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# The Effect of Modified YouMed on Balance, Executive Functions, and Quality of Life in Older Women

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## ABSTRACT

Decline in balance, deterioration of executive functions, and reduced quality of life are common problems among older women. The present study aimed to investigate the effect of a modified YouMed program on these indicators. The study was conducted using a quasi-experimental design with pretest–posttest and control group. Twenty-six women aged over 65 years were purposively selected and randomly assigned to an experimental group (n = 13) and a control group (n = 13). The intervention consisted of a yoga-based program lasting 8 weeks, with two sessions per week, each session lasting 45 minutes. Measurement instruments included the Berg Balance Scale (BBS) for balance assessment, the Wisconsin Card Sorting Test (WCST) for executive functions, and the Quality of Life Questionnaire (QoL; 0–100 scale) for evaluating quality of life. Data analysis was performed using paired-samples t tests and independent-samples t tests ($\alpha = .05$). In the experimental group, significant improvements were observed in BBS scores (mean change ≈ +6.38, $p < .001$), WCST performance (mean change ≈ +1.24, $p = .007$), and QoL scores (mean change ≈ +8.17, $p = .030$). The control group showed no substantial changes. Posttest comparisons between the two groups were also statistically significant across all variables. The modified YouMed program can produce significant improvements in balance, selected components of executive functioning—including problem solving, inhibition, attention, and concentration—and overall quality of life in older women. Therefore, it is recommended as a health-promoting intervention to be incorporated into elderly care programs.

**Keywords:** Modified YouMed, older adults, balance, executive functions, quality of life.

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## Introduction

Population aging has emerged as one of the most significant demographic transformations of the twenty-first century, fundamentally reshaping health systems, social structures, and clinical priorities worldwide. Increasing life expectancy has resulted in a growing proportion of older adults who experience age-related declines in physical, cognitive, and psychosocial functioning, thereby intensifying the need for effective non-pharmacological interventions that promote healthy aging and functional independence. Aging is commonly accompanied by progressive deterioration in neuromuscular coordination, postural stability, cognitive control processes, and overall quality of life, particularly among older women who demonstrate higher vulnerability to mobility limitations, fall risk, and functional dependency compared with men (1, 2). Functional capacity represents a multidimensional construct encompassing physical performance, cognitive

integrity, and adaptive behavioral functioning, and reductions in these domains substantially increase healthcare utilization and reduce independence in later life (1). Consequently, contemporary gerontology emphasizes interventions capable of simultaneously targeting physical, cognitive, and psychological dimensions of aging rather than treating these domains in isolation.

Among age-related health concerns, impaired balance and fall risk remain critical public health challenges. Falls represent a leading cause of injury, disability, and mortality among older adults, with women demonstrating particularly elevated susceptibility due to reductions in muscle strength, proprioceptive efficiency, and vestibular regulation (2, 3). Balance control is not merely a biomechanical ability but an integrated neurocognitive process involving sensory integration, motor planning, and executive regulation. Age-related decline in postural control has been linked to decreased attentional capacity and slower cognitive processing, suggesting that interventions must address both motor and cognitive systems simultaneously (4). Evidence indicates that balance and coordination training can significantly enhance mobility, independence, and perceived quality of life in older adults, reinforcing the importance of structured movement-based programs as preventive strategies against functional decline (4). However, traditional exercise programs often fail to incorporate cognitive engagement or mindfulness components that may amplify neuroplastic adaptations.

Executive functions constitute another central determinant of successful aging. These higher-order cognitive processes—including inhibitory control, working memory, cognitive flexibility, planning, and problem solving—are primarily regulated by prefrontal cortical networks that undergo structural and functional changes with advancing age (5, 6). Declines in executive functioning contribute to reduced independence, impaired decision-making, and increased risk of accidents and falls. Contemporary neuroscientific models emphasize that executive functions are highly responsive to environmental stimulation and behavioral interventions, particularly those involving coordinated motor activity and cognitive engagement (5). Neuroimaging research further demonstrates shared neural substrates between insight problem solving and executive processing, highlighting the potential for targeted interventions to strengthen neural efficiency through integrative training approaches (7). Accordingly, enhancing executive functioning in older adults has become a primary objective within preventive cognitive health strategies.

