# Effects of Bathing Skills Training on Independence and Satisfaction of Older Adults Living in a Nursing Home: A Randomized Controlled Trial

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

## Abstract

 **Background:** Dependence in bathing is the most common activities of daily living (ADLs) dependency among older adults. The aim of this study was to evaluate the effect of bathing skills training on the independence and satisfaction of older adults living in nursing homes.

 **Methods:** In this randomized controlled trial, 80 participants were assigned randomly to the intervention (n = 40) and control groups (n = 40). The intervention group received 10 weekly bathing skills training sessions, with each session lasting about 60 minutes, while the control group received no direct training. The evaluation was conducted using the Modified Barthel Index (MBI) and the Canadian Occupational Performance Measure (COPM). Analysis of variance for repeated measurements was used to test the effect of intervention at the baseline, post-intervention, and follow-up.

 **Results:** The mean improvement in the MBI was greater for the intervention group ($P < 0.001$; partial $\eta2 = 0.34$), which remained significant at the follow-up ($P < 0.001$; partial $\eta2 = 0.41$). The greater mean change of the COPM–Performance was significant in the intervention group ($P < 0.001$; partial $\eta2 = 0.17$), which remained significant at the follow-up ($P < 0.001$; partial $\eta2 = 0.19$). The greater mean improvement of the COPM–Satisfaction was observed for the intervention group ($P < 0.001$; partial $\eta2 = 0.36$), which remained at the follow-up ($P = 0.001$; partial $\eta2 = 0.42$).

 **Conclusion:** Bathing skills training is effective in improving the ADLs independence and satisfaction in older adults living in nursing homes; thus, it is recommended to be included in the schedules of nursing homes.

 **Keywords:** Baths, Training, Activities of daily living, Older adults, Nursing homes, Satisfaction

## Introduction

Bathing is defined as obtaining and using supplies, soaping, rinsing, drying body parts, maintaining bathing position, and transferring to and from bathing positions. It might be done in a variety of ways, such as in a sponge bath, a tub, or a shower, either on one's own or with the assistance of another person (1). Bathing is the first activities of daily living (ADLs) in which older adults become disabled (2-4). Bathing is one of the most complex ADLs that involves multiple subtasks, each with distinct physical and cognitive requirements (5). Bathing is a more demanding activity

_____

*Corresponding author: Dr Mohammad Khayatzadeh-Mahani, mahany@ajums.ac.ir*

1. Department of Occupational Therapy, Musculoskeletal Rehabilitation Research Center, School of Rehabilitation Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
2. Department of Biostatistics and Epidemiology, School of Health, Environmental Technology Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

*↑What is "already known" in this topic:*
Older adults living in nursing homes show a low level of participation in activities of daily living (ADLs), especially in bathing. There are many studies on the effectiveness of the interventions that focus on bathing among community-living older adults; however, there is a dearth of studies about older adults living in nursing homes.

*→What this article adds:*
Training in bathing techniques is recommended for inclusion in the schedule of nursing homes because it is helpful in increasing the independence of older adults residing in nursing homes in carrying out ADLs and their satisfaction with ADLs performance.

than the rest of the ADLs, because it involves the complex movements of both the upper and the lower body. It usually involves bending down, turning around, raising arms and legs, or gripping with fingers. It also requires good coordination, balance, and sensory function (6). Bathing is considered an important and meaningful activity by all older adults (7).

Bathing disability is defined as the inability to wash or dry one's whole body without personal assistance (8). Developing a bathing disability may be an indicator and potential precursor of further disability in other ADLs (9), and it is associated with the risk of a long-term nursing home admission (10). Bathing disability is related to decreased quality of life (QOL) and life dissatisfaction (11). Since bathing is one of the most important ADLs, some older adults may want to be as independent as possible in bathing (7). To prevent the onset of bathing disability, designing interventions to restore independence or develop less dependent bathing is significant (12).

Whitehead and Golding-Day (2019) showed that older adults with bathing problems feel embarrassed and their dependency is impacted by their dignity and feelings of self-control (13). Bathing is a basic ADLs, which can be considered as a fundamental activity in nowadays modern societies. Older adults with bating problems are more predisposed to be admitted in nursing homes and they are more likely to receive homecare services (14). Caregivers are also satisfied with increased bathing independence of older adults, which will reduce their workload as bathing of these people is a time-consuming and physically and psychologically demanding task (15).

