

Original Research Article

Assessment of dependency in activities of daily living among the elderly attending a rural health training centre: a cross-sectional study

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ABSTRACT

Background: With the increase in life expectancy, the proportion of elderly individuals in India is rising, leading to a greater burden of chronic diseases and functional disabilities. Activities of daily living (ADL) reflect well-being. Assessing ADL dependency helps identify elderly requiring supportive care. This study assessed ADL dependency among elderly attending a Rural Health Training Centre and examined socio-demographic and morbidity-related factors.

Methodology: A cross-sectional study was conducted among 200 elderly individuals aged ≥ 60 years attending the RHTC. Data were collected using a pre-tested semi-structured questionnaire. Functional ability was assessed using the Barthel index. Descriptive statistics summarized dependency levels, while the Chi-square test assessed associations.

Results: The mean age was 69.3 ± 8.1 years, and 52% were females. The mean Barthel Index score was 90.7 ± 17.4 . Overall, 57% were independent, 11% mildly dependent, 23% moderately dependent, 6% severely dependent, and 2% totally dependent. Dependency was more common among participants aged ≥ 70 years, females, illiterate individuals, and those with chronic morbidities, family stress, or financial dependence.

Conclusion: Nearly half of the elderly demonstrated ADL dependency, with mild-to-moderate dependency predominating. Advanced age, poor education, chronic diseases, and family stress were significant predictors. Integrating geriatric assessment, rehabilitation, and supportive services into rural health training centres could promote healthy ageing, preserve functional independence, and improve quality of life among rural elderly.

Keywords: Elderly, Activities of daily living, Barthel index, Functional dependency, Rural health, Geriatric care

INTRODUCTION

Ageing is an inevitable physiological phenomenon influenced by biological as well as social factors. The elderly population in India is growing rapidly; according to the 2011 census, elderly constitute about 8.6% of the total Indian population, projected to grow further to about 20% by 2050.^{1,2} The share of India's population over the age of 60 years is projected to increase from 10.5% in 2022 to 20.8% in 2050.³ This unprecedented demographic transition places immense pressure on healthcare systems,

particularly in developing nations like India. With increasing longevity comes a parallel rise in chronic diseases and functional impairments.

Functional status is typically defined in terms of one's ability to independently perform basic ADL and Instrumental ADL (IADL), performance in which is related not only to physical and mental health but also to the social well-being of the elderly.¹ Health professionals widely use the ability or inability to perform ADLs as a key indicator of an individual's functional status, particularly among the elderly.³ Disability is defined as a

difficulty in performing everyday activities necessary for independent living, and higher disability rates result from health risks across various chronic diseases and injury.² Several socio-demographic and clinical factors are known to influence ADL dependency. Evidence consistently suggests that female gender, advanced age, illiteracy, and presence of chronic co-morbidities increase the likelihood of disability or dependency among the elderly.^{1,2} Age is one of the strongest predictors of ADL disability, with risk of severe ADL increasing significantly with advancing age.²

The nationally representative longitudinal ageing study in India (LASI), 2017–18, found that around 3% of elderly had severe ADL disability and 19% had moderate ADL disability.² A cross-sectional study in rural Jammu reported ADL dependency in 46.3% of participants, with age, educational status, family stress, and chronic co-morbidity emerging as independent predictors.¹ Similarly, studies from Tamil Nadu and Maharashtra also reported that dependency consistently increased with advancing age across all ADL activities.³⁻⁵

Despite growing evidence, there remains a relative paucity of studies specifically assessing ADL dependency among elderly individuals attending rural health training centers (RHTCs), which serve as vital primary care contact points for the rural geriatric population. A better understanding of the prevalence and predictors of functional decline at such facilities will aid in the development of appropriate community-based geriatric care programs.¹

To address this need, the primary objectives of this study are to assess the proportion of dependency in ADL among the elderly attending a RHTC, to categorize the dependency levels using the barthel index, and to determine the socio-demographic and morbidity-related factors associated with ADL dependency.

METHODS

Study design and setting

A facility-based cross-sectional study was carried out among older adults visiting the RHTC attached to the Department of Community Medicine, Government Medical College and Hospital, Nagpur, Maharashtra, India.

Study duration

The study was carried out during the period from June 2025 to August 2025 spanning a total duration of 3 months.

Sample size determination

The required sample size was estimated by applying the standard formula $n = Z^2pq/d^2$, where the expected

proportion of ADL dependency was taken as 46.3% based on previously published literature, with a confidence level of 95% and an allowable margin of error of 7%. This yielded a minimum sample of 195 subjects, which was subsequently rounded up to 200 to account for potential non-responses and incomplete data.

Sampling approach

A consecutive sampling approach was adopted, wherein all eligible older adults presenting to the RHTC during the defined study period were enrolled sequentially until the target sample size was met.

Inclusion criteria

Older adults aged 60 years and above, attending the RHTC, who had been residing in the catchment area for a minimum of six months and who voluntarily agreed to participate by providing written informed consent were eligible for enrollment.

