

A Comparison of the Effect of Education through Video versus Demonstration on Fear of Falling in Nursing Home Residents of Mashhad, Iran

Abstract

Background: Fear of falling is one of the most serious potential health problems. This issue is of high importance in the elderly with serious consequences such as limitations in daily activities, gait imbalance, social isolation, and increased risk of falling. One way to resolve this problem is the use of modern teaching methods such as demonstration and videos. The present study aimed at comparing the effect of education through video versus demonstration on fear of falling in nursing home residents of Mashhad city, Iran. **Materials and Methods:** This quasi-experimental study (with pre-test and post-test) was performed among 66 elderly residents of nursing homes in Mashhad. The participants were randomly divided into two groups of demonstration and video. Then, they received training using the abovementioned methods. The participants' level of fear of falling was measured through Fall Efficacy Scale. **Results:** After the intervention, mean scores of the fear of falling were 47.50 and 49.84 in demonstration and video groups, respectively. As indicated by the results, after the intervention, participants' fear of falling decreased by 23.7% and 20.7% in demonstration and video groups, respectively. This difference is statistically significant ($P = 0.001$). **Conclusions:** Training through video methods reduces the fear of falling in the elderly. Because of the special conditions of the elderly, the video training method may require more consideration due to its lower costs and easier performance.

Keywords: Accidental falls, aged, demonstration, education, fear, nursing homes, video-audio media

Introduction

Aging is one of the glories of human life as well as one of the biggest challenges. Population aging is a result of development.^[1] The number of the elderly aged 60 years and above has been estimated to be more than 605 million people worldwide, and by 2050, this number will reach 2 billion people.^[2,3] Iran's elderly population will also increase in the same proportion. It is expected that the elderly population in Iran will increase to 25 million people by 2050.^[4,5] With increasing age, individuals will gradually lose some of their physiological, psychological, and social functioning.^[6-8]

A serious and common problem of the elderly is falling. Each year, one-third of the population over 65 years of age experiences falling on the ground at least once, and in half of the cases, this occurs several times.^[5] Falls are the leading cause of injury-related

emergency visits, hospitalizations, and deaths in older adults.^[9,10] Fear of falling potentially has serious health consequences among the elderly experiencing falling and among those with no experience of falling. In 30% of the elderly, restriction in performing activities has a direct relationship with their falling.^[11] The results of the studies showed that factors such as aging, gender (fear of falling rate was higher in elderly women than in elderly men), problems with balance, movement disorders, walking problems, psychological issues, and low economic status had increased the risk of fear of falling in the elderly.^[12,13] It was also observed that an increase in the fear of falling increased the rate of falling in the elderly.^[5,14,15]

Although many incidences of falling might not cause serious injuries, falling in the elderly, owing to multiple physiological (such as muscle weakness) and pathological changes (osteoporosis),

How to cite this article: Najafi Z, Barghi M, Kooshyar H, Karimi-Mounaghi H, Rodi MZ. A comparison of the effect of education through video versus demonstration on fear of falling in nursing home residents of Mashhad, Iran. *Iranian J Nursing Midwifery Res* 2017;22:195-200.

Received: October, 2015. **Accepted:** December, 2016.

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Access this article online

Website: www.ijnmrjournal.net

DOI:
10.4103/1735-9066.208160

Quick Response Code:



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is the leading cause of injury-related deaths as well as the sixth leading cause of death.^[5,16] Fear of falling, loss of confidence, physical fitness, limited range of motion, muscle weakness, limitations in daily activities and mobility, gait imbalance, social isolation, and increased reliance and dependence on others are among the consequences of falling in the elderly.^[11,17]

Outcomes and complications of falling in the elderly not only influence their own lives but also have important effects on health, treatment, and economic systems.^[18,19] In addition, studies have shown that care after falling has high costs, and the study of economic outcomes of fear of falling, as one of the most important risk factors in falling, is of significant importance^[20] because participation in balance and strength training classes has been proven to reduce falls and related injuries.^[21] A method of reducing fear of falling is supposed to provide the elderly with training on correct behavior. Through education, training and improving the performance of students in the scientific community has been made possible.^[22] Various methods of training, such as lectures, role-playing, performance, videos, face-to-face training, and group discussions, are available which can be used individually or in groups.^[21] The training of different topics and skills require the use of different teaching methods and techniques, the selection of which depends on the learning objectives, abilities, talents, and the age of learners.^[23]

A new method of teaching is the use of videos. Videos can be used to convey basic concepts of learning in a short time. Videos have made training easier and have increased the level of understanding and learning of the students. They are easy to watch and listen and are considered a cheap and affordable method of training.^[24] However, this method has limitations including its virtual nature and the trainee's lack of active participation in the education process. However, with the tremendous advancement in preparation of training videos, these defects are also being reduced.^[25] Another training method is performance based on observation as the best method in learning skills. The advantage of this method is the presence of the trainer allowing direct questioning of the trainees and providing the possibility of training a large number of learners in a short time.^[26] Like other methods, this method has limitations including damaged or lack of educational facilities. To resolve these problems, arrangements must be made before method implementation.

