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Original Research Article

Morbidity and socio-demographic profile of functionally impaired elderly and its impact on caregiver burden in Kerala

Subin Koshy[1]*, C. R. Saju[2], Rupesh Raman[1], Vidhu M. Joshy[2]

[1]Department of Community Medicine, KMCT Medical College, Kozhikode, Kerala, India
[2]Department of Community Medicine, Amala Institute of Medical Sciences and Research, Thrissur, Kerala, India

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***Correspondence:**
Dr. Subin Koshy,
E-mail: subkoshy@gmail.com

ABSTRACT

Background: Aging populations increase the prevalence of functional impairment, leading to substantial dependence on informal caregivers and a high risk of caregiver burden. Understanding elderly characteristics and morbidity profiles, and how these influence caregiver burden, is vital. The objective of the study was to describe the socio-demographic characteristics and morbidity profile of functionally impaired elderly and examine associations with caregiver burden.
Methods: Community-based cross-sectional study among 250 functionally impaired elderly and their primary caregivers in Thrissur, Kerala. Socio-demographic and morbidity data (self-report and clinical assessment) for elderly, and Zarit burden interview scores for caregivers, were collected and analysed. Associations were tested using Chi-square or Fisher's exact test.
Results: Out of the 250 elderly, more than half were females and widows. Mean age was 73 years. Common morbidities included visual impairment (52.3%), hypertension (35.2%), diabetes (34.8%), dementia (26%), and urinary incontinence (26%). A vast majority (91.2%) depended heavily on caregivers for their activities of daily living (ADLs) and instrumental activities of daily living (IADLs).64% of caregivers reported significant burden. Burden was significantly higher ($p<0.05$) among those caring for elderly with dementia, mental health issues, cancer, urinary incontinence, and those highly dependent for ADLs.
Conclusions: Elderly with cognitive, psychiatric, oncologic, or incontinence-related morbidities and those highly dependent in ADLs contribute notably to caregiver burden, highlighting a need for targeted support.

Keywords: Caregiver burden, Elderly, Functionally impaired, Morbidity

INTRODUCTION

Global demographic transition is characterized by a rapidly expanding elderly population due to increased life expectancy and declining fertility rates worldwide. In India, the elderly demographic is projected to reach approximately 15% of the total population by 2036. However, the state of Kerala is at the absolute forefront of this transition, experiencing an advanced demographic shift. Currently, individuals aged 60 and above constitute roughly 18.7% of Kerala's population, a figure projected to exceed 22.8% by 2036 and approach 30.6% by 2051.[1] Kerala's rapid aging is driven by a starkly low total fertility rate of 1.35 and a high life expectancy-currently estimated at 78.4 years for women and 71.9 years for men.[2] This demographic reality is heavily compounded by the "empty nest" phenomenon, which is a direct consequence of the large-scale out-migration of Kerala's working-age youth to other states and foreign countries. Consequently, an increasing number of elderly individuals are left living alone or solely with an aging spouse, leading to a high old-age dependency ratio and profound psychosocial vulnerabilities.[3] As age advances, the prevalence of chronic multimorbidity and subsequent functional dependency rises significantly. This decline in physical and cognitive capacity shifts the responsibility of care onto informal caregivers. Informal caregivers are defined as unpaid individuals-typically family members, neighbours,

or friends-who provide essential daily assistance with personal care and medical tasks.[4] The intensive and prolonged demands of managing an older adult's functional decline frequently result in caregiver burden, which is defined as the multidimensional physical, psychological, emotional, social, and financial strain experienced by those providing care.[5] Understanding the complex interplay between the morbidity profile and functional status of the elderly, and how these factors dictate the magnitude of caregiver burden, is of critical public health importance. In the current Kerala context, informal family-based caregiving structures are under unprecedented stress.[6]

Public health researchers and clinicians rely on several validated scales to quantify caregiver burden like Zarit burden interview (ZBI) which is a 22-item questionnaire evaluates the impact of caregiving on the individual's health, psychological well-being, finances, and social life.[7] Other scales include caregiver burden scale (CBS), caregiver burden inventory (CBI), and caregiver burden inventory (AMC-CBI).[8-10] ZBI is the most widely used scale for assessing caregiver burden. A cross-sectional study conducted in the Ernakulam district among informal caregivers of palliative care patients revealed that 32.1% experienced moderate to severe burden. The data highlighted that caring for patients aged 73 and older, prolonged illness durations, and having children acting as caregivers significantly amplified this burden.[11] The degree of burden a caregiver experiences are heavily dictated by the specific clinical and functional profile of the older adult they are supporting. Elderly with dementia and Alzheimer's disease require constant supervision and specialized behavioural management, which drastically increases caregiver fatigue and emotional distress.[12]

