

Investigating the effect of education based on need to prevent falling during activities of daily living among the elderlies referring to health centers of Isfahan

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ABSTRACT

Background: Falling has a great importance among the elderlies. Even if no physical injury occurs, it can cause fear of falling down again and, consequently, reduce older adults' activities. With regard to the prevalence of falling among older adults, its prevention is essential. Therefore, the present study was aimed to define the effect of need-based education on prevention of older adults' falling during their everyday life activities.

Materials and Methods: This is a quasi-experimental study. Study population comprised all the older adults of age 60 years and over referring to health care centers in Isfahan. Through multiple random sampling, 15 older adults were selected from four health care centers. Data collection tool in the present study was Daily Activity Questionnaire.

Results: Results showed a significant difference between the mean of daily activity scores in the intervention group before, immediately after, and 1 month after the intervention (12, 13.6, and 13.5, respectively; $P = 0.01$). Meanwhile, there was no significant difference between the scores immediately after and 1 month after the intervention. There was no significant difference observed between the three time points in the control group (mean = 12.3; $P = 0.907$).

Conclusion: Implementation of education concerning prevention of older adults' falling led to improvement of their daily activity in the intervention group.

Key words: Accidental falls, accident prevention, activities of daily living, aged, education, education based on need, prevention of fall

INTRODUCTION

Seniority of the population is one of the greatest challenges in the world.^[1] The population of over 60 years is estimated to be 605 million people in the world and it is predicted that this number would reach 2

billion by 2050.^[2] Statistical indicators have shown that the process of population aging has also started in Iran and it is predicted that during the 20-year interval from 2006 to 2026, the median age of Iranian population would be increased by 10 years.^[3] As the elderly population increases, their problems also increase.^[4] The elderly, due to physical and motion changes caused by aging, including reduced vision, reduced hearing, poor balance, slow motions, disabling diseases, drug consumption, dizziness, decentralization, and inappropriate conditions, would be more prone to indoor and outdoor accidents. Therefore, accidents among seniors have an essential importance in a way that falling is one of the top 10 causes of death among seniors.^[5] Falling is defined as an unintentional accident where the individual would lie

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on the floor or any lower surfaces accidentally and their feet would not be able to tolerate their weight.^[6] Regarding the statistics of falling among the elderly, in 2008, Oren *et al.*, in a study entitled “Falling-asleep-related injured falls in the elderly,” stated that about 30% of the elderly experience falling once or twice a year.^[7] Also, in 2007, Bayat, in a study entitled “Determine the risk factors for falls in the elderly in geriatric nursing Tehran,” demonstrated that about 40% of over 85-year-old people experience falling.^[8] In Iran, 12% of every 8000 people who refer to hospitals due to trauma are seniors over 60 years old and 70% of them have suffered from falling.^[6]

Studies have shown that the reasons for falling of the elderly are divided into two groups of internal reasons (including weakness of the lower extremity muscles, poor balance, and decreased mental ability) and external reasons (factors related to environmental conditions).^[9] Various studies have been conducted in this regard. Duglas, in a study conducted on falling in female seniors in 2013, revealed that cognitive disorders, aging, anemia, dizziness, history of stroke, and weakness are the risk factors of falling and accidents.^[10] Also, Salarvand and Birjandi, in a study entitled “Factors related to falling down in older adults,” believed that physiological changes like specific changes occurring in neuromuscular and musculoskeletal systems are important factors of falling.^[11]

After falling, 20–30% of people suffer from severe injuries like hip fracture or head trauma which consequently increase their dependence on others, decrease their self-esteem, and increase their risk of early death.^[12] In 2007, Bayat mentioned that fractures, soft tissue damage, bruising, ruptures, and subdural hematoma are common complications of falling in seniors.^[8] Also, losing self-esteem, fear of falling again, inability to perform daily activities, and rejection by society and others are some of the concerns of seniors in this regard.^[8] Falling in seniors is one of the common causes of hospitalization, decrease in physical activities, and decrease in quality of life.^[13] Fathi believed that during old age, the risks of immobility and decreased physical activities would increase. Physical activity would improve the self-esteem of seniors and distance them from inertia, uselessness, apathy, and unimportance. Passing the older ages requires doing daily activities,^[14] which include activities that are required for having an independent life. In fact, functional status of the elderly in regard with their ability to perform daily activities, by determining their general health status, would reflect their independence and need for health care services. Activities of daily living (ADL) include eating, dressing and undressing, walking, performing activities related to the appearance, taking a bath or a shower, going to and getting off the bed, and going