Numerous guidelines and trainings have been used to reduce the fear of falling in elderly and improve their physical balance. To mention some of these guidelines, we can refer to the necessity of age-appropriate exercises and daily mobility, the correct method of walking and compliance to safety precautions when walking, the appropriate way of going up and down stairs, safety guidelines for the bathroom and toilet, wearing suitable

clothes and shoes, the correct way of sitting on and getting up from bed and chair, correct usage of mobility aids such as canes and walkers, keeping the living environment clean and tidy, and controlling the environmental risk factors for falling. Some of training exercises include Tai Chi and yoga as well as simple and effective exercises for the elderly in order to strengthen and maintain muscle strength, or a combination of these methods.^[27,28] In the present study, a combination of these methods was used. Therefore, this study aimed at studying the impact of training programs on the fear of falling in elderly residents of nursing homes. In addition, the effectiveness of training through videos and demonstration on fear of falling in the elderly was compared.

Materials and Methods

This was a quasi-experimental study comprising two groups. In the pre-test and post-test study, the demonstration and video groups were considered to be intervention and control groups, respectively.

This study was conducted in 2014 in 8 elderly nursing homes in Mashhad, Iran, which were selected using purposive sampling method. The study population comprised all the elderly residents of nursing homes in Mashhad.

The inclusion criteria for the elderly included willingness to participate in the study, lack of any mental and cognitive disorders, the ability to communicate with the researcher (no acute impairment in vision, speech, and hearing) so that they were able to answer questions, lack of any acute debilitating diseases, and a score of 50 and higher in the Fall Efficacy Scale. Exclusion criteria included the death of the elderly, refusing to participate in the study, physical abnormalities preventing participation in the study, and absence from training sessions 2 times. Because the main variables of the study were quantity variables, the formula of "mean comparison of the two communities" based on variables regarding fear of falling was used to determine the sample size. First, a pilot study was conducted among 20 elderly participants. Then, based on its results, the exact sample size was calculated. The sample size was estimated at 27 participants in each group with 95% confidence interval and 80% test power. Regarding the possibility of sample loss, a total of 66 elderly (33 participants in each group) were enrolled in the study.

Sampling was conducted in two stages. First, among all the nursing homes in Mashhad, 8 were selected via nonrandomized purposive sampling, based on having the highest number of elderly. In the next stage, the selected nursing homes were randomly assigned to two intervention groups. In the video intervention group, 2 participants were lost; 1 due to absence from more than 2 sessions and the other due to physical deterioration. Moreover, 1 participant was excluded from the performance intervention group due

to lack of willingness to participate in the post-test. Finally, 31 elderly participants participated in the video group and 32 in the performance group.

The data collection tools consisted of the demographic questionnaire (consisting of 5 items on age, sex, history of falling, limb fracture history, and history of chronic disease) and the Fall Efficacy Scale. The Fall Efficacy Scale consists of 10 items; each of which is assigned a score between 1 and 10. Thus, the total score of fear of falling ranged from 10 to 100. A score of 50 to 70 indicated a moderate fear of falling in the elderly. The validity of the scale was approved by 10 professors of Mashhad University of Medical Sciences, Iran, via content validity. The reliability of the tool was measured in the past study. Permission and an introduction letter were obtained from the Ethics Committee of Mashhad University of Medical Sciences. After submitting the letter to the authorities of the elderly care center and obtaining their approval, sampling was performed. After the selection of participants and completion of their demographic form, details regarding the research objectives of the study were given to the elderly. Furthermore, their fear of falling was studied through the completion of the Fall Efficacy Scale and evaluation of the elderly by the researchers. The intervention in one group included training sessions with videos and the other group with performances. For the elderly in the performance group, 4 sessions of 30–45 minutes were held (2 sessions per week). The first session included presentations on training related to appropriate shoes and clothing, reducing environmental risk factors, and the importance of activity and mobility. The second session included training related to the correct way of how to get out of bed, how to go up and down the stairs, how to walk, and how to use cane and walker. The third session included 6 easy training exercises aiming at increasing power and balance in the elderly. The fourth session included training of another 6 easy exercises related to strengthening the muscles of the lower and upper extremities performed by the elderly. These training sessions were recorded on video (in the group with performance training) and the video was displayed for the video group with a 1-session delay. The researchers referred to the nursing homes 3 months (29) after the end of the training sessions, and the fear of falling was evaluated again using the Fall Efficacy Scale. Data were analyzed using the Statistical Package for the Social Sciences software (version 16.5, SPSS Inc., Chicago, IL, USA). To describe and summarize the background characteristics of the elderly, descriptive statistics (mean, standard deviation, and relative frequency) were used. In the analysis of the quantitative data, to evaluate the normal distribution of the data, Shapiro–Wilk, and Kolmogorov–Smirnov tests were used. Then, independent *t*-test and Chi-square test were used to study the homogeneity of the variables and to obtain specific objectives. The significance level for all tests was 0.05.