Chronic non-communicable diseases (NCDs) like diabetes, hypertension, stroke, and coronary heart disease (CHD) necessitate strict medication adherence, dietary management, and frequent medical appointments, placing a heavy time and logistical burden on the caregiver.[13] Advanced terminal illnesses introduce severe emotional strain, the need for complex symptom management (like pain and dyspnoea), and anxiety about the unpredictable trajectory of the disease.[14] Dependency levels of elderly also play a role in caregiver burden. Burden spikes significantly when the elderly require hands-on physical assistance with activities of daily living (ADL), such as feeding, bathing, grooming, and mobility transfers (like moving from a bed to a chair). When an older adult can no longer manage instrumental ADL (IADL) like finances, prepare meals, or take their own medications, the caregiver must entirely absorb the household management.[15] Bowel and urinary incontinence are massive drivers of physical exhaustion. They demand constant hygiene maintenance and frequently disrupt the caregiver's sleep.[16] Visual impairments and musculoskeletal conditions (like severe osteoarthritis) limit mobility and increase fall risk, forcing caregivers to constantly monitor the environment to ensure safety.[17] While many studies evaluate caregiver burden in the context of specific diseases, such as dementia and cancer, there is a paucity of research examining this burden across various comorbidities and types of impairments. Furthermore, few studies explore how an older adult's ability to perform ADLs and IADLs impacts caregiver burden. The Kerala government set up the first dedicated department for senior citizens' welfare (department of senior citizens' welfare) in May 2026.[18] It acts as the nodal agency to implement legislation, coordinate with health and local self-government departments, and run specific schemes like Vayoraksha (emergency assistance and caregiver support for BPL families) and Vayomithram (mobile clinics and palliative care). Kerala state policy for senior citizens 2026 shifts the framework of aging from a charity-based model to a rights-based, "healthy aging" approach.[19] Despite the promise of recent policy developments, empirical data is needed. Objective of this study is to describe the socio-demographic characteristics and morbidity profile of functionally impaired elderly and examine their associations with caregiver burden.

METHODS

This community based cross-sectional study was conducted in Kaiparambu panchayat, a rural area of Thrissur district in the state of Kerala. Study population included the elderly population and their caregivers between December 2017 to December 2020. Inclusion criteria for the study were elderly persons aged 60 years and above having functional impairment and an informal caregiver aged above 18 years caring the elderly for at least 2 months. Caregivers who are not in a position to answer the questionnaire (deaf and mute) and those who cannot be contacted even after 3 visits were excluded from the study. Sample size was calculated using the formula given, knowing that the caregiver burden was estimated at 44%, by Zarit burden questionnaire from a similar study in the rural area in Bangalore district.[20]

$$N = Z^2pq/d^2$$

Wards of the panchayat was considered as clusters. As cluster sampling method was used, owing to the design effect, sample size was doubled to give 246 that was rounded to 250 elderly and their caregivers. A pretested, interviewer-administered, structured questionnaire was used for data collection, which was administered in Malayalam language. Institutional ethical committee clearance was obtained prior to starting the study. The list of the elderly persons in each ward was obtained by HMIS (health management information system). Elderly person was assessed for their functional impairment. Functionally impaired elderly was only included in the study, and they were asked to identify their caregiver. The written informed consent was obtained from each of the study participant. A demographic questionnaire was administered to the caregiver by the interviewer following their informed consent. Caregiver was evaluated by a structured questionnaire and clinical examination. Variables under study for functionally impaired elderly

