Research Article

Effects of Activities of Daily Living Training on Independence and Satisfaction of Older Adults Residents of Nursing Homes: A Randomized Controlled Trial

Mohammad Khayatzadeh-Mahani [1, *], Sepide Riyahi [2], Elham Amiri [2], Kambiz Ahmadi Angali [2]

[1] Occupational Therapy Department, Rehabilitation Research Center, School of Rehabilitation Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

[2] Department of Biostatistics and Epidemiology, School of Health Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

[*] *Corresponding Author*: Occupational therapy Department, Rehabilitation Research Center, School of Rehabilitation Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Email: mahany@ajums.ac.ir

Abstract

Background: Many older adults living in nursing homes are dependent on activities of daily living (ADL), which causes them dissatisfaction.

Objectives: The present study aimed to investigate the effect of ADL training on the independence and satisfaction of older adult residents in a nursing home.

Methods: In this study, 80 ambulatory and cognitively healthy older adult residents in a nursing home were randomly assigned to intervention and control groups in equal proportions. The intervention group received group-based ADL training consisting of eight weekly 90-minute sessions. Both groups were evaluated using the Modified Barthel Index (MBI) and Canadian Occupational Performance Measure (COPM) at baseline, post-intervention, and follow-up. The data were analyzed using SPSS version 26 with analysis of variance (ANOVA) with repeated measurement.

Results: Between-group comparison showed a significant difference in terms of MBI, Canadian occupational performance measure-performance (COPM-P), and Canadian occupational performance measure-satisfaction (COPM-S) at post-intervention, respectively ($P < 0.001$, partial $\eta^2 = 0.35$; $P < 0.001$, partial $\eta^2 = 0.19$; and $P < 0.001$, partial $\eta^2 = 0.38$). Furthermore, a significant difference was observed between the two groups in terms of MBI, COPM-P, and COPM-S at follow-up, respectively ($P < 0.001$, partial $\eta^2 = 0.42$; $P < 0.001$, partial $\eta^2 = 0.20$; and $P < 0.001$, partial $\eta^2 = 0.43$).

Conclusions: Policy-makers are advised to support ADL training programs to enhance the performance and satisfaction of the elderly and help implement these programs in nursing homes.

Keywords: Activities of Daily Living, Older Adults, Satisfaction, Independent Living, Training Program, Nursing Homes

1. Background

According to Iran's national census (2016), the elderly population of Iran increased from 7.27% to 8.65% from 2006 to 2016. The population aged 65 and older is projected to be 22% (more than 20 million) and that of those aged 80 and older 3.8% (around 3.5 million) of Iran's population by 2050 (1). According to the UN, 60% of older adults have difficulty or need assistance with activities of daily living (ADL) (2). The ADL is a set of basic activities that people need to perform in their daily lives to take care of themselves (3). The results of a Swedish study showed that the most common ADL problems in nursing homes were bathing, dressing, and toileting, with incidences of 81.0%, 68.4%, and 53.1%, respectively (4). Masoumi et al. showed that many elders need help in activities such as bathing, dressing, and toileting (5). Covinsky et al. reported a strong association between the loss of independence in ADL and institutionalization, caregiver burden, higher resource

use, and death (6). Cognitive impairment has a significant impact on the dependency of elders in ADL (7). Social support also plays an important role in ADL performance, so weak social support could lead to ADL dependency (8). Elders residing in nursing homes experience more loneliness, depressive symptoms, and lower quality of life (QOL) compared with community-dwelling ones (9, 10). Depression among elders in nursing homes is influenced by many factors, including the loss of independence (9). Improving ADL may be beneficial in decreasing the risk of depression among elders with cognitive impairment (11).

Life satisfaction (LS) is the degree to which someone positively evaluates his/her QOL. Life satisfaction in elders is supposed to be predicted by loneliness, personality traits, depression, mental/emotional status, and recent participation in physical activity (12). Financial status, age, social involvement, living place, functional performance, and quality of care interact with LS as well. Changes in health status and limitations in ADL are significantly related to the LS of the elderly in institutions (13). The ADL educational programs could play an important role in enhancing the independence of elders (14). The result of a systematic review showed the effectiveness of multicomponent interventions in improving ADL in the elderly (15). Van Het Bolscher-Niehuis et al. showed the positive effect of self-management support programs on the performance of ADL in community-dwelling elderly (16). Hastaoglu and Mollaoglu showed the effectiveness of ADL education on the independence and LS of elders (17). Their program consisted of information about the old age period, nutrition, personal care, excretion, dressing, and mobility, which differs from our program. However, Cremer et al. showed that the evidence on ADL nursing interventions that affect independence is inconclusive (18).