It is argued that the occupational skill training designed to improve ADLs, especially bathing, could enhance independence and life satisfaction (LS) in older adults (11). Occupational therapy interventions can improve clients' abilities to bathe themselves independently (8, 9). Interventions that focus on bathing disability among older adults present a cost-effective use of resources and lead to both QOL gains improvements and reduced societal costs (12). It has been observed that Reablement programs are more cost-effective than standard care for older adults living in the community (16). To our knowledge, there is a dearth of studies about bathing skills training and its effects on the independence and satisfaction of older adults, especially those living in nursing homes. Our assumption was that bathing encompasses different ADLs, such as dressing and functional mobility; therefore, it is an important component of ADLs. Thus, this study aimed to evaluate the effect of bathing skill training on independence and satisfaction in performing ADLs, including bathing, in older adults living in nursing homes.

## Methods

This double-blind, randomized, 2-armed parallel controlled trial was performed in Karaj (Iran) from June 2018 to February 2019. The study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (grant No.: PHT-9612). All participants signed informed written consents. The trial was registered on www.irct.ir (IRCT registration No.:

IRCT2017101136709N2).

### Participants

The participants were recruited from the older adults living in a nursing home in Kahrizak Charity Foundation (Karaj, Iran). The participants who met the inclusion criteria were enrolled after being informed of the research's goals. The inclusion criteria were as follows: age between 60 to 85 years; ability to read and write in Persian; Mini Mental State Examination scores over 23 to show that they are cognitively able (17); dependence or difficulty in bathing; and willingness to participate in the study. Participants were excluded if they had serious diseases such as cancer or neurologic diseases such as Alzheimer, Stroke, and Parkinson's disease. All participants and their caregivers gave informed written consent.

The sample size was determined based on the mean and standard deviation of a similar study (18) according to 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 $Z_{1-\beta} = 0.85$. However, the sample size for each group was determined 42 participants.

The random allocation process performed in 2 steps. In the first step, to generate the random sequence, the participants were randomly allocated to one of the intervention and control (waiting list) groups equally based on blocked random allocation through a computer-generated random number list using the "Random Allocation Software 1.0." In the second step, the random allocation sequence was concealed from the participants; thus, the participants did not know which group they have been placed in until after the intervention was finished. To keep the participants blinded, the duration and form of the sessions were considered the same for both groups. Thus, there was the blinding of the participants, the evaluators, and the data analyzers in this study.

### Intervention Procedure

At first, an evaluator who was not aware of the groups' allocation measured the ability of both groups in performing the basic ADLs using the Modified Barthel Index (MBI). The participants were interviewed to obtain the MBI scores. Participants' performance and satisfaction were also measured through interviews using the Canadian Occupational Performance Measure (COPM). Before the study, usual care were delivered to older adults in the nursing home, such as ADLs assistance, medication care, physician/nursing service, nutrition counseling; and rehabilitation services, including physical therapy and occcupational therapy; and psychosocial services. There was no direct bathing skills training in the curriculum of the nursing home.

The intervention procedure began after the randomisation and allocation was completed. The participants were asked about the presence (yes/no) of disability with the following bathing subtasks—obtaining and using supplies; taking off clothes; turning on water and adjusting the temperature; getting into the bath; washing the whole body, including shampooing hair; getting out of the bath; drying the whole body; and getting dressed (8). Dependence and difficulty

with bathing are referred to as bathing dependence and bathing difficulty. To respect the dignity of participants and for their convenience, same-sex occupational therapists were considered for male and female participants.

