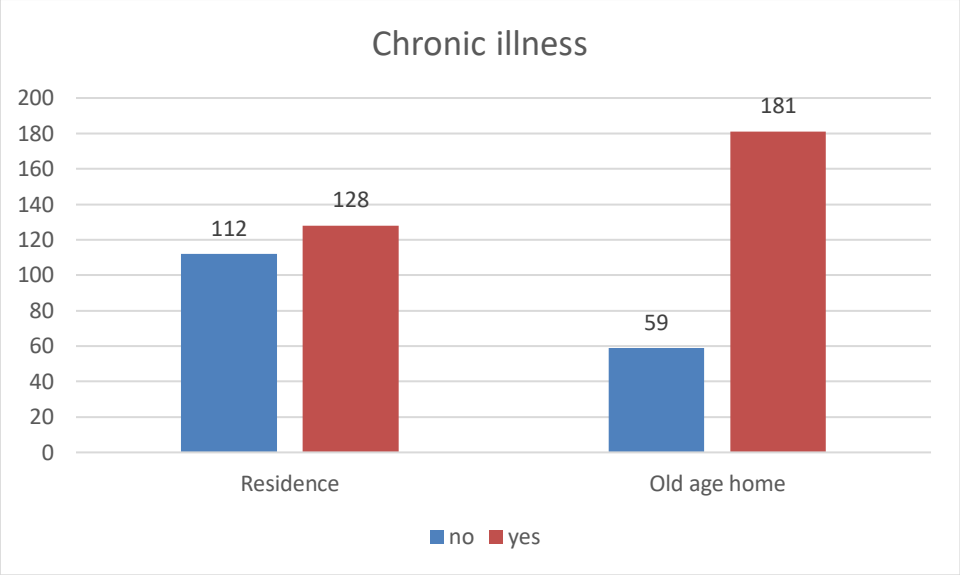


Figure 2. Distribution and comparison of study participants based on place according to the chronic illness

Table 2. Distribution and comparison of study participants based on place according to the chronic illness (N=480)

Chronic illness	Old age home n = 240	Residence n = 240	Total N = 480	χ^2	p- value
	n (%)	n (%)	n (%)		
No	59 (24.6)	112 (46.7)	171 (35.6)	25.518	<0.001*
Yes	181(75.4)	128 (53.3)	309 (64.4)		

*p-value <0.05 shows significance

The largest majority of participants (64.4%) had a chronic condition, according to Table 2, with 75.4% living in assisted living facilities and 53.3% in private homes. This suggests that the majority of people in the research have a chronic condition. A significant correlation (<0.001*) exists between the type of stay and chronic illness.

Table 3. Distribution and comparison of study participants based on place according to number of chronic illness (N=480)

Number of chronic illness	Old age home	Residence	Total	χ^2	p- value
	n (%)	n (%)	n (%)		
0	45 (18.8)	47 (19.6)	92 (19.2)	22.994	<0.001*
1	44 (18.3)	54 (22.5)	98 (20.4)		
2	76 (31.7)	97 (40.4)	173 (36.0)		
3	50 (20.8)	34 (14.2)	84 (17.5)		
4	25 (10.4)	5 (2.1)	30 (6.3)		
5	0 (0)	3 (1.3)	3 (0.6)		

*p-value <0.05 shows significance

The majority of study participants (36.0%) have two chronic conditions, as shown in Table 3, with 40.4% living in houses and 31.7% in assisted living facilities. This indicates that the research population's most prevalent condition is having two chronic illnesses. The least represented group is those with five chronic illnesses (0.6%), with 0% living in assisted living facilities and 1.3% living in homes. There is a significant correlation between the number of chronic illnesses and the type of stay (<0.001*).