Exclusion criteria

Those who declined to participate, individuals diagnosed with terminal or life-threatening conditions, and those with significant psychiatric illness affecting their ability to respond were excluded from the study.

Data collection procedure

Information was gathered through structured face-to-face interviews conducted by trained investigators using a pre-tested, semi-structured questionnaire developed in the regional language (Marathi/Hindi) for ease of comprehension. Written informed consent was obtained from all participants prior to the commencement of the interview. Each interview session lasted approximately 20 to 25 minutes. Participant identity was kept confidential throughout the course of the study.

Study instrument

The data collection tool comprised two components a socio-demographic and health profile proforma capturing details such as age, sex, level of education, occupation, marital status, type of family, monthly household income, presence of chronic medical conditions, and perceived family-related stress.

The barthel index (BI), a well-established and internationally validated ordinal tool used to quantify an individual's level of independence in performing ten essential daily activities, namely-feeding, personal hygiene, bathing, dressing, bowel function, bladder function, toilet use, bed-to-chair transfer, ambulation, and stair climbing. The total score ranges from 0 to 100 and is interpreted as follows: 0–20 indicating total dependence, 21–60 severe dependence, 61–90 moderate dependence,

91–99 mild dependence, and 100 reflecting complete functional independence.^{2,3}

Statistical analysis

All collected data were entered and statistically analyzed using Jamovi software (Version 2.0). Descriptive statistics were applied to summarize the data-categorical variables were presented as frequencies and percentages, whereas continuous variables were reported as mean with standard deviation (SD). To explore associations between socio-demographic characteristics and ADL dependency status, the Chi-square test was applied; Fisher's exact test was used wherever cell frequencies were below five. Statistical significance was set at a p value of less than 0.05.

RESULTS

Table 1 shows the association between ADL dependence and selected socio-demographic and morbidity variables among the elderly participants. A statistically significant association was observed between age and ADL

dependence, with participants aged >70 years showing higher levels of moderate and severe dependency compared to those aged <70 years ($\chi^2=10.82$, $p=0.013$).

Occupation was also significantly associated with ADL dependence ($\chi^2=18.0$, $p=0.001$), with unemployed elderly participants demonstrating higher dependency levels. Financial dependency showed a significant association with ADL dependence ($\chi^2=24.7$, $p=0.001$), where fully dependent individuals had greater functional dependence compared to financially independent participants.

Marital status was significantly associated with ADL dependence ($\chi^2=31.5$, $p=0.001$). Widow/widower participants exhibited comparatively higher severe dependency than married participants. Presence of co-morbidity was also significantly associated with ADL dependence ($\chi^2=9.40$, $p=0.024$), indicating greater dependency among participants with coexisting illnesses. However, no statistically significant association was found between ADL dependence and gender ($\chi^2=1.87$, $p=0.600$), educational status ($\chi^2=0.186$, $p=0.980$), or type of family ($\chi^2=10.3$, $p=0.330$).

Table 1: Association of ADL dependence with socio-demographic and morbidity variables among the elderly.

Variables	No dependence (%)	Slight dependence (%)	Moderate dependence (%)	Severe dependence (%)	Chi square/Fisher exact test (P)
Age (in years)					
<70	94 (47)	14 (7)	17 (8.5)	5 (2.5)	10.82 (0.013)
>70	24 (12)	14 (7)	29 (14.5)	3 (1.5)	
Gender					
Males	72 (36)	21 (10.5)	28 (14)	7 (3.5)	1.87 (0.600)
Females	42 (21)	7 (3.5)	18 (9)	5 (2.5)	
Education					
Illiterate	25 (12.5)	7 (3.5)	11 (5.5)	3 (1.5)	0.186 (0.980)
Literate	89 (44.5)	21 (10.5)	35 (17.5)	9 (4.5)	
Occupation					
Unemployed	13 (6.5)	6 (3)	16 (8)	6 (3)	18.0 (0.001)
Employed	101 (50.5)	22 (11)	30 (15)	6 (3)	
Financial dependence					
Fully independent	56 (28)	8 (4)	7 (3.5)	2 (1)	24.7 (0.001)
Fully dependent	21 (10.5)	10 (5)	22 (11)	6 (3)	
Partially dependent	37 (18.5)	10 (5)	17 (8.5)	4 (2)	
Marital status					
Married	110 (55.0)	24 (12.0)	38 (19.0)	7 (3.5)	31.5 (0.001)
Unmarried	0 (0)	0 (0)	2 (1)	0 (0)	
Widow/Widower	3 (1.5)	4 (2)	5 (2.5)	5 (2.5)	
Divorced/Separated	1 (0.5)	0 (0)	1 (0.5)	0 (0)	
Type of family					
Nuclear	42 (21)	15 (7.5)	13 (6.5)	6 (3)	10.3 (0.330)
Joint	72 (36)	13 (6.5)	33 (16.5)	6 (3)	
Co-morbidity					
Present	87 (43.5)	24 (12)	41 (20.5)	11 (5.5)	9.40 (0.024)
Absent	11 (5.5)	12 (6)	10 (5)	4 (2)	

Figure 1 shows the distribution of ADL dependency among the elderly participants. Out of the total study participants, 43% were dependent in performing activities of daily living, whereas 57% were independent. Figure 2 depicts the graded distribution of ADL dependency based on the BI. Among the study participants, 57% were independent, 14% had slight dependency, 23% had moderate dependency, and 6% had severe dependency in activities of daily living.

