

Determinants and Prevalence of Disabilities in Activity of Daily Living and Instrumental Activities of Daily Living of Elderly

Sofia Helen Ponmalar P * and Dr.Sylvia Subapriya M **

*Research Scholar, ** Professor

Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore- 641043, Tamilnadu, India.

Abstract

Aim: Population ageing represents global phenomenon, the world and India in particular are witnessing a rapid ageing phenomenon characterised by a fast expansion of the elderly population. Elderly are the most vulnerable groups of the society more prone to experiencing chronic illnesses, infections and disabilities making them a high risk group requiring more attention and care. As ageing advances, the elderly experience a reduction in physical abilities, increasing disability to perform every day living tasks and instrumental activities of daily living. This is an escalating public health concern in India. Hence, the present study aimed to study the incidence of physical disabilities in performing every day living tasks and activities of daily living using instruments among the elderly and to investigate the factors contributing to it among the selected elderly population 60 - 75 years in Coimbatore.

Methods: This community based study was conducted among the randomly selected elderly population (100) living in Coimbatore. Activities of daily living (ADL) and Instrumental activities of daily living (IADL) were evaluated using Katz Index of Independence and Lawton IADL scale. The ADL and IADL prevalence were analyzed by single factor descriptive analysis and analytical statistics, such as the chi-square test was applied, with a p-value of <0.001 considered statistically significant.

Results: Out of the 100 selected elderly, 60% Women and 40% men participated in this study. The Mean age of the selected elderly was 67.97 ± 5.06 . Majority (62%) of the elderly were financially dependent. The highest level of independence was observed for the activity of feeding, 99% of selected elderly feed themselves without any support from others. About 35% of the elderly were independent in performing their daily activities and belonged to the 60-65 age group. There was a noteworthy relationship between ($p < 0.001$) age and functional ability.

Key words:

Elderly, Functional disabilities, Prevalence, ADL and IADL, Katz Index, Lawton IADL scale, Co-morbidities

Introduction

Ageing among population is an unavoidable natural global phenomenon and it is a result of demographic transition. Life expectancy is increasing worldwide with better medical facilities and nutrition care (Mayhew & Smith, 2015, Partridge et al., 2018). According to World bank data in India the population > 65years dependency ratio was 6.4 percent in 2019 and 10.4 percent in 2023. As ageing increases structural and functional changes occur in the human body leads to numerous co - morbidity conditions (Figueiredo Neto et al., 2015, Meunier et al., 2014). Old age accompanied with physical disabilities and reduced mental capacities make them to gradual withdrawn from socio economic activities impacted in increased dependence in financial and other required support in life (Pati et al., 2017, Shwe et al., 2019).

Higher levels of functional limitations and disabilities was observed among women than men from the literature on gender differences especially as they age (India demographic profile, 2018). Encountering difficulties in doing basic living tasks and IADL is called functional difficulties in elderly (Tas, 2007). ADL further categorized into mild, moderate, severe and no disabilities. Instrumental activities of living encompass eight instrumental complex activities cooking, shopping, making telephone calls, transportation, laundry, housekeeping, medication and finance handling. IADL further classified the disabilities into moderate, severe and no disabilities (Lawton, 1969).

IADL activities are more connected to cognitive function (de Castro & Guerra, 2008). Physically inactive elderly are victims of higher risk for severe ADL and IADL related functional limitations. (Anand 2020, Salisbury, 2011). A study in India indicates that 6% of elderly are fully dependent for IADL activities (Chauhan, 2022). The prevalence of Instrumental activities of disability in ASEAN countries is 46.8% reported by a recent review (Yau, 2022). Aging involves physical and cognitive impairment experience by which the elderly faces hardship in doing some Instrumental activities of living. As age increases functional impairment with IADL also increases. Recent research revealed a gradual increase in a 10 year period (Feger et al., 2020).