2. Objectives

To the best of our knowledge, there is a dearth of studies about the effect of ADL training on the independence and satisfaction of older adults living in nursing homes, especially in Iran. Most of the mentioned studies have been conducted in Western countries, which differ culturally from Iran. In Iranian culture, older adults are usually cared for by their families. Recently, because of changes in family size,

migration, and urbanization, the trend of transferring older adults to nursing homes has increased (19). Therefore, the present study aims to train ADL in older adults residing in nursing homes and evaluate its effect on their independence and satisfaction.

3. Methods

3.1. Study Design

This double-blind, two-armed parallel randomized control trial was conducted to determine the effect of ADL training on the independence and satisfaction of elderly residents living in a nursing home in Karaj, Iran, from June 2018 to February 2019.

3.2. Study Participants and Sampling

All older adults residing in a nursing home (Kahrizak, Karaj) were invited, and those who met the inclusion criteria were included in the study. The sample size was determined based on the mean and standard deviation of a previous study (20) and the following formula: $N = (Z_{1-\alpha/2} + Z_{1-\beta})^2(S_1 + S_2)^2/(\mu_1 - \mu_2)^2$; $Z_{1-\alpha/2} = 1.96$, and $Z_{1-\beta} = 0.85$. The sample size for each group was determined to be 42 participants. The random allocation process was performed in two steps. In the generation of the random sequence step, participants were randomly allocated to one of the intervention and control groups equally. This step was done based on blocked random allocation through a computer-generated random number list using the "Random Allocation Software 1.0". In the next step, the concealment of the random allocation sequence from the participants was performed; therefore, participants did not know which group they were in until the end of the intervention. To keep the participants blinded, the duration and format of the sessions were kept the same for both groups.

3.3. Inclusion and Exclusion Criteria

The inclusion criteria were as follows: Age between 60 and 80 years, ability to walk (regardless of using assistive devices such as a walker), understanding Persian, MMSE score over 21, having a problem in doing ADL (including bathing, toileting, and dressing), not having serious diseases like cancer or neurologic diseases like stroke, and willingness to participate in the study. Participants were excluded if they had critical

illnesses that prevented them from participating and did not attend more than two sessions.

3.4. Intervention Procedure

Routine services provided to older adults in the nursing home include assistance with ADL, medication care, physician/nursing services, physical/occupational therapy services, and psychosocial services. No direct education about ADL was given to people in the nursing home. Both groups received routine services at the nursing home. Besides the routine services, the proper way of performing the ADL was trained in the intervention group in eight weekly group-based training sessions (each session lasted 90 minutes) directed by an expert occupational therapist. Each sub-group contained five people (a total of eight sub-groups). Group-based training was used to enhance learning. The method of training was oral representation and practical demonstration in the ADL training room, which was quiet and equipped with the required tools for ADL training. The occupational therapist practically taught the correct way of performing the ADL for the elders in their groups and also one by one if necessary. The activities taught included toileting, bathing, and dressing. These activities were chosen because they have been noted as the most common problematic activities reported by older adults (3-5). Each ADL was broken down into several tasks, and each task was divided into its component behaviors or the sequence of steps required to complete the activity. The teaching-learning techniques such as task analysis, feedback, modeling, forward and backward chaining, verbal/nonverbal prompts, and chunking were used. Cognitive strategies were also used so that the elders were provided with a metacognitive tool called goal-plan-do-check to use when thinking about and solving performance problems. Compensatory strategies and environmental adaptations/modifications such as the use of assistive devices or installation of grab bars in the bathroom/toilet were also used to ensure better ADL performance. Safety considerations were also trained to prevent hazards (Table 1). The control group received no direct ADL training. However, similar group discussion sessions (eight weekly 90-minute sessions) were held for them. The people in the control group discussed general health issues that were not relevant to ADL.

3.5. Data Collection Tools and Techniques

The data were collected through the Modified Barthel Index (MBI) and Canadian Occupational Performance Measure (COPM) as primary outcome measures. The MBI measures the degree of assistance required by an individual on ten common ADL items including feeding, bathing, grooming, dressing, bowel control, bladder control, toilet use, chair/bed transfer, ambulation, and stair climbing. Its total score is 100, with a higher score indicating a better ADL condition. The ten items are scored with a number of points, and then a final score is calculated by summing the points awarded to each functional skill. Tagharrobi et al. evaluated its validity and reliability in older adults dwelling in Golabchi Nursing Home in Kashan, Iran (21).

The COPM is administered through semi-structured interviews by an occupational therapist. It consists of two parts: Performance (COPM-P) and satisfaction (COPM-S). It is scored in five steps and takes about 20 - 30 minutes. In the first step, the participant is asked to specify daily activities he/she wants or needs to do, or expects to do but is not able to do. In the second step, he/she is asked to rank the importance of the activities from 1 to 10. In the third step, the participant is asked to give scores for any problem in terms of performance and satisfaction, and the total score is calculated. In the fourth step, the scoring process is repeated after the intervention. In the last step, the total performance score 1 (baseline) is subtracted from the total performance score 2 (post-intervention) and the total performance score 2 from the total performance score 3 (follow-up). In addition, the total satisfaction score 1 is subtracted from the total satisfaction score 2 and the total satisfaction score 2 from the total satisfaction score 3. Thus, the changes in performance and satisfaction scores are calculated. The validity of the Persian version of COPM was confirmed by Atashi in Iranian older adults (22).