person include sociodemographic factors, ADL - the Barthel ADL scale, IADL scale.[21,22] Cognitive impairment using mini mental status examination (MMSE) scale, functional assessment of mobility, ability to use upper limb, presence of depression and urinary incontinence, vision assessment using Snellen's chart, hearing assessment using whisper test.[23-25] Caregiver burden assessment was done using ZBI. In ZBI caregivers will be asked to respond to a series of 22 questions about the impact of the elderly person's disabilities on their life.[7] For each item, caregivers were asked to indicate how often they felt that way (never, rarely, sometimes, quite frequently, or nearly always), and the answer is scored. Based on the scores obtained, caregiver burden is categorized as follows: 0-20: no burden, 21-60: moderate burden, and 61-88: severe burden.[7] The data obtained was entered in Microsoft Excel sheet and analysed using the statistical software, statistical package for social sciences (SPSS version-23). Baseline characteristics of the study subjects were explained in terms of frequency, percentage, mean and standard deviation. Association between caregiver burden and various factors was analysed using Pearson's chi square test. Fisher's exact test was used when expected count was less than 5. The level of significance was estimated with 95% confidence intervals and p value <0.05. Ethical conduct and strict confidentiality were maintained during data collection and throughout the research.

RESULTS

Out of the 250 elderly subjects, mean age of the functionally impaired elderly is 73 years ranging from 60-98 years. There is an almost equal distribution of both sexes in the study population i.e. 47.2% males and 52.8% females. Maximum (39.2%) elderly people were in age group 70-79 years, 36.8% were in their sixties, whereas 24% constituted those aged 80 years and above. According to modified B. G. Prasad socioeconomic classification (2020), the elderly people and their family caregivers mostly (38.4%) belong to middle class families, 28% belong to upper middle class, 18% belong to upper class and 15.6% belong to lower middle-class families.[26] 48% families are three generation families, 38.4% are nuclear families and 13.6% are joint families. More than half of the elderly (52.8%) were widowed, 42.8% married, 2.4% got divorced or separated and 2% never married. Regarding education, 10% of elderly people and 1.6% of caregivers have not received any formal schooling. 30% elderly have not completed primary school. 91.2% elderly people are retired and not going for any job. 90% of the elderly have pension as their source of income (Table 1). The distribution of elderly people based on self-reported morbidity and its association with caregiver burden is mentioned in Table 2. Table 3 describes the type of ADL and IADL for which the elderly subject needs help from the caregiver.

No caregiver had scores above 60 while answering the ZBI. 160 caregivers (64% had a burden in caring for their functionally impaired elderly person while 90 (36%) caregivers responded as having no burden in caring for the functionally impaired elderly person. Table 4 and Figure 1 shows the distribution of elderly people based on the type of functional impairment and caregiver burden.

Table 1: Association between sociodemographic profile of elderly and caregiver burden of caregivers.

Variable	Level	Frequency n=250, N (%)	Caregiver burden present frequency n=160, N (%)	Chi-square	P value
Age category (years)	60-69	92 (36.8)	60 (37.5)	5.678	0.058
	70-79	98 (39.2)	55 (34.4)		
	≥80	60 (24)	45 (28.1)		
Gender	Male	118 (47.2)	74 (46.25)	0.141	0.707
	Female	132 (52.8)	86 (53.75)		
Religion	Hindu	163 (65.2)	103 (64.4)	0.683	0.711
	Christian	82 (32.8)	53 (33.1)		
	Muslim	5 (2.0)	4 (2.5)		
Type of family	Nuclear	96 (38.4)	64 (40)	5.497	0.064
	Joint	34 (13.6)	26 (16.25)		
	Three generation	120 (48.0)	70 (43.75)		
Marital status	Widowed/separated/not married	142 (56.8)	97 (60.6)	7.504	0 .112
	Currently married	108 (43.2)	63 (39.3)		
Educational status	No formal schooling	25 (10)	17 (10.6)	0.099	0.992
	Up to primary school	144 (57.6)	94 (58.8)		
	Up to secondary school	54 (21.6)	35 (21.9)		
	Above secondary school	27 (10.8)	14 (8.7)		
Socioeconomic status	Upper class	45 (18)	28 (17.5)	3.104	0.541
	Upper middle class	70 (28)	41 (25.6)		
	Middle class	96 (38.4)	67 (41.9)		

Continued.

Variable	Level	Frequency n=250, N (%)	Caregiver burden present frequency n=160, N (%)	Chi-square	P value
	Lower middle class	39 (15.6)	24 (15)		
Financial dependency status	Independent	12 (4.8)	6 (2.5)	5.510	0.064
	Partially dependent	231 (92.4)	152 (95)		
	Fully dependent	7 (2.8)	6 (2.5)		

Table 2: Distribution of elderly people based on self-reported morbidity and its association with caregiver burden.