The 10 weekly training sessions that lasted about 60 minutes were held for each participant of the intervention group. The control group received no direct bathing skills training. The intervention group received bathing skills training by 2 occupational therapists through individualized training sessions. First, the task of bathing was described to all older adults to enhance their knowledge and attitudes regarding this task. Since bathing is a highly personalized and culturally-dependent task, interventions were tailored to the preferences of older adults. Thus, each participant was asked to express their personalized bathing patterns/routines, problems with bathing, and recommendations to solve the problem. The bathing skill training focused on supporting the older adults, enabling them to restore or develop the abilities required to perform bathing. Since most Iranians do not use the bathtub, showering was selected as the bathing method of bathing. Because interventions designed to improve bathing skills may need to account for concurrent disability in other essential ADLs, other ADLs related to bathing, such as dressing and functional mobility, were also trained. There was training for additional bathing subtasks, such as washing and drying the entire body. Compensatory strategies, safety considerations including fall prevention techniques, and the proper use of bathing aids were also trained (Table 1).

Training strategies—such as verbal instruction (100%), practical demonstration (90%), and physical guidance (70%)—were used to teach bathing skills to the participants. Teaching-learning techniques based on the 4-quadrant model of facilitated learning, such as priming, prompting, problem-solving, modeling, patterning and proper use of feedbacks, were also used (19) (Table 1). Based on this model, explicit instruction, demonstration, and visual cues were parts of the teaching-learning protocol (20). The practical sessions were done in the real condition of being in the bathroom to enhance the learning effect. After completion of the intervention sessions and 3 months later (follow-up), a blind assessor (an occupational therapist who did not engage in the training and was not aware of the groups) evaluated the control and the intervention groups using the MBI and COPM.

### Outcome Measures
### MBI

In this study, the MBI or Shah version of the BI was used because it is more detailed in scoring than the original BI (21). The MBI consisted of 10 subtests, including bathing. The MBI was used because all participants had problems in performing ADLs in varying degrees, especially bathing. Furthermore, the bathing task requires dressing/undressing, transfer, and functional mobility. The MBI is scored based on 5-point Likert rating scale. The total score of MBI is 100, with a higher score showing better ADLs performance. If the score is between 0 and 20, the person is considered as totally dependent, scores between 21 to 60 show severe dependence, scores between 61 to 90 show moderate

*Table 1.* Details of bathing skills training program

| Week | Intervention Goal | Training Strategy | Teaching Techniques |
|---|---|---|---|
| 1 | Problem Identification: Participants' experiences and opinions | Verbal instruction | Group discussion about bathing patterns/routines, problems with bathing, and recommendations to solve the problem |
| 2 | Task specification: Description of bathing sub-tasks | Verbal instruction, Practical demonstration | Group discussion, Video clip presentation, Task analysis |
| 3 | Bathing aid usage | Verbal instruction, Practical demonstration | Group discussion, Video clip presentation |
| 4 | Safety considerations including fall prevention techniques | Verbal instruction, Practical demonstration, Physical guidance | Group discussion, Video clip presentation, Physical prompt, Feedback |
| 5 | Functional mobility training including getting into/out of bathroom | Verbal instruction, Practical demonstration, Physical guidance | Group work, Task analysis, Problem solving, Feedback, Physical prompt, Chunking, Video modeling |
| 6 | Training the taking off/on clothes | Verbal instruction, Practical demonstration, Physical guidance | Group work, Task analysis, Part-task training, Problem solving, Feedback, Physical prompt, Chunking, Video modeling, Forward/backward chaining |
| 7 | Handling the bathroom environment including turning on/off water, adjusting temperature, use of supplies | Verbal instruction, Practical demonstration, Physical guidance | Group work, Task analysis, Problem solving, Feedback, Physical prompt, Video modeling |
| 8 | Training the whole-body washing | Verbal instruction, Practical demonstration, Physical guidance | Group work, Task analysis, Part-task training, Problem solving, Feedback, Physical prompt, Chunking |
| 9 | Training the body drying | Verbal instruction, Practical demonstration, Physical guidance | Group work, Task analysis, Part-task training, Problem solving, Feedback, Physical prompt, Chunking, Video modeling, Forward/backward chaining |
| 10 | Reviewing the previous sessions | Verbal instruction, Practical demonstration, Physical guidance | Group discussion, Whole-task training, Problem solving, Feedback, Physical prompt |

dependence, scores between 91 to 99 show mild dependence, and if the score is 100, the person is completely independent. The MBI for Iranian older adults is reported to be a valid and reliable tool (22).