The assessments were conducted three times (baseline, post-intervention, and three months after completing the intervention as follow-up). First, an evaluator who was blinded to the groups measured the elder's degree of independence in ADL using MBI and their performance and satisfaction using COPM at baseline. Both groups were re-evaluated after the completion of the intervention and at follow-up. Data collection was done by an occupational therapist who

Table 1. Demographic Characteristics of Participants in Two Groups

Variables	Interventions	Control	P-Value
Age (y; mean ± SD)	73.95 ± 5.66	73.75 ± 5.90	0.848
Gender (male/female)	22/18	20/20	0.654
Education			0.697
Illiterate	37	35	
Primary schools	2	4	
Diploma	1	1	
Marital status (married/widow)	24/16	34/6	0.098
Having a chronic disease (yes/no)	34/6	33/7	0.762
Length of stay (mo; mean ± SD)	17.95 ± 8.82	18.82 ± 9.11	0.950

was blind to the allocation of samples in the groups. The data analyzer was also blinded. Therefore, there was blinding of participants, assessors, and data analyzers.

3.6. Ethical Consideration

This randomized controlled trial was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (grant No.: PHT-9612, ethical approval code: IR.AJUMS.REC.1396.486). The trial registration on www.irct.ir is IRCT2017101136709N2. All participants filled out the informed consent form. Participants were assured that their participation in the study would not affect their quality of usual care and would not cause them any harm.

3.7. Statistical Analysis

The participants who completed the study were analyzed according to a per protocol basis. Participant characteristics were described using descriptive statistics through frequency (number and percentage), mean, and standard deviation. SPSS version 26 was used for statistical analysis using analysis of variance (ANOVA) with repeated measurements to test the effects of intervention, time (baseline, post-intervention, and follow-up), and the interaction between treatment groups and time. The normal distribution of data was confirmed through the Kolmogorov-Smirnov test. The univariate ANOVA was used to control the effect of confounding covariates including age, gender, marital status, and education on the MBI, COPM-P, and COPM-S at baseline. Effect size (ES) was also calculated using the partial eta squared. Cohen's definition of small, medium, and large ES (ES = 0.2, 0.5, and 0.8, respectively) was used ([23]). The minimal clinically important

difference (MCID) was also calculated by dividing the difference in scores from baseline to post-intervention by the standard deviation of the change. The MCID scores greater than 3.1 for MBI ([24]) and greater than 2 for COPM-P/COPM-S ([25]) are considered a clinically important difference. A confidence interval (CI) of 95% was considered, and the significance level was set at $P < 0.05$. Power analysis was also used for the between-effect test about mean difference among groups. Power (1-β) greater than .80 was considered.

4. Results

Demographic characteristics, including age, gender, marital status, educational level, length of stay, and presence of chronic diseases (such as diabetes, cardiovascular diseases, respiratory diseases, and musculoskeletal disorders), are shown in Table 2. The mean age was 73.85 years with a standard deviation of 5.75 years. Most participants in both groups were illiterate and married.

The intervention flow diagram is presented in Figure 1. All older adults residing in the nursing home (161 individuals) were invited to participate in the study, and finally, 80 participants were analyzed. The drop rate was 4.8%. Details are presented in Figure 1.

The results of the repeated measures ANOVA for total scores of MBI, COPM-P, and COPM-S are shown in Table 3 and Figures 2 - 4. The results for MBI, COPM-P, and COPM-S indicated a significant effect for group × time interaction ($P < 0.001$), time ($P < 0.001$), and group ($P < 0.001$). The between-group comparison showed that the MBI, COPM-P, and COPM-S scores in the two groups were not significantly different at baseline ($P > 0.05$). Analysis of covariance showed no significant effect of

Table 2. Details of Activities of Daily Living Training Program

Weeks	Intervention Goal	Teaching Techniques
1	Problem identification: Participants' experiences and opinions about their difficulties in each ADL	Group discussion about each ADL patterns/routines, problems with each ADL, and recommendations to solve the problems
2	Task specification: Description of each ADL sub-task	Group discussion, video clip presentation, task analysis
3	Safety considerations including fall prevention techniques	Group discussion, video clip presentation, physical prompt, feedback
4	Functional mobility training including getting into/out of bathroom, and toilet	Group work, task analysis, problem solving, feedback, physical prompt, chunking, video clip presentation, modeling
5	Training the taking off/on clothes	Group work, task analysis, part-task training, problem solving, feedback, physical prompt, chunking, modeling, forward/backward chaining
6	Cognitive strategy use	Group work, using metacognitive tool called goal-plan-do-check to use when thinking about and solving performance problems
7	Compensatory strategies and environmental adaptations/modifications	Group work, using assistive devices, feedback, physical prompt
8	Reviewing the previous sessions	Group discussion, problem solving