Recent studies in India stress that, around 22 % of demented elderly find difficulty in performing slightly any one ADL, and up to 48 % had difficulty in functioning any one IADL (Chauhan, 2022). Many studies reveal that the severity of functional disabilities in elderly varied by socio demographic characteristics such as age, sex, educational level, some health problems, BMI and functional status (Ashworth 2021, Wang, 2020). Modifiable and non-modifiable factors deteriorate the functional abilities in old age, in specific, nutritional factors, food frequency, and depression.

Cognitive impairment can be improved through preventive measures (Kim et al., 2022). Instrumental activities of daily living restrictions differ according to gender. Elderly longitudinal study in China, reveals that social isolation and depression were associated with IADL disabilities in women and men respectively (Chiu et al., 2020). In IADL lists the limitations seen for men in house hold work like cooking, housekeeping and laundering (Sheehan et al., 2019). Mild cognitive impairments, dementia and mortality in elderly are due to decline in ADL and IADL abilities can serve as a warning signs (Liu et al., 2018).

Thus several studies suggest that decline in functional abilities of elderly may act as an alarm and call attention for continuous constant monitoring and intervention. With these perceptions the current research was carried out to estimate the disabilities in activities of daily living and IADL of the elderly with following objectives.

OBJECTIVES

1. Assess the socio demographic profile of the elderly
2. Assess the activities of daily living of the elderly
3. Assess the instrumental activities of daily living of the elderly

Materials and Methods

Selection of the area

Coimbatore as known as Kovai is one of the metropliton cities of Tamil nadu in India-there are five zones in Coimbatore City Municipal Corporation. South zone of Coimbatore was selected as a study area due to easy accessibility, availability of the elderly ease and cooperation in the conduct of the study.

Selection of the sample

The elderly for the current study were selected using purposive sampling technique. A total of 100 elderly including 40 men and 60 women belongs to 60-75 years were randomly selected based on per-determined inclusion and exclusion criteria.

Inclusion Criteria

Elderly aged sixty years and more and those who were interested in participating in the current research

Exclusion Criteria

Elderly with severe morbidity, any neuro degenerative disease, unwilling to participate in the research.

Tools

Tools used include a pre designed interview schedule to elicit information on socio demographic details such as age, sex, religion, education, marriage status, livelihood and financial status. Additionally KATZ standardized scale for evaluating ADL and Lawton IADL scale were used to assess the regular IADL of the elderly.

Statistical analysis

Descriptive statistics and bi - variate analysis were used to intrepert findings of the study. Association between dependent variables (ADL, IADL) and independent variables was analyzed by using bi-variate analysis. Degree of significance was done using chi-square technique A p-value below 0.001 indicate statistical significance.

RESULTS AND DISCUSSION

Demographic and socio - economic details of elderly is presented in Table I.

Table I
Socio - Demographic Details of the Elderly

(N= 100)

Details	Number (N = 100)	Percent (%)
Age (in years)		
60 - 65	42	42.0
66 - 70	24	24.0
71 -75	34	34.0
Gender		
Men	40	40.0
Women	60	60.0
Marital Status		
Married	62	62.0
Unmarried	13	13.0
Divorced	1	1.0
Widow	19	19.0
Widower	5	5.0
Education		
Illiterate	36	36.0
Primary	34	34.0
Matric	15	15.0
Higher Secondary & above	15	15.0
Financial Status		
Dependent	62	62.0
Self sufficient	19	19.0
Partially sufficient	19	19.0
Income Range		
Rs. <4500	44	44.0
Rs.4501 - 7500	41	41.0
>Rs. 7501	15	15.0
Type of Family		
Nuclear		
Joint	38	38.0
Single	48	46.0
	14	14.0

The data revealed that majority of elderly 42 % and 34 % belonged to 60-65 years and 71-75 years age group respectively. Only 24 % elderly belonged to 66-70 years age group . Out of total (100) selected elderly majority of the respondents were (60 %) female, remaining 40 % were male.

