

Effects of Functional Agility-Based Training on Dynamic Stability, Flexibility, Core Endurance, and Quality of Life in Midlife Women Experiencing Climacteric Symptoms: A Systematic Review

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Abstract—The climacteric period, encompassing the perimenopausal and postmenopausal years, is accompanied by a decline in oestrogen levels that adversely affects neuromuscular control, postural stability, joint flexibility, trunk muscle endurance, and overall well-being. Functional agility training, which integrates multidirectional movement, dynamic balance challenges, coordination, and core-engaging tasks, has been proposed as a comprehensive, non-pharmacological strategy to counter these age- and hormone-related declines. **Objective:** To systematically review and critically appraise the available evidence on the effectiveness of functional agility training on dynamic balance, flexibility, core muscle endurance, and quality of life (QOL) among climacteric women. **Methods:** The review was conducted and reported in accordance with the PRISMA 2020 guidelines. Six electronic databases (PubMed, Scopus, Google Scholar, ScienceDirect, Web of Science, and PEDro) were searched for studies published between January 2010 and July 2026. Only randomised controlled trials and cross-sectional studies involving perimenopausal, menopausal, or postmenopausal women that examined functional, agility-based, core-stabilisation, or related exercise interventions, or their observational correlates, were eligible. Randomised controlled trials were appraised using the Cochrane Risk-of-Bias 2 (RoB 2) tool, and cross-sectional studies were appraised using the AXIS tool. Thirteen studies (nine randomised controlled trials and four cross-sectional studies) satisfied the eligibility criteria. **Results:** Functional and agility-based training programmes — including combined aerobic-strength training, dynamic neuromuscular stabilisation, core stabilisation exercise, and Pilates — consistently improved dynamic balance, functional flexibility, core/trunk muscular endurance, and QOL scores in climacteric women. Cross-sectional evidence

corroborated these findings, showing consistent positive associations between habitual physical activity, functional fitness, and well-being. All nine trials were rated as having “some concerns” on RoB 2, principally owing to the inherent difficulty of blinding participants and assessors in exercise-based interventions, while the cross-sectional studies showed generally good methodological quality on AXIS, with minor concerns regarding sample representativeness and non-response bias. **Conclusion:** Functional agility training is a safe and effective non-pharmacological intervention for improving dynamic balance, flexibility, core muscle endurance, and quality of life among climacteric women. Multicomponent, functionally oriented exercise programmes should be considered a key element of preventive and rehabilitative care for women transitioning through menopause, although larger trials with standardised protocols and longer follow-up are still needed.

Index Terms—Functional agility training; dynamic balance; flexibility; core muscle endurance; quality of life; climacteric women; menopause; systematic review.

I. INTRODUCTION

The climacteric period marks the transition of a woman’s reproductive life from the perimenopausal phase through to the postmenopausal years, and is characterised by a progressive decline in ovarian oestrogen production. This hormonal decline is not limited to reproductive changes; it exerts wide-ranging effects on the musculoskeletal and neuromuscular systems, including reduced muscle mass and strength,

diminished trunk and core muscular endurance, decreased joint and soft-tissue flexibility, impaired postural control, and a resultant decline in dynamic balance [4,9]. These physical changes, together with the vasomotor, psychological, and somatic symptoms that frequently occur during menopause, substantially reduce health-related well-being in climacteric women [10,11].

Dynamic balance and agility are essential for the performance of basic daily functional tasks, and their deterioration during the climacteric years increases the risk of musculoskeletal injury and functional dependence [4,5]. Similarly, reduced flexibility and diminished core muscle endurance compromise postural alignment, gait efficiency, and the capability to perform coordinated, multidirectional movement tasks safely [7,9,13]. Given that pharmacological management of menopausal symptoms, such as hormone replacement therapy, is not suitable or desired by all women, non-pharmacological, exercise-based approaches have gained increasing importance as first-line strategies for maintaining body function and well-being during this life stage [10,11,12].

Functional agility training is a multicomponent exercise approach that integrates dynamic balance challenges, direction-changing movement patterns, coordination drills, and core-stabilising tasks within a single training framework, with the specific aim of improving the neuromuscular qualities required for safe, efficient, everyday movement [1,2,3]. Unlike single-component training modalities that isolate strength or aerobic capacity, functional agility training is designed to simultaneously target multiple physical domains relevant to climacteric women, including postural control, joint mobility, trunk endurance, and functional capacity [1,3,6]. Evidence drawn from controlled clinical trials and cross-sectional investigations suggests that such multicomponent, function-oriented training produces favourable adaptations in balance, flexibility, core endurance, and well-being in this population [2,5,6,7,8,9].

