

## The Relationship between Chronic Diseases and Disability in Daily Activities and Instrumental Activities of Daily Living in the Elderly

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### ABSTRACT

**BACKGROUND AND OBJECTIVE:** Chronic disease is one of the major causes of disability in doing daily activities. The aim of this study is to determine the relationship between chronic disease and disability in daily activities and instrumental activities of daily living in the elderly.

**METHODS:** This cross-sectional study was conducted among the elderly of Amirkola. Demographic characteristics (age, gender, level of education and occupation), daily activities and instrumental activities of daily living were collected using a questionnaire. The ability to perform daily activities and instrumental activities was categorized as independently, with the help of others and completely dependent, and ultimately, completely dependent people and those using the help of others were placed in the disability group. The presence of chronic diseases in the elderly was characterized and examined by reviewing the medical records.

**FINDINGS:** Of 1,500 elderly who were eligible to enter the study, 832 people (55.5%) were male and 668 people (44.5%) were female. In this study, 38 people (2.5%) had a disability in daily activities and 723 (48.2%) had disability in instrumental activities of daily living. The number of associated diseases ( $p < 0.003$ , CI-95% = 1.08–1.46, OR = 1.261), cognitive impairment ( $p < 0.009$ , CI-95% = 1.308–6.508, OR = 2.917) and old age had a significant relationship with daily activity. The highest significant relationship was between the instrumental activities of daily living and gender ( $p < 0.000$ , CI-95% = 1.53–2.69, OR = 2.029), age ( $p = 0.000$ ), education level ( $p = 0.000$ ), the number of associated diseases ( $p = 0.000$ , CI-95% = 1.13–1.28, OR = 1.2) and cognitive impairment ( $p = 0.000$ , CI-95% = 1.487–2.596, OR = 1.965).

**CONCLUSION:** According to the results of this study, the presence of chronic diseases, especially cognitive impairment, is one of the effective factors in disability in daily activities and instrumental activities of daily living.

**KEY WORDS:** Daily Activity, Chronic Disease, Disability, Old Age.

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## Introduction

Along with improvements in health conditions, medical services, and increased life expectancy, the elderly population is rising (1, 2), which is referred to as silent revolution (3). According to the World Health Organization (WHO), the number of elderly people in Southwest Asia (including Iran) in 2000 was about 7% of the total population, and this figure will reach 15% by 2030 (4). According to the census of 2016, about 7.5 million (9.27%) of Iran's population were 60 years old and above (5). According to international estimates, from 2040, the elderly population of Iran will grow faster than other countries (6). Chronic diseases are very important due to their effect on mortality rates (7). About 60 - 75% of the elderly have at least two chronic diseases (8).

The most common chronic diseases among the elderly are reported to be cardiovascular diseases (30.3%), cancer (15.1%), chronic pulmonary diseases (9.5%), cognitive impairment (6.6%), musculoskeletal disorders (7.5%), digestive disorders (3.4%), sensory disorders (3.1%), and urinary tract infections (2.9%) (9). Chronic diseases can be a threat to the quality of life of individuals and lead to early and severe disabilities (10,11). The most important causes of functional disability in activities of daily living (ADL) and instrumental activities of daily living (IADL) include leg problems, arthritis, cognitive impairment, heart problems, and eyesight problems (12). In studies, the incidence of disability in ADL in the elderly was 4.5% (13) and 10.4% (14).

In a study, the incidence of disability in ADL in the elderly was 38% and the incidence of disability in IADL was 57% in (15). Since it is necessary to determine the groups that are prone to disability and take prevention and rehabilitation measures to reduce disability in the elderly (16), and considering that the relationship between chronic diseases and disability in the elderly has not been thoroughly investigated in Iran, this study aims to examine the relationship between chronic diseases and disability in activities of daily living and instrumental activities of daily living in the elderly.

## Methods

This cross-sectional study is part of a cohort study of AHAP (the Amirkola Health and Ageing Project) entitled "An assessment of the health status of older people in Amirkola", which is conducted among all individuals aged 60 years and older after obtaining the

approval of the Ethics Committee of the Babol University of Medical Sciences (Code of Ethics: MUBABOL.REC.1389.4), and is still in progress (17). A total of 1616 people participated in the first phase of the comprehensive project, of which only 1500 were eligible for inclusion in the present study, because their files were complete.