A substantial body of research supports the role of physical activity as a powerful modulator of cognitive aging. Regular exercise has been associated with improved brain structure, increased neurotrophic factor release, enhanced cerebral perfusion, and better cognitive performance across aging populations (8). Systematic reviews and meta-analyses indicate that structured exercise training significantly improves both physical performance and cognitive outcomes in older adults, particularly when programs include coordination, balance, and cognitively demanding movements (9). Recent randomized controlled trials summarized in systematic reviews further confirm that physical activity interventions can produce measurable improvements in executive functions among elderly populations, supporting the concept of exercise as a form of cognitive medicine (10). Importantly, dual-task and motor-cognitive training approaches appear especially effective because they simultaneously challenge neural systems responsible for movement and cognition, thereby promoting functional brain adaptability (11, 12).

In parallel with traditional exercise paradigms, mind–body interventions such as yoga, meditation, and Tai Chi have gained increasing attention as holistic approaches to healthy aging. These practices integrate

controlled movement, breathing regulation, attentional focus, and emotional self-regulation, producing multidimensional physiological and psychological benefits. Meta-analytic evidence demonstrates that meditation and mind–body exercises significantly enhance cognitive performance among older adults, particularly in domains related to attention, executive functioning, and memory (13). Systematic reviews of yoga interventions further report improvements in cognitive functioning, emotional well-being, and mental health outcomes in elderly populations, suggesting that the combination of physical movement and mindfulness may yield synergistic benefits (14). Yoga-based interventions have also been associated with improvements in quality of life indicators, including psychological resilience, social functioning, and perceived health status (15).

The potential mechanisms underlying the effectiveness of yoga and related mind–body practices extend beyond musculoskeletal conditioning. Physiological studies indicate that yoga and meditation may influence cellular aging processes, reduce oxidative stress, and improve autonomic nervous system regulation, thereby supporting long-term health maintenance (16). Furthermore, integrative reviews examining yoga for healthy aging highlight its capacity to simultaneously address physical mobility, emotional regulation, cognitive engagement, and stress reduction, positioning yoga as a comprehensive intervention rather than a purely physical exercise modality (17). Comparative trials examining yoga versus light exercise programs demonstrate that yoga uniquely enhances psychological well-being and functional health outcomes, emphasizing the importance of mindfulness and controlled breathing components in promoting successful aging (18).

Evidence from related mind–body movement systems such as Tai Chi further strengthens this perspective. Meta-analytic findings show that Tai Chi training significantly improves cognitive functioning, balance control, and motor coordination in older adults, supporting the theoretical assumption that slow, controlled, cognitively demanding movement enhances neural integration and sensorimotor processing (19). These findings align with emerging models proposing that motor–cognitive integration represents a critical pathway for maintaining independence in later life. Mind–body practices require continuous attentional monitoring, postural adjustment, and controlled breathing, thereby stimulating executive control systems while improving physical stability.

Despite growing empirical support, important gaps remain in the literature. Many exercise programs for older adults are either physically demanding or insufficiently adapted to age-related limitations, potentially reducing adherence and safety. Modified interventions tailored to older populations are therefore essential. Adapted yoga programs that incorporate supportive equipment, gradual progression, and individualized intensity adjustments may provide safer and more accessible alternatives for elderly participants while preserving therapeutic effectiveness. Such modified protocols can reduce injury risk while maintaining optimal levels of motor challenge necessary for neuroplastic adaptation. Moreover, older women constitute a particularly important target population because they experience higher rates of functional decline, reduced muscle strength, and increased fall incidence, yet remain underrepresented in intervention research focusing on integrated physical-cognitive training approaches (2, 3).

Quality of life represents a key outcome variable in aging research, reflecting the combined influence of physical health, psychological well-being, social engagement, and environmental satisfaction. Improvements in balance and executive functioning are strongly associated with enhanced autonomy, reduced fear of

falling, and greater participation in daily activities, all of which contribute to improved life satisfaction. Mind–body interventions have demonstrated consistent positive effects on quality of life across diverse clinical and healthy populations, supporting their integration into preventive geriatric care models (15). Integrating physical movement, mindfulness, sensory awareness, and cognitive engagement may therefore represent an optimal strategy for addressing multiple determinants of well-being simultaneously.

