

**Original article:**

**The relationship between activities of daily living, falls and fear of falling in older adults : A cross-sectional study**

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**Abstract:**

**Objective :** Doing activities of daily living can bring independence for the elderly. It can also maintain their health and social participation. However, experience of falls and fear of falling can affect the health and personal social life of the elderly. The aim of this study was to evaluate the relationship between falls and fear of falling with activities of daily living in older adults. **Materials and methods :** Four hundred and fifty elderly persons were enrolled in this cross-sectional study using cluster sampling. Demographic variables, Fall Efficacy Scale-International (FES-I) and questionnaires related to the study of activities of daily living were employed. To investigate advanced activities of daily living, open-ended questions were used. The history of falls within the last 12 months was investigated. **Results :** Mean score of basic activities of daily living in the elderly being studied was  $15.49 \pm 1.74$ , and 95.4% of them were independent in doing these activities. Mean score of instrumental activities of daily living was  $11.30 \pm 3.36$ , and 71.5% of them were independent in doing these activities. Participation of elderly persons in social activities was reported to be 77.9%. There was a significant relationship between activities of daily living (basic, instrumental, and advanced) and falls and fear of falling ( $p < 0.05$ ). **Conclusion :** Falls and fear of falling reduce the independence of elderly persons in doing activities of daily living.

**Keywords:** Activities of Daily Living; Falls, Accidental Falls; Aged; Elderly

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**Introduction**

The growing number of the elderly in the world faces many problems, resulting in health issues and increased social demands to resolve them.<sup>1</sup> Fall is a leading cause of physical disability in the elderly<sup>2-3</sup> and has a significant effect on their personal and social life.<sup>4</sup> According to the literature, the incidence of falls in the elderly varies from 20% to 40%.<sup>5-9</sup> About 60% of those with a history of fall in the past year will re-experience.<sup>4</sup> Most elderly who are hospitalized after falls never return to their previous level of activity),

and those with frequent falls are more afraid of falls than those who experience it occasionally.<sup>10</sup> Fear of falling is a psychological variable that increases physical weakness and decreases the physical activities of the community-dwelling elderly.<sup>11</sup> The incidence rate of fear of falling has been reported to be between 16% and 60% in various studies.<sup>5, 10, 12</sup> Fear of falling in the elderly could result in excessive care, motor constraints, and lack of independence leading to a decrease in their motor functions.<sup>13</sup> Examining the ability of the elderly to perform activities of daily living is a way of evaluating their health status.<sup>14</sup>

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Activities of daily living are the major factor affecting the elderly.<sup>15</sup>The functional status of the elderly can be assessed at three levels, *i.e.* basic, instrumental, and advanced activities of daily living.<sup>16</sup> The basic activities of daily living include bathing, dressing, using the toilet, moving around in the house, and eating <sup>7</sup>; the instrumental activities of daily living include shopping for groceries, driving, doing chores, making food, taking medications, and managing financial affairs; and the advanced activities of daily living that include the ability to play roles in the society and the family and to participate in recreational and occupational activities.<sup>16</sup>Doing daily activities leads to independence, health, social participation, and achievement.<sup>17</sup>Therefore, it is important to attempt and plan to maintain and promote the elderly's activities of daily living.<sup>7</sup>In a study showed that 43.15% of the elderly reduced their activities due to fear of falling.<sup>18</sup>In addition, a history of falls may result in decreased activity of older adults.<sup>4, 19</sup>This is while another study revealed that, in general, the risk of falls increased in the elderly population being studied as their daily activities increased or decreased and that those with good status of daily activities may be at greater risk of falls due to increased activity.<sup>20</sup>

It appears that motor constraints and lack of independence lead to fear of falling and reduce the self-confidence and self-efficacy of the elderly. This will reduce their motor function as well. On the other hand, the elderly may be at higher risk of falls due to their high level of activity. Therefore, due to the limited number of domestic studies in this area, the researchers decided to design this study aiming to investigate the relationship between activities of daily living (basic, instrumental and advanced) and falls and fear of falling in the elderly.