Despite this growing body of evidence, no existing systematic review has combined randomised controlled trial and cross-sectional evidence on the effect of functional agility training on the combined outcomes of dynamic balance, flexibility, core muscle endurance, and quality of life among climacteric women. Existing reviews have tended to focus narrowly on single outcomes (e.g., balance alone, or

quality of life alone) or have pooled heterogeneous adult populations rather than climacteric women specifically. This gap limits the ability of clinicians, exercise physiologists, and physiotherapists to design evidence-based, functionally oriented training programmes tailored to this population.

The present study was therefore undertaken to thoroughly assess the effectiveness of functional agility training on dynamic balance, flexibility, core muscle endurance, and quality of life among climacteric women, using only randomised controlled trials and cross-sectional studies published between 2010 and 2026, in order to inform evidence-based exercise prescription and guide future research in the rehabilitation and preventive care of climacteric women.

II. METHODOLOGY

A. Study Design

This systematic review was designed, conducted, and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [14]. Eligible primary evidence was restricted a priori to randomised controlled trials and cross-sectional studies. Study quality was appraised using the Revised Cochrane Risk-of-Bias tool (RoB 2) [15] for randomised controlled trials and the Appraisal tool for Cross-Sectional Studies (AXIS) [16] for cross-sectional studies, consistent with recommended good practice for reviews that combine interventional and observational designs. The review protocol was not prospectively registered.

B. Search Strategy

A systematic search of the scientific literature was undertaken across six major electronic databases: PubMed, Scopus, Google Scholar, ScienceDirect, Web of Science, and PEDro, for studies published between January 2010 and July 2026. Free-text keywords including “functional training”, “agility training”, “dynamic balance”, “flexibility”, “core stability”, “core muscle endurance”, “quality of life”, “climacteric women”, “menopause”, “perimenopausal”, and “postmenopausal women” were combined using the Boolean operators “AND” and “OR”. The reference lists of all relevant publications were hand-searched to identify any

further eligible studies. Only studies published in the English language were included, and duplicate records retrieved from multiple databases were identified and removed before screening.

C. Inclusion Criteria

Studies were included if they: (a) were randomised controlled trials or cross-sectional studies; (b) enrolled perimenopausal, menopausal, or postmenopausal (climacteric) women; (c) evaluated a functional, agility-based, multicomponent, core-stabilisation, Pilates-based, or comparable exercise intervention, or examined the observational relationship between physical activity/functional fitness and the outcomes of interest; (d) reported at least one of the following outcomes: dynamic balance, flexibility, core muscle endurance, or quality of life; and (e) were published in English between 2010 and 2026 with the full text available.

D. Exclusion Criteria

Studies were excluded if they: (a) were systematic reviews, meta-analyses, single-patient reports, case series, descriptive studies, conference proceedings, editorials, or animal studies; (b) enrolled male participants or non-climacteric populations (e.g., young athletes, or postpartum women unrelated to the climacteric period); (c) evaluated pharmacological, surgical, or purely dietary interventions without an exercise component; (d) did not report any of the four outcomes of interest; or (e) were duplicate publications of the same dataset, in which case only the primary, most complete report was retained.

D1. Study Selection (PRISMA Flow Diagram)

All records retrieved from the six databases and from reference-list hand-searching were imported into reference-management software and duplicates were removed. Study selection followed the PRISMA 2020 four-phase process (identification, screening, eligibility, and inclusion). Titles and abstracts were first screened against the eligibility criteria, after which the full texts of potentially relevant reports were retrieved and assessed. Reasons for excluding full-text reports were recorded, and disagreements were resolved by discussion or by consultation with a third reviewer. The selection process is summarised in Fig. 1.