Sixty two per cent of the elderly were married. Only a 5 % elderly were widowers and 19 % were widows . Only 15 % studied up to matric, higher secondary and above ; 36 per cent were illiterates ; 34 % of the elderly had education up to primary level ; 62 % of the elderly were financially dependent , while 19 % were partially and totally self sufficient to manage their financial requirements .

The data highlighted that a majority of the elderly (44 %) had monthly family income less than Rs. 4,000 . Only 15 % had monthly income more than Rs. 7,501, While 41 % of the elderly belonged to families with the income range of Rs.4501 - 7500 . Around 40 % elderly were staying with their children , while 38 % were not living with their children .The distribution of elderly according to type of family revealed that 38 % were in nuclear families , and 14 % were living alone .

Table II indicates ADL of the elderly

Table II
Performance of ADL of the Elderly

(N= 100)

Category (ADL)		Independent	Dependent
Bathing	Men	83%	18%
	Women	58%	42%
Dressing	Men	88%	13%
	Women	72%	28%
Toileting	Men	95%	5%
	Women	75%	25%
Transferring	Men	78%	23%
	Women	67%	33%
Continenence	Men	78%	23%
	Women	90%	10%
Feeding	Men	98%	3%
	Women	100%	0%

The activities included are bathing, dressing , toileting , transferring , continence and feeding. The data reveals basic tasks of living , results indicates that women were found to be fully dependent in bathing (42 %) compared to men (18%) . Seventy eight percent of men were independent in getting in and out of bed / chair compared to women (67%) who need assistance in doing transferring task . The highest level of independence was observed for the activity of feeding (100 %) in women they feed themselves without any support from others than men (98 %) . More number of (95 %) men were capable of doing their toilet activities compared to 75% women . A higher per cent of men (88%) were found to be independent in dressing themselves , while 28 % women were dependent in wearing their clothes . 90% women had good control over urination and defaecation compared to 78% men.

Analysis of data regarding the status of disabilities in ADL of elderly is presented in the Table III and fig I depicts the incidence of disabilities of the selected elderly .

Table III
Status on ADL among the Elderly as per Age (N= 100)

Age Group	ADL Score (Katz Index)					
	Fully Dependent		Partially Dependent		Independent	
	No.	%	No.	%	No.	%
60-65 years	-	-	7	17	35	83
66-70 years	2	8	13	54	9	38
71-75 years	2	6	22	65	10	29
Total	4	4	42	42	54	54

