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Original Research Article

Dependency and associated factors among elderly in central Kerala

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ABSTRACT

Background: Globally the proportion of elderly has been increasing and physical dependency is one of major problem faced by elderly. Physical dependency will affect the quality of life. Despite this, very limited number of studies were done to assess the dependency among elderly. Aim was to estimate the prevalence of dependency and to determine the association between selected factors and dependency among elderly >60 years.
Methods: A cross-sectional study was conducted among 352 elderly in Athirampuzha Panchayat using simple random sampling. A semi-structured interview schedule using basic activities of daily living scale-BADL (Katz scale) was used. Data was coded and entered in Microsoft Excel and analysed using IBM SPSS software version 22.
Results: The mean age of participants was 71.68 years with a standard deviation of 8.457 years and the prevalence of dependency was found to be 30.7%. Univariate analysis results revealed that age (>85 years), occupation, living arrangement, presence of aphasia, hearing impairment, visual disturbances, locomotor disability, presence of comorbidity, onset of comorbidity and comorbid conditions like diabetes mellitus, coronary artery disease and chronic arthritis were found to have significant association with dependency. Binary logistic regression results revealed that factors like age group (>85 years), presence of hearing impairment, loco motor disability, onset of comorbidity, presence of diabetes mellitus and coronary artery disease were found to be independent predictors of dependency.
Conclusions: Since dependency increases with age physical dependency is to be assessed periodically to achieve healthy ageing.

Keywords: Central Kerala, Comorbidity, Dependency, Elderly, Katz scale, Kottayam

INTRODUCTION

Ageing begins from birth and continues throughout the life and is dependent on factors like physical, mental, social wellbeing and the healthcare services.

The number of elderly is expected to double again by 2050 and it is projected to reach nearly 2.1 billion globally. A multi cohort study was conducted across 23 countries to assess the functional dependency and found that 30% were dependent and 70% were independent. Dependency is more pronounced in the oldest-old (>80years).[1] According to a community based study in central India, prevalence of dependency is found to be 53%.[2]

In Kerala there are 4.2 million people above 60 years.[3] The elderly population (>60 years) of Kottayam district is

15.9%. According to the cross sectional study in central Kerala, the dependency among elderly is found to be 33.6%.[4]

Even though population of elderly is increased, their daily activities will be reduced due to non-modifiable factor like ageing and modifiable factors like depression, anxiety, loneliness, etc [5] and comorbidities like diabetes mellitus, hypertension, musculo skeletal disorders, cardiovascular disorder, chronic kidney disease, arthritis etc.[7] Therefore physical dependency of old aged is to be assessed at regular intervals, so that it will be a gate way to strengthen our health system by new policy formation and funding the existing policies.

In Kerala, studies on prevalence of dependency based on ADL scales is less. In view of the paucity the present work is conducted to assess the prevalence of dependency among elderly aged more than 60 years in Kottayam.

Aim of study was to estimate the prevalence of dependency and to determine the association between selected factors and dependency among elderly >60 years.

METHODS

Study area

A cross-sectional study conducted for 12 months (July 2021 till June 2022) at Athirampuzha panchayat in elderly aged above 60 years.

Semi structured interview schedule and Katz scale were used as study tools.

Sampling method

There are 22 wards in Athirampuzha panchayat. Total number of elderly people (>60 years) list was prepared from the recent voters list provided by the panchayat office.

My sample size is 342, so from 22 wards of Athirampuzha pamchayat 16 elderly was selected by simple random sampling and the data were collected by visiting each household of selected elderly and interviewing them. Those people with difficulty in speaking or hearing, their data was collected by interviewing their primary care giver.

Study procedure

Institutional review board clearance and consent from the secretary of Athirampuzha panchayat obtained. Individual consent for interviewing will be obtained from the study subjects.

The data for this study were collected by visiting 16 households of randomly selected elderly in each ward. Elderly more than 60 in a house was interviewed and if 2 elderly of same age are in a house then one of them was selected for study by lottery method.

An interview schedule and a semi structured questionnaire was used to collect sociodemographic characters and associated comorbidity, and also dependency was calculated by using ADL scales.

Katz scale for assessment of BADL: consists of 6 domains bathing, dressing, toileting, transferring, continence, feeding.

Each domain is given score of 0 or 1. Score <2 was patient dependent. Score 3-5 was partially dependent. Score 6 was patient independent.

Inclusion criteria

Elderly people who are above 60 years and gave consent to participated in this study.

Exclusion criteria

Critically ill and mentally challenged people were excluded from this study.

Definition of variables

Elderly was defined as people aged more than 60 years of age. Acute morbidity was defined as injury or illness which occurred within 2 weeks prior to survey (falls, recent surgery and accidents. Chronic morbidity was defined as pre existing medical condition with or without Hospitalization/on treatment for >1year. Type of morbidity was collected by history or from previous treatment records. Ambulating was the extent of an individual‟s ability to move from One position to another and walk independently. Feeding was defined as the ability of a person to feed oneself. Dressing was defined as the ability to select appropriate clothes and to put the cloths on. Personal hygiene was the ability to bathe and groom oneself and to maintaining the dental hygiene, nail and hair. Continence was the ability to control bladder and bowel function. Toileting was the ability to get to and from the toilet, using it appropriately, and cleaning oneself.

