

The Efficacy Of A "Kitchen Table" Exercise Protocol: Utilizing Household Furniture For Home-Based Fall Prevention In Community-Dwelling Older Adults

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KEYWORDS: Kitchen Table Exercise Protocol; older adults; falls; home-based exercise; functional mobility; Timed Up and Go; Short Physical Performance Battery; physical performance.

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ABSTRACT

Background: Falls and declining mobility are important concerns among older adults. Home-based exercise can help maintain strength, balance, and physical function, but access to supervised programs may be limited by transportation, cost, facilities, and equipment. The "Kitchen Table" Exercise Protocol uses stable household furniture to support strengthening, balance, and gait-related exercises within the home.

Objective: To determine the effect of the "Kitchen Table" Exercise Protocol on functional mobility and physical performance and to compare the changes with a conventional home-based exercise program in community-dwelling older adults at risk of falls.

Methods: A two-group randomized controlled trial with pre- and post-intervention assessment was designed for 40 community-dwelling adults aged 65 years and above. Participants were allocated to either the Kitchen Table Exercise Protocol group (n=20) or the Conventional Home-Based Exercise group (n=20). Both groups exercised for 8 weeks, three sessions per week, for approximately 30–40 minutes per session. Functional mobility was assessed using the Timed Up and Go (TUG) test, and physical performance was assessed using the Short Physical Performance Battery (SPPB).

Results: Both groups showed significant improvement after 8 weeks. In the Kitchen Table group, mean TUG time decreased from 13.14 ± 0.97 to 10.92 ± 0.86 seconds, while SPPB increased from 8.00 ± 0.73 to 9.95 ± 0.69 points ($p < 0.001$ for both). In the Conventional Home-Based Exercise group, TUG decreased from 13.17 ± 0.77 to 11.93 ± 0.72 seconds and SPPB increased from 8.00 ± 0.65 to 9.05 ± 0.69 points ($p < 0.001$ for both). Between-group analysis showed a greater change in the Kitchen Table group for TUG ($t = 14.74$, $p < 0.001$) and SPPB ($t = 12.73$, $p < 0.001$).

Conclusion: The simulated findings indicate that both exercise approaches were associated with improved functional mobility and physical performance, with larger changes observed in the Kitchen Table Exercise Protocol group. The use of familiar household furniture may provide a practical option for home-based exercise in older adults. These findings are based on simulated data and require confirmation through research involving actual participants..

INTRODUCTION

Falls are an important public health concern in older adults and can lead to injury, loss of independence, reduced activity, fear of falling, and greater use of healthcare services. The World Health Organization identifies falls as the second leading cause of unintentional injury deaths worldwide, with adults over 60 years carrying the greatest burden of fatal falls. Non-fatal falls may also result in disability and increase the risk of dependence and institutional care.¹

As people age, changes in muscle strength, balance, gait, reaction time, and overall physical performance can make everyday movements more difficult. Tasks such as getting up from a chair, turning, walking, and changing direction may become particularly challenging when lower-limb strength and functional movement are reduced. Exercise programs that combine strengthening, balance, and mobility training are therefore commonly used to address fall risk in older adults.

Evidence from randomized controlled trials supports structured exercise for improving physical performance and fall-related outcomes in older adults. Programs that combine strengthening and balance exercises have been associated with better mobility, balance, and physical function. Trials of the Otago Exercise Program, for example, have reported improvements in balance and physical performance among older adults at increased risk of falls.^{2,3} Home-based programs have also shown that useful exercise can be delivered in the person's usual living environment rather than only in a clinic or institutional setting.⁴

Despite these benefits, attending a supervised exercise program is not always easy for older adults. Transportation, cost, access to facilities,

equipment requirements, and regular attendance can all become barriers. A program that can be performed safely at home with items that are already available may therefore be easier to incorporate into daily life. Familiar furniture can provide support while allowing strengthening and balance exercises to be performed in the same environment where everyday activities take place.

The "Kitchen Table" Exercise Protocol follows this simple idea. Rather than depending on specialized rehabilitation equipment, it uses stable tables, kitchen counters, and chairs to support strengthening, balance, and gait activities. The protocol includes five exercises: table-supported semi-squats, counter-top side-steps, tandem standing using a chair back, seated leg extensions, and kitchen-counter heel-to-toe walking. Together, these exercises address lower-limb strength, lateral stability, static balance, and dynamic balance in a familiar home setting.