Chi-Square Test

	Value	df	P-value	Sig.
Chi-Square	26.254	4	.000	**

** - Significant at 1% level * - Significant at 5% level NS – Not Significant

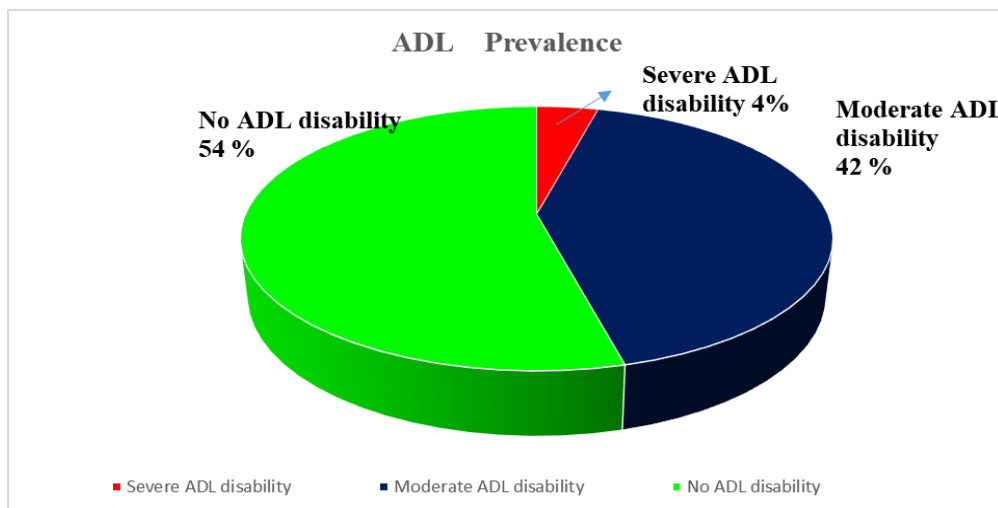


Figure I - Prevalence of disabilities in ADL of elderly

Table III data reveals that the elderly belonging to 60-65 years of age group show full independence (83 %) in performing their daily activities than the elderly belongs to 66-70 and 71-75 age group . It is clearly observed from the data more number of elderly (65 %) belonging to 71 -75 years age group were partially dependent for doing their daily activities , Prevalence of ADL disabilities was found to be more in 71- 75 age group than their younger counterparts (60 -70) age groups. which ensures as age increases the functional disabilities also increasing . Only 8.3% and 5.9% of the study participants are non performers need full support in doing their daily tasks are belongs to 66-70 years and 71-75 years age group respectively . Further, the chi square test was applied to find whether age is significantly associated with activities of daily living . A Chi-Square value of 26.254 with 4 degrees of freedom is significant at the 1% level.

Analysis on dependency Status in activities of daily living by gender is presented in Table IV .

Table IV
Dependency Status in Activities of Daily Living Among the Elderly as per Gender
(N= 100)

Gender	ADL Score						Total	
	Fully Dependent		Partially Dependent		Independent		No.	%
	No.	%	No.	%	No.	%		
Men	-	-	15	38	25	62	40	100.0
Wemen	4	7	27	45	29	48	60	100.0
Total	4	4	42	42	54	54	100	100.0

Chi-Square Test

	Value	df	P-value	Sig.
Chi-Square	3.880	2	.144	Ns

Women were found to be fully dependent (7 %) in completing their daily tasks . More number of women (45 %) were partially dependent compared to men (38%) ; 62 % men had no limitation in doing their daily tasks of living independently compared to women (48%). Thus in the present study incidence of ADL disabilities was more in women than men .

Data regarding the IADL of the selected elderly were presented in the table V .

Table V
Frequency of Difficulties in IADL Among the Elderly
(N= 100)

Category (IADL)		Independent		Dependent	
		No	%	No	%
Ability to use telephone	Men	34	85	6	15
	Women	47	78	13	22
Shopping	Men	24	60	16	40
	Women	25	42	35	58
Food preparation	Men	11	27	21	53
	Women	19	32	41	68
Housekeeping	Men	10	25	30	75
	Women	25	42	35	58
Laundry	Men	20	50	20	50
	Women	32	53	28	47
Mode of transportation	Men	30	75	10	25
	Women	35	58	25	42
Responsibility for own medication	Men	17	42	23	58
	Women	22	37	38	63
Ability to handle finance	Men	22	55	18	45
	Women	25	42	35	58

It is observed from the data that 85% men elderly had the ability to use telephone, compared to 78% women elderly. Shopping ability were found in majority (60%) of the men elderly compared to women elderly (42%). Majority of women elderly 68% were not able to do cooking by themselves. Fifty percent of men and 53% women elderly were found to be independent in performing laundry for themselves. 75% men elderly were capable of using transport facility compared to 58% of elderly women. Majority of men elderly 42% were had responsibility for own medication, while 37% women elderly were able to take their medicine independently. Majority of men elderly (55%) were independent in handling their finances compared to women elderly (42%).

compared to women elderly On the whole the independence was found to be more in women elderly in female oriented activities like cooking and house keeping. While other activities such as using telephone, shopping, using transports, medication, handling their finance were found to be more in men elderly. Laundering activities found to be equal in both women elderly and men elderly.