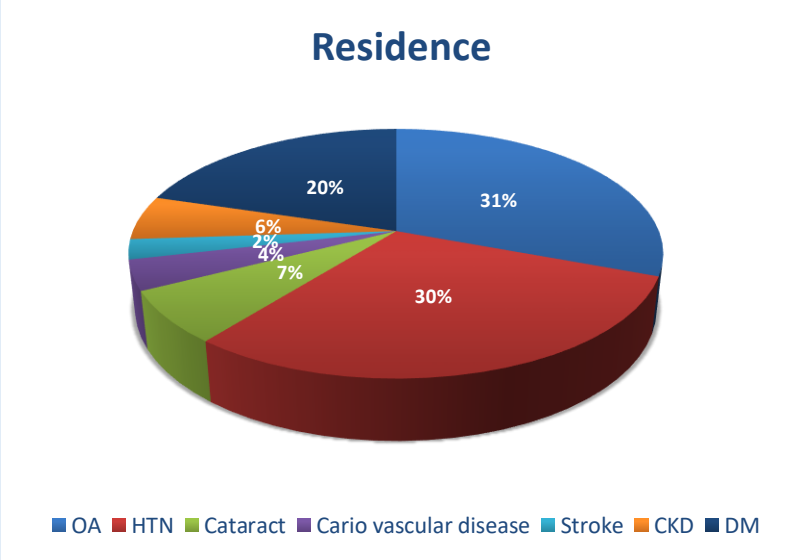


Figure 3. Distribution of morbidity patterns among elderly population in residences

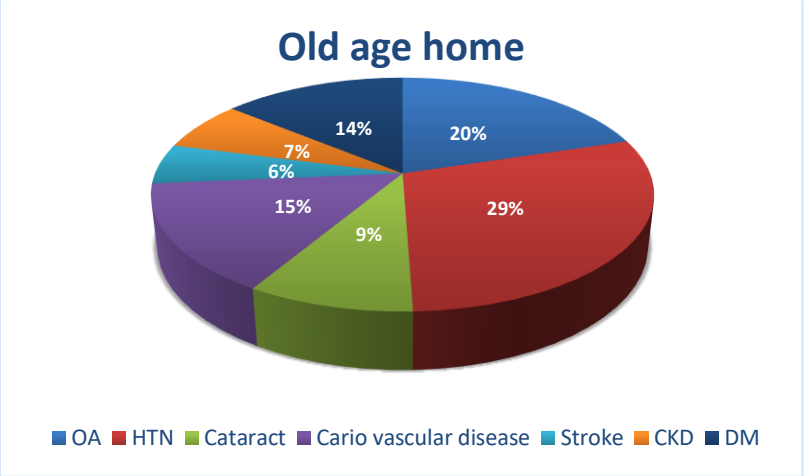


Figure 4. Distribution of morbidity patterns among elderly population in old age homes.

Figures 3 and 4 show that cardiovascular disease, osteoarthritis, diabetes mellitus, and hypertension are more common in both senior living facilities and homes. The two non-communicable diseases that are least common are stroke and chronic kidney disease.

Discussion

This study aims to assess the sociodemographic characteristics and patterns of illness among the elderly population living in the old age homes and residences in Puducherry. In addition to the urban and rural field practice areas of Aarupadai Veedu medical college and hospital, Puducherry, specifically Chinakankanankuppam, Periyakanganan-kuppam, Subaupalavadi, and Uchimedu, this cross-sectional study was carried out in four villages of Ariyankuppam: Chinnaveerampattinam, Manavely, Veerampattinam, and Nagoranthottam. A total of 480 study participants (30 from each village or anganwadi and 30 from each old age home) were chosen based on the inclusion and exclusion criteria, and samples were collected using the cluster sampling technique. A semi-structured validated questionnaire and a pre-validated questionnaire were used to gather data after informed consent.

Demographic distribution of our study participants

Age distribution in our study was approximately 33.8% between 60 and 70 years old, 37.9% between 70 and 80 years old, and 28.3% over 80 years old.