### Materials and Methods

A total of 450 elderly persons living in Bojnurd (urban and rural areas) were enrolled in this cross-sectional study using cluster sampling. The proposal was approved and confirmed by the Ethics Committee of the university and the required permissions were obtained, and the multistage random sampling was conducted from December 2016 to June 2017. First, cities and villages were sampled as categories and then the cluster sampling was performed within the categories. Considering the population of the elderly in cities and villages (63% city and 37% village), 290 elderly persons were enrolled from urban districts (148 females and 142 males) and 160 from rural areas (85 females and 75 males). After determining

the cluster head and referring their house to complete details, other samples were determined based on the right hand rule. Then, data were collected considering inclusion criteria (age of 60 years and older; willingness to participate in the study; living at home; being aware of time and place; being capable of verbal communication; not being bedbound; and lack of Alzheimer's disease, dementia, and a history of admission due to psychiatric disorders), after connecting the elderly and explaining the study objective according to ethical considerations. In this study, questionnaires of demographic data, FES-I, questionnaires related to basic and instrumental activities of daily living were employed. To investigate advanced activities of daily living, open-ended questions were used. The history of falls within the last 12 months was investigated by asking the participants. The validity and reliability of the questionnaire in Iran was verified <sup>8, 21</sup> If the elderly could not answer the questions for any reason, the question was posed to one of their relatives. The data were analyzed using SPSS version 24. Considering the fact that the amount of lost data in each question was less than 10%, the data imputation method was used.

### Results

Four hundred and fifty seniors with a mean age of 70.46±8.17 years participated in the study; 233 (51.9%) were female and 217 (48.1%) were male; 239 (54.3%) were illiterate; 303 (68.2%) were married; 209 (64.4%) were living in the city and 160 (35.6%) in the countryside; 232 (55.8%) had normal MBI; 112 (27.6%) used more than one aid; 184 (45.1%) took more than one medication; 242 (54.4%) had changes in blood pressure; and 188 (42.2%) lived with their spouse. Frequency distribution of falls based on the location and times of falls is shown in Table 1.

**Table 1:** Frequency distribution of falls according to the location and times of falls within the last 12 months

Falling location	Falling once	Falling twice or more	Total times of falling
Indoor and yard	43 (63.2%)	39 (45.3%)	82 (53.3%)
Alley or street	25 (36.8%)	18 (20.9%)	43 (27.9%)
Over one location	0 (0%)	29 (33.7%)	29 (18.8%)
Missed		3	3
<b>Total</b>	68 (100%)	89 (100%)	157 (100%)

Fifty seniors (27.62%) with a history of falls required hospitalization. Of the elderly living in cities and villages, 84 (29.6%) and 73 (46.8%) subjects suffered from falls, respectively. There was a significant relationship between falls and sex; education; marital status; income; habitat; central nervous system diseases; nervous, skeletal, and motor problems; taking hypnotic drugs; sedatives; cardiovascular medications; and taking more than one medication ( $p<0.05$ ), such that falls occurred more in females (103, 45.8%), illiterates (109, 46.2%), singles (65, 51.1%), low-income seniors (86, 43%), and village dwellers (73, 46.8%). The history of falls was not significantly related to age ( $p=0.679$ ). Sixty-four seniors (15.6%) studied suffered from fear of falling and 346 (84.4%) did not. Mean value of fear of falling in the elderly studied was  $29.14\pm 11.07$  and the highest rate of fear of falling was related to walking on a slippery surface (32.9%) an fear of falling and sex; education; marital status; income; habitat; central nervous system diseases; nervous, skeletal and motor problems; sedatives; cardiovascular medications; and taking more than one medication ( $p<0.05$ ), such that the mean score of fear of falling was higher in the elderly over 80 years old ( $35.25\pm 14.99$ ),

women ( $31.50\pm 11.40$ ), illiterates ( $31.28\pm 12.03$ ), singles ( $32.04\pm 13.34$ ), and low-income seniors ( $32.40\pm 12.95$ ). There was a significant relationship between basic activities of daily living in the elderly and age, education, income, heart diseases, changes in blood pressure, central nervous system diseases, cancer, and taking cardiovascular medications ( $p<0.05$ ). There was a significant relationship between instrumental activities of daily living in the elderly and age, sex, education, marital status, central nervous system diseases, musculoskeletal disorders, asthma, metabolic diseases, hearing problems, vision problems, taking hypertension medications, sedatives, cardiovascular medications, neuropsychiatric medications, and taking more than one medication ( $p<0.05$ ). There was a significant relationship between advanced activities of daily living in elderly persons and age, sex, education, income, heart diseases, central nervous system diseases, cancer, musculoskeletal disorders, asthma, hearing problems, vision problems, taking sedatives, and cardiovascular medications ( $p<0.05$ ). Distribution of central indices and independence of the elderly in doing activities of daily living are shown in Table 2.