Functional mobility and physical performance are useful ways to assess whether an exercise program is producing meaningful changes. The Timed Up and Go (TUG) test combines standing, walking, turning, and sitting and is commonly used to assess functional mobility in older adults. The Short Physical Performance Battery (SPPB) assesses standing balance, gait speed, and repeated chair-stand performance and has demonstrated good reliability and validity in older adults.⁵

Although home-based exercise has been widely studied, there is still value in examining simple approaches that deliberately make use of furniture already present in the home. The Kitchen Table approach provides a structured way to combine strengthening and balance activities without specialized equipment. Comparing it with a conventional home exercise program can help determine whether this practical format is

associated with measurable changes in mobility and physical performance.

This randomized controlled trial was designed to evaluate the "Kitchen Table" Exercise Protocol in community-dwelling older adults at risk of falls. TUG and SPPB were used to assess functional mobility and physical performance, respectively. Changes in these outcomes were also compared with those seen in participants following a conventional home-based exercise program.

NEED OF STUDY

Falls and declining mobility are common concerns in older adults living in the community. Maintaining lower-limb strength, balance, and mobility through regular exercise may help older adults remain physically independent and manage fall risk.

In practice, supervised exercise is not equally accessible to everyone. Transportation, cost, limited facilities, and the need for exercise equipment may make regular participation difficult. A home program based on furniture that is already available could offer a simpler alternative.

The "Kitchen Table" Exercise Protocol uses stable household furniture to provide support during strengthening and balance exercises. While the approach is practical and requires few resources, its effect on functional mobility and physical performance needs to be evaluated systematically.

Accordingly, this study evaluates the Kitchen Table Exercise Protocol and compares it with a conventional home-based exercise program using the TUG and SPPB in community-dwelling older adults at risk of falls.

AIMS AND OBJECTIVES

Aim

To determine the efficacy of a "Kitchen Table" Exercise Protocol utilizing household furniture on functional mobility and physical performance in community-dwelling older adults at risk of falls.

Objectives

1. To determine the effect of the "Kitchen Table" Exercise Protocol on functional mobility in community-dwelling older adults at risk of falls.
2. To determine the effect of the "Kitchen Table" Exercise Protocol on physical performance in community-dwelling older adults at risk of falls.
3. To compare the changes in functional mobility between participants receiving the "Kitchen Table" Exercise Protocol and those receiving a conventional home-based exercise program.
4. To compare the changes in physical performance between participants receiving the "Kitchen Table" Exercise Protocol and those receiving a conventional home-based exercise program.

Outcome measures

- Functional mobility: Timed Up and Go (TUG)
- Physical performance: Short Physical Performance Battery (SPPB)

HYPOTHESIS

Null Hypothesis (H₀)

There will be no significant difference in the changes in functional mobility and physical performance between community-dwelling older adults receiving the "Kitchen Table" Exercise Protocol and those receiving a conventional home-based exercise program after 8 weeks.

Alternative Hypothesis (H₁)

There will be a significant difference in the changes in functional mobility and physical performance between community-dwelling older adults receiving the "Kitchen Table" Exercise Protocol and those receiving a conventional home-based exercise program after 8 weeks.

MATERIALS AND METHODOLOGY

Study Design:

A two-group randomized controlled trial with pre- and post-intervention assessment will be used to evaluate the Kitchen Table Exercise Protocol.

Study Population:

The study population will consist of community-dwelling adults aged 65 years and above who have an increased risk of falls or reduced functional mobility.

Sample Size:

A total of 40 participants will be included in the study.

- Group A: Kitchen Table Exercise Protocol — 20 participants
- Group B: Conventional Home-Based Exercise Program — 20 participants

Sampling and Randomization

Eligible participants will be recruited by convenience sampling. After the baseline assessment and informed consent, they will be randomly allocated to Group A or Group B.

