Prevalence of Falling and its relation with Chronic diseases and Balance of Older Adults in Urmia City

Research Article

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Abstract

Introduction: Falling is one of the most common and serious health problems in the elderly people. As a result of aging , the muscles will be departed, so it will be difficult to balance and gait. This study aims to Prevalence of falling and its relation with chronic diseases and balance of Older Adults in Urmia city. Methods: This is a cross-sectional (descriptive-analytic) study in which 200 elderly people were selected by random cluster sampling method. Data were collected by using a two-part questionnaire which was included demographic information, common epidemic diseases and history of falling of the elderly people in the last year and *Tinetti* balance *assessment* questionnaire. Data were analyzed by using t- test and logistic regression in SPSS v.21 software. Results: The results of this study showed that, the rate of falling was 30 percent. Diseases such as cardiovascular diseases, arthritis, osteoarthritis, stroke, visual impairment, respiratory disease, fecal incontinence increase the risk of falling in the elderly people. Logistic Recession Results show that old age (OR = 4.2, p = .04; 95%CI = 0.87-1.3)female (OR = 2.2, p = .03; 95%CI = 0.59-2.7)chronic disease (OR = 1.7, p = .05; 95%CI = 0.49-3.07)Poor economic situation (OR = 1.4, p = .008; 95%CI = 0.57-7.3) Low balance (OR = 9.6, p < .0001; 95%CI = 2.3-7.1)·increased the likelihood of falling elderly. Conclusion: The findings of this study showed that the rate of falling in Iranian elderly people is relatively high. The appropriate and effective preventive interventions should be made according to effective factors in falling of older adults.

Keywords: Falling, Chronic diseases, Balance, Older adults.

Introduction:

Falling is one of the most widespread problems in the older adults, because, their abilities decreases by increasing age. Also, physiological changes that occur during the process of elderly, older adults are increasingly exposed to various illnesses (1, 2). Studies have shown that between 24% to 35% of 64 year-olds in the community and 30% to 50% of the elderly who are living in long-term care institutions have experienced the falling and 40% of them are falling down more than once a year (3, 4)

Approximately one third of people over 65 year-olds have fallen down once in a year, which in half of them, the falling down happens frequently. In addition, in elderly over 65 year-olds, hospitalization in the hospital is the 80 % of falling reason and it is the sixth reason of death. So that, about 7% of deaths of older adults are due to the falling within one year (7, 8), falling rates and recurrent injuries will be increased by increase in the age (5, 6). Falling is an unpredictable and unexpected change in physical condition because of the falling of person on one object or the floor and also it can be because of the hit of epileptic seizures or the external forces (9). The causes of falling in the elderly are classified into two types of internal and external factors.

Internal factors include musculoskeletal problems, mental-psychological problems, underlying diseases, neurological diseases and age-related disabilities (urinary incontinence, pain-vision ...). External factors include environmental problems which can be related to the area of residence, the shape of house and environmental hazards, lighting, slider surfaces, auxiliary equipment, and the type of shoe (10, 11). In most cases, a set of these factors leads to falling.

The consequences of falling of older adults , not only affect their lives but also it can lead to different complications such as fear of re-falling, limitation of activities, social isolation, increasing the dependence on others and economic problems. Also it is important for health systems of community (12, 13). The prevalence of falling down varies among elderly people in different

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countries, in Turkey 28.5% (14), in Iran 27% (15), in China 26.4% (16), in the Netherlands 33.3% (3), 31% in Switzerland (17), in Australia 29 percent (18), 27.1 percent in Brazil (13), and 28.5 percent in Argentina (25).

In order to identify early interventions for preventing falls, it is essential that the older people which are at high risk of falling should be identified because the rate of falling in the elderly is high and can lead to complications such as fractures, scratches, endangering mobility, loss of confidence, self-esteem in performing tasks and fear of falling in these individuals. Considering these issues, the study of balance and risk of collapse is essential and basic matter for accurate evaluation, selection and presentation of them. For this purpose, the researcher is seeking to study the Prevalence of falling and its relation with chronic diseases and balance of Older Adults in Urmia city.