### COPM

This scale measures the satisfaction of older adults with performance of ADLs, including bathing. As all participants were cognitively capable of being interviewed, this scale was used. This scale is run through semi-structured interviews by a trained occupational therapist who helps the older adults to identify their problems performing daily activities. The scale scoring is done in 5 steps and it takes about 20 to 30 minutes to complete. In the first step, which is the identification of occupational performance problems, the participants are asked to specify daily activities they want or need to do, or they are expected to do but are not able to do. In the second step, they are asked to rank the importance of the activities from 1 to 10 using the ranking card. In the third step, using the scoring cards, the examiner asks the participants to give scores to any problem in terms of performance and satisfaction. Then, the total score is calculated. In the fourth step, the scoring process is conducted again after the intervention. In the fifth step, the total performance score 1 (baseline) is subtracted from the 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 determined. The Persian version of the COPM can be used as a valid and reliable tool for detecting changes in client-perceived problems with ADLs in Iranian older adults (23).

### Data Analysis

Descriptive statistics were used to describe the characteristics of the participants using frequencies (number and percent), means, and standard deviations. All analyses were conducted on per protocol basis; thus, the participants who completed the study were evaluated. Statistical analysis was conducted with SPSS Version 26. Analysis of variance (ANOVA) for repeated measurements was used to test the effect of training program on the obtained scores of the MBI (total score) and the COPM–Performance (COMP–P) and the COPM–Satisfaction (COMP–S) at the baseline, post-intervention, and follow-up in the intervention group compared with the control group. 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 (24). The significance level was set at $P < .05$ for tests of the interaction and main effects.

### Results

An intervention flow diagram is presented in Figure 1. A total of 80 participants were evaluated in this study. The drop-out rate was 4.8%. Demographic characteristics, including the age, sex, marital status, educational level, bathing disability status, experience of falling, and other ADLs disabilities, are presented in Table 2. No significant differences were observed between the groups in all demographic variables ($P > 0.05$).

Almost all participants mentioned bathing as the most important activity that they had problems in its performance. For the purpose of this study, only bathing scores in the COPM were considered and calculated. The bathing performance and satisfaction scores of the COPM in the 2 groups are presented in Table 3 and Figures 2 to 4.

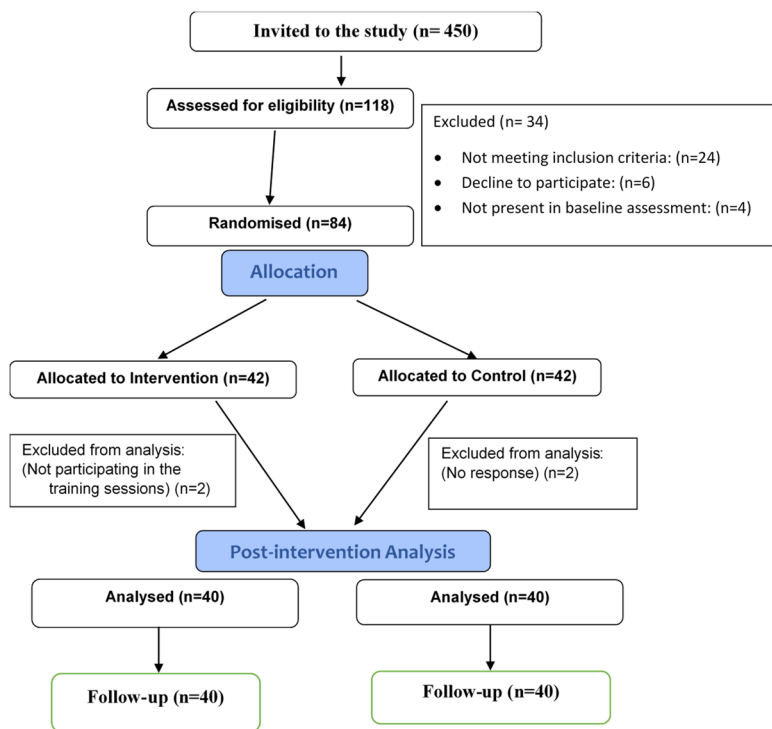The repeated measure ANOVA results for the MBI