Abbreviation: ADL, activities of daily living.
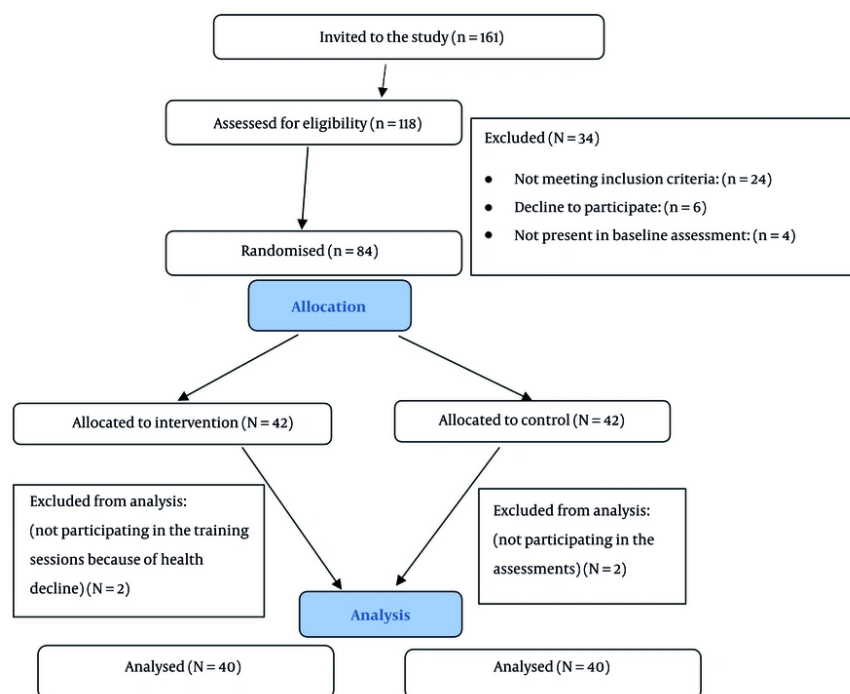
Figure 1. Consort flowchart of study process

demographic factors, including age, gender, marital status, and education, on MBI, COPM-P, and COPM-S scores at baseline ($P > 0.05$).

Between-group comparison showed a significant difference in terms of MBI, COPM-P, and COPM-S at post-intervention, respectively ($P < 0.001$, partial $\eta^2 = 0.35$; $P < 0.001$, partial $\eta^2 = 0.29$; and $P < 0.001$, partial $\eta^2 = 0.38$). Furthermore, a significant difference was observed between the two groups in terms of MBI, COPM-P, and COPM-S at follow-up, respectively ($P < 0.001$, partial $\eta^2 =$

Table 3. The Comparison of Modified Barthel Index, Canadian Occupational Performance Measure-P, and Canadian Occupational Performance Measure-S in Intervention and Control Groups Using ANOVA with Repeated Measures

Variables	Intervention Group		Control Group		P-Value
	Mean ± SD	(95% CI)	Mean ± SD	(95% CI)	
Total score of MBI					
Baseline	87.63 ± 3.31	(86.68 - 88.57)	88.03 ± 2.65	(87.07 - 88.97)	0.477
Post-intervention	93.18 ± 2.86	(92.29 - 94.06)	88.90 ± 2.76	(88.01 - 89.79)	< 0.0001
Follow-up	92.83 ± 2.84	(91.97 - 93.68)	88.15 ± 2.57	(87.30 - 89.00)	< 0.0001
COPM-P					
Baseline	26.05 ± 6.73	(23.77 - 28.33)	25.90 ± 7.72	(23.62 - 28.18)	0.236
Post-intervention	32.73 ± 6.31	(30.68 - 34.77)	26.65 ± 6.65	(24.61 - 28.70)	< 0.0001
Follow-up	32.02 ± 6.39	(29.92 - 34.13)	24.37 ± 6.96	(22.27 - 26.48)	< 0.0001
COPM-S					
Baseline	17.65 ± 5.61	(16.08 - 19.22)	19.53 ± 4.28	(17.96 - 21.10)	0.133
Post-intervention	29.73 ± 7.23	(27.78 - 31.67)	19.43 ± 4.90	(17.48 - 21.37)	< 0.0001
Follow-up	29.30 ± 6.49	(27.58 - 31.02)	19.13 ± 4.21	(17.40 - 20.85)	< 0.0001