Materials and Methods:

In the descriptive-analytic study, the population of the study consists of older adults over 60 years old who were referred to urban health centers of Urmia City in 2017. According to previous studies and estimation of falling rate of elderly (3, 14, 16), it was at 95% of confidence level (d = 06) (Z = 1/96, P = 0.3), 200 patients were determined as sample. The *Cluster* sampling method was used to select 10 centers from among the 35 urban health centers and the satisfiedolder adults from each center were randomly assigned to the population. Data were collectedby using a two-part questionnaire including demographic data, common disease of older adults such as cardiovascular disease, diabetes, vision impairment etc. History of falling down of the older adults in a last year and Tinetti's Balance Assessment Questionnaire. Balance and standing and gaiting conditions were examined by the means of the Tinetti Standard Tool (POMA)(19) This tool was designed to assess the balance and walking conditions and consists of two parts of the equilibrium test and the way of gaiting and standing test. Equilibrium test consists of 9 components and each component has a different score, ranging from zero to a maximum of 2 scores and a total of 12 scores. The total score of the two sections is 16 score. The test of standing and gaiting is made up of seven components; each component has a different score, ranging from zero to a maximum of 2 scores and a total of 12 scores. The total score of the two sections is 28 scores.

If the individual score is below 19, it means that he/she is in a high risk of falling, or in a high-risk group, and if the score is between 19 -24, it means that he/she is in a moderate risk of falling, and if their score is 25 or more, it means that he/she in the low-risk of falling. The older adults were invited to the relevant health center by telephone, and the objectives of the research were explained to all participants in the study, then the questionnaires were completed by the elderly themselves. In case of illiteracy or low literacy of the individuals who were unable to complete the questionnaire, the questionnaire was completed by a trained questioner using interview method. The inclusion *criteria* were consist of being in an age group of 60 to 80 years old, non-use of anticonvulsants, able to walk without any helping tool, not being in the nursing home, and the Exclusion *criteria* were consisted of dissatisfaction, or death of the research cases or being unable to gait during the study.

Ethical consideration

At all stages of this study, ethical principles were observed. This study was approved by the Yazd Medical Sciences Ethics Committee. After explanations about objectives and results of this study, the participants have provided written consent.

Results

The mean age of the elderly was 71.42 ± 5.97 years old. The Most individuals were in 75 to 80 *year* old *age group* (33%). Most of the elderly were housewives (42%) and married (56%).Also, the highest level of their education was elementary (33%). In economic terms, most of the elderly were in a moderate economic situation (54%).Sixty (30%) of the elderly had an experience of falling over the last year, most of the fallings, 36 individuals have history of falling at home (60%) and 26 individuals in the morning, (43.3%) (Table 1)

Table 1. Frequency and distribution of baseline characteristics of the elderly (n = 200)

Variables		N (%)
Sex	Male	104 (52)
	Female	96(48)
Age	60-65	36 (18)
	65-70	54 (27)
	70-75	44 (22)
	80-75	66 (33)
Education	Illiterate	58 (29)
	Elementary	66 (33)
	junior	42 (21)
	Diploma and	34(17)
	Postgraduate	
Income	Weak	36 (18)
	Moderate	108 (54)
	Good	56 (28)
Marital status	Married	112 (56)
	divorced	26 (13)
	Widow /widower	62(31)
Job	Housewife	84 (42)
	Self-employed	40 (20)
	retired	20(10)
	Out of work	56 (28)
History of chronic diseases	Yes	149(74.5)
	No	51(25.5)
History of falling down	Yes	60(30)
	No	140(70)
The place of falling down	House	36(60)
	Out door	24(40)
The time of falling down	In the morning	26(43.3)
	In the evening	16(26.7)
	At night	18(30)

The most common chronic diseases in the elderly were Osteoarthritis / arthritis, stroke, visual impairment, and hypertension. The findings of this study showed that cardiovascular disease, arthritic -osteoarthritis, stroke, visual impairment, awareness or sensory disorder, Respiratory disease, Urinary incontinence increase the risk of falling in the elderly (Table 2).

Table 2: Relationship between falling and chronic diseases in the elderly in Urmia city