*Figure 1.* Consort flowchart of the study process

*Table 2.* Demographic characteristics of participants in the 2 groups

| Variable | | Intervention (n = 40) | Control (n = 40) | Total (n = 80) |
|---|---|---|---|---|
| Age | (Mean±SD*) | 75.95±5.66 | 75.75±5.90 | 75.85±5.75 |
| Sex | Male/Female | 20/20 | 22/18 | 42/38 |
| Education | Primary education | 25 | 21 | 46 |
| | Secondary education | 12 | 14 | 26 |
| | University | 3 | 5 | 8 |
| Marital status | Married | 14 | 12 | 26 |
| | Widow | 26 | 28 | 54 |
| Experience of falling in last 6 month | N** (percent) | 10(25%) | 11(22.5%) | 21(26.25%) |
| Other ADLs*** Dependency/Difficulty | Toileting | 23 | 25 | 48 |
| | Dressing | 22 | 20 | 42 |
| | Functional mobility | 20 | 20 | 40 |
| | Eating | 10 | 11 | 21 |

*Standard Deviation, ** Number of people, ***Activities of daily Living

*Table 3.* Comparisons of outcome measures across intervention and control groups and time using repeated measures ANOVA

| Measure | Control Group | | | Intervention Group | | | Difference Between Groups | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | SD | 95% CI | M | SD | 95% CI | $M_C-M_I$ | F | *P* |
| MBI | | | | | | | | | |
| Pre-trial | 72.28 | 11.67 | 68.65-75.89 | 76.53 | 11.30 | 72.90-80.14 | -4.25 | 2.73 | .034 |
| Post-trial | 73.30 | 12.43 | 70.02-76.58 | 88.13 | 7.92 | 84.84-91.40 | -14.82 | 40.49 | <.001 |
| Follow-up | 71.75 | 11.52 | 68.73-74.76 | 87.75 | 7.15 | 84.73-90.76 | -16.00 | 55.66 | <.001 |
| COPM-S | | | | | | | | | |
| Pre-trial | 3.53 | 1.12 | 3.57-4.36 | 3.53 | 1.12 | 3.13-3.92 | .44 | 2.46 | .121 |
| Post-trial | 5.89 | 1.53 | 3.30-4.20 | 5.59 | 1.53 | 5.44-6.34 | -2.14 | 44.97 | <.001 |
| Follow-up | 6.01 | 1.37 | 3.35-4.18 | 6.01 | 1.37 | 5.59-6.42 | -2.24 | 57.26 | <.001 |
| COPM-P | | | | | | | | | |
| Pre-trial | 4.99 | 1.83 | 4.47-5.51 | 5.26 | 1.46 | 4.73-5.78 | -.26 | .51 | .477 |
| Post-trial | 4.86 | 1.75 | 4.35-5.36 | 6.31 | 1.46 | 5.80-6.82 | -1.45 | 16.17 | <.001 |
| Follow-up | 4.77 | 1.72 | 4.27-5.27 | 6.30 | 1.44 | 5.79-6.80 | -1.52 | 18.33 | <.001 |

Mc: Mean in Control group, M_I: Mean in Intervention group, MBI: Modified Barthel Index, COPM-S: Canadian Occupational Performance Measure- Satisfaction, COPM-P: Canadian Occupational Performance Measure- Performance

showed a significant main effect for group × time interaction (*P* < 0.001), time (*P* < 0.001), and for group (*P* < 0.001). Between-group contrasts showed that the mean MBI scores for the 2 groups were not different at baseline (*P* > 0.05), while at post-intervention, the mean improvement in the MBI was greater for the intervention group than the control group (*P* < 0.001; partial η2 = 0.34); and this difference between the groups remained significant at the follow-up (*P* < 0.001; partial η2 = 0.41) (Table 3 and Figure 2).