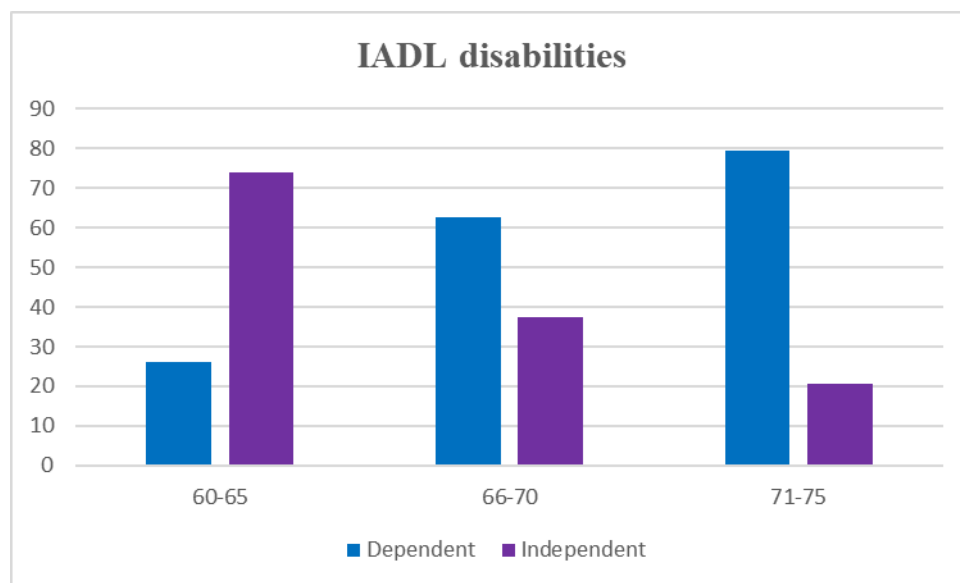


Figure II IADL disabilities as per age

Figure II depicts the IADL disabilities according to age, the dependency on IADL increases as shown in figure. Notably the age group 71-75 shows a higher percentage of IADL disabilities compared to other age groups indicating a significant increase in functional limitations and need assistance with daily IADL tasks in this age range. The study states that increasing age limits the ADL and IADL functional abilities of the elderly. Most of the studies agree these findings (Alam et al., 2020).

Data regarding the prevalence of ADL and IADL of the elderly by various socio demographic background characteristics are presented in Table VI .

Table VI
Level of ADL disabilities and IADL disabilities of elderly by socio demographic parameters
(N= 100)

Socio economic characteristics		ADL disability						P Value	IADL disability				P VALUE
		Severe		Moderate		No disability			Severe		Moderate		
		No	%	No	%	No	%		No	%	No	%	
Age	60-65	-	-	7	18	35	82	.000*	11	26	31	74	.000*
	66-70	2	8	13	54	9	38		15	62	9	38	
	71-75	2	6	22	65	10	29		27	79	7	21	
Sex	Male	-	-	15	38	25	62	.144	16	40	24	60	.034*
	Female	4	7	27	45	29	48		37	62	23	38	
Education	Illiterate	2	6	17	47	17	47	.854	21	58	15	42	.328
	Primary	2	6	13	38	19	56		20	59	14	41	
	Matric	-	-	6	40	9	60		5	33	10	67	
	Higher secondary& above	-	-	6	40	9	60		7	47	8	53	
Income	Rs.<4500	1	2	22	50	21	48	.463	25	57	19	43	.527
	Rs.4501-7500	2	5	13	32	26	63		19	46	22	54	
	>Rs. 7501	1	6	7	47	7	47		6	60	6	40	
	Higher secondary& above	-	-	6	40	9	60		7	47	8	53	

Results derived from cross-tabulation are shown along with a p-value. More percent of elderly in 71-75 age groups had moderate ADL disability than other age groups (65 & vs 54 & 18) and IADL severe disability is higher in 71-75 age groups (79 % vs 62 % & 26%) than elderly who were 66-70 years. A statistically significant association ($P < 0.001$) of functional disability was found with age and gender. Strongest risk factor of severe ADL and IADL is age of the elderly.

