

A Cross-Sectional Study on Functional Disability among the Elderly in Rural Area of Goa

Arya Ravi¹, Vanita G. Pinto Da Silva²

¹Postgraduate Student, ²Associate Professor, Department of Community Medicine, Goa Medical College and Hospital, Bambolim, Goa, India

Correspondence: Dr. Arya Ravi, Email: aryaravi2024@gmail.com

Abstract:

Introduction: Functional disability among the elderly reduces autonomy, leading to dependency, decreased quality of life, increased hospitalization, and higher mortality rates, ultimately lowering general life expectancy and increasing disabled life expectancy. **Objectives:** 1. To estimate the prevalence of functional disability among the elderly residing in the field practice area of Rural Health and Training Centre, Mandur, Goa. 2. To determine the factors associated with functional disability among study participants **Methods:** A community-based cross-sectional study was conducted among elderly individuals (aged 60 years and above) in the field practice area of Rural Health and Training Centre, Mandur, Goa. Systematic random sampling recruited 372 participants from 1,588 households. Functional disability was assessed using the Barthel Index, with data analysed using SPSS 22.0. Prevalence was expressed as a percentage, and associations were evaluated using significance tests and Odds ratios with 95% confidence intervals. **Results:** Out of 372 participants (mean age: 71.24 ± 8.03 years), 95 (25.5%) had functional disabilities in ADL, visual, or hearing impairments. Significant associations were found with age, literacy, financial dependence, and current alcohol consumption (p < 0.05). **Conclusion:** The high prevalence of functional disability among the elderly in rural Goa highlights the need for targeted interventions to improve quality of life and independence. Health education, literacy, and financial support are critical for preserving functional abilities. Community-based initiatives and supportive healthcare policies are essential for reducing disability and healthcare costs among the elderly.

Keywords: Activities of Daily Living, Elderly, Functional disability

Introduction:

Disability is an intrinsic aspect of the human experience, with nearly everyone encountering temporary or permanent disability at some juncture in their lives.^[1] Embracing a holistic perspective, the International Classification of Functioning, Disability and Health (ICF) advocates for a biopsychosocial model that integrates both medical and social dimensions of disability.^[2] Disability encompasses impairment in bodily structure or function, activity limitations, and participation restrictions in daily activities.^[2]

Presently, about 15% of the global population, amounting to one billion individuals, live with

disabling conditions, with a significant portion being elderly individuals, constituting over 46% of the elderly worldwide.^[3] The demographic landscape is shifting, particularly in countries like India, where the proportion of elderly in the population rose from 5.61% in 1961 to 8.6% in 2011.^[4] This figure is further projected to gradually rise to approximately 20% in 2050, posing substantial challenges to healthcare and social support systems.^[4] This demographic shift underscores the imperative for increased attention to disability inclusion, not only for the well-being of individuals but also for advancing global health priorities and Sustainable Development Goals.^[4]

As individuals age, they often face a myriad of challenges that can impact their overall well-being and functional abilities.^[5] These challenges can manifest as acute morbidity conditions and functional losses, encompassing both physical and mental aspects. Consequently, older adults frequently experience functional disability, which poses risks to their health and working capacities.^[5] Activities of Daily Living (ADLs) serve as vital indicators of functional disability, comprising two categories: Basic ADLs and Instrumental ADLs.^[6] While Basic ADLs primarily involve motor functions, Instrumental ADLs are more closely associated with cognitive abilities.^[6]

The spectrum of disability among the elderly can be broadly categorized into three groups: those who can manage daily activities with mechanical aids, those with significant health issues requiring intensive care, and those with mild impairments in ADLs or cognitive functions.^[7] Understanding the magnitude of disability is crucial in assessing disease burden alongside morbidity and mortality rates.^[7]

Access to effective healthcare plays a pivotal role in ensuring the well-being and financial stability of older individuals.^[8] Recognizing the rights of persons with disabilities to equitable healthcare access underscores the importance of integrating disability considerations into public health and development

agendas.^[8] This study was carried out to estimate the prevalence of functional disability among the elderly residing in rural areas of Goa using the Barthel index. Also, this study was done to explore the factors associated with functional disability. By shedding light on these aspects, it is aimed to contribute valuable insights into the understanding of disability among the elderly population in rural areas of Goa.