to the bathroom. Disruption in ADL is common among the elderly, so it is estimated that 20% of people aged from 65 to 74 years have limitations in performing these activities. Some of the risk factors of disruption in ADL are age, being female, cognitive disorders, chronic behaviors, depression, and physical problems.^[15]

Considering the above-mentioned facts, implementing necessary measures to prevent falling in the elderly is essential. The simplest concept of prevention means stopping an accident before happening. Evidences have shown that falling could be prevented.^[16] The needs of today’s world have shown that primary prevention has a deeper impact and one of the methods to reduce falling among seniors is primary prevention that could be achieved by training prevention methods. A wide range of programs for prevention of falling exists that has been discussed in different studies. For example, in the study of Karlsson *et al.* that was conducted in 2013, training method was used to prevent falling.^[17] To promote knowledge about falling and to prevent it, training is the most important and the least expensive method of intervention.^[18] The first and most fundamental step in developing and implementing a training program is correct and reality-based execution of need assessment. In fact, need assessment is the foundation of training structure; the more fundamental and strong the foundation, the more secure and invulnerable the structure. In the field of training, need assessment is considered as one of the basic and essential components of planning process, and whenever the matter of developing educational plans and adopting a series of educational measures is proposed, need assessment would repeatedly be mentioned and the logical base of every program is the existence of one or a series of needs.

Need assessment, in fact, is the process of gathering and analyzing the data, based on which the needs of individuals, groups, organizations, and societies would be determined. Determining the educational needs is the first step of educational programming for staff and, in fact, the first factor of creating and ensuring the effectiveness of educational function and enhancement; if performed correctly, a more objective basis for programming, as an effective plan, would be prepared. Educational activities that would be designed and executed without considering these conditions are actually wasting valuable resources.^[19] But most of the conducted studies have not considered need assessment. Therefore, in the present study, the researcher first evaluated the educational needs of seniors and trained them according to the need assessment. So, considering the importance of falling and its various complications and also lack of need assessment-based studies, the aim of this study was to evaluate the effect of need-based training about prevention of falling on seniors’ ADL.

MATERIALS AND METHODS

This study was a before-after two-group (case and control) field trial. The case group received need-based training about prevention of falling and the control group received a brief educational card.

After taking written permission from the Health Deputy of Isfahan and the ethics committee of Isfahan University of Medical Sciences, the researcher randomly selected health centers from 11 health centers of Isfahan through multi-stage random sampling in which four centers were selected through drawing. Then, from these four centers, two were randomly selected to be the case group and the other two became the control group. All the files of the elderlies of each center were studied and from them, those that satisfied the inclusion criteria (willingness to participate in the study, being sufficiently aware and able to hear, knowing the Persian language, being aged 60 or more, not being mentally or physically retarded, history of having at least one fall, and not using mobility aids) were selected and coded. Then, using the table of random numbers, 60 seniors were selected to participate in the study. It must be noted that participants were justified about the method of the study, the confidentiality of the data, and the aim of the study. Since in this study trainings were based on needs, for preparing the educational package, some of the seniors were interviewed. Through these interviews, educational needs of seniors (including understanding the causes and risk factors of falling, its complications, strategies to prevent falling in common places of falling at home, strategies for fall-proofing the house, and muscle strengthening exercises) were extracted, matched with related resources, necessary changes were made, and the final form of educational programs was developed.