Sample size

According to study titled “Study on morbidities and functional disabilities of elderly in rural area of kottayam” by Baskar et al - the prevalence of dependency was found to be 33.6%[4] and applying that in formula:

$n = z\alpha 2\ PQ \div d^2$

where; $z\alpha = 1.96$, P= 33.6%, Q=66.4%, D=5%, sample size=342.

Statistical analysis

Dependency were presented in percentage and confidence interval. Association between qualitative variables were calculated by Chi square test.

RESULTS

A cross sectional study was conducted among 352 elderly of Athirampuzha Panchayat. Study participants were selected from all 22 wards. Equal number of participants were selected (16 subjects per ward).

Sociodemographic details of the study subjects

The mean age of the study participants was 71.68 years with a standard deviation of 8.457 years. Of the study participants, 66% were unemployed and 34% were employed (Table 1).

Of the study participants, 63.9% are married followed by 28.9% are widow, 6.4% are widower. Only 0.8% study participants were unmarried.

Table 1: Distribution of study participants based on socio demographic details.

		N (%)
Gender	Male	140 (39.77)
	Female	212 (60.22)
Education	School	213 (60.5)
	Post diploma/degree	109 (30.96)
	Honours	21 (5.96)
Living arrangement	Alone	86 (24.43)
	With family	266 (75.56)

Table 2: Distribution of study participants based on basic activities of daily living.

Activity	Frequency (%)
Bathing	259 (73.6)
Dressing	257 (73)
Having food	282 (80.1)
Continence	285 (81)
Using toilet	255 (72.4)
Walking	241 (68.5)

Among the basic activities of daily living, the study participants were less dependent for continence and more dependent for walking (Table 2).

Among the study participants, 24.7% dependent, 6% partially dependent (total 30.7% dependent) and 69.3% are independent for basic activities of daily living according to Katz scale (Table 3).

The above variables had a statistically significant difference with dependency on univariate analysis. Whereas gender, education, presence of long standing HTN were not found to have a statistically significant association with dependency (Table 4).

Table 3: Distribution of study participants based on prevalence of dependency-BADL.

Dependency	Frequency	Percent	95% CI
Dependent	87	24.7	19.9-29.3
Partially dependent	21	6.0	3.7-8.5
Independent	244	69.3	63.9-74.1
Total	352	100.0	

Table 4: Summary table showing variables with statistically significant difference with dependency on univariate analysis-BADL.

Variable	Factor with highest percentage	Chi square value	P value
Age	>85yrs	18.850	0.000
Occupation	Unemployed	70.567	0.000
Living arrangement	With family	8.076	0.18
Aphasia	Yes	21.416	0.000
Hearing impairment	Yes	5.828	0.054
Visual disturbances	No	26.886	0.000
Locomotor disability	Yes	28.853	0.000
Comorbidity	Yes	14.895	0.001
Comorbidity - onset	Acute	29.155	0.000
Long standing DM	Yes	15.109	0.001
CAD	Yes	48.243	0.000
Chronic arthritis	Yes	15.684	0.000

Table 5: Binary logistic regression-BADL.

	P value	Odds ratio	95% C.I.	
			Lower	Upper
Age group	0.000	1.950	1.419	2.680
occupation	0.994	55.000	0.000	32.602
Living arrangement	0.809	0.904	0.398	2.054
Aphasia/dysarthria	0.65	2.304	0.950	8.313
Hearing impairment	0.026	2.328	1.106	4.902
Visual disturbances	0.229	0.621	0.197	1.042
Locomotor disability	0.000	3.500	1.908	6.419
Comorbidity	0.220	0.261	0.030	2.233

Continued.

	P value	Odds ratio	95% C.I.	
			Lower	Upper
Comorbidity – onset	0.040	3.207	1.056	9.739
Long standing DM	0.034	2.096	1.059	4.417
CAD	0.000	9.306	3.409	25.405
Chronic arthritis	0.082	0.419	0.157	1.117

Those variables which were found to have a statistically significant association with dependency with p<0.05 in univariate analysis were further analysed using binary logistic regression. Method of logistic regression used was Enter method. Model summary as explained by the Negelkerke R^2 value obtained in the final model was 0.324, which is a moderate one. According to this model, the following factors were found to be independent predictors (with p value <0.05) of dependency among elderly aged more than 60 years : age group OR of 1.950 (CI :1.419-2.680), presence of hearing impairment with OR of 2.328 (CI : 1.106-4.902), presence of locomotor disability with OR of 3.500 (CI : 1.908-6.419), onset of comorbidity with OR 3.207 (CI : 1.056-9.739), presence of long standing DM with OR 2.096 (CI :1.059-4.417) presence of chronic CAD with OR 9.306 (CI : 3.409-25.405) (Table 5).