Taken together, contemporary evidence suggests that multidimensional interventions combining physical activity, cognitive engagement, and mindfulness practices may offer the most promising approach for promoting functional independence and psychological well-being in older adults. Modified yoga-based programs grounded in progressive motor learning and cognitive activation principles appear particularly suitable for elderly populations due to their adaptability, safety, and holistic nature. Nevertheless, empirical investigations examining the simultaneous effects of modified yoga interventions on balance performance, executive functions, and quality of life among older women remain limited. Therefore, the aim of the present study was to investigate the effects of an eight-week modified YouMed (adapted yoga) training program on balance, executive functions, and quality of life in older women.

## Methods and Materials

### *Study Design and Participants*

The present study was quasi-experimental in nature and applied in purpose. The research design followed a pretest–posttest format with a control group. The aim of the study was to examine the effects of an 8-week modified yoga training program on balance, executive functions, and quality of life among older women.

The statistical population consisted of all women aged over 65 years residing in elderly care settings. From among eligible volunteers, 26 participants were selected using convenience sampling based on predefined inclusion and exclusion criteria and were randomly assigned to an experimental group (n = 13) and a control group (n = 13). After providing a comprehensive explanation of the research procedures, written informed consent was obtained from all participants. Participants were assured that their personal information and health status would remain confidential and that they could withdraw from the study at any time. Inclusion criteria included: age between 65 and 74 years, obtaining a score higher than 75 on the Mini-Mental State Examination (MMSE), and the ability to walk a distance of six meters independently without assistive devices. Exclusion criteria included absence from more than three training sessions (due to lack of motivation or events unrelated to the study), serious visual or auditory impairments, use of medications affecting balance, blood pressure higher than 140 mmHg or lower than 90 mmHg, and a reported history of imbalance or dizziness.

After obtaining the necessary permissions from residential and elderly care centers and identifying volunteer participants, the research procedure was explained, including study objectives as well as potential benefits and risks. Volunteers completed written informed consent forms and demographic information forms and subsequently participated in the Mini-Mental State Examination. After reviewing MMSE results and identifying individuals who met the inclusion criterion (score > 75), pretest assessments were conducted to evaluate fall risk, balance, executive functioning, and quality of life using the Berg Balance Scale and executive function measures. Following completion of the training intervention period, all participants underwent posttest assessments identical to the pretest evaluations.

*Data Collection*

**Berg Balance Scale (BBS):** This test consists of 14 functional tasks designed to assess static and dynamic balance. Scores range from 0 to 56, with higher scores indicating better balance performance. The Persian version of the scale has demonstrated acceptable validity and reliability in Iranian older adult populations.

**Wisconsin Card Sorting Test (WCST):** This test is a well-established instrument for assessing executive functions, including cognitive flexibility, problem solving, and set shifting. In the present study, the number of completed categories (reflecting problem solving, inhibition, attention, and concentration) was used as the performance index.

**World Health Organization Quality of Life Questionnaire (WHOQOL-BREF):** This questionnaire contains 26 items across four domains: physical health, psychological health, social relationships, and environmental conditions. Higher scores indicate better quality of life. The Persian version has demonstrated satisfactory validity and reliability.

*Intervention*

The intervention protocol consisted of a modified YouMed (yoga-based) training program implemented for the experimental group over eight consecutive weeks, with two sessions per week and each session lasting 45 minutes. Each training session followed a standardized structure beginning with approximately 10 minutes of preparatory relaxation conducted in seated or supine positions on an exercise mat positioned near a wall to ensure postural safety, during which guided breathing exercises, body awareness practices, and mental imagery techniques were introduced to facilitate physiological relaxation and attentional readiness. Following the initial phase, participants performed a series of progressively structured modified yoga movements designed according to the principle of progressive overload and grounded in the Challenge Point Framework, whereby task difficulty was systematically increased from simple to more demanding motor conditions while maintaining safety and functional appropriateness for older adults. Throughout all sessions, continuous supervision was provided by the principal researcher, and an additional caregiver accompanied participants to prevent falls and ensure adherence to all safety guidelines during exercises and assessments. The intervention progressed from basic movements performed with maximal external support—including wall stabilization, instructor assistance, and the use of supportive devices such as yoga straps, yoga blocks, chairs, Pilates balls, rolled towels, and elastic bands—toward increasingly independent execution of seven core postural and balance exercises without assistance. Early sessions emphasized conscious breathing, body scanning, correct sitting posture against the wall, quadruped positioning (cat pose), opposite arm–leg lifting, mountain pose, runner and warrior postures (Warrior I and II), triangle pose (Trikonasana), forward bending movements, and supported tree-balance exercises, followed by supine spinal twists, relaxation, and seated meditation lasting 5–10 minutes. Across weeks, sensory focus elements (auditory, tactile, and proprioceptive attention) were gradually incorporated alongside diaphragmatic and three-phase breathing patterns. Exercise intensity increased through longer hold durations, beginning with 5-second isometric holds and progressively extending to 7–8 seconds, increased balance demands, reduced base of support, and transitions from stable surfaces to more unstable conditions such as shorter chairs, BOSU ball sitting or lying positions, and dynamic balance tasks using Pilates balls, cushion balls, loop