After selecting the participants, seniors were invited by phone calls to show up at the health center at the predetermined date. At the determined date, the aims and methods of the study were explained for both groups and written consent form was obtained from all the participants; then, ADL questionnaire was completed. In this questionnaire, questions on ADL are answered with the options without help, with some help, and not able to perform it. "Without help" is scored 2, "with some help" is given 1, and "not able to perform it" is scored 0. After scoring the questions, the total score of the questionnaire was obtained by summing the scores of all questions and based on the obtained scores, seniors were divided into three groups of completely dependent, somewhat dependent, and independent; a score of 0–6 indicated completely dependent, 7–10 was somewhat dependent, and a score of 11–14 indicated independence. The validity of this questionnaire was evaluated through content validity

method by Habibi *et al.* in 2007 in their study that was conducted on 410 seniors of over 60 years old living in the west of Tehran and for evaluating its scientific validity, test-retest method was used ($r = 0.9$). Thus, it could be said that ADL questionnaire is reliable and valid.^[20]

After completing the questionnaire, the case group received six 45-min sessions for 1 day per week. During the sessions, lecturing, group discussion, and question and answer methods were used. Educational content included teaching the nature, causes, and complications of falling, training strategies for fall-proofing the house, training methods for prevention of falling, and also, exercises for strengthening the muscles. At the end of the sixth session, both groups completed ADL questionnaire again. The control group received a brief educational card (definition of falling and its complications) at the first session after completing the questionnaire for the first time. One month after the intervention (this time interval was selected based on literature review), participants of the case and control groups were invited again for completing the questionnaire again. Data was analyzed using Chi square, independent *t*-test, Mann–Whitney, least significant difference (LSD), and repeated measures analysis of variance (ANOVA). Statistical analysis ($P < 0.05$) was conducted through SPSS 19.

RESULTS

Results showed that the mean age of the case and control groups was 69.4 (4.8) and 69.4 (5.8) years, respectively. The most frequent sex in both groups was female, and both groups had no significant difference regarding their demographic characteristics (age, sex, marital status, educational level, and family combination) before the intervention [Table 1].

Based on the need assessment that was conducted on seniors, their needs were categorized into five groups including understanding the causes and risk factors of falling, complications of falling, strategies for prevention of falling in common places of falling at home (like bathroom, kitchen, and stairs), strategies for fall-proofing the house, and exercises for strengthening the muscles. Participants of the case group were introduced to these subjects after six educational sessions. So, before the need-based educational intervention, no significant difference existed between the mean score of ADL of both groups ($P = 0.38$). But this difference became significant right after the intervention ($P = 0.01$) and 1 month after the intervention ($P = 0.01$), and the score of ADL of the case group was significantly higher than the control group [Table 2]. Also, in the control group, the mean score of ADL showed no significant difference between the three different time intervals ($P = 0.907$).

Furthermore, the mean score of ADL in the case group before the intervention had a significant difference with the mean scores obtained right after the intervention and 1 month after the intervention; but the difference between the scores obtained right after the intervention and 1 month after the intervention was not significant [Table 3].

DISCUSSION

The present study was conducted to evaluate the effect of need-based education about prevention of falling on ADL in seniors. Statistical results showed that the mean score of ADL was increased in the case group after execution

Table 1: Demographic specifications of the case and control groups before the intervention

Variable	Number (percent) or mean (standard deviation)		P
	Case group	Control group	
Gender			
Female	23 (76.7)	24 (80)	0.75
Male	7 (23.3)	6 (20)	
Age, years	69.4 (4.8)	69.4 (5.8)	0.97
Marital status			
Single	1 (3.3)	2 (6.7)	37.1
Married	18 (60)	14 (46.7)	
Widow	7 (23.3)	10 (13.3)	
Divorced	4 (13.3)	4 (13.3)	
Family composition			
With spouse	8 (26.7)	6 (20)	0.716
Single	8 (26.7)	8 (26.7)	
With spouse and children	11 (36.7)	10 (33.3)	
With other family members	3 (10)	6 (20)	
Education level			
Illiterate	15 (50)	15 (50)	0.84
Reading and writing	10 (33.3)	9 (30)	
Third grade middle school	3 (10)	2 (6.7)	
Diploma	2 (6.7)	3 (10)	
More than a diploma	0 (0)	1 (3.3)	

of educational program about prevention of falling. These results are similar to the results of previous studies conducted by other researchers. For example, in 2001, Rostami, in a study that evaluated the effect of training about prevention of falling on the level of awareness of seniors and caregivers and the performance of seniors living at Kahrizak nursing home, reported that educational programs about prevention of falling had a significant effect on the level of awareness of the participants and performance of seniors.^[21]