Demographic information (age, gender, education, occupation) and data on ADL and IADL activities was collected by referring to the elderly's homes and interviewing the elderly people or an informed person, by experts who were trained for one year. Disability in activities of daily living was evaluated among the elderly using the Katz criterion (10). The validity and reliability of this scale were reported in the study of Habibi sola et al. (18). Activities of daily living included eating, wearing, and bathing, paying attention to appearance, walking, going to bed, going out of bed, and going to the restroom. Instrumental activities of daily living were also evaluated using the Lawton questionnaire, which included using the phone, going shopping, preparing their own meals, doing housework, taking medications, managing their finances, doing heavy work around the neighborhood, moving up and down the stairs, and walking for about one kilometer (17, 18).

The overall ADL score is from zero to 14 and the overall IADL score is from zero to 24. In IADL classification, the cut-off point was based on the earned mid-point scores; those who earned scores more than 20 were considered capable people and those who earned scores equal to or below 20 were considered incapable people. Moreover, in ADL classification, those who earned scores more than 14 were considered capable people and those who earned scores equal to or below 14 were considered incapable people. Regarding the presence or absence of chronic diseases, if an elderly person reported having a particular health problem, the case or medical records of the patient were reviewed and if there was no medical record, it was considered negative.

Chronic diseases in this study included diabetes mellitus, dementia, depression, high blood pressure, coronary heart disease, chronic obstructive pulmonary disease (COPD), urinary rejection, various types of fractures, and incontinence have that lasted for at least three months.

Data were analyzed using SPSS version 19, t-test, and chi-square tests, and  $p < 0.05$  was considered significant.

## Results

In this comprehensive plan, of the total 1616 elderly participants, 1500 people were eligible to enter the study due to the fact that their records and information were complete. The mean age of the subjects was  $68.81 \pm 7.1$ , with an age range of 60–97 years (Table 1). Women were more incapable than men in most of the IADL-related criteria ( $p=0.000$ ).

However, in preparing their food and doing their housework, men were more incapable ( $p=0.000$ ) (Table 2). In this study, the increase in age, the presence of

chronic diseases ( $p=0.041$ , CI-95%=1.007 – 1.205, OR=1.205) and cognitive impairment ( $p=0.009$ , CI-95%=1.308–6.508, OR=2.917) had the greatest effect on the daily activities of the elderly people. In addition, the variables of gender ( $p=0.000$ , CI-95%=1.530–2.690, OR=2.029), age, level of education and chronic diseases ( $p=0.000$ , CI-95%=1.101–1.275, OR=1.185) and cognitive impairment ( $p=0.000$ , CI-95%=1.487–2.596, OR=1.965) were variables effective on IADL (Table 3).

**Table 1. Frequency distribution and percentage of demographic characteristics of elderly people in Amirkola**

Variables		Number (percent)
Gender	Male	832(55.5)
	Female	668(45.5)
Age	60 – 64	552(36.8)
	65 – 69	314(20.9)
	70 – 74	264(17.6)
	75 – 79	229(15.3)
	80 – 84	95(6.3)
	85 and above	46(3.1)
Education	Illiterate	955(63.7)
	Elementry and middle school	441(29.4)
	High school and university	104(6.9)
Job	Unemployed	94(6.3)
	housewife	592(39.5)
	With job record and retired	329(21.9)
	Job other than housekeeping	477(31.8)
	Unknown	8(0.5)
Marital status	Married	1282(85.5)
	Unmarried	218(14.5)
Living condition	Alone	102(6.8)
	With family	1398(93.2)
Body mass index	Lower than 25	492(32.8)
	25 – 29.99	642(42.8)
	Higher than 30	366(24.4)

**Table 2. Frequency distribution and percentage of instrumental activities of daily living based on gender in the elderly of Amirkola**