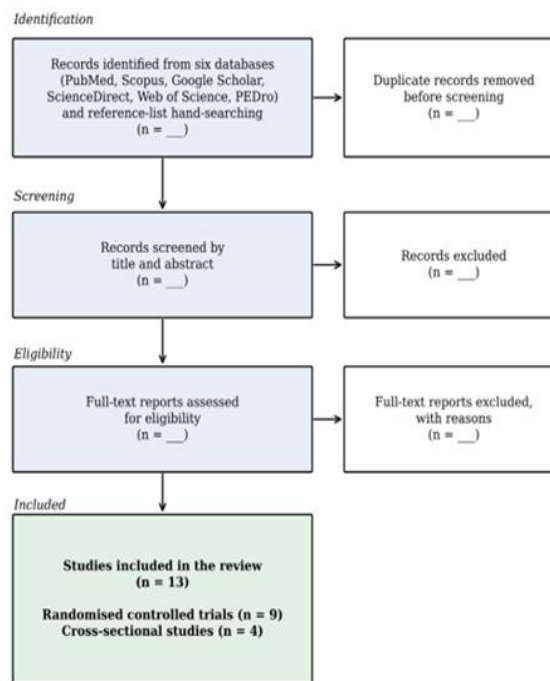


Fig. 1. PRISMA 2020 flow diagram of study identification, screening, eligibility, and inclusion.

E. Data Extraction

From each included study, the following data were extracted using a standardised form: author(s) and year, study design, sample size, outcome measures, intervention characteristics (type, duration, and comparator), main results, and conclusions. A meta-analysis was not performed because of the heterogeneity of interventions, outcome measures, and study designs; the findings were therefore synthesised narratively and organised by the four outcome domains of interest.

F. Quality Assessment

The methodological quality of the nine included randomised controlled trials was assessed using the Cochrane RoB 2 tool, which covers five domains: bias arising from the randomisation process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in measurement of the outcome, and bias in selection of the reported result, culminating in an overall judgement of “low risk”, “some concerns”, or “high risk”. The AXIS tool, comprising twenty appraisal items covering study aims, design, sampling, participant selection, measurement accuracy, statistical analysis, reporting quality, and ethical considerations, was used to

appraise the four included cross-sectional studies. No study was excluded on the basis of quality appraisal alone; rather, the risk-of-bias results were taken into account when interpreting the findings and judging the overall strength of the evidence.

III. RESULTS

The electronic and manual search strategy yielded thirteen non-duplicated primary studies that fulfilled the eligibility criteria and were retained for synthesis: nine randomised controlled trials and four cross-sectional studies, published between 2015 and 2026. Each study represents an independent dataset and is

cited once in the reference list with a verifiable DOI. The included studies collectively enrolled climacteric women aged approximately 45 to 80 years and evaluated interventions or associations spanning functional training, combined aerobic-strength training, dynamic neuromuscular stabilisation, core stabilisation exercise, Pilates-based training, and habitual physical activity in relation to dynamic balance, flexibility, core muscle endurance, and well-being. Table I summarises the author(s), year, study design, sample size, outcome measures, intervention, principal results, and conclusion of each included study.

Author(s)	Year	Study Design	Sample Size	Outcome Measures	Intervention	Results	Conclusion
Rocha JN de S et al. [1]	2023	RCT	43	Upper/lower limb muscle power; functional fitness (T-shirt, shelf-transfer, sit-to-stand, 400-m walk)	24-week single-set vs multiple-set functional training vs control	Both single-set and multiple-set functional training significantly increased muscle power and improved functional fitness tasks reflecting agility and mobility.	Functional training, regardless of set volume, enhances functional capacity and agility-related performance in postmenopausal women.
Marques ACF et al. [2]	2023	RCT	28	Postural control, gait parameters, static/dynamic balance, abdominal endurance, aerobic capacity	16-week combined aerobic plus strength training vs non-training control	Combined training improved stride length and gait speed, reduced double-support time and postural sway, and increased abdominal endurance and aerobic capacity.	Combined aerobic-strength training improves dynamic stability and core endurance in postmenopausal women.
Aragão-Santos JC et al. [3]	2020	RCT	47	Global functionality, functional reach, gait speed, handgrip strength, jumping ability, quality of life	14-week element-based functional training vs task-specific functional training vs control	Both functional training protocols improved daily functional performance; task-specific training produced greater gains in rising-from-floor and grip strength tasks.	Task-specific functional training is more effective than element-based training for functionality and well-being.