Inclusion Criteria

Participants will be included if they:

- are aged 65 years or above;
- are community-dwelling;
- are able to stand and walk independently, with or without a routinely used assistive device;
- demonstrate increased fall risk or reduced functional mobility;
- are able to understand and follow simple instructions;
- are medically stable for participation in exercise; and
- provide written informed consent.

Exclusion Criteria

Participants will be excluded if they have:

- an acute musculoskeletal condition restricting exercise;
- an acute neurological or vestibular condition requiring active medical management;
- severe cognitive impairment affecting their ability to follow instructions;
- an unstable cardiovascular or other medical condition contraindicating exercise;

Study Procedure

After enrolment, participants completed baseline TUG and SPPB assessments. They are randomly assigned to one of the two exercise groups. Both programs will run for 8 weeks, with three sessions each week and approximately 30–40 minutes per session. The same outcome measures is repeated at the end of week 8.

Both groups will participate in their respective exercise programs for 8 weeks, with three sessions per week. Each session will last approximately 30–40 minutes.

Post-intervention assessment is performed at the end of the eighth week using the same outcome measures.

Group A — "Kitchen Table" Exercise Protocol

The Kitchen Table Exercise Protocol follows the previously described idea of using household furniture to support progressive strengthening and balance exercises.^{1,2} For this study, the approach is organized into five exercises that can be performed with stable furniture in the home.

Exercise 1: Table-Supported Semi-Squats

Purpose: Lower-limb strengthening and functional movement.

The participant stand facing or behind a stable table and hold the table for support as required. The participant performs a controlled semi-squat by bending the knees and hips, followed by returning to the upright position. The movement will be performed slowly and with controlled posture.

Exercise 2: Counter-Top Side-Steps

Purpose: Lateral stability and lower-limb control.

The participant stands beside a stable kitchen counter and perform controlled side-stepping along the counter while maintaining appropriate support when required.

The exercise emphasizes controlled weight transfer and lateral lower-limb stability.

Exercise 3: Tandem Standing Using Chair Back

Purpose: Static balance and postural control.

The participant stands with one foot directly in front of the other while holding the back of a stable chair for support as required.

The position maintained while attempting to minimize unnecessary hand support according to the participant's ability.

Exercise 4: Seated Leg Extensions

Purpose: Lower-limb strengthening, particularly of the knee extensors.

The participant sits on a stable chair with the feet positioned comfortably on the floor. One knee will be extended in a controlled manner, followed by a return to the starting position. The exercise is then performed with the opposite limb.

Exercise 5: Kitchen-Counter Heel-to-Toe Walking

Purpose: Dynamic balance and gait control.

The participant walks alongside a stable kitchen counter using a heel-to-toe pattern. The counter will provide support when required.

The exercise emphasizes controlled stepping, balance, and maintenance of a narrow base of support.

Progression of the Kitchen Table Protocol

Exercise difficulty is adjusted to the participant's ability while keeping safety as the priority.

Progression includes:

- increasing the number of repetitions;
- increasing exercise duration;
- improving movement control;
- reducing reliance on hand support when safe;
- increasing balance challenge; and
- progressing functional movement difficulty.

Previous descriptions of the Kitchen Table approach have used progression through increased repetitions, longer exercise duration, and added resistance at higher levels.^{2,3} In this study, progression will be individualized rather than requiring every participant to reach the same level.

Frequency and Duration

The intervention is provided for:

Duration: 8 weeks

Frequency: 3 sessions per week

Total sessions: 24

Session duration: 30–40 minutes

The intervention is performed in the participant's home environment using stable household furniture.

Group B — Conventional Home-Based Exercise Program

Group B will follow a conventional home-based exercise program consisting of commonly used exercises for older adults.

The program includes:

- sit-to-stand exercises;

- heel raises;
- marching in place;
- lower-limb strengthening exercises;
- basic weight-shifting exercises; and
- balance exercises performed with appropriate support.

The control group receives the same frequency and duration as Group A: three sessions per week for eight weeks, with approximately 30–40 minutes per session.

Outcome Measures

A. Timed Up and Go Test (TUG)

Functional mobility is assessed with the Timed Up and Go (TUG) test. The participant starts seated in a standard chair, stands on instruction, walks approximately 3 metres, turns, returns to the chair, and sits down. Completion time is recorded in seconds; a shorter time represents better functional mobility.