Method:

This community-based cross-sectional study was conducted in the field practice area of Rural Health and Training Centre, Mandur, and includes villages namely Mandur, Azossim, Neura over a period of three months from March 25, 2023, to June 25, 2023.

The study focused on elderly individuals aged over 60 years residing in the area, who consented to participate. The inclusion criteria encompassed individuals aged over 60 years who had been residents of the area for more than six months, while those who could not be contacted after two consecutive visits, refused consent, were unable to comprehend the questionnaire, or were too ill to participate were excluded.

The sample size was calculated using $n = Z^2 pq/d^2$ and estimated at 372, based on the prevalence of functional disability affecting activities of daily living (ADL) status, found to be 37.4% in a previous study by Gupta et al.,^[14] with a 5% permissible error. Participants were recruited using systematic random sampling from a total of 1,588 households within the study area, which encompasses a population of 5,812 individuals. The estimated geriatric population within this area is 512 individuals. The sampling process began by calculating a sampling interval 'K', which was determined by dividing the total number of households (1,588) by the required sample size of elderly individuals (372). This yielded a sampling interval of approximately 4. Starting with a randomly selected household within the first interval, every fourth household was subsequently included in the sampling process. Within each selected household, if

more than one elderly individual was eligible for inclusion in the study, one was randomly chosen using a simple lottery method. Any identified health issues were addressed with referrals to appropriate healthcare facilities. Age verification relied on birth certificates or Election Commission identity cards, with alternative age estimation methods employed when necessary.

Data collection commenced after obtaining ethical clearance from the Goa Medical College Ethical Committee (GMC IEC/2023/69). Participation was voluntary, with informed consent secured from all participants, and confidentiality maintained. Sociodemographic information, including age, gender, religion, marital status, education, occupation, and financial dependence, was collected through face-to-face interviews using a pre-designed and pre-tested proforma. Educational levels were assessed using the Modified Kuppaswamy Socioeconomic Scale: 2022,^[9] while socioeconomic status was evaluated using the Updated BG Prasad's classification for 2022.^[10]

Operational Definition:

Elderly or senior citizens are defined as individuals aged over 60 years.^[11]

Functional disability was defined in this study as having a disability in (ADL) or blindness or bilateral hearing impairment or a combination of these.^[12]

Visual acuity was measured using Snellen's distance vision chart at 6 meters. Participants were categorized as having vision $<6/60$ or $\geq 6/60$, with blindness defined as presenting visual acuity of $<6/60$ in the better eye.^[13]

Hearing assessment began with Rinne's and Weber's tests using a 512 Hz tuning fork to determine bilateral hearing impairment.^[14]

Activities of Daily Living was measured using Barthel's Index.^[15] It uses 10 variables - Dressing, grooming, bathing, toileting, bladder control, bowel control, feeding, transferring from bed to chair, mobility, and stair climbing.^[15] The participant was

considered as having a disability in Activities of Daily Living, if he/she had at least one of these ten Activities of Daily Living disabilities. Sum the patient's scores for each item.^[15] The ten items are summed and x 5 to get a total score out of 100.^[24]

Scores of 0-20 indicate "total" dependency

Scores of 21-60 indicate "severe" dependency

Scores of 61-90 indicate "moderate" dependency

Scores of 91-99 indicate "slight" dependency

Score of 100 indicate "independent"

Most studies use a score of 60/61 (moderate dependency) as a cutting point.^[24]

Statistical Analysis

Data was entered in Microsoft Excel and transferred to IBM Statistical Package for the Social Sciences Statistics (SPSS) 22.0 for statistical analysis. Simple bivariate analysis was used to compute the association between various socio-demographic factors and functional disability. The prevalence of functional disability was estimated and reported as prevalence (95% confidence interval [CI]). To control for confounding factors, Binary logistic regression analysis was used. $P < 0.05$ was considered to be statistically significant

Results:

In Table 1, it was observed that a total of 372 elderly individuals participated in this study, out of which 226 (60.8 %) were females and 146 (39.2%) were males. The mean age of the participants was 71.24 ± 8.03 years. Predominantly, 189 (50.8%) elderly individuals belonged to the age group of <70 years, 196 (52.7%) were Hindu by religion, 364 (97.8%) were unmarried/separated/divorced, 218 (58.6%) were educated up to primary school, 254 (68.3%) were financially dependent, 313 (84.1%) had comorbidities, 231 (62.1%) were not current smokers, and 259 (69.6%) were current alcoholics.