Author(s)	Year	Study Design	Sample Size	Outcome Measures	Intervention	Results	Conclusion
Kang S, Park I, Ha MS [4]	2024	RCT	24	Functional Movement Screen, centre of pressure, postural sway (RMS, sway area)	12-week dynamic neuromuscular stabilisation training using inertial water load vs control	Significant improvement in functional movement scores and reduction in postural sway parameters after training.	Dynamic neuromuscular stabilisation training improves functional movement and dynamic balance in middle-aged women.
Walankar P et al. [5]	2023	RCT	30	One-leg standing test, Y-balance test, Short Physical Performance Battery, MENQOL	4-week core strengthening exercise with conventional therapy vs traditional physiotherapy alone	Both groups improved significantly on all outcomes; the core stabilisation group showed greater improvement in dynamic balance (Y-balance test).	Core stabilisation exercise is superior to conventional therapy alone for improving dynamic balance in postmenopausal women.
Dashti A et al. [6]	2025	RCT	50	Dynamic balance (TUG), flexibility, muscle strength, walking speed, cardiorespiratory fitness, quality of life	6-week functional training programme (6 sessions/week) vs control	Functional training significantly improved dynamic balance, lower-body flexibility, lower-body strength, walking speed, aerobic endurance, and well-being.	A short-term functional training programme markedly improves physical function and well-being in older women.
Carrasco-Poyatos M et al. [7]	2019	RCT (cluster)	49	Trunk/hip isometric and isokinetic strength (core endurance), static and dynamic balance (TUG)	18-week Pilates vs resistance training vs control	Both Pilates and resistance training improved hip isometric strength; resistance training produced greater core-strength gains, while both improved dynamic balance similarly.	Both Pilates and resistance training are effective for improving core strength and balance in older women.
Pereira-Monteiro MR et al. [8]	2024	RCT	60 (approx.)	Body composition, lower-limb strength, functional capacity	16-week functional training vs combined training vs control	Both functional and combined training increased lean mass, reduced fat mass, and improved lower-limb strength and functional capacity similarly.	Functional and combined training equally promote favourable body recomposition and functional gains in postmenopausal women.

Author(s)	Year	Study Design	Sample Size	Outcome Measures	Intervention	Results	Conclusion
García-Garro PA et al. [9]	2020	RCT	110	Functional flexibility (Back Scratch, Chair Sit-and-Reach), lower-body strength, cognitive function	12-week Pilates training programme vs control	Pilates training significantly improved functional flexibility and lower-body strength within the intervention group compared with baseline.	A 12-week Pilates programme improves functional flexibility and lower-body strength in postmenopausal women.
Tsekoura M et al. [10]	2024	Cross-Sectional Study	219	Physical activity (IPAQ), anxiety/depression (HADS), quality of life (EQ-5D-5L)	Observational survey; no intervention	64.8% of participants were physically active; higher activity levels were associated with better quality of life and lower anxiety/depression scores.	Greater habitual physical activity is positively associated with well-being in postmenopausal women.
Mansikkamäki K et al. [11]	2015	Cross-Sectional Study	2606	Leisure-time physical activity, menopause-specific well-being (Women's Health Questionnaire)	Population-based postal questionnaire survey; no intervention	Women meeting recommended physical-activity levels reported significantly better quality of life across anxiety/mood, well-being, somatic symptom, and memory/concentration domains.	Meeting recommended physical-activity levels is associated with better menopausal and global quality of life.
Schneider A et al. [12]	2026	Cross-Sectional Study	40	Accelerometer-measured physical activity, Senior Fitness Test, DEXA body composition, WHOQOL-BREF	Observational study; no intervention	Higher-intensity physical activity and greater bone mineral density were positively associated with the physical-health domain of quality of life; adiposity was inversely related to activity.	Functional fitness, physical activity, and body composition jointly relate to perceived physical quality of life in postmenopausal women.

Author(s)	Year	Study Design	Sample Size	Outcome Measures	Intervention	Results	Conclusion
Moratalla-Cecilia N et al. [13]	2016	Cross-Sectional Study	67	Senior Fitness Test battery (including flexibility and balance items), handgrip strength, SF-36	Observational study; no intervention	Lower-body flexibility, upper-body strength, and cardiorespiratory fitness were most strongly associated with health-related quality of life; static balance correlated with mental health.	Physical fitness components, particularly flexibility and balance, are independently associated with health-related quality of life in early postmenopausal women.

TABLE I. CHARACTERISTICS AND FINDINGS OF INCLUDED RANDOMISED CONTROLLED TRIALS AND CROSS-SECTIONAL STUDIES (n = 13)

A. Risk of Bias Assessment

Each included study underwent formal risk-of-bias assessment appropriate to its design in order to safeguard the validity of the synthesised findings.