Similar findings were reported in the study conducted in a rural area of south Karnataka by Pooja Anudhar et al. [10], which found that the majority of study participants were between the ages of 60 and 69 (about 38.3%), 70 and 79 (about 38.3%), and over 80 years old (23.4%). The questionnaire was completed after informed consent.

A study by Ramocha et al. [11] reveals that 41% of the participants were in the 60–70 age range. 41.2% of people were between the ages of 71 and 80. The percentage of those over 80 was 17.5%. Conversely, Habatamu Sewunet Mekonnen et al.12 discovered that roughly 67.2% of their study participants were between the ages of 60 and 69, 23.3% were between the ages of 70 and 79, and 9.8% were over the age of 80.

Additionally, in contrast to our findings, George et al. (2010) observed that 70% of the participants were in the 60–69 age category, 27% were in the 70–79 age group, and 3% were beyond 80 years old. The study participants' varied geographic locations could be the cause. Therefore, it may be said that the mortality pattern increases with age.

Gender

Sixty-four percent of the participants in our study were men, and roughly 36 percent were women. Similarly, Sireesha Srinivasa Rao et al. [13] study revealed that 62% of participants were female and 38% were male.

Additionally, the study by Asmita Patnaik et al. [14] revealed that 33.2% of the population were female and 66.8% were male. On the other hand, the majority of study participants in the Sujitha P et al. [15] study were female (52.1%), compared to 47.9% of male individuals. Additionally, approximately 46% of the participants in the study by Sahoo et al. [16] were men, and 54% were women. Geographical variation or the mortality and morbidity pattern of the research region are the main causes of this gender discrepancy.

Marital status

Married individuals made up the largest percentage of survey participants (62.7%), followed by separated individuals (7.5%) and bereaved individuals (16.7%).

Similarly, Clarie Gough et al.'s study from 2017 reveals that 39% of research participants were married, 35% were widowed, 4% were single, and 22% were separated. The majority of the participants in a research by Bincy et al. [18] were married (44%), with 14% being widowed. In contrast, 52% of the study participants in the Sahoo et al. [16] study were widowed, divorced, or separated, while 22% of them were married and 16% were single. Ramocha et al. (2011) found that 57% of people were widowed and 40% of people were married.

Educational status

Most of the study participants had only finished high school (around 25.4%), followed by elementary school (24.2%), middle school (25%), and graduate school (12.7%). Illiteracy rates were 12%. Similarly, Habtamu Sewunet Mekonnen et al. [12] found that 27.7% of people could read and write, 16.9% had completed elementary school, 9.1% had completed middle school, 17.5% had graduated, and 28.8% were illiterate. In contrast, Sujitha et al. [15] survey revealed that around 40.3% were illiterate, 15.8% had finished elementary school, 29.7% had finished middle and upper secondary school, and 14.2% had graduated. According to a research by Ramocha et al. (2011), 16.25% of people had finished their tertiary education, while 11.25% were illiterate. The primary cause of these differences in educational attainment was the differential between residential stays and old age facilities.

Occupation

In our survey, 31% of individuals were employed, whereas roughly 69.0% were unemployed. Similar to this, a study by Sahoo et al. [16] found that 30% of people in urban areas of Raipur, Chhattisgarh, were employed, while 70% of people were unemployed. Conversely, Sujitha et al. [15] study reveals that, based on data from senior living facilities in the

Chengalpattu area, 60.9% of the population was employed and 39.1% was unemployed. The main reasons for this mismatch are the socioeconomic differences across the research sites and the lack of knowledge about government assistance for the elderly.