Ethical considerations

This study received ethics approval from the ethics committee at Mashhad University of Medical Sciences (code 921534) according Helsinki Declaration. In all stages of the research, all ethical codes related to the participants were upheld, including both the written and verbal consent for participation in the research, participants' right to decline participation, and the right to withdraw from the study at any time. All competent participants provided written and verbal consent. Written informed consent for the older participants who were not competent was obtained from the next of kin or legal guardian.

Results

The results showed that, from a total of 63 elderly participants, 65.1% were females. There were 21 (65.55%) elderly women in the performance group and 20 (64.5%) in the video group. Chi-square test results showed that the two groups were homogeneous in terms of gender ($P = 0.93$). The mean age of the elderly was 70.44 (0.54) years; the mean age of the elderly in the performance group was 70.18 (4.53) years and in the video group was 70.70 (4.11) years. Independent *t*-test indicated that the two groups were homogeneous regarding this variable ($P = 0.63$). Other background characteristics of the participants and their homogeneous results in two groups using Chi-square test and Fisher's exact test are shown in Table 1.

Table 2 shows that there was statistically significant difference between the mean scores of fear of falling in the two groups before and after the intervention ($P < 0.001$).

After the intervention, this difference was statistically significant ($P < 0.001$). After the intervention, the demonstration method reduced the fear of falling in the elderly (2.33) and so did the video method (2.27). The paired *t*-test results showed that there was a significant difference between the score of fear of falling in both the groups before and after the intervention ($P < 0.001$).

The Chi-square test results showed that there was a significant relationship between gender and mean score of fear of falling ($P = 0.01$) and between the history of falling and mean score of fear of falling ($P < 0.001$). There was no statistically significant relationship between the other background and confounding variables and mean score of fear of falling.

Discussion

The results of the present study showed the higher efficacy of the demonstration training method compared to the video method in reducing the fear of falling in the elderly. Furthermore, in both the study groups, there was a significant reduction in the mean score of fear of falling in the elderly after the intervention ($P < 0.001$).

Table 1: The frequency distribution of the history of falling, broken limbs, and chronic diseases in video and performance groups

Variable number	Performance group		Video group		Total		Test result
	Number	%	Number	%	Number	%	
History of falling							
Yes	24	75	22	71	46	73	Chi square=0.13, P=0.71
History of broken limbs							
Hands	1	3.1	1	3.2	2	3.2	Chi-square=0.001, P=0.99
Pelvic	2	6.2	2	6.5	4	6.3	
History of chronic illness							
Respiratory disease	2	6.2	2	6.5	4	6.3	Fisher's exact test=2.45, P=0.98
Diabetes	1	3.1	0	0.0	1	1.6	
Kidney disease	2	6.2	3	9.7	5	7.9	
Hypertension	2	6.2	2	6.5	4	6.3	
Arthritis	2	6.2	2	6.5	4	6.3	
Heart disease, hypertension, and diabetes	3	9.4	3	9.7	6	9.5	
Hypertension and heart disease	8	25	7	22.6	15	23.8	
Hypertension and diabetes	3	9.4	2	6.5	5	7.9	
Arthritis	0	0.0	1	3.2	1	1.6	

Table 2: The mean and standard deviation of fear of falling in the elderly in the two groups before and after the intervention

Fear of falling score	Mean (SD)		Independent t-test results
	Demonstration group	Video group	
Before the intervention	62.38 (2.58)	62.87 (2.94)	
After the intervention	47.50 (2.09)	49.84 (2.07)	
Before and after difference	14.87 (2.33)	13.03 (2.27)	t=3.17, P<0.001
Paired t-test results	t=35.98, P<0.001	t=31.92, P<0.001	

Oslen *et al.* conducted a study entitled The effect of exercise and education on fear of falling in elderly women with osteoporosis and a history of vertebral fracture – results of a randomized controlled trial.^[29] In this study, exercise was performed for 3 months (2 times a week, each 60 min), and 3 educational sessions were held. Exercise program comprised aerobic exercise with music and stretching muscles of the upper and lower extremities.