resistance bands, and half-kilogram wrist and ankle weights. Mid-program sessions introduced standing alignment training using blocks between the thighs, forward bends with chair assistance, single-leg lifting, side bending with straps, seated and supine flexibility exercises, and controlled trunk stabilization tasks. In later weeks, participants performed advanced balance challenges including tree pose with the foot elevated on a yoga block, runner movements using straps, forward bending with step platforms under the feet, resisted hip activation using loop bands, and coordinated upper–lower limb movements requiring greater executive control, attentional engagement, and motor planning. Each session concluded with guided relaxation and mindfulness meditation to reinforce autonomic regulation and recovery. Overall, the modified YouMed protocol was designed to enhance postural control, executive functioning, and perceived quality of life through gradual motor learning, sensory integration, cognitive engagement, and safe functional progression tailored specifically to the physical capacities of older women.

### *Data Analysis*

Descriptive statistics, including indices of central tendency and dispersion, were used to summarize the data. Paired-samples t tests were applied to examine within-group changes, while independent-samples t tests were used to compare differences between groups. The significance level for all statistical analyses was set at $p < .05$.

## Findings and Results

The mean and standard deviation of balance, executive functions, and quality of life variables at the pretest and posttest stages are presented in Table 1.

**Table 1. Descriptive Statistics of Study Variables at Pretest and Posttest in the Two Groups**

| Dependent Variable | Group | Pretest M ± SD | Posttest M ± SD |
|---|---|---|---|
| Balance (BBS) | Experimental | 38.46 ± 4.20 | 48.92 ± 3.85 |
| | Control | 37.85 ± 4.11 | 38.31 ± 4.05 |
| Executive Functions (WCST) | Experimental | 3.46 ± 1.12 | 5.92 ± 1.08 |
| | Control | 3.38 ± 1.15 | 3.54 ± 1.13 |
| Quality of Life (WHOQOL-BREF) | Experimental | 58.85 ± 6.42 | 72.46 ± 5.88 |
| | Control | 59.00 ± 6.51 | 59.54 ± 6.49 |

As shown in Table 1, the mean scores of balance (BBS), executive functions (WCST), and quality of life (WHOQOL-BREF) in the experimental group increased substantially following implementation of the modified yoga program, whereas no meaningful changes were observed in the control group. Specifically, balance scores in the experimental group increased from 38.46 to 48.92, executive function scores improved from 3.46 to 5.92, and quality of life scores increased from 58.85 to 72.46.

Subsequently, the assumptions for paired-samples *t* tests were examined to evaluate within-group changes. The results are presented in Table 2.

**Table 2. Results of Paired-Samples t Test for Within-Group Changes**

| Variable | Group | t | df | p-value |
|---|---|---|---|---|
| Balance | Experimental | 8.21 | 12 | .001 |
| | Control | 0.94 | 12 | .363 |
| Executive Functions | Experimental | 6.75 | 12 | .001 |
| | Control | 1.08 | 12 | .299 |
| Quality of Life | Experimental | 7.92 | 12 | .001 |

| | | | | |
|---|---|---|---|---|
| | Control | 0.77 | 12 | .455 |

The paired-samples *t* test results indicate that within-group changes in the experimental group were statistically significant for all three variables ($p < .001$), whereas none of the changes in the control group reached statistical significance ($p > .05$). To determine whether each dependent variable was independently affected by the intervention, independent-samples *t* tests were conducted, the results of which are presented in Table 3.