Socio economic status

According to the modified B.G. Prasad classification, the majority of research participants—34.8%—belonged to the upper class, followed by the upper middle class (30.6%), middle class (21.5%), lower middle class (9.6%), and lower class (less than 1.8%). Similarly, the George LS et al.9 study found that almost 43.9% of the participants were from the lower middle class, followed by the middle class (30.9%) and upper middle class (12.2%), with the lowest percentages from the lower and upper classes (10.4% and 2.6%, respectively). A study by Ruchi Dhar et al. (19), on the other hand, reveals that around 49% of participants in the metropolitan Davengere region were lower middle class, 26% were middle class, 13% were higher middle class, 12% were lower class, and 0% were upper class. Perhaps this discrepancy results from survey participants' ignorance about senior pension schemes' advantages.

Old age home versus Community dwelling old age

The distribution of individuals in our study who were between the ages of 60 and 70 was around 31.7% in the old age home, 33.8% in the residence, and 41.3% in the old age home. People over 80 made up 27.1% of the old age home's population and 28.3% of the dwellings', with 37.9% of the residents being between the ages of 70 and 80.Similarly, the study by Pooja Anudhar et al. [10] reveals that, across all regions of south Karnataka, 59.5% of people in the 60–70 age group lived in residences and 20% in old age homes, 40.5% of people in the 70–80 age group lived in old age homes and 33.5% of people lived in residences, and 39.5% of people over 80 lived in OAH and 7% lived in residences respectively.

The majority of study participants in Raipur, Chhattisgarh's urban areas, on the other hand, were between the ages of 60 and 70, with 37% living in residences and 18% in old age homes; those between the ages of 70 and 80 had 20% in old age homes, 7% in residences, and those over 80 had 12% in OAH and 6% in residences, according to a study by Sahoo et al. [17]. Consequently, it is concluded that the pattern of mortality differs according to the location of stay.

Magnitude of morbidity pattern

Approximately 64.4% of research participants reported that their daily activities were hampered by a chronic disease. Hypertension (51.5%), osteoarthritis (43.5%), cardiovascular disease (17.3%), vision impairment (14%), stroke (7.3%), chronic renal disease (11%), and diabetes mellitus (about 29.4%) comprised the morbidity pattern of chronic illnesses that characterized the majority of research participants. Comparably, a study conducted in the Shimla hills of North India by Deepak Sharma et al.20 revealed that 55% of the participants had osteoarthritis, 30.8% had visual impairment, 40.5% had hypertension, 8% had cardiovascular disease, 5.8% had diabetes mellitus, and 1.5% had stroke.

Also, in the study done by Kiran Bala et al. [21] done Similar to our findings, 56.5% of rural elderly people in

Jammu district had hypertension, 40% had visual issues, 52% had diabetes, 37.5% had osteoarthritis, and 32.5% had cardiovascular disease. In the contrary, the study done by Prabhakar et al. [22] approximately 49.4% of people in Delhi's suburban area had visual impairment, 58% had hypertension, and 30.3% had diabetes mellitus. 32.9% of people with arthritis had it, with one exception. Additionally, according to the LASI survey23, which was carried out in India, about 32.7% of people had hypertension, 14.2% had diabetes mellitus, 5.19% had cardiovascular disease and stroke (2.73%), which was less than what we found, and, on the other hand, only about 19.7% had osteoarthritis (43.5%). Additionally, the Jana et al. study from 24 revealed that almost 35% of participants had high blood pressure, 30% had diabetes, 15% had heart disease, and 3% had stroke. These variations in non-communicable disease prevalence may be due to changes in the morbidity pattern of non-communicable illnesses in connection to their lifestyle and awareness of NCD sickness prevention.

Conclusion

Noncommunicable diseases (NCDs) are more common in assisted living facilities than in the residences of older individuals, according to a comparison of the noncommunicable disease morbidity pattern. Many NCDs, such as diabetes mellitus, hypertension, cardiovascular disease, stroke, chronic renal disease, visual impairment, and osteoarthritis, have morbidity patterns that were found to be significantly influenced by most sociodemographic factors.

Statements and Declarations

Conflicts of interest

The authors declare that they do not have conflict of interest.

Funding

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