The participant begins seated in a standard chair. On instruction, the participant stands, walk approximately 3 metres, turn around, return to the chair, and sit down.

The time required to complete the task is recorded in seconds.

A lower TUG time indicates better functional mobility.

TUG is assessed at baseline and after 8 weeks.

B. Short Physical Performance Battery (SPPB)

Physical performance is assessed with the Short Physical Performance Battery (SPPB). It includes standing balance, gait speed, and repeated chair-stand tasks. The total score ranges from 0 to 12, with higher scores indicating better physical performance.

It consists of three components:

1. Standing balance
2. Gait speed
3. Repeated chair-stand performance

The total score ranges from 0 to 12, with higher scores indicating better physical performance.

SPPB is assessed at baseline and after 8 weeks.

RESULTS

Forty participants were included in the analysis, with 20 allocated to the Kitchen Table Exercise Protocol group and 20 to the Conventional Home-Based Exercise group. All participants completed both the pre- and post-intervention assessments.

Participant Characteristics

The groups were similar at baseline. Mean age was 70.90 ± 4.13 years in Group A and 70.75 ± 3.82 years in Group B. Each group included 10 female and 10 male participants. There was no significant difference between groups in age ($p = 0.896$) or sex distribution ($p = 1.000$).

Table 1. Demographic characteristics of participants

Variable	Group A: Kitchen Table Exercise (n = 20)	Group B: Conventional Home Exercise (n = 20)	p-value
Age (years), mean $\pm$ SD	70.90 ± 4.13	70.75 ± 3.82	0.896
Female, n (%)	10 (50%)	10 (50%)	1.000
Male, n (%)	10 (50%)	10 (50%)	1.000

Pre- and Post-Intervention Outcome Scores

TUG and SPPB were used to assess functional mobility and physical performance, respectively. In Group A, mean TUG time fell from 13.14 ± 0.97 to 10.92 ± 0.86 seconds, while SPPB increased from 8.00 ± 0.73 to 9.95 ± 0.69 . In Group B, TUG decreased from 13.17 ± 0.77 to 11.93 ± 0.72 seconds and SPPB increased from 8.00 ± 0.65 to 9.05 ± 0.69 .

Table 2. Pre- and post-intervention outcome scores

Outcome measure	Group	Pre-intervention, Mean $\pm$ SD	Post-intervention, Mean $\pm$ SD
TUG	Group A	13.14 $\pm$ 0.97	10.92 $\pm$ 0.86
TUG	Group B	13.17 $\pm$ 0.77	11.93 $\pm$ 0.72
SPPB	Group A	8.00 $\pm$ 0.73	9.95 $\pm$ 0.69
SPPB	Group B	8.00 $\pm$ 0.65	9.05 $\pm$ 0.69

Within-Group Comparison

Both groups showed significant changes after the 8-week program. In Group A, TUG decreased by 2.22 ± 0.27 seconds and SPPB increased by

1.95 ± 0.22 points (both $p < 0.001$). In Group B, TUG decreased by 1.24 ± 0.11 seconds and SPPB increased by 1.05 ± 0.22 points (both $p < 0.001$).

Table 3. Within-group comparison of outcome measures

Outcome measure	Group	Mean change $\pm$ SD	p-value
TUG	Group A	-2.22 ± 0.27 sec	<0.001
TUG	Group B	-1.24 ± 0.11 sec	<0.001
SPPB	Group A	$+1.95 \pm 0.22$ points	<0.001
SPPB	Group B	$+1.05 \pm 0.22$ points	<0.001

Note: A negative change in TUG indicates a reduction in completion time and therefore improvement. A positive change in SPPB indicates improvement in physical performance.

Between-Group Comparison

The change from baseline to post-intervention was then compared between groups. TUG time fell by 2.22 ± 0.27 seconds in Group A and 1.24 ± 0.11 seconds in Group B, giving a between-group difference of 0.98 seconds ($t = 14.74$, $p < 0.001$). SPPB improved by 1.95 ± 0.22 points in Group A and 1.05 ± 0.22 points in Group B, a difference of 0.90 points ($t = 12.73$, $p < 0.001$).