According to Updated BG Prasad's classification for 2022, majority of the study participants 154 (41.4%) belonged to middle class, followed by 136

(36.6%) belonged to Upper middle class, 51 (13.7%) belonged to Lower middle class, 22 (5.9%) belonged to Upper class and 9 (2.4%) belonged to Lower class

Table 1 depicts the factors affecting functional disability are described. A statistically significant association ($p < 0.05$) was observed with age, literacy, financial dependence, currently alcoholic, whereas

there is no such significant association between the comorbidities, gender, religion, marital status, and smoking.

Table 2, depicts the prevalence of functional disability among the study participants. A total of 292 (78.5%) participants obtained a Barthel score of 100 indicating complete independence, whereas only 80

Table 1: Factors affecting Functional Disability and its Association with the Socio Demographic Characteristics (N=372)

Variables	Functional disability		Total (N=372)	χ^2	p value
	Presentn n (%)	Absent n (%)			
Age*					
≥ 70 years	73 (39.9%)	110 (60.1%)	183 (100%)	39.02	0.001
<70 years	22 (11.6%)	167 (88.4%)	189 (100%)		
Gender					
Male	37 (25.3%)	109 (74.7%)	146 (100%)	0.005	0.945
Female	58 (25.6%)	168 (74.4%)	226 (100%)		
Religion					
Hindu	53 (27.0%)	143 (73%)	196 (100%)	0.492	0.483
Christian	42 (23.8%)	134 (76.2%)	176 (100%)		
Literacy*					
Illiterate	51 (47.7%)	56 (52.3%)	107 (100%)	38.669	0.001
Literate	44 (16.6%)	221 (83.4%)	265 (100%)		
Financial status*					
Financial independence	9 (7.6%)	109 (92.4%)	118 (100%)	29.153	0.003
Financial dependence	86 (33.9%)	168 (66.1%)	254 (100%)		
Marital Status					
Married	2 (25%)	6 (75%)	8 (100%)	0.001	0.972
Unmarried/Widower/Separated	93 (25.5%)	271 (74.5%)	364 (100%)		
Comorbidities					
Present	79 (25.2%)	234 (74.8%)	313 (100%)	0.092	0.761
Absent	16 (27.1%)	43 (72.9%)	59 (100%)		
Current Smoker					
Yes	36 (25.5%)	105 (74.5%)	141 (100%)	0.00	0.998
No	59 (25.5%)	172 (74.5%)	231 (100%)		
Current Alcoholic*					
Yes	58 (22.4%)	201 (77.6%)	259 (100%)	4.432	0.035
No	37 (25.5%)	76 (74.6%)	113 (100%)		

* $p < 0.05$ is considered statistically significant.

Table 2: Prevalence of Functional Disability among the Study Participants (N=372)

Characteristics	n (%)
Visual impairment	25 (6.7%)
Hearing impairment	15 (4.0%)
ADL score (<100)	80 (21.5%)
Disability in (ADL) or blindness or bilateral hearing impairment or a combination of these.	95 (25.5%)

(21.5%) participants had Disability in activities of daily living (ADL) items according to Barthel index. About 95 (25.5%) have a disability in (ADL) or blindness or bilateral hearing impairment or a combination of these.