Ability to do activities IADL based on gender		Done without help N(%)	Done with some help N(%)	Not able to do N(%)	P-value
Using phone	Man	365(43.9)	432(51.9)	35(4.2)	0.000
	Woman	194(29)	438(65.6)	36(5.4)	
Go to faraway places	Man	738(88.7)	90(10.8)	4(0.5)	0.000
	Woman	422(63.2)	238(35.6)	8(1.2)	
Going shopping	Man	764(91.8)	57(6.9)	11(1.3)	0.000
	Woman	451(67.5)	176(26.3)	41(6.1)	
Preparing their own meal	Man	185(22.2)	614(73.8)	33(4)	0.000
	Woman	534(79.9)	122(18.3)	12(1.8)	
Doing housework	Man	208(25)	591(71)	33(4)	0.000
	Woman	435(65.1)	216(23.3)	17(2.5)	
Receiving medicine	Man	728(87.5)	97(11.7)	7(0.8)	0.000
	Woman	537(80.4)	117(17.5)	14(2.1)	
Managing their financial issues	Man	718(86.3)	63(7.6)	51(6.1)	0.000
	Woman	198 (29.6)	204(30.5)	266(39.8)	

**Table 3. Odds ratio and 95% confidence interval of the variables affecting the activities of daily living and instrumental activities of daily living in the elderly of Amirkola**

Variables		Activities of daily living (ADL)		Instrumental activities of daily living (IADL)	
		OR (CI-95%)	Pvalue	OR (CI-95%)	P value
Gender (male / female)		1.319 (0.595 – 2.926)	0.495	2.029 (1.530 – 2.690)	0.000
Age	60 – 64	Reference		Reference	
	65 – 69	0.975 (0.276 – 3.442)	0.968	1.354 (0.980 – 1.871)	0.066
	70 – 74	1.092 (0.305 – 3.904)	0.893	2.299 (1.0635 – 3.232)	0.000
	75 – 79	3.021 (1.064 – 8.580)	0.038	4.681 (3.180 – 6.890)	0.000
	80 – 84	5.693 (1.767–18.346)	0.004	8.648 (4.774 – 15.663)	0.000
	85 and above	8.704 (2.217–34.169)	0.002	15.181 (5.919 – 38.937)	0.000
Education	Illiterate	Reference		Reference	
	Elementry and middle school	0.993 (0.401–2.460)	0.988	0.445 (0.339 – 0.583)	0.000
	High school and university	1.425 (0.165–12.292)	0.747	0.110 (0.046 – 0.263)	0.000
Marital status (married / Single)		0.778 (0.322 – 1.880)	0.578	0.783 (0.548 – 1.119)	0.179
Body mass index	Less than 25	Reference		Reference	
	25 – 29.99	0.404 (0.178 – 2.915)	0.030	0.938 (0.704 – 1.250)	0.663
	30 and above	0.554 (0.219 – 1.402)	0.213	0.879 (0.627 – 1.232)	0.453
Diseases (Yes / No)		1.205 (1.007 – 1.442)	0.041	1.185 (1.101 – 1.275)	0.000
Depression (yes / no)		1.431 (0.669 – 3.064)	0.356	1.087 (0.835 – 1.416)	0.534
Diabetes mellitus (yes / no)		1.766 (0.839 – 3.718)	0.134	1.264 (0.963 – 1.659)	0.091
Hypertension (Yes / No)		0.810 (0.387 – 1.698)	0.577	0.987 (0.760 – 1.283)	0.923
Cognitive impairment (Yes / No)		2.917 (1.308 – 6.508)	0.009	1.965 (1.487 – 2.596)	0.000

## Discussion

The results of this study showed that 2.5% of the elderly were incapable in doing ADL and 48.2% of them were incapable in doing IADL. In another similar

study in Canada, functional disability in ADL was 15.4% and in IADL was 33.4% (12). In the study of Rajan et al., the prevalence of disability in ADL in the elderly was 37% and in IADL was 48% (19).

Furthermore, in the study of Millan-Calenti et al., 1.7% of the elderly were completely dependent in doing ADL and 5.5% in doing IADL (20). The low percentage of disability in ADL in this study may be related to the culture and social conditions of the elderly, as they try to do their activities of daily living independently as far as their ability allows. In addition, the high percentage of disability in IADL could be related to the low literacy of the elderly in our society. Based on the results of this study, the mean score of men was higher in performing IADL, but there was no significant difference in ADL between genders. According to the results of the present study, men are more likely to be incapable in preparing food and doing housework than women are. In Kim's study in South Korea, the prevalence of disability in ADL in women (20.8%) was more than that of men (13.3%) (21).