Results from the repeated measure analysis of variance on the COPM–P data demonstrated a significant main effect for group × time interaction (*P* < 0.001), time (*P* < 0.001), and for group (*P* = 0.003). Between-group contrasts
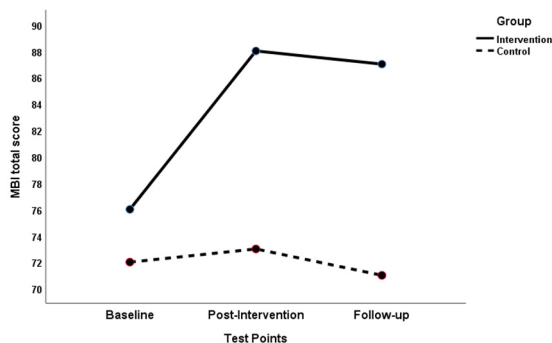
showed that the mean COPM–P scores for the 2 groups were not different at baseline, while at post-intervention, the mean improvement in the COPM–P was greater for the intervention group than the control group (*P* < 0.001; partial η2 = 0.17); and this difference between the groups remained significant at the follow-up (*P* < 0.001; partial η2 = 0.19) (Table 3 and Figure 3).

The repeated measure ANOVA results for the COPM-S showed similar results. A significant main effect for group × time interaction (*P* < 0.001), time (*P* < 0.001), and group (*P* < 0.001) was found. Between-group contrasts revealed



*Figure 2.* Changes of MBI total score in the intervention and control groups at the baseline, post-intervention, and follow-up.
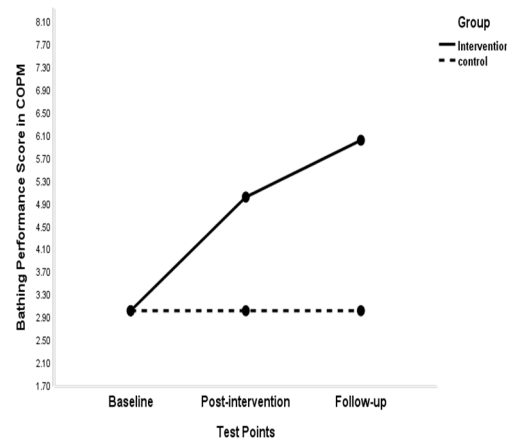


*Figure 3.* Changes of COPM- P score in the intervention and control groups at baseline, post-intervention and follow-up.
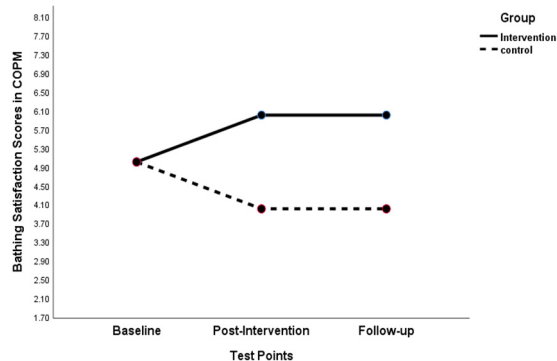
*Figure 4.* Changes of COPM- S score in the intervention and control groups at baseline, post-intervention and follow-up.

that the mean improvement was greater for the intervention group at post-intervention than the control group ($P < 0.001$; partial $\eta2 = 0.36$), which remained at the follow-up ($P = 0.001$; partial $\eta2 = 0.42$) (Table 3 and Figure 4).

## Discussion

According to results, independence in performing ADLs increased in the intervention group, whereas it did not change in the control group. In addition, the acquired skills maintained during the follow-up phase. Our findings point to the training protocol's success in fostering ADLs independence. Since bathing disability is the first disability that occurs (3) and bathing encompasses different ADLs, such as dressing/undressing and functional mobility/transfers (8), it seems that improvement in bathing skills improves the performance of other ADLs (13). Based on the PEO model, most studies have emphasized the relationship between the person and the environment (such as assistive device use and environmental hazards), with less focus on the task of bathing in terms of bathing task analysis, task/subtask demands, actions required to perform the task, and remediation of bathing disability (25-27); therefore, the relationship between the person and the occupation was emphasized in this study. According to a report by Chester et al (2020) on the effectiveness of bathing skill training for older adults, they found the instruction to be satisfactory (28). Zingmark and Bernspang (2011) showed the effectiveness of occupational therapy interventions in terms of supporting older adults in becoming independent in bathing that is congruent with our study (11).