Morbidity	Frequency n=250, N (%)	Caregiver burden present frequency n=160, N (%)	Chi-square	P value
Hypertension	88 (35.2)	47 (29.4)	9.389	0.002
DM	87 (34.8)	51 (31.9)	2.880	0.04
Paralysis of limbs (stroke, paraplegia, TIA)	54 (21.6)	40 (25)	2.192	0.139
CHD, MI and diseases affecting the heart	42 (16.8)	19 (11.9)	9.275	0.002
Bronchial asthma, COPD, diseases affecting the respiratory system	36 (14.4)	20 (12.5)	1.880	0.170
Gastrointestinal problems including diseases affecting kidney and liver	31(12.4)	22 (13.75)	0.452	0.501
Trauma, accidents	40 (16)	21 (13.1)	3.621	0.057
Osteoarthritis, disc prolapse, muscle and bone pain	30 (20)	25 (15.625)	6.74	0.009
Cancer	23 (9.2)	21 (13.1)	7.416	0.006
Mental problems including depression	49 (19.6)	46 (28.75)	21.595	0.0001
Dementia, memory loss parkinsonism	65 (26)	54 (33.75)	11.889	0.001
Genitourinary problems including urinary incontinence	65 (26)	61 (38.125)	31.055	0.0001

Table 3: Description of type of ADL and IADL for which the elderly subject needs help from the caregiver.

Variables	Frequency	Percentage, n=250
Activities of daily living		
Getting in and out of beds and chairs	216	86.4
Getting dressed	119	47.6
Getting to and from the toilet	173	69.2
Bathing or showering	102	40.8
Dealing with incontinence or diapers	65	26.0
Feeding	89	35.6
Instrumental activities of daily living		
Giving medications, pills, or injections	239	95.6
Managing finances, such as paying bills	197	78.8
Housework	233	93.2
Preparing meals	228	91.2
Transportation, either by driving or helping the elder to get transportation	223	89.2

Table 4: Distribution of elderly people based on the type of functional impairment and caregiver burden.

Type of functional impairment n=250	N (%)	Care giver burden present n=160, N (%)	Chi-square	P value
Cognitive impairment	60 (24)	50 (31.2)	11.002	0.001
Visual impairment	132 (52.8)	86 (53.7)	0.025	0.875
Hearing impairment	39 (15.6)	29 (18.1)	1.571	0.210
Dependent in at least one ADL	228 (91.2)	154 (96.25)	4.338	0.037