In other studies, the disability of women in ADL and IADL was more than that of men (19,20,22). The disability of women in IADL may be due to the fact that the rate of illiteracy is higher among women. In the present study, disability in ADL was more observed in the elderly aged over 75 years and disability in IADL was more observed in the elderly aged over 70 years. Similar to the results of our study, disability in ADL and IADL increased with age in other studies (12, 19, 21, 22). This issue may be due to the decrease in the physical strength of the elderly and the increase in the prevalence of chronic diseases at older age.

Regarding the level of education, similar to other studies (19,21), the present study showed that the ability to do IADL in the elderly has a significant relation with the level of education. Since the majority of participants (63.7%) were illiterate in this study and most of the elderly (60%) were disable in doing IADL, and considering that IADL-related criteria, such as the ability to use the phone and etc. require literacy, it was expected that the level of disability in IADL be associated with the level of education. In this study, no significant correlation was observed between marital status, BMI and activities of daily living and instrumental

activities of daily living. Similarly, there was no relationship between ADL, IADL, and BMI in another study (8). In addition, in the present study, the variables of the presence of multiple chronic conditions and cognitive impairment significantly affected ADL and IADL.

In the study of Kim, the most common causes of disability in men were cancer, stroke, and diabetes mellitus and in women were stroke, respiratory diseases, diabetes, and incontinence (21). In other similar studies, elderly people who experienced chronic diseases had significantly more disability (23-25). One of the strengths of the present study is conducting a cohort study with a high participation rate for the elderly in Amirkola (1616/2234). One of the limitations of this study is that it is cross-sectional, which makes it difficult to study the causal relationship between chronic diseases and disability in ADL and IADL.

Self-reported chronic diseases, less referral of elderly people with lower socioeconomic status and late detection of illnesses deprive us of a more precise prevalence of these diseases in the elderly. This study showed that ADL and IADL were associated with increased age, and older women were more incapable in IADL, and disability was more common in the elderly with lower education. In addition, the presence of multiple chronic diseases, especially cognitive impairment, has been a factor in disability in performing ADL and IADL. Therefore, considering the growth of the elderly population, the illiteracy of most elderly women and the prevalence of cognitive impairment in elderly, preventive interventions and proper planning to achieve healthy aging seem necessary.