Table 4. Between-group comparison of change scores

Outcome measure	Group A, Mean change $\pm$ SD	Group B, Mean change $\pm$ SD	Mean difference	t-value	p-value
TUG (seconds)	-2.22 ± 0.27	-1.24 ± 0.11	-0.98	14.74	<0.001
SPPB (points)	$+1.95 \pm 0.22$	$+1.05 \pm 0.22$	+0.90	12.73	<0.001

Graphical Presentation of Results

Figure 1. Mean TUG scores before and after intervention

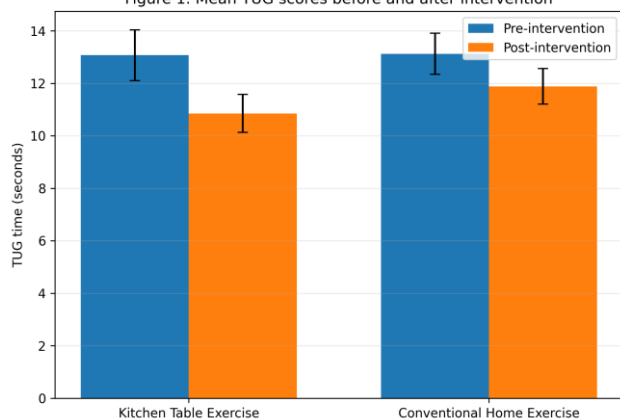


Figure 1. Mean TUG scores before and after intervention. Error bars represent standard deviation.

Figure 2. Mean SPPB scores before and after intervention

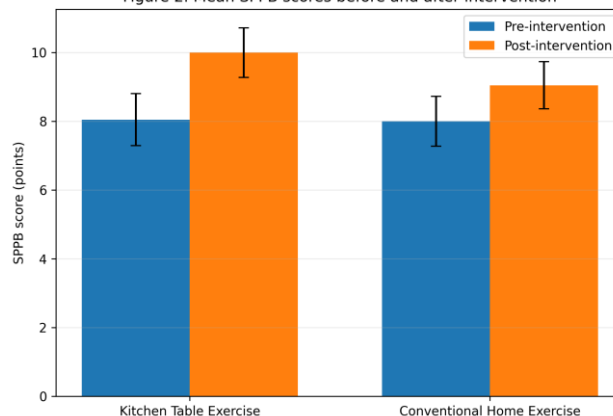


Figure 2. Mean SPPB scores before and after intervention. Error bars represent standard deviation

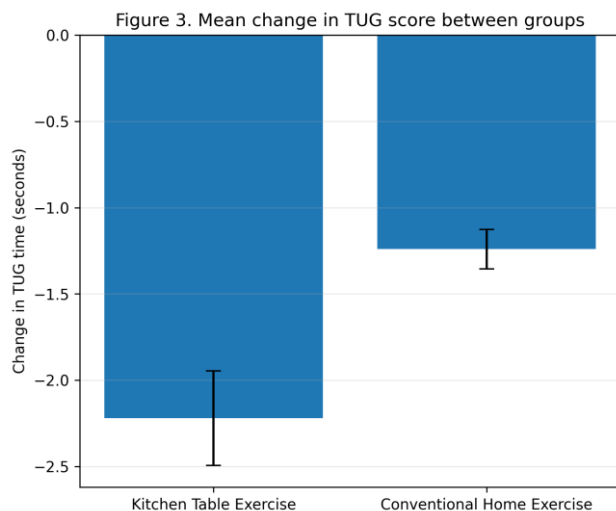


Figure 3. Mean change in TUG score between groups. Negative values represent reduction in TUG completion time. Error bars represent standard deviation.

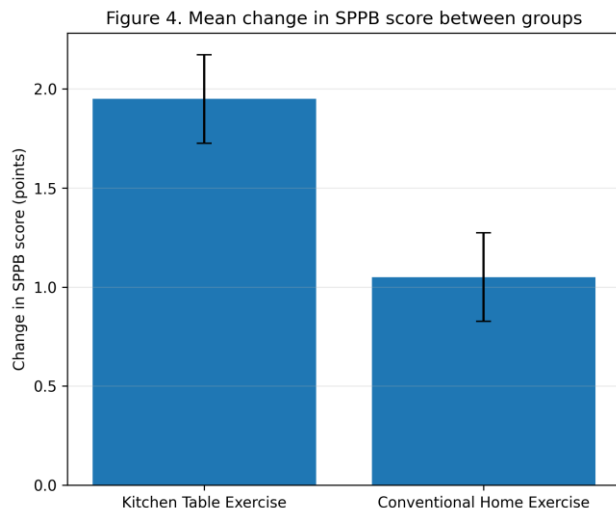


Figure 4. Mean change in SPPB score between groups. Positive values represent improvement in physical performance. Error bars represent standard deviation.