Abbreviations: MBI, Modified Barthel Index; COPM-P, Canadian occupational performance measure-performance; COPM-S, Canadian occupational performance measure-satisfaction; CI, confidence interval.
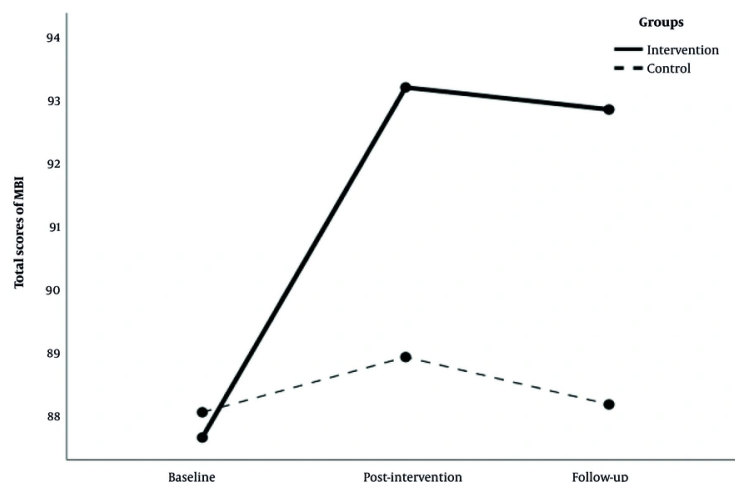

Figure 2. The total scores of Modified Barthel Index (MBI) at baseline, post-intervention and follow-up in intervention and control groups

0.42, 1-β = 0.96; P < 0.001, partial η2 = 0.25, 1-β = 0.86; and P < 0.001, partial η^2 = 0.43, 1-β = 0.97).

The results showed a meaningful MCID in MBI, COPM-P, and COPM-S in the intervention group, with values of 3.135, 2.641, and 2.481, respectively. In contrast, no meaningful MCID was observed in any of the outcomes in the control group.

5. Discussion

Our results demonstrated the effectiveness of group-based training in promoting independence and satisfaction in performing ADL. According to the results, a significant difference was observed in MBI [MCID more than 3.1 (24)], COPM-P, and COPM-S scores [MCID more than 2 (25)] before and after the intervention in the intervention group. Although there was a slight decrease in these scores at follow-up, this decrease was not significant. This slight decrease may be due to a lack
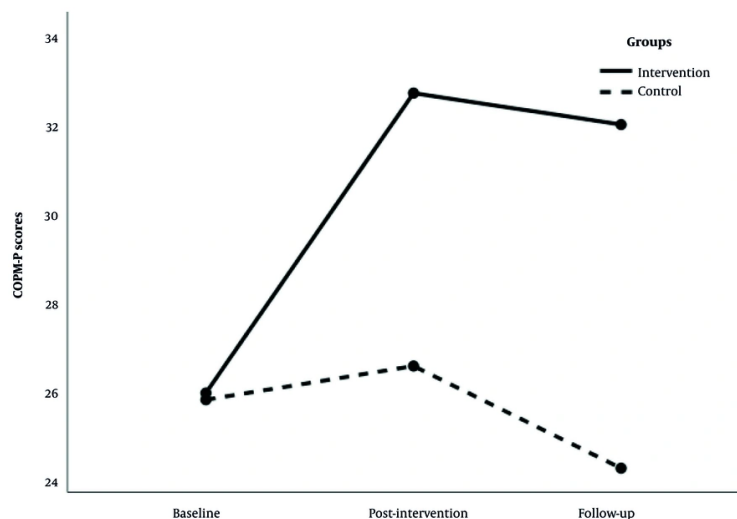
Figure 3. The Canadian occupational performance measure-performance (COPM-P) scores at baseline, post-intervention and follow-up in intervention and control groups
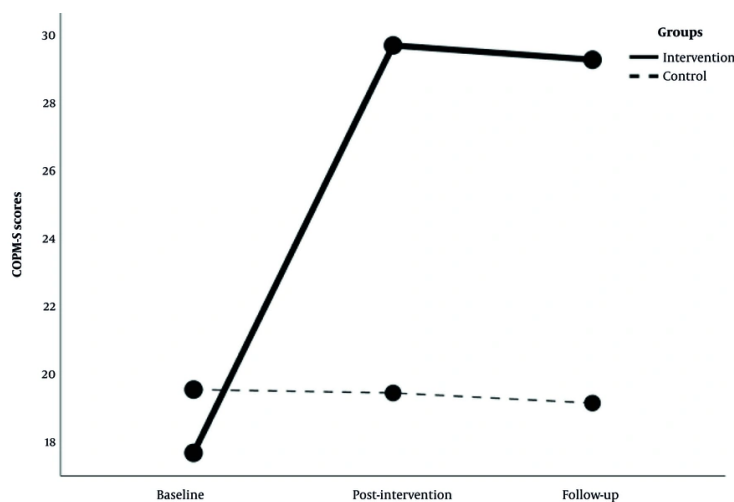
Figure 4. The Canadian occupational performance measure-satisfaction (COPM-S) scores at baseline, post-intervention and follow-up in intervention and control groups

of practice after the completion of the study. Many therapeutic interventions that involve behavioral changes require ongoing effort and commitment from the individual. Without support, motivation, and consistent reinforcement, individuals may revert to old habits, leading to a decrease in the desired outcome

(26). Unfortunately, some caregivers in nursing homes did not provide enough support and encouragement to ensure that the elders continued with their program.