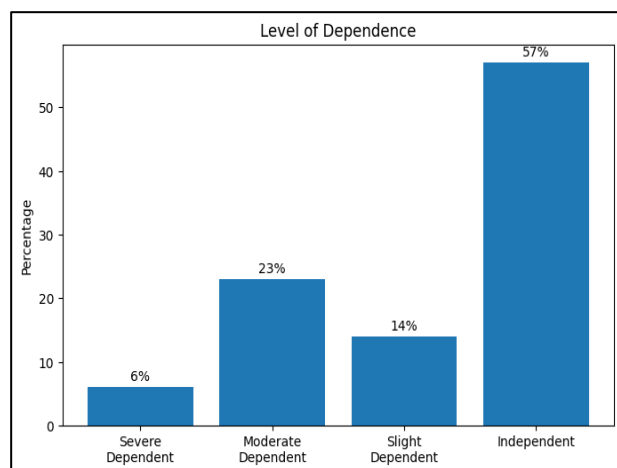


Figure 2: Graded distribution of ADL dependency among the elderly (Based on BI).

DISCUSSION

In the present study, 43% of the elderly were dependent in one or more ADLs, while 57% were independent. Moderate dependency (23%) was more common than slight (14%) and severe dependency (6%). Similar findings were reported by Usha et al where a considerable proportion of elderly showed moderate-to-severe dependency in ADL. Kumaran et al also observed increasing dependency among rural elderly with advancing age.^{4,6}

Age showed a statistically significant association with ADL dependency ($p=0.013$) in the present study, with elderly aged >70 years demonstrating higher dependency. Similar findings were reported by Peter et al, Sekhon et al, Yadav et al, Gupta et al who documented increasing dependency with advancing age among elderly populations.^{3,7-9} Gender and educational status were not significantly associated with ADL dependency in the current study. Similar findings were observed by Sekhon et al Peter et al.^{7,8} However, Ohri et al reported greater dependency among elderly females.¹⁰

Occupation and financial dependency showed statistically significant association with ADL dependency ($p=0.001$). Elderly who were unemployed and financially dependent had greater functional limitation. Similar observations were reported by Anandaraj et al and Chauhan et al who highlighted socioeconomic factors as important determinants of disability among elderly individuals.^{2,11}

Marital status showed significant association with ADL dependency ($p=0.001$), with widowed elderly demonstrating greater dependency. Similar findings were reported by Nagarkar et al emphasizing the importance of social and family support in maintaining functional independence among elderly individuals.¹² Co-morbidity was significantly associated with ADL dependency ($p=0.024$) in the present study. Elderly with chronic illnesses had higher dependency levels. Similar findings were reported by Gupta et al, Puteh et al and Chellappa et al who documented strong association between chronic diseases and functional disability among elderly populations.^{9,13,14}

Overall, the present study findings indicate that advancing age, unemployment, financial dependency, widowhood, and co-morbidities are important determinants of ADL dependency among the elderly, emphasizing the need for comprehensive geriatric healthcare and rehabilitation services.

Limitations

The present study has certain limitations. Being a facility-based cross-sectional study, causal relationships between associated factors and ADL dependency cannot be established. Since the study was conducted at a single RHTC using consecutive sampling, the findings may not be generalizable to the entire elderly population. Information on some variables was self-reported and may be subject to recall or reporting bias. Functional status was assessed only using the BI, and IADL, cognitive function, depression, nutritional status, and quality of life were not evaluated. Further multicentric longitudinal studies with larger representative samples are recommended to validate these findings.

CONCLUSION

The present study found that 43% of the elderly attending the RHTC were dependent in one or more activities of daily living, while 57% were functionally independent. Moderate dependency was the most common form of dependency observed. Advancing age, unemployment, financial dependency, widowhood, and presence of co-morbidities showed significant association with ADL dependency among the elderly. The findings highlight that functional limitation is an important public health concern among the geriatric population and emphasize the need for early identification and appropriate geriatric care interventions at the primary healthcare level.

Recommendations

Regular geriatric screening should be conducted at rural health training centres and health & wellness centres for early identification of functional decline. Community-based rehabilitation and home-based care programs to maintain independence among elderly. Promote health education on physical activity, nutrition, and chronic

disease management. Train primary health-care workers (ASHA/ANM/CHO) in use of the Barthel Index for early detection. Establish comprehensive geriatric care services integrated with national programme for health care of the elderly (NPHCE) and NPNCD (national programme for prevention and control of non-communicable diseases). Future research should focus on longitudinal follow-up and urban–rural comparisons.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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