A greater percent of women elderly 45% had moderate ADL disability compared to men 38%. 62% women elderly had severe IADL disability while 40% men were found in severe IADL category. The findings of this study are compatible with those of previous research, more than 40 percent of elderly in India are affected from ADL and IADL functional disabilities it includes female with high proportions (IIPS, 2020). Gender shows a significant relationship with IADL disability (p -value = 0.034)

Results found that higher educated elderly had no severe ADL disability compared to illiterate elderly (6%). 60% educated elderly had no ADL disability compared to illiterate (47%) elderly. 67% elderly who had education up to metric were found to had moderate IADL disabilities compared to illiterate elderly (42%) and 42% elderly who had education up to primary. Previous studies revealed that higher educational attainment had positive association with functional abilities (Shekhar et al., 2020). The chi-square test confirms there is no statistically significant ($P > 0.05$) association between education, ADL and IADL categories.

A Severe disabilities in ADL and IADL was more prominent (6% & 60%) among the elderly who belongs to the income group > Rs. 7501. Sixty three percent elderly belongs to Rs.4501-7500 income group had no ADL disability and 54% elderly in the same income group had moderate IADL disability. In the present study income levels do not show significant relationships with ADL or IADL disability based on the p-values provided ($P > 0.05$).

Conclusion

Maintaining functional abilities becomes a significant concern as people age. The present cross sectional study reveals that the incidence of ADL disabilities found more in 71-75 age group than their younger counterparts (60-70) age groups. The main findings of the present study is that age and gender are important risk factors, functional disability increases as elderly ages and women have higher chances of affected by functional disability compared to men among the selected elderly. This confirms that as age increases the functional disabilities also increase. The result of the present study indicates that illiterate elderly had severe ADL and IADL disabilities 6% and 58% respectively. Among the socioeconomic characteristics education and income shows no statistically significant ($P > 0.05$) association between ADL and IADL categories.

Reference :

- Alam, M. R., Hossain, M. S., Chowdhury, A. I., Akhter, M., Al Mamun, A., & Reza, S. (2020). Relationship between Malnutrition and Functional Disability in Selected Community-Dwelling Geriatric Population in Bangladesh. medRxiv, 2020.08.02.20167049. <https://doi.org/10.1101/2020.08.02.20167049>.
- Anand A, Syamala TS, Sk IK, et al. Understanding Frailty, Functional Health and Disability among Older Persons in India: A Decomposition Analysis of Gender and Place of Resident. Hamadan Univ Med Sci 2020;20:e00484..
- Ashworth A. Sarcopenia and Malnutrition: Commonly Occurring Conditions in the Older Population. Br J Nurs (2021) 30(21):S4–S10. doi:10.12968/bjon.2021.30.21.S4