The results of our study were similar to a Turkish study that showed the effectiveness of ADL training on the independence and LS of elders (17). Kahrezaie and

Mirshekar showed that the QOL and the ability to perform ADL were improved in men with spinal cord injury through group training (20), which is similar to our result but with different participants. Zingmark and Bernspang and Khayatzadeh-Mahani et al. reported the effectiveness of therapeutic interventions in supporting elders to bathe independently (27, 28), which is in concordance with our result, but they just investigated one ADL (bathing). Chang et al. showed that elders receiving the self-care intervention had significant improvement in self-care activities (29), which just focused on the care part of ADL, not on the mobility part. Since the level of dependence in performing ADL increases with age (17), educational programs seem necessary to reduce the level of dependence. Therefore, it can be concluded that ADL training is beneficial without any harm. It can improve the QOL and the performance of ADL in elders. Less dependence on ADL performance may help reduce elders' problems caused by dependency, such as depression.

According to the results, a significant improvement was observed in COPM-P and COPM-S in the intervention group. Enkvist et al. found that the LS of older adults who were unable to perform ADL was lower than those who were able (30). Chang et al. showed a positive correlation between ADL performance and LS among elders in Taiwan (29). These correlational studies show that LS was well associated with independence in ADL. Increasing the level of independence in ADL can lead to a higher level of LS and QOL in elders, based on Bandura's self-efficacy theory, which states that independence is important for maintaining QOL (31). On the other hand, ADL educational programs could positively influence elders' independence levels and LS (17). Alavijeh et al. showed high self-esteem and motivation to maintain independence among the elders participating in ADL training (32), which is somewhat similar to our study. When elders improve their ability to independently perform ADL, this improvement could enhance their LS (33).

Most of the literature focuses on LS, which is different from satisfaction with ADL performance emphasized in our study. However, mediating factors such as low quality of care, age, being widowed/divorced, low level of education, low income, living alone, existence of chronic disease, hospitalization, poor perceived health, and not being visited by relatives may affect elders'

dissatisfaction (6, 34), which could have affected our results as confounding factors, and we tried to control them in our study design. Therefore, ADL training not only makes the elders more independent in ADL but also increases their satisfaction with performing ADL. This satisfaction may help improve the QOL of the elders and even nursing home staff/caregivers, which requires further investigation. Furthermore, it seems that it may reduce nursing home budgets in terms of less reimbursement, less need for caregivers, reduced caregiver hours, less caregiver burden, less staff workload, and fewer resources required, which requires a cost-effectiveness study.

Given the importance of ADL training programs, it is recommended that policy-makers support educational programs and help implement these programs in nursing homes. Although there are numerous studies relevant to ADL independence and satisfaction in the elderly, this recent study is the first comprehensive interventional one in Iran in which group-based training was conducted by an occupational therapist.

5.1. Conclusions

Based on the results, independence in performing ADL and satisfaction improved significantly after the intervention. Increasing the level of ADL independence could lead to a higher level of satisfaction with ADL performance in elders. Improving the independence and satisfaction of the elders could be achieved through educational programs. Thus, policy-makers are advised to support and emphasize ADL training programs to improve the performance and satisfaction of the elders.

5.2. Limitations and Recommendations

Despite the strengths of this study, it had some limitations, such as a limited sample size, a short duration of the follow-up period, and a lack of cooperation from some caregivers to encourage and support the participants to continue their program at follow-up. The participants of this study were ambulatory and cognitively healthy individuals, so it is recommended that future studies examine non-ambulatory and cognitively impaired individuals. It is also recommended that a study be conducted in which caregivers of the elderly are involved in the training program. Additionally, conducting a study on community-dwelling elders is suggested.

Acknowledgements

Footnotes

References

1. Mehri N, Messkoub M, Kunkel S. Trends, Determinants and the Implications of Population Aging in Iran. *Ageing International*. 2020;**45**(4):327-43. https://doi.org/10.1007/s12126-020-09364-z.

2. Leong DP, Teo KK, Rangarajan S, Lopez-Jaramillo P, Avezum Jr A, Orlandini A. World Population Prospects 2019. Department of Economic and Social Affairs Population Dynamics. *Geneva: WHO*. 2018;**73**(7):362.

3. Gao J, Gao Q, Huo L, Yang J. Impaired Activity of Daily Living Status of the Older Adults and Its Influencing Factors: A Cross-Sectional Study. *Int J Environ Res Public Health*. 2022;**19**(23). [PubMed ID: 36497680]. [PubMed Central ID: PMC9735591]. https://doi.org/10.3390/ijerph192315607.