Also, in 2014, Najafi *et al.* conducted a study evaluating the effect of multidimensional programs about prevention of falling on the incidence of falling and quality of life of seniors living at nursing homes and used multidimensional methods in their study, including training about prevention of falling, exercise, and environmental adjustment. Results of the study showed that after 4 months of intervention, the number of falls decreased and the quality of life in seniors was increased.^[22] Also, a study that was conducted in 2007 evaluating the relation between health improving behaviors with the level of ADL and ADL with mobility aids in seniors of western Tehran revealed a significant relation between health improving behaviors and ADL ($P < 0.05$).^[20]

In the present study, to prevent falling, strategies for fall-proofing the house were trained, which is similar to previous studies. For example, in the study of Karlsson *et al.* on prevention of falling, different methods have been mentioned and one of the most effective methods was training strategies for fall-proofing the house that caused a significant improvement in the quality of life of seniors.^[23] To confirm the results of the present study, studies of Gillespie *et al.*,^[24] Rajendran,^[18] Shaw,^[25] and Pereira^[26] *et al.* could be named that have used fall-proofing strategy for prevention of falling in seniors.

Another method that was used in the present study was training exercises for strengthening the muscles, which is also similar to the results of previous studies. In this regard, Jannati *et al.* conducted a study on the effect of selected yoga exercises on the balance of female seniors. The results

Table 2: Comparing the mean of activities of daily living in the case and control groups at three time intervals (before the intervention, right after the intervention, 1 month after the intervention)

Time	Case group		Control group		Independent t-test	
	Mean	Standard deviation	Mean	Standard deviation	t	P
Activities of daily living before the intervention	12	1.7	12.3	0.9	0.88	0.38
Activities of daily living right after the intervention	13.6	1	12.3	0.92	2.52	0.01
Activities of daily living 1 month after the intervention	13.5	1.2	12.2	0.95	2.53	0.01
ANOVA test with repeated						
F		4.52		0.098		
P value		0.02		0.907		

Table 3: Comparing the mean of activities of daily living between different time intervals in the case group

Time interval	P
Before and right after the intervention	0.01
Before and 1 month after the intervention	0.02
Right after and 1 month after the intervention	0.26

of their study showed that exercising would increase the strength of muscles, increase the performance of motion and nervous system, and decrease the risk of falling in female seniors.^[27] In 2015, Tüzün *et al.* conducted a study titled “The effect of exercising programs on decreasing falling in seniors with dementia” and their results showed that exercising interventions would decrease the number of falls in seniors.^[28] Also, the results of studies of Tozenof *et al.*,^[29] Khaje Nemat *et al.*,^[30] and Bahgeri *et al.*^[31] confirmed this finding.

In the present study the mean scores of ADL in the case group before, right after, and 1 month after the intervention showed significant differences, but the difference between the scores right after and 1 month after the intervention was not significant. The researcher believes that in future studies, by considering factors like the time interval after the intervention and the interval between sessions and by increasing the sample size, a more desirable result could be achieved. One of the most important limitations of this study was the physical condition of the seniors that was an obstacle for the researcher. Their impatience and tiredness was a barrier to better communication; so, spending more time and conducting longer studies in future researches are necessary. Also, lack of internal studies about falling in seniors was another limitation of this study that affected the strength of discussion about the results of this study.

CONCLUSIONS

Results of the present study showed that performing need-based educational programs about prevention of falling had a significant effect on ADL in seniors. Therefore, nurses and caregivers could help the elderly population through educational interventions to reach ideal seniority condition. Currently, for various reasons, this logical need of seniors is less considered in provision of health cares and services, while this essential need could be provided through a developed and inexpensive program and nurses, who are a member of medical teams in health centers and have the most contact with seniors, could have more opportunities to deal with this matter.

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Conflicts of interest

There are no conflicts of interest.

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