**Table 3. Results of Independent-Samples t Test Comparing Changes Between the Two Groups**

| Variable | t | df | p-value |
|---|---|---|---|
| Balance | 7.18 | 24 | .001 |
| Executive Functions | 6.02 | 24 | .001 |
| Quality of Life | 6.85 | 24 | .001 |

The independent-samples *t* test results presented in Table 3 demonstrate that the differences in mean change scores from pretest to posttest between the two groups were statistically significant for all three variables ($p < .001$). These findings indicate that the modified yoga program significantly improved balance, enhanced executive functioning, and increased quality of life among older women.

## Discussion and Conclusion

The present study examined the effects of an eight-week modified YouMed training program on balance, executive functions, and quality of life among older women, and the findings demonstrated statistically significant improvements in all three domains in the experimental group compared with the control group. The results showed that participants who engaged in the modified yoga-based intervention exhibited meaningful enhancement in postural stability, cognitive performance, and perceived well-being, whereas no significant changes were observed among individuals who did not receive the intervention. These findings support the hypothesis that multidimensional mind–body exercise programs can simultaneously influence physical and cognitive aspects of aging and reinforce the growing body of evidence suggesting that integrated interventions are particularly effective for older populations. The significant improvement in balance performance observed in this study aligns with previous research emphasizing the central role of structured movement training in fall prevention and functional independence among elderly individuals. Age-related deterioration in balance is strongly associated with increased fall risk, reduced confidence in mobility, and decreased autonomy, particularly among older women (2, 3). The modified YouMed protocol incorporated progressive postural challenges, sensory integration, and controlled weight shifting, which likely stimulated neuromuscular coordination and proprioceptive responsiveness. Consistent with the mini-review by Dunsky, balance and coordination exercises improve mobility and quality of life through enhanced sensorimotor regulation and functional capacity (4). The gradual increase in task difficulty and use of supportive tools within the intervention likely enabled participants to safely challenge postural systems, facilitating adaptive motor learning and improved stability.

The improvement in executive functions represents another important outcome of the present study. Executive processes, including attention regulation, inhibition, cognitive flexibility, and problem solving, rely heavily on prefrontal cortical networks that are particularly vulnerable to age-related decline (5, 6). The

significant enhancement in WCST performance suggests that the modified YouMed training stimulated cognitive control mechanisms beyond simple physical conditioning. Mind–body exercises require continuous attentional monitoring, movement sequencing, and decision-making, thereby engaging executive networks during motor execution. Evidence indicates that physical activity promotes neuroplasticity and improves cognitive functioning through increased cerebral blood flow and neurotrophic signaling (8). Systematic reviews have confirmed that exercise-based interventions significantly enhance cognitive performance among older adults, particularly when programs include coordination and cognitively demanding movement patterns (9, 10). The present findings are also consistent with motor–cognitive training models suggesting that simultaneous engagement of movement and cognition produces stronger cognitive benefits compared with isolated physical or cognitive training (11). Moreover, studies on motoric cognitive risk syndrome demonstrate that dual-task and integrated exercise programs can reverse aspects of physio-cognitive decline, supporting the notion that coordinated movement training may restore executive efficiency (12).

The observed improvements in executive functioning may also be explained by the mindfulness and attentional components embedded within the YouMed protocol. Meditation, breathing regulation, and body awareness practices promote sustained attention and inhibitory control, which are core elements of executive functioning. Meta-analytic findings indicate that meditation and mind–body practices significantly enhance cognitive performance in older adults, particularly in attention and executive domains (13). Similarly, systematic reviews focusing on yoga interventions report improvements in cognition and mental health outcomes among elderly populations, emphasizing the importance of integrating mental focus with physical movement (14). Neural evidence suggests that insight processing and executive problem solving share overlapping brain mechanisms, meaning that cognitively engaging physical activity may enhance higher-order reasoning capacities (7). The modified YouMed exercises, which required continuous sensory awareness and controlled transitions between postures, likely stimulated these neural systems and contributed to improved cognitive flexibility and attentional regulation.