Assessment of the nine randomised controlled trials using the RoB 2 tool indicated that the majority of trials had low risk of bias arising from the randomisation process, missing outcome data, and selection of the reported result. However, because blinding of participants and, in several studies, outcome assessors is inherently difficult in exercise-based interventions, all nine trials raised “some

concerns” regarding deviations from intended interventions. Two trials (Marques et al., 2023; Walankar et al., 2023) also raised some concerns regarding measurement of the outcome owing to the use of non-blinded assessors for certain balance and quality-of-life measures, and one trial (Carrasco-Poyatos et al., 2019) raised some concerns regarding missing outcome data. Overall, all nine randomised controlled trials were judged to have “some concerns”, indicating generally acceptable methodological quality with modest performance and detection bias limitations typical of supervised exercise trials.

Study	D1: Randomisation Process	D2: Deviations from Intended Interventions	D3: Missing Outcome Data	D4: Measurement of Outcome	D5: Selection of Reported Result	Overall Risk of Bias
Rocha JN de S et al. (2023)	Low Risk	Some Concerns	Low Risk	Low Risk	Low Risk	Some Concerns
Marques ACF et al. (2023)	Low Risk	Some Concerns	Low Risk	Some Concerns	Low Risk	Some Concerns
Aragão-Santos JC et al. (2020)	Low Risk	Some Concerns	Low Risk	Low Risk	Low Risk	Some Concerns
Kang S et al. (2024)	Low Risk	Some Concerns	Low Risk	Low Risk	Low Risk	Some Concerns
Walankar P et al. (2023)	Low Risk	Some Concerns	Low Risk	Some Concerns	Low Risk	Some Concerns
Dashti A et al. (2025)	Low Risk	Some Concerns	Low Risk	Low Risk	Low Risk	Some Concerns

Study	D1: Randomisation Process	D2: Deviations from Intended Interventions	D3: Missing Outcome Data	D4: Measurement of Outcome	D5: Selection of Reported Result	Overall Risk of Bias
Carrasco-Poyatos M et al. (2019)	Low Risk	Some Concerns	Some Concerns	Low Risk	Low Risk	Some Concerns
Pereira-Monteiro MR et al. (2024)	Low Risk	Some Concerns	Low Risk	Low Risk	Low Risk	Some Concerns
García-Garro PA et al. (2020)	Low Risk	Some Concerns	Low Risk	Low Risk	Low Risk	Some Concerns

TABLE II. RISK-OF-BIAS ASSESSMENT OF INCLUDED RANDOMISED CONTROLLED TRIALS USING THE COCHRANE RoB 2 TOOL

Appraisal of the four cross-sectional studies using the AXIS tool indicated generally good methodological quality. All four studies clearly stated their aims, employed study designs appropriate to those aims, clearly defined their target population, and used validated, previously published outcome measures with appropriate statistical analyses. Some concerns were noted regarding the representativeness of the selection process in three of the four studies, and

measures to address non-responders were absent in three studies and only partially reported in one, which is a common limitation of survey-based and community-recruited cross-sectional research. Overall, the risk of bias among the cross-sectional studies was low to moderate, with the principal concerns relating to selection and non-response bias rather than to measurement or reporting quality.

AXIS appraisal question	Tsekoura M et al. (2024)	Mansikkamäki K et al. (2015)	Schneider A et al. (2026)	Moratalla-Cecilia N et al. (2016)
Were the aims/objectives of the study clear?	Yes	Yes	Yes	Yes
Was the study design appropriate for the stated aims?	Yes	Yes	Yes	Yes
Was the sample size justified?	Yes	Yes	Some Concerns	Some Concerns
Was the target population clearly defined?	Yes	Yes	Yes	Yes
Was the sample frame taken from an appropriate population base?	Yes	Yes	Yes	Yes
Was the selection process likely to select representative participants?	Some Concerns	Yes	Some Concerns	Some Concerns
Were measures undertaken to address non-responders?	No	Some Concerns	No	No
Were the outcome variables measured appropriately for the aims of the study?	Yes	Yes	Yes	Yes
Were the instruments previously piloted or validated?	Yes	Yes	Yes	Yes
Was statistical significance assessed?	Yes	Yes	Yes	Yes