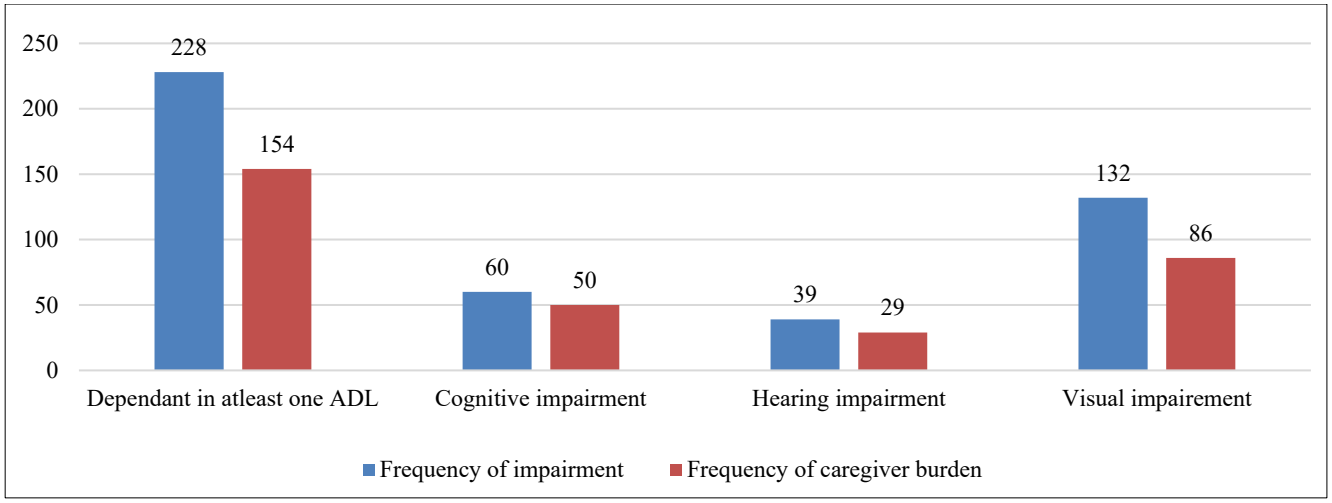

Figure 1: Distribution of elderly people based on the type of functional impairment and caregiver burden (n=250).

DISCUSSION

This study highlights that functionally impaired older adults in rural Kerala commonly live with multiple chronic and disabling conditions, and that caregiver burden is substantial, affecting nearly two-thirds of primary caregivers. The burden was especially pronounced when the older person had dementia, mental health problems, cancer, urinary incontinence, and greater dependence in activities of daily living. These findings reinforce that caregiver burden is not driven by age alone, but by the cumulative effect of cognitive, physical, and continence-related impairments that increase day-to-day care demands.

The sociodemographic profile of the participants reflects the realities of population ageing in Kerala, where women, widowed individuals, and those in the younger-old to old-old age range from a large proportion of the functionally impaired population. Similar patterns have been observed in other settings, where older age, chronic disease, and reduced functional independence are consistently linked to higher caregiving burden. A recent Malaysian study also found that chronic disease in the care recipient and higher functional dependence were important predictors of caregiver burden, which aligns closely with the present findings.[27]

The association between dementia and caregiver burden is well established and likely reflects the need for constant supervision, behavioural management, and emotional adjustment. Recent evidence continues to show that functional impairment in dementia is associated with greater caregiver burden, while the broader literature confirms that dysfunctional coping and limited adaptive support further intensify this strain. In the present study, the significantly higher burden among caregivers of older adults with cognitive impairment is therefore consistent with the multidimensional nature of caregiving stress.[28]

Urinary incontinence and mental health problems were also strongly associated with burden in this study. These conditions often require frequent monitoring, hygiene care, sleep disruption, and emotional labour, which can make caregiving more exhausting than management of stable chronic diseases alone. The recent literature from community and palliative care settings similarly shows that continence problems, chronic disease, and functional disability are important drivers of caregiver burden, suggesting that these issues should be addressed proactively in geriatric care planning.[29]

A notable finding was the high level of dependence in ADL and IADL tasks, particularly mobility transfers, toileting, medication administration, housework, meal preparation, and transportation. This indicates that caregiving in the study setting extends beyond occasional assistance and includes sustained hands-on support and household management. Such high-intensity caregiving is known to increase burden, and recent reviews show that caregiver burden is closely related to the care recipient's dependency.[30] Major strengths of this study were that standardized tools like Zarit burden questionnaire was used as the mode of data collection.

Limitations

Limitations of the study are that this study is that the current emotional condition, mood, recent incidents with elderly people or arguments, or any other tensions from work place and family may affect the response of the caregiver to the questionnaire. The desire of the caregivers to present themselves in a positive light also makes desirability bias very likely. These data reflecting community-level dynamics in semi urban/rural areas of central Kerala, may not be entirely generalizable to highly metropolitan areas where reliance on paid caregiving is more prevalent. Due to Kerala's advanced aging index, high youth out-migration, robust local healthcare infrastructure and increased out of pocket expenditure for

health care, the caregiving burden observed in our study may not directly extrapolate to other Indian states.

CONCLUSION

Older adults experiencing functional limitations within rural regions of Kerala frequently present with complex multimorbidity profiles, necessitating extensive assistance with fundamental and complex daily tasks. Our analysis reveals that roughly two out of three informal caregivers consider caring for the elderly a burden. The primary catalysts for this burden include the care recipient's degree of functional dependence, alongside specific clinical challenges such as malignancies, psychiatric symptoms, dementia, and poor bladder control. To address this, it is imperative that grassroots healthcare systems embed dedicated caregiver evaluations alongside targeted restorative, cognitive, and continence therapies. By identifying high-risk caregiving units early and deploying precise support mechanisms, health systems can alleviate provider fatigue and support the dignified community integration of vulnerable elders.

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