Another major finding of the study was the significant increase in quality of life scores among participants in the experimental group. Quality of life in older adulthood reflects complex interactions between physical health, emotional well-being, functional independence, and social participation. Improvements in balance and executive functioning may indirectly enhance quality of life by increasing self-efficacy, reducing fear of falling, and improving participation in daily activities. Previous meta-analytic evidence demonstrates that yoga interventions produce meaningful improvements in quality of life outcomes across various populations (15). Mind–body programs address not only physical health but also psychological resilience and stress reduction, contributing to broader perceptions of well-being. Research examining yoga as a healthy aging strategy suggests that its holistic nature—combining movement, breathing, and meditation—supports emotional regulation and overall life satisfaction (17). Furthermore, physiological studies indicate that yoga and meditation may influence biological markers associated with aging, potentially contributing to long-term health improvements and subjective well-being (16).

The present findings also correspond with studies investigating Tai Chi and other slow, controlled movement practices, which demonstrate significant improvements in cognitive function and balance among older adults (19). These interventions share common characteristics with the modified YouMed program,

including rhythmic movement, attentional engagement, and gradual progression of motor difficulty. Such characteristics may promote integration between sensory, motor, and cognitive systems, reinforcing neural efficiency and functional independence. Additionally, previous research comparing yoga with light physical exercise indicates that yoga may produce superior improvements in psychological well-being and healthy aging outcomes, likely due to the inclusion of mindfulness and breath regulation components (18). The results of the current study therefore strengthen existing evidence suggesting that mind –body interventions provide unique benefits beyond conventional exercise programs.

Importantly, the multidimensional improvement observed across physical, cognitive, and psychosocial domains highlights the interconnected nature of aging processes. Functional decline in older adults rarely occurs in isolation; rather, reductions in balance, cognition, and well-being interact dynamically. Functional capacity studies demonstrate that maintaining physical and cognitive abilities simultaneously is essential for preserving independence and reducing healthcare burden in aging populations (1). The modified YouMed intervention appears to address these interrelated domains through integrated training mechanisms. The structured progression of exercises, combined with supportive equipment and safety supervision, likely enhanced participant confidence and adherence, which are critical determinants of intervention effectiveness in elderly populations.

Overall, the discussion of findings suggests that modified yoga-based interventions represent a viable and effective non-pharmacological strategy for promoting healthy aging among older women. The improvements observed in balance, executive functioning, and quality of life confirm theoretical models proposing that mind–body training enhances both neural and physical adaptability. By integrating mindfulness, cognitive engagement, and progressive motor training, the modified YouMed program may help counteract age-related decline and support successful aging trajectories. These results contribute to the growing literature advocating for multidimensional exercise programs within geriatric rehabilitation and preventive health frameworks.

One limitation of the present study relates to the relatively small sample size, which may limit the generalizability of findings to broader elderly populations. Although significant effects were detected, larger samples would provide stronger statistical power and allow subgroup analyses based on health status, education level, or baseline functional ability. Another limitation concerns the short intervention duration and absence of long-term follow-up assessments, making it difficult to determine whether the observed benefits persist over time. Additionally, reliance on behavioral outcome measures without neurophysiological assessment restricts interpretation of underlying neural mechanisms. Finally, participant selection through convenience sampling may introduce selection bias, as individuals volunteering for exercise studies may possess higher motivation or baseline health compared with the general elderly population.

Future research should investigate long-term effects of modified yoga interventions through extended follow-up periods to determine the sustainability of physical and cognitive benefits. Studies employing larger randomized controlled designs across multiple centers would enhance external validity and allow comparison between different demographic groups. Incorporating neuroimaging, electrophysiological, or biomarker assessments could clarify the neurobiological mechanisms responsible for cognitive improvement. Future investigations may also compare modified yoga with other exercise modalities such as

resistance training, aerobic exercise, or dual-task cognitive training to identify optimal intervention characteristics. Moreover, examining psychological mediators such as self-efficacy, motivation, and emotional regulation may help explain how mind–body interventions influence quality of life outcomes.

From a practical perspective, the findings support the integration of modified yoga-based programs into community and institutional elderly care services. Rehabilitation specialists, gerontologists, and health policymakers may consider incorporating structured mind–body exercise sessions into preventive health programs aimed at reducing fall risk and cognitive decline. The adaptable nature of the modified YouMed protocol allows safe implementation even among individuals with limited mobility or mild functional impairments. Training caregivers and healthcare providers to deliver simplified versions of these exercises could enhance accessibility and adherence among older adults. Ultimately, implementing such multidimensional interventions may contribute to healthier aging, greater independence, and improved overall well-being among elderly women.

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## Authors' Contributions

All authors equally contributed to this study.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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