Educational programs (3 sessions, each 3 hours) were managed by a physiotherapist aiming at increasing the knowledge of elderly women regarding prevention techniques, awareness of the body, and ergonomic guidelines in specific situations of life. As indicated by the results of the study, the level of fear of falling significantly decreased in the intervention group after 3 months ($P = 0.04$) and 12 months ($P = 0.07$).

In this study, the decrease in fear of falling is due to the simultaneous effect of interventions on physical and mental factors. Fear of falling decreases in the elderly as their awareness increases and they get more domination on performing their daily tasks including walking up and down stairs and even standing up from the ground.

The study by Brenda *et al.* on 38 elderly residents of nursing homes in Canada showed that fear of falling

in the elderly was at a moderate level before training.^[25] In this study, after the training, the mean score of fear of falling was significantly reduced in the elderly. In a study by Zhang *et al.*, it was also indicated that Tai Chi reduced fear of falling in the elderly.^[28] Dong Hyun *et al.* also showed the impact of an exercise program on reducing the fear of falling in the elderly.^[30] Rucker *et al.* also examined the impact of education on reducing the fear of falling.^[31] In this study, the fear of falling in the elderly before intervention was at a moderate level and was reduced after the intervention. The results of the abovementioned studies were consistent with those of the present study.

The results of this study opposed with those of the other studies. For example, Arlene *et al.*, in a study entitled “Effect of a 12-Week Yoga Intervention on Fear of Falling and Balance in Older Adults,” found no significant difference in the elderly’s fear of falling after performing yoga exercises compared with before the exercises.^[27] This finding was inconsistent with the results of the present study. The differences reported in the fear of falling can be due to many factors such as age, sex, education, depression, history of falling, stress, environmental differences, the time of the intervention (the season in which the intervention was performed), and cultural differences.^[32]

In the current study, the results of the Chi-square test showed that there was a significant relationship between fear of falling and history of falling. This can affect the level of fear of falling among the elderly.

Smulders *et al.* reported a study entitled Efficacy of a Short Multidisciplinary Falls Prevention Program for Elderly Persons with Osteoporosis and a Fall History: A Randomized Controlled Trial.^[33] In this study, Nijmegen's Fall Prevention Program comprising 6 items including education, one course of obstacle, walking exercise, exercise of bearing weight, walking disorders correction, and falling techniques education was applied for 11 sessions during 5.5 weeks. As indicated by the results, in the intervention group, the level of fear of falling subtly decreased, and there was no significant relationship between two groups ($P = 0.48$). Some minor improvement was seen in the level of balance in two groups. However, no improvement was evident in the level of daily activities and life quality (0.81, 0.13). One reason behind the inefficacy of the intervention was the short time of the educational course and the lack of willingness to participate. The elderly should be encouraged to follow programs and perform exercises. Attending educational sessions and pursuing them are of high importance.

Lio *et al.* carried out a study entitled Balance Confidence Improves with Resistance or Agility training: Increase is not Correlated with Objective Changes in Fall Risk and Physical Abilities.^[34] In this study, 89 elderly women participated in three randomly selected groups including resistance educational program, agility educational program, and stretching exercises for 13 weeks, two times a week, each for 50 minutes.

As indicated by the results of the study, both resistance and agility educational programs improved the level of balance confidence. However, these changes had no correlation with the level of fear of falling, speed of walking, and physical activities. Elderly interventional programs for reducing the level of fear of falling should cover educational programs including factors effective on fear of falling. For this, the intervention should not be too short.

The limitation of this study was the difficulty of explaining some of the questions to the elderly. Thus, the questions were clarified for the participants to the extent possible.

Conclusion

The results showed that training can reduce the fear of falling. Applying suitable educational materials and equipment attract learners, facilitate education, and make learning more effective and stable. Through displaying animated images, movements are shown more realistically with the chance of displaying them more slowly or rapidly. This results in elderly playing an important role in learning through knowledge transfer using two domains of

mental-movement and mental-emotion. Because learning occurs less through movie than display, the present study emphasizes on applying display in skill education.

Therefore, by informing the authorities of elderly nursing homes and using the results of this study, their fear of falling can be reduced, and consequently, their quality of life can be improved. It is recommended that further research be conducted to confirm or refute this topic. Moreover, further research on the effectiveness of different teaching methods on the fear of falling in the elderly should be considered.

Acknowledgement

This article was the result of a research project of a master's dissertation on nursing education coded 921534 and was approved by the Research Deputy of Mashhad University of Medical Sciences. Our sincere appreciation goes to the Research Deputy for the financial support, and the officials and staff of nursing homes in Mashhad, and all the elderly residents of the nursing homes.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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