The results of this study showed a significant improvement in the performance and satisfaction with performing ADLs based on the COPM in the intervention group that maintained during the follow-up period. Enkvist et al (2012) found that the QOL of older adults who reported inability in performing ADLs were lower than the able older adults (29). Kamei et al (2010) showed that the change in ADLs and functional capacity was significantly associated with changes in LS (30). Moreira et al (2018) found that the caregivers' and the older adults' QOL was improved as a result of educational interventions regarding the ADLs (31). Tuntland et al (2015) showed that the Reablement

program resulted in better activity performance and satisfaction in older adults (32). These studies show that LS and QOL were associated with performance of ADLs, which support our findings.

This study was the first to evaluate the effect of bathing skill training on performance and satisfaction of ADLs in older adults living in nursing homes. However, our study had some limitations including that most participants had little education, which limited our training to verbal instruction or practical demonstration rather than using written materials. No harm was reported during our study, nonetheless, bathing skill training in older adults may have some adverse events such as falls that requires proper supervision to prevent possible falls. It is recommended that more research be conducted on older adults who have neurological impairments, such as stroke survivors. Also, a qualitative study could identify the experiences of older adults and caregivers who are receiving training in bathing techniques.

## Conclusion

Based on the results, the independence and the satisfaction in performing ADLs in older adults living in nursing homes improved after bathing skills training. Therefore, in addition to adaptive modifications to reduce the environmental hazards and assistive devices considerations, attention should be paid to bathing skills training with older adults and their caregivers in nursing homes. Bathing skills training is suggested to be implemented in nursing homes to increase the independence and satisfaction of older adults in performing ADLs.

## Acknowledgment

## Conflict of Interests

The authors declare that they have no competing interests.

## References
1. Boop C, Cahill SM, Davis C, Dorsey J, Gibbs V, Herr B, et al. Occupational therapy practice framework: Domain and process fourth edition. Am J Occup Ther. 2020;74(S2):1-85.
2. Fong JH. Disability incidence and functional decline among older adults with major chronic diseases. BMC Geriatr. 2019;19(1):1-9.
3. Fong JH, Feng J. Patterns of functional disability in the oldest adults in China. J Am Geriatr Soc. 2016;64(9):1890-4.
4. Fong JH, Feng J. Comparing the loss of functional independence of older adults in the US and China. Arch Gerontol Geriatr. 2018;74:123-7.
5. Utami TR, Andayani B. Mentari's guide validation as a guidelines in teaching bath skills for tunagrahita children. J Psychol Instr. 2020;4(3):98-106.
6. Liu C, Fong JH, Hoh JW, Wu H, Dong Y, Gu D, et al. Bathing and toileting difficulties of older adults in rural China: the role of environment. BMC Geriatr. 2020;20(1):1-9.
7. Ahluwalia SC, Gill TM, Baker DI, Fried TR. Perspectives of older persons on bathing and bathing disability: a qualitative study. J Am Geriatr Soc. 2010;58(3):450-6.
8. Wolf ZR, Czekanski KE. Bathing disability and bathing persons with dementia. Medsurg Nurs. 2015;24(1):9.

9. Golding-Day M, Whitehead P, Radford K, Walker M. Interventions to reduce dependency in bathing in community dwelling older adults: a systematic review. Syst Rev. 2017;6(1):1-6.

10. Fong JH, Mitchell OS, Koh BS. Disaggregating activities of daily living limitations for predicting nursing home admission. Health Serv Res. 2015;50(2):560-78.

11. Zingmark M, Bernspång B. Meeting the needs of elderly with bathing disability. Aust Occup Ther J. 2011;58(3):164-71.

12. Zingmark M, Nilsson I, Norström F, Sahlén KG, Lindholm L. Cost effectiveness of an intervention focused on reducing bathing disability. Eur J Ageing. 2017;14(3):233-41.

13. Whitehead PJ, Golding-Day MR. The lived experience of bathing adaptations in the homes of older adults and their carers (BATH-OUT): A qualitative interview study. Health Soc Care Community. 2019;27(6):1534-43.