**Table 2:** Distribution of central indices and independence of seniors in doing activities of daily living

Activities of Daily Living	Mean	Standard deviation	Independent	Slightly dependent	Totally dependent
Basic Activities of Daily Living (BADL)	15.49	1.74	416 (95.4%)	17 (3.9%)	3 (0.7%)
Instrumental Activities of Daily Living (IADL)	11.30	3.36	314 (71.5%)	72 (16.4%)	53 (12.1%)
Advanced Activities of Daily Living (AADL)	mostly at home		participating in social activities		
	98 (22.1%)		345 (77.9%)		

The relationship between falls and fear of falling with activities of daily living in the elderly is shown in Table 3.

**Table 3:** Relationship between activities of daily living and falls and fear of falling in the elderly

Activities of Daily Living		History of falling				Fear of falling			
		Yes		No		Yes		No	
		Number	%	Number	%	Number	%	Number	%
BADL	Independent	137	33.6	271	66.4	44	11.6	336	88.4
	Slightly dependent	10	62.5	6	37.5	13	76.5	4	23.5
	Totally dependent	3	100	0	0	3	100	0	0
IADL	Independent	81	26.5	225	73.5	14	4.7	282	95.3
	Slightly dependent	38	53.5	33	46.5	20	31.7	43	68.3
	Totally dependent	33	63.5	19	36.5	27	61.4	17	38.6
AADL	Mostly at home	56	58.9	39	41.1	38	45.8	45	54.2
	Participating in social activities	98	28.9	241	71.1	25	7.8	297	92.2
Statistical test		Chi-square ( $p<0.05$ )				Chi-square ( $p<0.05$ )			

## Discussion

The present study was conducted to find the relationship between activities of daily living and falls and fear of falling. Results showed a significant relationship between incidence rate of falls and fear of falling with activities of daily living (basic, instrumental, advanced) in the elderly living in urban and rural areas. The elderly was independent in doing basic activities of daily living (59.4%) and similar results were obtained in other studies.<sup>22-23</sup> In this study, the highest independence in doing basic activities of daily living (BADL) was related to eating (98%) and the lowest rate of independence was related to bathing (87.9%). Similar results are seen in other studies.<sup>14, 24-25</sup> In this study, 71.5% of the elderly were independent in doing instrumental activities of daily life. Similar results are seen in other studies.<sup>24, 26</sup> Also, the highest independence in doing IADL was related to cost control (85.9%) and the lowest rate of independence to using the phone (52.1%). This is while in the study by Tavafiyani *et al.*,<sup>24</sup> the highest rate of independence in the elderly was related to using the phone that does not comply with this study. It appears that this difference is due to the inconsistency between the education level of the elderly being studied in the mentioned paper (83.2%) and that of this study (54% illiterate). It is worth mentioning that dependence of the elderly in using the phone can negatively affect their ability to call for emergency help. In this paper, 77.9% of the elderly being studied participated in social activities. The results of a study showed that difference in methodology in various studies prevents the comparison of the results of advanced activities of daily living. Unlike BADL and IADL, which are measured in the same way in various communities, advanced activities of daily living (AADL) is different among various cultures.<sup>27</sup> In this study, all activities of daily living decrease with age and this is supported by numerous other studies.<sup>28-30</sup> Men are more independent in doing instrumental and advanced activities of daily living and this is supported by other studies.<sup>26, 28, 31</sup> In addition, the results of our study showed that married elderly couples were more independent in doing instrumental and advanced activities of daily living compared to singles. The results of various studies are consistent with those of this study.<sup>14, 26, 31</sup> In addition, the results of this study showed that the elderly with a history of falls are less independent in all levels of activities of daily living and results of various studies support

this.<sup>4, 18</sup> However, the results of another study showed that the elderly who are more independent in their activities of daily living, experience more falls.<sup>20</sup> On the other hand, the results of our study showed that the elderly with fear of falling are less independent in doing activities of daily living and this is consistent with the results obtained in other studies.<sup>11, 18, 32-34</sup>

## Conclusion

It could be concluded that falls and fear of falling in the elderly can limit their activities of daily living. This constraint results in inactivity and the dependence of the elderly on relatives and caregivers. Therefore, in addition to investigating the causes of the problem, the elderly's self-efficacy and self-confidence could be increased and active aging could be obtained by providing good environmental and mental conditions, training, and encouraging the elderly to be active.

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## Conflicts of Interest:

All authors declare no conflict of interest.

## Authors' Contribution:

Data gathering and idea owner of this study: Hamed Mortazavi, Mohadece Masoumi

Study design: Hamed Mortazavi, Mahbubeh Tabatabaieichehr

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## Ethical clearance:

The ethics committee of North Khorasan University of Medical Sciences approved the protocol of this study.

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