4. Bjork S, Juthberg C, Lindkvist M, Wimo A, Sandman PO, Winblad B, et al. Exploring the prevalence and variance of cognitive impairment, pain, neuropsychiatric symptoms and ADL dependency among persons living in nursing homes; a cross-sectional study. *BMC Geriatr*.

5. Masoumi N, Jafroodi S, Ghanbari A, Kazemnejad LE. [Assessment of retired elderly's people autonomy and its affecting factors in Rasht]. *J Holistic Nurs Midwifery*. 2011;**21**(1):46-51. FA.

6. Covinsky KE, Palmer RM, Fortinsky RH, Counsell SR, Stewart AL, Kresevic D, et al. Loss of independence in activities of daily living in older adults hospitalized with medical illnesses: increased vulnerability with age. *J Am Geriatr Soc*. 2003;**51**(4):451-8. [PubMed ID: 12657063]. https://doi.org/10.1046/j.1532-5415.2003.51152.x.

7. Mograbi DC, Faria Cde A, Fichman HC, Paradela EM, Lourenco RA. Relationship between activities of daily living and cognitive ability in a sample of older adults with heterogeneous educational level. *Ann Indian Acad Neurol*. 2014;**17**(1):71-6. [PubMed ID: 24753664]. [PubMed Central ID: PMC3992775]. https://doi.org/10.4103/0972-2327.128558.

8. Zidrou C, Kleisiaris C, Adamakidou T. Associations between Disability in Activities of Daily Living and Social Capital aspects among older adults: a scoping review. *J Frailty Sarcopenia Falls*. 2021;**6**(3):119-30. [PubMed ID: 34557611]. [PubMed Central ID: PMC8419853]. https://doi.org/10.22540/JFSF-06-119.

9. Choi NG, Ransom S, Wyllie RJ. Depression in older nursing home residents: the influence of nursing home environmental stressors, coping, and acceptance of group and individual therapy. *Aging Ment Health*. 2008;**12**(5):536-47. [PubMed ID: 18855169]. https://doi.org/10.1080/13607860802343001.

10. Karakaya MG, Bilgin SC, Ekici G, Kose N, Otman AS. Functional mobility, depressive symptoms, level of independence, and quality of life of the elderly living at home and in the nursing home. *J Am Med Dir Assoc*. 2009;**10**(9):662-6. [PubMed ID: 19883891]. https://doi.org/10.1016/j.jamda.2009.06.002.

11. Zhang F, Yang W. Interaction between activities of daily living and cognitive function on risk of depression. *Front Public Health*. 2024;**12**:1309401. [PubMed ID: 38384887]. [PubMed Central ID: PMC10880188]. https://doi.org/10.3389/fpubh.2024.1309401.

12. Ni Mhaolain AM, Gallagher D, O. Connell H, Chin AV, Bruce I, Hamilton F, et al. Subjective well-being amongst community-dwelling elders: what determines satisfaction with life? Findings from the Dublin Healthy Aging Study. *Int Psychogeriatr*. 2012;**24**(2):316-23. [PubMed ID: 22189624]. https://doi.org/10.1017/S1041610211001360.

13. Pinto JM, Neri AL. Factors associated with low life life satisfaction in community-dwelling elderly: FIBRA Study. *Cad Saude Publica*. 2013;**29**(12):2447-58. [PubMed ID: 24356691]. https://doi.org/10.1590/0102-311x00173212.

14. Dobek JC, White KN, Gunter KB. The effect of a novel ADL-based training program on performance of activities of daily living and physical fitness. *J Aging Phys Act*. 2007;**15**(1):13-25. [PubMed ID: 17387226]. https://doi.org/10.1123/japa.15.1.13.

15. Motamed-Jahromi M, Kaveh MH. Effective Interventions on Improving Elderly's Independence in Activity of Daily Living: A Systematic Review and Logic Model. *Front Public Health*. 2020;**8**:516151. [PubMed ID: 33659228]. [PubMed Central ID: PMC7917261]. https://doi.org/10.3389/fpubh.2020.516151.

16. van Het Bolscher-Niehuis MJ, den Ouden ME, de Vocht HM, Francke AL. Effects of self-management support programmes on activities of daily living of older adults: A systematic review. *Int J Nurs Stud*. 2016;**61**:230-47. [PubMed ID: 27400029]. https://doi.org/10.1016/j.ijnurstu.2016.06.014.

17. Hastaoglu F, Mollaoglu M. The effects of activities of daily living education on the independence and life satisfaction of elders. *Perspect Psychiatr Care*. 2022;**58**(4):2978-85. [PubMed ID: 36030386]. https://doi.org/10.1111/ppc.13149.

18. Cremer S, Vluggen S, Man-Van-Ginkel JM, Metzelthin SF, Zwakhalen SM, Bleijlevens MHC. Effective nursing interventions in ADL care affecting independence and comfort - a systematic review. *Geriatr Nurs*. 2023;**52**:73-90. [PubMed ID: 37269607]. https://doi.org/10.1016/j.gerinurse.2023.04.015.