14. Morgan R, DiZazzo-Miller R. The Occupation-Based Intervention of Bathing: Cases in Home Health Care. Occup Ther Health Care. 2018;32(3):306-18.

15. Yamamoto A, Matsuyama M, Kamoi H, Yamamoto R, Kuwahara N, Kida N. Physical and mental burden of caregivers in providing bathing assistance. In: Vincent GD, Editor. Advances in Humans Aspects of Healthcare. 1st ed. New York: Tailor & Francis Group; 2012. pp. 269-75.

16. Kjerstad E, Tuntland HK. Reablement in community-dwelling older adults: a cost-effectiveness analysis alongside a randomized controlled trial. Health Econ Rev. 2016;6(1):1-10.

17. Ramezani A, Alvani SR, Saleh MI, Hosseini SMP, Alameddine LR. Healthy and clinical meta-data and aggregated mini-mental status exam scores for the Persian speaking population. Curr Psychol. 2021:1-14.

18. Kahrazei 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.

19. Greber C, Ziviani J, Rodger S. Clinical utility of the four-quadrant model of facilitated learning: Perspectives of experienced occupational therapists. Aust Occup Ther J. 2011;58(3):187-94.

20. Ghaffari A, Azad A, Zarei MA, Rassafiani M, Sharif Nia H. Effect of Occupation Performance Coaching with Four-Quadrant Model of Facilitated Learning on Children with Specific Learning Disorder. Occup Ther Int. 2022;2022:4654204.

21. Aminalroaya R, Mirzadeh FS, Heidari K, Alizadeh-Khoei M, Sharifi F, Effatpanah M, et al. The validation study of both the modified barthel and barthel index, and their comparison based on rasch analysis in the hospitalized acute stroke elderly. Int J Aging Hum. 2021;93(3):864-80.

22. Tagharrobi Z, Sharifi K, Sooky Z. Psychometric evaluation of Shah version of modified Barthel index in elderly people residing in Kashan Golabchi nursing home. KAUMS J (FEYZ). In Persian. 2011;15(3):213-24.

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

24. Cohen J. Statistical power analysis for the behavioral sciences. New York: Routledge; 2013.

25. De-Rosende-Celeiro I, Torres G, Seoane-Bouzas M, Ávila A. Exploring the use of assistive products to promote functional independence in self-care activities in the bathroom. PLoS One. 2019;14(4):e0215002.

26. Gell NM, Brown H, Karlsson L, Peters DM, Mroz TM. Bathroom modifications, clutter, and tripping hazards: prevalence and changes after incident falls in community-dwelling older adults. J Aging Health. 2020;32(10):1636-44.

27. Kamei T, Kajii F, Yamamoto Y, Irie Y, Kozakai R, Sugimoto T, et al. Effectiveness of a home hazard modification program for reducing falls in urban community-dwelling older adults: A randomized controlled trial. Jpn J Nurs Sci. 2015;12(3):184-97.

28. Chester M, Hocking C, Smythe L. Providing, receiving and using equipment: A hermeneutic literature review. N Z J Occup Ther. 2020;67(2):6-13.

29. Enkvist Å, Ekström H, Elmståhl S. Associations between functional ability and life satisfaction in the oldest old: results from the longitudinal population study Good Aging in Skåne. Clin Interv Aging. 2012;7:313.

30. Kamei T, Hashimoto S, Kawado M, Seko R, Ujihira T, Konagaya M. Change in activities of daily living, functional capacity, and life satisfaction in Japanese patients with subacute myelo-optico-neuropathy. J Epidemiol. 2010;20(6):433-8.

31. Moreira ACA, Silva MJd, Darder JJT, Coutinho JFV, Vasconcelos MIO, Marques MB. Effectiveness of an educational intervention on knowledge-attitude-practice of older adults' caregivers. Rev Bras Enferm. 2018;71:1055-62.

32. Tuntland H, Aaslund MK, Espehaug B, Førland O, Kjeken I. Reablement in community-dwelling older adults: a randomised controlled trial. BMC Geriatr. 2015;15(1):1-11.