Discussion:

The study describes the prevalence of functional disability among elderly persons in a rural area and its association with socio-demographic variables. The study population was randomly selected from the field practice area under Rural health and training centre, Mandur. In the present study, it was observed that the prevalence of functional disability among the elderly was about 25.5%. Similar findings were reported in other studies; Vaish et al.,^[16] conducted in urban Delhi reported 25.6%, Gupta et al.^[14] conducted in rural Haryana reported 37.4%, Chakrabarty D et al.^[19] in rural West Bengal reported 16.6%, Paul et al.^[18] in Tamil Nadu reported 20.6%, Medhi GK et al.^[19] in Dibrugarh reported 43.7% and Gupta S et al.^[20] in Jhansi reported 23.4%. Disparities in prevalence rates were also evident when using the Katz scale, with figures ranging from the studies done by Sowmiya Kr et al.^[21] done in rural Tamil Nadu reported 46.7% to Kavya C et al.^[22] in Bangalore reported 24.2%. These variations may stem from differences in measurement scales and the inclusion criteria for disability types, particularly locomotor disabilities. The present study was conducted in a rural village, possibly yielded lower prevalence rates due to improved healthcare access. It is crucial to

acknowledge that differences in defining functional disability across studies could contribute to discrepancies in prevalence rates.

Age emerged as a significant factor associated with functional disability in our study. As participants' age increased, so did the likelihood of experiencing functional limitations. Similar findings were reported in the studies done by Gupta et al.,^[14] Paul et al.,^[18] Gureje et al.,^[23] and Vaish et al.,^[16] all of which underscore the impact of advancing age on functional disability. The observed pattern suggests that physiological changes associated with aging, cumulative health issues, and reduced resilience to stressors may contribute to the increased susceptibility to functional limitations among older adults.

In the present study, it was observed that a notable gender disparity in functional disability, with a higher prevalence observed among females (61.1%) compared to males (38.9%). This gender gap was particularly pronounced in the age group of 70 years and above, where 61.1% of females and 38.9% of males experienced functional disability. This finding underscores the complex interplay between gender and age in shaping the burden of functional disability among elderly populations. Factors such as differences in healthcare-seeking behaviour, socio-economic status, and biological factors likely contribute to this gender disparity.

Financial dependence among the elderly emerged as another significant correlate of functional disability in the present study. Financially dependent elderly individuals often rely heavily on family members for various needs beyond financial support, which may lead to overlooked health concerns and exacerbate disability risks.

In terms of sensory impairments, we identified visual impairment in 6.7% and hearing impairment in 4% of participants. These figures contrast with those reported by Kavya C et al.^[22] in Bangalore, where

visual impairment affected 28.5% and hearing impairment affected 38.5% of elderly participants.

Strengths and Limitations:

The present study benefits from a community-based approach, providing a potentially accurate representation of functional disability prevalence among elderly residents in rural Goa. Rigorous methodology ensured robust participant selection and data collection by a single interviewer minimized inter-observer bias. The use of validated questionnaires such as Barthel's Index enhanced the reliability of our assessment.

However, the study's limitations include the lack of inclusion of locomotor disabilities and Instrumental Activity of Daily Living (IADL) which may affect the comprehensiveness of our findings and the absence of information on disability duration hinders our understanding of the permanence or transience of disabilities observed in the study population.

Conclusion:

The study emphasizes the urgent need to address various factors that greatly impact the quality of life and independence of the elderly in rural Goa. According to the study findings, the prevalence of functional disability among the elderly was found to be 25.5%. With a notable prevalence of functional disability, particularly among those aged 70 and above and among the illiterate, it is clear that targeted interventions are necessary. Programs aimed at health education and improving literacy could be crucial in mitigating the risk of functional disability. It was observed that there were significant associations ($p < 0.05$) between functional disability and factors such as age, literacy, financial dependence, and alcohol consumption, while no significant associations were found with comorbidities, gender, religion, marital status, or smoking.

Recommendations:

By addressing functional disability in the elderly through a multidisciplinary approach that includes family support, healthcare, policy initiatives, and community engagement, we can significantly improve the elderly's quality of life, encourage their independence, and lessen the burden of disability in rural Goa. Putting the needs of the elderly first and carrying out focused interventions can encourage good aging and improve their health outcomes.

Declaration:

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Conflicts of interest: Nil

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