DISCUSSION

A cross-sectional study was conducted in Athirampuzha panchayat to estimate the prevalence of dependency and its associated factors. The age wise distribution of elderly in the current study is similar to that of Kerala.[6]

In the current study, increasing trend of prevalence of dependency is found with the increasing age. This increasing trend was found to have a statistically significant association with a Chi-square value of 18.850 and p value of 0.001. Similar results were obtained in study conducted by Kumar et al, in a study conducted among rural elderly women by Kumari et al in Thiruvananthapuram.[7,8] This is because ageing is a multifactorial process which leads to decline in both innate and acquired immune status of individual.[9]

In the current study literacy rate is 100% which is in line with the literacy rate of kottayam district.[10]

Highest proportion of elderly in the current study are staying with family which is similar to the study results of Sebastein et al.[11] According to Katz scale the study subjects who are staying alone 18.6% are dependent and among those who are staying with family 26.7% are dependent.

In the current study the prevalence of dependency among elderly is found to be 30.7%. Similar results were found in the study conducted by Gayathri et al in Tamil Nadu (32.7%), Baskar et al in Kottayam, Kerala (33.6%).[12,4]

Highest percentage of dependency among the basic activities of daily living in the current study is for walking/transferring which is similar to the results obtained from a study conducted by Gomathy et al in Pondicherry.[13]

In the current study, there is significant association found between functional disability (aphasia/dysarthria, hearing impairment, locomotor disability, visual disturbances) and dependency assessed by katz scale. These results were similar to the study results conducted in Haryana by Gupta et al of AIMS Delhi.[14]

In the current study, the prevalence of comorbidity was found to be 78.1%. The dependency was found to be 29.09% among the comorbid subjects and among the subjects without comorbidity is 10.7%. The difference is found to be statistically significant with the chi-square value 14.895 and p value 0.001. Similar study results were obtained in study conducted by Davis et al among elderly in Hawai and a study conducted by Peter et al in Tamil Nadu.[15,16] Comorbidity due to poor lifestyle habits increases with age which leads to physical dependency in old age.

Among the study subjects, 6.8% had acute comorbidity and 71.3% had chronic comorbidity. The prevalence of dependency based on Katz scale among the subjects with acute comorbidity is 50% and among the subjects with chronic comorbidity is 27.1%. This difference is found to be statistically significant with chi-square value: 29.155 and p value 0.001. In the current study acute comorbid elderly like falls, recent surgery and accidents are mostly dependent on their family members. This is similar to study conducted by Jedrzejczyk et al in Poland and a study conducted by Trang vu in Australia which states that acute comorbidity plays a major role in sudden physical dependence among elderly.[17,18]

In the current study, the prevalence of long standing diabetes is found to be 44.6%. According to katz the prevalence of dependency among the diabetic individuals is 31.2% and among the non-diabetic individuals is 19.5%. This difference is found to be statistically significant with chi square value 15.109 and p value 0.001. The study findings of Hong et al in China. His study results were ADL score (odds ratio [OR], 11.7; 95% confidence interval [CI], 3.076–44.497; *P*<0.01). There is a significant association found between long

standing diabetes mellitus and dependency of elderly (BADL).[19]

In the current study, the prevalence of CAD is found to be 9.65%. The prevalence of dependency among the individuals with is 73.5% and among the individuals without CAD is 19.5%. This difference is found to be statistically significant with the chi-square value 48.243 and p value 0.001. Similar results were obtained in a study conducted by Dunlay et al, Mayo clinic, Rochester which states that there is a significant association between heart failure (CAD) and dependency based on Katz scale.[20]

In the current study, the prevalence of chronic arthritis is found to be 14.77%. Based on katz scale, prevalence of dependency among the subjects with chronic arthritis is 28.8% and among the subjects without chronic arthritis is 24%. This difference is found to be statistically significant with the chi square value 15.648 and p value 0.001. This is because the dependency is based on the severity of arthritis. In a study conducted by Gilmour et al among elderly found that chronic arthritis/rheumatism have a significant association with dependency among elderly.[21]

On binary logistic regression for BADL, the following factors were found to be independent predictors (with p value <0.05) of dependency among elderly aged more than 60 years: age group OR of 1.950 (CI :1.419-2.680), presence of hearing impairment with OR of 2.328 (CI: 1.106-4.902), presence of locomotor disability with OR of 3.500 (CI : 1.908-6.419), onset of comorbidity with OR 3.207 (CI : 1.056-9.739), presence of long standing DM with OR 2.096 (CI :1.059-4.417), presence of CAD with OR 9.306 (CI: 3.409-25.405). The association with occupation, living arrangement, aphasia/dysarthria, visual disturbances, comorbidity, chronic arthritis were lost due to confounding effect.

This study has several limitations. ADL scales can be used as screening tools but examination is not done to confirm dependency. Lab investigations are not done to confirm the comorbidities.

CONCLUSION

Since dependency increases with age physical dependency is to be assessed periodically to achieve healthy ageing.

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