Type of disease		With falls history	Without falls history	t- test P-value
		Number (percent)	Number (percent)	
High blood pressure	Yes	34(39.5)	52 (60.5)	0.2
	No	26(22.8)	88(77.2)	
Diabetes	Yes	18(47.4)	20(52.6)	0.3
	No	42(25.9)	120(74.1)	
Cardiovascular disease	Yes	25(46.3)	29(53.7)	0.02*
	No	35(24)	111(76)	
Osteoarthritis arthritis	Yes	38(33.3)	76(66.7)	0. 04*
	No	22(25.6)	64(74.4)	
Stroke	Yes	18(64.3)	10(35.7)	0.008*
	No	42(24.4)	130(75.6)	
Visual impairment	Yes	35(36.5)	61(63.5)	0.004*
	No	25(25)	79(75)	
Sleeping disorders	Yes	20(33.3)	40(66.7)	0. 9
	No	40(40)	100(60)	
Awareness or sensory disorder	Yes	29(49.2)	30(50.8)	0.002*
	No	31(22)	110(78)	
Respiratory disease	Yes	21(67.7)	10(32.3)	0.001*
	No	39(23.1)	130(76.9)	
Hearing impairment	Yes	22(32.8)	45(67.2)	0.5
	No	38(28.6)	95(71.4)	
Tumor	Yes	7(25.9)	20(74.1)	0.7
	No	53(30.6)	120(69.4)	
Urinary incontinence	Yes	15(65.2)	8(34.8)	0.001*
	No	45(25.4)	132(74.6)	
Fecal incontinence	Yes	12(75)	4(25)	0.001*
	No	48(26.1)	136(73.9)	

* Significant p-value

All of the studied variables were introduced into the logistic regression model to predict the falling. The results indicated that five variables, age, gender, chronic disease, economic status, and the state of equilibrium and gaiting, predict the falling down in the older adults so that the odds ratio of falling in female elderly was 2.2 times more than the male (OR = 2.2) and it was statistically significant. In the more than 75 *year* old *age group*, the odds ratio of falling was 2.4 times more than other age groups (OR = 4.2). The odds ratio of falling in older adults with chronic illness was 1.7 more than healthy older adults (OR = 1.7). Also, the odds ratio of falling in older adults with poor economic status was 1.4% more than older adults with good economic status (OR = 1.4). The most predictors of falling in the elderly are related to balance and gaiting. Thus, the odds ratio of falling in older adults with poor economic status with poor balance and moderate balance was respectively 7.7 and 9.6 more than the older adults with poor economic status with high balance (OR= 9.6,OR= 7.3).

Table 3: predictive variables of falling of older adults by using logistic regression test (N = 200)

Independent variables	ß (regression coefficient)	S.E	OR (Odds ratio)	P-value	95% confidence interval for odds ratio	
					Lower	Upper
Age						
60-65	-	-	1	-	-	-
65-70	-0.36	0.79	0.69	0.64	0.17	1.3
70-75	0.54	0.61	1.8	0.08	0.51	4.1
75>	1.43	0.86	4.2	0.04	0.98	5.9

Independent variables	ß (regression coefficient)	S.E	OR (Odds ratio)	P-value	95% confidence interval for odds ratio	
					Lower	Upper
Gender						
Male	-		1	-	-	-
Female	0.8	0.87	2.2	0.03	0.59	2.72
Chronic disease						
No	-	-	1	-	-	-
Yes	0.57	0.38	1.7	0.05	0.49	3.07
The Economic condition						
Good	-	-	1	-	-	-
Medium	.60	0.52	1.02	0.02	0.42	2.27
Weak	.84	0.71	1.4	0.008	057	3.07
POMA Test **High Balance**	-	-	1	-	-	-
Medium balance	1.6	0.53	7.3	<0.001	1.9	6.7
Poor balance	2.9	0.62	9.6	<0.001	2.3	7.1