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## References

1. Lashkarboloki F, Aryaei M, Djazayeri A, Eftekhari-Ardebili H, Minaei M. Association of demographic, socio-economic features and some health problems with nutritional status in elderly. *Iran J Nutr Sci Food Technol*. 2015;9(4):27-34. [In Persian]
2. Kunstová NŠ, Šidlo L. The future development of elderly care home capacity in South Bohemia. *Kontakt*. 2016;18(2):103-11.
3. Azadchehr M, Rahgozar M, Karimloo M, Adib Haj Bageri M. To identify some factors effective on survival of the elderly living in nursing home using copula competing risk model: bayesian approach. *J Health Promot Manag*. 2014;3(4):46-55.
4. Mirzaei M, Sahaf R, Mirzaei S, Sepahvand E, Pakdel A, Shemshadi H. Depression and its associated factors in elderly nursing home residents: A screening study in Khorramabad. *Iran J Ag*. 2015;10(1):54-61. [In Persian].
5. Statistical Center of Iran. Office of the Head, Public Relations and: International Cooperation. Selection of the results of the census of population and housing in 1395. Statistical Center of Iran; 2017. p. 22.
6. Ahrari S, Moshki M, Bahrami M. The relationship between social support and adherence of dietary and fluids restrictions among hemodialysis patients in Iran. *J Caring Sci*. 2014;3(1):11.
7. Kabasakal E, Kublay G. Practices of family health professionals regarding chronic disease control and prevention programs. *Health Sci*. 2017;6(10):93-104.
8. Ralph NL, Mielenz TJ, Parton H, Flatley A-M, Thorpe LE. Multiple chronic conditions and limitations in activities of daily living in a community-based sample of older adults in New York City, 2009. *Prevent Chronic Dis*. 2013;10:199.
9. Prince MJ, Wu F, Guo Y, Robledo LMG, O'Donnell M, Sullivan R, et al. The burden of disease in older people and implications for health policy and practice. *The Lancet*. 2015;385(9967):549-62.
10. Chalise HN, Saito T, Kai I. Functional disability in activities of daily living and instrumental activities of daily living among Nepalese Newar elderly. *Pub Health*. 2008;122(4):394-6.
11. Omran MT, Khakpour S, Oliaie F. Left ventricular function before and after kidney transplantation. *Saudi Med J*. 2009;30(6), 821-23.
12. Griffith L, Raina P, Wu H, Zhu B, Stathokostas L. Population attributable risk for functional disability associated with chronic conditions in Canadian older adults. *Age Ageing*. 2010;39(6):738-45.
13. Dunlop DD, Song J, Arntson EK, Semanik PA, Lee J, Chang RW, et al. Sedentary time in US older adults associated with disability in activities of daily living independent of physical activity. *J Physical Act Health*. 2015;12(1):93-101.
14. Gopinath B, Schneider J, McMahon CM, Teber E, Leeder SR, Mitchell P. Severity of age-related hearing loss is associated with impaired activities of daily living. *Age Ageing*. 2011;41(2):195-200.
15. James BD, Boyle PA, Buchman AS, Bennett DA. Relation of late-life social activity with incident disability among community-dwelling older adults. *J Gerontol Ser Sci*. 2011;66(4):467-73.
16. da Silva Alexandre T, Corona LP, Nunes DP, Santos JLF, de Oliveira Duarte YA, Lebrão ML. Gender differences in incidence and determinants of disability in activities of daily living among elderly individuals: SABE study. *Arch Gerontol Geriatr*. 2012;55(2):431-7.
17. Hosseini SR, Cumming RG, Kheirkhah F, Nooreddini H, Baiani M, Mikaniki E, et al. Cohort profile: The Amirkola health and ageing project (AHAP). *Int J Epidemiol*. 2013;43(5):1393-400.
18. Habibi Sola A, Nikpour S, Rezaei M, Haghani H. Relation between Health Promoting Behaviors and activities of daily living and Instrumental activities of daily living among older people in Tehran. *Salmand*. 2008;2(5):332-5.
19. Rajan KB, Hebert LE, Scherr PA, Mendes de Leon CF, Evans DA. Disability in basic and instrumental activities of daily living is associated with faster rate of decline in cognitive function of older adults. *Biomed Sci Med Sci*. 2012;68(5):624-30.
20. Millan-Calenti JC, Tubío J, Pita-Fernández S, González-Abraldes I, Lorenzo T, Fernandez-Arruty T, et al. Prevalence of functional disability in activities of daily living (ADL), instrumental activities of daily living (IADL) and associated factors, as predictors of morbidity and mortality. *Arch Gerontol Geriatr*. 2010;50(3):306-10.

21. Kim IH. Age and gender differences in the relation of chronic diseases to activity of daily living (ADL) disability for elderly South Koreans: based on representative data. *J Prev Med Pub Health*. 2011;44(1):32-40.
22. Hacıhasanoğlu R, Yildirim A, Karakurt P. Loneliness in elderly individuals, level of dependence in activities of daily living (ADL) and influential factors. *Arch Gerontol Ger*. 2012;54(1):61-6.
23. Bowling CB, Sawyer P, Campbell RC, Ahmed A, Allman RM. Impact of chronic kidney disease on activities of daily living in community-dwelling older adults. *J Biomed Sci Med Sci*. 2011;66(6):689-94.
24. Giebel CM, Sutcliffe C, Challis D. Activities of daily living and quality of life across different stages of dementia: a UK study. *Aging Ment Health*. 2015;19(1):63-71.
25. Jekel K, Damian M, Wattmo C, Hausner L, Bullock R, Connelly PJ, et al. Mild cognitive impairment and deficits in instrumental activities of daily living: a systematic review. *Alzheimer's Res Therapy*. 2015;7(1):17.