19. Teymoori F, Dadkhah A, Shirazikhah M. Social welfare and health (mental, social, physical) status of aged people in Iran. *Middle East Journal of Age and Ageing*. 2006;**3**(1):39-45.

20. Kahrazie F, Mirshekar T. [Effect of wives group training on activities of daily living and quality of life in male patients with spinal cord injury]. *Med Surg Nurs J*. 2015;**4**(1):54-9. FA.

21. Tagharrobi Z, Sharifi KH, Sooky Z. [Psychometric evaluation of the short forms of barthel index in the elderly residing in nursing home]. *J Paramed Sci Rehabilit*. 2013;**2**(1):26-38. FA. https://doi.org/10.22038/jpsr.2013.493.

22. Atashi N, Aboutalebi S, Heidari M, Hosseini SA. Reliability of the Persian version of Canadian Occupational Performance Measure for Iranian elderly population. *Iran Rehabilit J*. 2010;**8**(2):26-30.

23. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2013. https://doi.org/10.4324/9780203771587.

24. Bouwstra H, Smit EB, Wattel EM, van der Wouden JC, Hertogh C, Terluin B, et al. Measurement Properties of the Barthel Index in Geriatric Rehabilitation. *J Am Med Dir Assoc*. 2019;**20**(4):420-425 e1. [PubMed ID: 30448338]. https://doi.org/10.1016/j.jamda.2018.09.033.

25. McColl MA, Denis CB, Douglas KL, Gilmour J, Haveman N, Petersen M, et al. A Clinically Significant Difference on the COPM: A Review. *Can J Occup Ther*. 2023;**90**(1):92-102. [PubMed ID: 36650928]. [PubMed Central ID: PMC9923202]. https://doi.org/10.1177/00084174221142177.

26. Cepni AB, Shehata N, Ullah F, Johnston CA. Habit Formation in Older Adults. *Am J Lifestyle Med*. 2024:15598276241301700. [PubMed ID: 39568797]. [PubMed Central ID: PMC11574773]. https://doi.org/10.1177/15598276241301743.

27. Khayatzadeh-Mahani M, Riyahi S, Amiri E, Ahmadi Angali K. Effects of Bathing Skills Training on Independence and Satisfaction of Older Adults Living in a Nursing Home: A Randomized Controlled Trial. *Med J Islam Repub Iran*. 2023;**37**:103. [PubMed ID: 38021382]. [PubMed Central ID: PMC10657268]. https://doi.org/10.47176/mjiri.37.103.

28. Zingmark M, Bernspang B. Meeting the needs of elderly with bathing disability. *Aust Occup Ther J*. 2011;**58**(3):164-71. [PubMed ID: 21599681]. https://doi.org/10.1111/j.1440-1630.2010.00904.x.

29. Chang SH, Wung SF, Crogan NL. Improving activities of daily living for nursing home elder persons in Taiwan. *Nurs Res*. 2008;**57**(3):191-8. [PubMed ID: 18496105]. https://doi.org/10.1097/01.NNR.0000319492.14005.7f.

30. Enkvist A, Ekstrom H, Elmstahl S. Associations between functional ability and life satisfaction in the oldest old: results from the longitudinal population study Good Aging in Skane. *Clin Interv Aging*. 2012;**7**:313-20. [PubMed ID: 22956866]. [PubMed Central ID: PMC3430095]. https://doi.org/10.2147/CIA.S33610.

31. Suzuki M, Shigeta M, Kanamori T, Yokomichi M, Uchiyama M, Inagaki K, et al. Development of a Daily Living Self-Efficacy Scale for Older Adults in Japan. *Int J Environ Res Public Health*. 2023;**20**(4). [PubMed ID: 36833986]. [PubMed Central ID: PMC9961564]. https://doi.org/10.3390/ijerph20043292.

32. Alavijeh MS, Zandiyeh Z, Moeini M. The effect of self-care self-efficacy program on life satisfaction of the Iranian elderly. *J Educ Health Promot*. 2021;**10**(1):167. [PubMed ID: 34250101]. [PubMed Central ID: PMC8249966]. https://doi.org/10.4103/jehp.jehp_928_20.

33. Liao M, Zhang X, Xie Z, Li L, Zou L. The mediating effect of life satisfaction between daily living abilities and depressive symptoms in the Chinese older people: evidence from CHARLS 2020. *Front Public Health*. 2024;**12**:1393530. [PubMed ID: 39211904]. [PubMed Central ID: PMC11357936]. https://doi.org/10.3389/fpubh.2024.1393530.

34. Boccaccio DE, Cenzer I, Covinsky KE. Life satisfaction among older adults with impairment in activities of daily living. *Age Ageing*. 2021;**50**(6):2047-54. [PubMed ID: 34510173]. [PubMed Central ID: PMC8581387]. https://doi.org/10.1093/ageing/afab172.