- Chauhan, S. *et al.* (2022). Prevalence and determinants of activity of daily living and instrumental activity of daily living among elderly in India. *BMC geriatrics*, 22(1), 1-10. <https://doi.org/10.1186/s12877-021-02659-z>
- Chiu CJ, Li ML, Chou CY, Trends and biopsychosocial correlates of physical disabilities among older men and women in Taiwan: Examination based on ADL, IADL, mobility, and frailty. *BMC Geriatr.* 2022; 22(1):148. <https://doi.org/10.1186/s12877-022-02838-6> PMID: 35193512
- De Castro KCM, Guerra RO. Impact of cognitive performance on the functional capacity of an elderly population in Natal, Brazil. *Arq Neuropsiquiatr.* 2008;66(4):809–13. <https://doi.org/10.1590/S0004-282X2008000600006>
- Feger DM, Willis SL, Thomas KR, Marsiske M, Rebok GW, Felix C, et al. Incident instrumental activities of daily living difficulty in older adults: Which comes first? Findings from the advanced cognitive training for independent and vital elderly study. *Front Neurol.* 2020; 11:550577. <https://doi.org/10.3389/fneur.2020.550577> PMID: 33192982
- Figueiredo Neto JA, Reis LM, Veras MR, et al. Impact of cardiovascular interventions on the quality of life in the elderly. *Braz J Cardiovasc Surg.* 2015 Dec;30(6):626–630.
- IIPS, NPHCE, MoHFW, HSPH, USC. Longitudinal Ageing Study in India (LASI) Wave 1, 2017–18. 2020. Available: <http://keperawatan.ugm.ac.id/index.php/2017/01/hypertension-risk-factors-and-treatment>
- India demographic profile. Available from: https://www.indexmundi.com/india/demographics_profile.html; 2018. Accessed July 4, 2020.
- Kim M, Shin E, Kim S, Sok S. The effectiveness of multicomponent intervention on daily functioning among the community-dwelling elderly: A systematic review. *Int J Environ Res Public Health.* 2022; 19 (12):7483. <https://doi.org/10.3390/ijerph19127483> PMID: 35742730
- Lawton MP, Brody EM. Instrumental activities of daily living scale (IADL). *Gerontologist.* 1969;9:179–86.
- Liu CJ, Chang WP, Chang MC. Occupational therapy interventions to improve activities of daily living for community-dwelling older adults: A systematic review. *Am J Occup Ther.* 2018;72(4):1–[PubMed] [Google Scholar]
- Mayhew, L and Smith, D. On the decomposition of life expectancy and limits of life. *Popul Stud* 9 (Camb) ., 2015, 69, 73-89 doi : 10.1080/00324728.2014.972433
- Meunier D, Stamatakis EA, Tyler LK. Age-related functional reorganization, structural changes, and preserved cognition. *Neurobiol Aging.* 2014 Jan 1;35(1): 42–54.
- Pati, S. Sharma, A., Pati S and Zodpey, S. Teaching of Geriatric Health in India :Mapping the terrain. *Gerontol. Geriatr. Educ.* : 2017, 38, 92-103. doi : 10.1080/02701960.2016.1232590.

- Partridge,L., Deelen,J. and Slagboom ,P.E. Facing up to the global challenges of ageing . Nature , 2018, 561 ,45-56 .<https://doi.org/10.1038/s41586-018-0457-8>
- Salisbury C, Johnson L, Purdy S, Valderas JM, Montgomery AA. Epidemiology and impact of multimorbidity in primary care: a retrospective cohort study. Br J Gen Pract. 2011;61(582):e12–21 <https://doi.org/10.3399/bjgp11X548929>.
- Sheehan C, Don Sheehan C, Doningue B, Crimmins E. Cohort trends in the gender distribution of household tasks in the United States and the implications for understanding disability. J Aging Health. 2019; 31(10):1748–69. <https://doi.org/10.1177/0898264318793469> PMID: 30141717
- Shekhar Chauhan¹ , Shubham Kumar² , Rupam Bharti³ and Ratna Patel⁴ 2022,Prevalence and determinants of activity of daily living and instrumental activity of daily living among elderly in India BMC Geriatrics (2022) 22:64 <https://doi.org/10.1186/s12877-021-02659-z>
- Shwe , P.S ., Ward ,S.A., Thein,P.M .and junckerstorff,R.Frailty oral health and nutrition in geriatrics inpatients : A cross sectional study .Gerodontology ., 2019,63, 223-228 .doi: 10.1111/ger.12397 .
- Tas Ü, Verhagen AP, Bierma-Zeinstra SM, Odding E, Koes BW. Prognostic factors of disability in older people: a systematic review. Br J GenPract.2007;57(537):319–23.
- Wang DX, Yao J, Zirek Y, Reijnierse EM, Maier AB. Muscle Mass, Strength, and Physical Performance Predicting Activities of Daily Living: a Metaanalysis. J Cachexia, Sarcopenia Muscle (2020) 11(1):3–25. doi:10.1002/jcsm.12502
- Yau, P. N. *et al.* (2022). The prevalence of functional disability and its impact on older adults in the ASEAN region: a systematic review and meta-analysis. Epidemiology and Health, 44, e2022058. <https://doi.org/10.4178/epih.e2022058>