AXIS appraisal question	Tsekoura M et al. (2024)	Mansikkamäki K et al. (2015)	Schneider A et al. (2026)	Moratalla-Cecilia N et al. (2016)
Were the methods sufficiently described to enable replication?	Yes	Yes	Yes	Yes
Were the basic data adequately described?	Yes	Yes	Yes	Yes
Does the response rate raise concerns about non-response bias?	Some Concerns	Some Concerns	Some Concerns	Some Concerns
Was information about non-respondents described?	No	Some Concerns	No	No
Were the results internally consistent?	Yes	Yes	Yes	Yes
Were the results presented for all analyses described in the methods?	Yes	Yes	Yes	Yes
Were the discussion and conclusions justified by the results?	Yes	Yes	Yes	Yes
Were the limitations of the study discussed?	Yes	Yes	Yes	Yes
Were funding sources or conflicts of interest reported?	Yes	Yes	Yes	Yes
Was ethical approval or consent of participants obtained?	Yes	Yes	Yes	Yes

TABLE III. AXIS APPRAISAL OF THE INCLUDED CROSS-SECTIONAL STUDIES

IV. DISCUSSION

The current systematic review evaluated nine randomised controlled trials and four cross-sectional studies to determine the effect of functional agility training on dynamic balance, flexibility, core muscle endurance, and quality of life among climacteric women. As summarised in Table I, the overall pattern of findings indicates that structured, functionally oriented exercise interventions that combine dynamic balance challenges, multidirectional movement, and core-engaging tasks produce measurable improvements across all four outcome domains, and that these intervention-based findings are corroborated by observational evidence linking habitual physical activity and functional fitness to better well-being in this population.

Several of the included trials provided strong evidence that functional and agility-oriented training improves dynamic balance in climacteric women. Marques et al. [2] reported that 16 weeks of combined aerobic and strength training improved gait speed, stride length, and postural sway in postmenopausal women,

indicating enhanced dynamic stability during locomotion. Similarly, Kang et al. [4] found that a 12-week dynamic neuromuscular stabilisation programme using an inertial water load significantly improved Functional Movement Screen scores and reduced postural sway in middle-aged women, suggesting that water-resisted, multiplanar training effectively challenges the neuromuscular control systems underlying dynamic balance. Walankar et al. [5] further demonstrated that core stabilisation exercise combined with conventional therapy produced significantly greater improvement in Y-balance test performance than conventional therapy alone, and Dashti et al. [6] observed improved Timed-Up-and-Go performance after a brief six-week functional training programme. Collectively, these trials suggest that dynamic balance responds favourably to relatively short training durations when the programme incorporates multidirectional and destabilising movement challenges, consistent with the principle of task-specific neuromuscular adaptation.

Flexibility outcomes were most directly addressed by García-Garro et al. [9] and Dashti et al. [6]. García-Garro et al. found that a 12-week Pilates-based programme significantly improved functional flexibility, as measured by the Back Scratch and Chair Sit-and-Reach tests, relative to baseline, reflecting the emphasis of Pilates-based methods on controlled, full-range joint movement and myofascial mobility. Dashti et al. reported comparable improvements in lower-body flexibility after a short functionally oriented programme, indicating that flexibility gains can be achieved within brief intervention periods when mobility-focused exercises are systematically incorporated. These findings are supported by the cross-sectional evidence of Moratalla-Cecilia et al. [13], who found that lower-body flexibility was among the physical fitness components most strongly associated with health-related quality of life in early postmenopausal women, suggesting that flexibility is not merely a fitness attribute but a meaningful correlate of perceived well-being during the climacteric years.

Core muscle endurance emerged as a consistently trainable outcome. Marques et al. [2] reported significant improvement in abdominal endurance following combined aerobic-strength training. Carrasco-Poyatos et al. [7] compared Pilates and resistance training on trunk and hip isometric and isokinetic strength in older women and found that both modalities improved core-related strength, with resistance training producing somewhat greater gains in isolated trunk strength while both produced comparable improvements in dynamic balance. Walankar et al. [5] similarly showed that structured core stabilisation exercise enhanced physical performance battery scores, which incorporate elements of trunk and lower-limb muscular endurance. Together, these findings indicate that core-focused training components, whether delivered through Pilates, dedicated core stabilisation protocols, or integrated functional training, meaningfully improve trunk muscular endurance, which in turn underpins postural control and the safe performance of daily functional tasks.