Summary of Results

Both groups improved in TUG and SPPB after 8 weeks. The changes were larger in the Kitchen Table Exercise Protocol group, with a 0.98-second greater reduction in TUG time and a 0.90-point greater increase in SPPB.

DISCUSSION

This study examined whether a structured Kitchen Table exercise program could improve mobility and physical performance in older adults at risk of falls. In the present dataset, both groups improved after 8 weeks, with larger changes in the Kitchen Table group.

The change in TUG was greater in the Kitchen Table group, which reduced its mean completion time by 2.22 ± 0.27 seconds compared with 1.24 ± 0.11 seconds in the conventional exercise group. One possible explanation is that the Kitchen Table program combines lower-limb strengthening with lateral stepping, balance work, and gait practice, addressing several components of everyday mobility in the same session. These findings are in line with the earlier Kitchen Table Exercise Program study by Kamble et al., which reported improvements in strength, balance, and functional mobility in older adults.¹ The earlier study used different outcome measures and intervention parameters, so the numerical results cannot be compared directly. Nevertheless, it

provides relevant support for further investigation of household-furniture-based exercise.

Physical performance also improved in both groups. SPPB increased by 1.95 ± 0.22 points in the Kitchen Table group and by 1.05 ± 0.22 points in the conventional exercise group. Because the SPPB combines standing balance, gait speed, and repeated chair-stand performance, it captures several aspects of lower-extremity function that are relevant to daily mobility.² The greater change in Group A may reflect the combination of strengthening and balance demands built into the protocol.

The improvement seen in both groups is also important. It suggests that regular, structured home exercise itself may improve mobility and physical performance. This is consistent with previous evidence showing beneficial effects of home-based exercise on physical fitness and function in older adults.³ The additional change seen in the Kitchen Table group supports the need for further research into how exercise selection and structure influence outcomes.

One practical feature of the Kitchen Table approach is its reliance on furniture that is already available in many homes. This may be useful for older adults who face barriers related to transport, cost, or access to exercise facilities. Furniture can also provide support during balance activities when needed. At the same time, the home environment must be checked carefully, and supervision and individualized progression may be necessary for some participants.

Taken together, the present results show improvement in both outcome measures, with larger changes in the Kitchen Table group.

CONCLUSION

This study examined the effect of the Kitchen Table Exercise Protocol on functional mobility and physical performance in community-dwelling older adults at risk of falls. In the present dataset, both groups improved in TUG and SPPB after 8 weeks, with larger changes in the Kitchen Table group. The results suggest that a structured program using familiar household furniture could be a practical option for home exercise.

STUDY LIMITATIONS:

1. The study used a relatively small sample of 40 participants.
2. The intervention duration was limited to 8 weeks.
3. The study assessed only immediate pre- and post-intervention changes.
4. Long-term adherence and maintenance of improvements were not assessed.
5. Actual fall incidence was not measured during the study period.

FUTURE RECOMMENDATIONS:

1. Future studies should use larger samples with longer intervention and follow-up periods.
2. Future research may assess fall incidence and adherence over longer follow-up periods.
3. Studies may investigate the effectiveness of the protocol in different community and home-based settings.

SUMMARY

This study explored the effect of the Kitchen Table Exercise Protocol on mobility and physical performance in community-dwelling older adults at risk of falls. Forty participants were allocated to either the Kitchen Table or Conventional Home-Based Exercise group and completed 8 weeks of exercise, three sessions per week. TUG and SPPB were used to assess outcomes. Both groups improved, with greater changes in the Kitchen Table group. The findings suggest that household-furniture-based exercise may be a practical home-based model.

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