Discussion

The frequency of the falling in the elderly was 30% in this study, 28.8% in Turkey (14), 26.4 % in China (16), 33.3% in Netherlands (3), 31% in Switzerland (4), 29% Australia (18), 28.5% in Argentina(20), which are similar to the result of this study. Also, most of the fallings have happened at home 60%. As older adults often have a passive role in society and usually spend their time at home and do not work outside, it can be the important reasons for increasing the rate of falling down at home. In this study, the lowest rate of falling was at noon (26.7%) and the highest rate was in the morning (43.3%) Since the physical activities of the elderly are high at night, so the probability of falling is high at night. In similar studies, the highest rate of falling of older adultswas during the active hours in one day (21-23). Therefore, it is recommended that older adults should be taken care of falling during the active hours overnight. In the present study, the most common chronic diseases in the elderly were arthritis, Visual impairment and blood pressure, as well as diseases such as Osteoarthritis / arthritis, stroke, visual impairment, thought disorder and distractibility, depression, Respiratory disease, urinary incontinence which they can increase the risk of falling, respectively.According to Rao, nowadays, there are three main chronic diseases in older adults, arthritis, Blood pressure and auditory perception disorder(24). Also one of the findings of this study was the high correlation between visual impairment and falling down; therefore, visual impairment was as a risk factor of falling down.Studies have shown that the age-related vision changes are gradually being created and often overlooked for years.As changes progress with daily life activities, the elderly may resign from normal activities, or they may pay attention tovisual impairmentsor may adapt themselves with changes. Visual impairment due to cataracts, glaucoma, degeneration, or macular degeneration, or not usingof glasses can affect the ability of a person to move around the environment (25). On the other hand, the present study showed that Cardiovascular and respiratory disease significantly increase the risk of falling. Findings from other studies also confirm these results. According to Potter and Carey (26), heart disease is responsible for 77% of injuries of falling in the older adults, and cardiovascular disease falling cause more deaths than falling because of unknown or non-cardiovascular reasons and, in this regard, these diseases are important in relation with falling down. In the present study, there is a significant relationship between osteoarthritis / arthritis and falling down, which other studies also confirm these findings. Some researchers believe that the conditions which have the greatest impact on the older adults' performance include knee osteoarthritis, stroke, heart disease and depressing Symptoms. Arthritis and musculoskeletal disorders approximately effect on 49% of people with 65 years old and more than 65 *year* old *age group* in the United States (27).In the present study, there was a relationship between urinary and fecal incontinence and falling down, which is consistent with similar studies; a study in Australia showed that urinary and fecal incontinence is associated with increasing risk of falling (28) Also, in the study of Huang (9), there was a positive relationship between urinary and fecal incontinence and falling down. In the present study, there was a significant relationship between strokes and falling down; also all of the attacks which have decayed neurological function, such as stroke or Parkinson's disease, increase the risk of falling (29). There was a significant correlation between thought disorder or distractibility and falling down, which other studies also confirmed that cognitive and dizziness disorders would increase the risk the falling. The results of the study of Cauley et al.(30). also indicate the effect of mental problems and cognitive deficits on increasing the risk of falling down. The results of logistic regression showed that the falling down is different in two genders, and the odds ratio of falling in female older adults was 2.5 times more than the males, which this is associated with results of the study by Halil et al. (14) in Turkey, and Jalali et al. (15) in Iran, also, Zhang and Chen (31), report that falling down rates of men in China is less than women. Iranian women have a lot to do in daily living activities such as housekeeping, shopping, taking

care of grandchildren while older male after retirement tend to stay and rest, for example, in a normal day , they prefer to stay at home and perform religious duties or meet their friends. In this study, there was a significant relationship between the age and falling down, in which the odds ratio of falling in above 75 *year* old *age group* was 2.4 times higher than the elderly with under 75 *year* old *age*. The highest rate of falling in older adults may be due to the visual, movement, cognitive impairment, physical inactivity, chronic disease and other factors which they all are confirmed in various studies (21, 31, 32). Also, the odds ratio of falling in the older adults, with a history of chronic disease were 1.7 times more than that of the older adults, who did not have a history of illness. In other similar studies, the rate of falling in elderly has a significant relation with chronic diseases (14, 22, 31, 32), in fact, suffering from chronic illness can lead to cause disability and at least it cause to fall down in the older adults. Also due to the use of drugs can lead to feel sleepiness, urination, physical weakness and consciousness disorders which cause to fall down in the older adults. The studies of Speechley have shown that poverty is effective at falling rates, because poverty has a direct impact on nutritional and environmental conditions, and on mental health and physical health (33). In our study, the odds ratio of falling in the older adults with poor economic status is 1.4 times more than elderly with good economic situations. One of the findings of the current study is the significant relationship between the falling with balance score and the Tinetti test. Thus, the odds ratio of falling in the older adults with a poor balance and moderate balance were more than the elderly with a high balance, 7.7 and 9.6, respectively. In the study of Cattaneo et al. (34), those, who had fallen down 2 or more in the past 2 months, had a weaker balance than the non-falling group. And the study of Jalali et al. (15) in Iran by different equilibrium tests showed that the older adults, whose balance of equilibrium scores were lower in equilibrium tests, were 2 to 3 times more than those who had high scores. Hanley, et al (35). also found that the weakness of the lower limb muscles was related to the equilibrium disorders and the resulting injuries. Their implications are same as the present study. Therefore, the results of the present study and the previous studies suggest that, there is an important relationship between equilibrium and the experience of falling in the older adults. The severity of the balance disorder is related to their falling of older adults. The obtained results from the study showed that the most elderly had a moderate and high rate of equilibrium. Elderly with few rate of equilibrium had more falling. The findings of this study showed that the rate of falling in Iranian elderly people is relatively high. The appropriate and effective preventive interventions should be made according to effective factors in falling of older adults.

Acknowledgement

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