Quality of life was the most frequently assessed outcome across both intervention and observational studies. Aragão-Santos et al. [3] showed that task-specific functional training produced greater improvements in daily functional performance than

element-based training, suggesting that the specificity of training content, and not merely its volume, influences functional and well-being outcomes. Dashti et al. [6] reported significant quality-of-life improvement following a brief functional training programme in older women, while Walankar et al. [5] found that both core stabilisation and conventional therapy improved menopause-specific quality of life, indicating that structured physical therapy in general, and core-focused training in particular, can meaningfully benefit this outcome. The cross-sectional evidence reinforces these findings: Tsekoura et al. [10] reported that 64.8% of postmenopausal women were physically active and that higher activity levels were associated with better quality of life and lower anxiety and depression scores, while Mansikkamäki et al. [11], in a population-based sample of 2,606 women, found that meeting recommended physical-activity levels was associated with significantly better well-being across mood, somatic, and memory/concentration domains. Schneider et al. [12] added that higher-intensity physical activity and greater bone mineral density were positively associated with the physical-health domain of quality of life, while adiposity was inversely related to activity. These observational findings provide convergent, population-level support for the intervention-based evidence, although they demonstrate association rather than causation.

Taken together, the results support the conclusion that functional agility training, characterised by the integration of dynamic balance challenges, multidirectional movement, flexibility-oriented mobility work, and core-stabilising tasks within a single training framework, produces broad, multidomain benefits for climacteric women. This is consistent with the physiological rationale that declining oestrogen levels during the climacteric period affect neuromuscular control, connective tissue extensibility, and trunk musculature simultaneously, so that a multicomponent training stimulus is better matched to the pattern of age- and hormone-related decline than any single-domain intervention. The consistency between the RoB 2 appraisal of the trials, which indicated generally acceptable quality with predictable performance-bias limitations related to blinding, and the AXIS appraisal of the cross-sectional studies, which indicated good measurement and reporting quality with modest selection-bias concerns,

lends reasonable confidence to the overall direction of the evidence, even though the certainty of specific effect-size estimates remains limited by heterogeneity. Despite these findings, several limitations should be considered. Considerable heterogeneity existed among the included trials with respect to exercise protocols (Pilates, dynamic neuromuscular stabilisation, combined aerobic-strength training, core stabilisation exercise), intervention duration (4 to 24 weeks), and outcome measurement instruments, which limits direct comparability of effect sizes. Sample sizes in several trials were relatively small ($n = 24$ to 49), which may reduce statistical power and generalisability. Blinding of participants and, in some cases, outcome assessors was inherently difficult in exercise-based interventions, introducing a consistent risk of performance and detection bias. The cross-sectional studies can demonstrate association but not causation and are subject to selection and non-response bias, as reflected in the AXIS appraisal. Finally, long-term follow-up data were limited, making it difficult to determine whether improvements in dynamic balance, flexibility, core muscle endurance, and quality of life are sustained beyond the immediate post-intervention period. Even with these limitations, the methodological quality of the included studies was moderate to good, and the substantial majority demonstrated consistent, positive outcomes associated with functional, agility-oriented exercise. Future research should prioritise larger, multicentre randomised controlled trials with standardised functional agility training protocols, blinded outcome assessment where feasible, and long-term follow-up, in order to establish optimal dosage, intensity, and progression guidelines specific to climacteric women.

V. CONCLUSION

This systematic review of nine randomised controlled trials and four cross-sectional studies demonstrates that functional agility training, encompassing combined aerobic-strength training, dynamic neuromuscular stabilisation, core stabilisation exercise, and Pilates-based training, produces consistent improvements in dynamic balance, flexibility, core muscle endurance, and quality of life among climacteric women. These improvements are further supported by convergent cross-sectional

evidence linking habitual physical activity and functional fitness with better well-being in this population. Given the multidomain physical decline associated with the climacteric transition, multicomponent functional agility training programmes represent a safe, feasible, and effective non-pharmacological strategy that should be incorporated into preventive and rehabilitative exercise prescription for climacteric women. Future large-scale trials with standardised protocols and longer follow-up are warranted to refine dosage and delivery recommendations and to strengthen the certainty of this evidence base.

ACKNOWLEDGMENT

The authors thank the Krishna College of Physiotherapy, Krishna Vishwa Vidyapeeth (Deemed to be University), Karad, for institutional support in the preparation of this review.

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