Principles and Practice of Clinical Research
A GLOBAL JOURNAL OF CLINICAL RESEARCH

Effects of Walking on LDL Cholesterol and Cardiometabolic Risk Factors in Postmenopausal Women: A Scoping Review

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Abstract

Background: *Postmenopausal women face an increased risk of cardiovascular disease. While aerobic physical activity is widely recommended, the specific effect of walking on low-density lipoprotein cholesterol (LDL-C) remains unclear. LDL-C is a key modifiable cardiovascular risk factor, yet it has been inconsistently evaluated in exercise-focused studies. This scoping review aimed to examine LDL-C as a cardiometabolic outcome in studies evaluating walking-based aerobic interventions among postmenopausal women.*

Methods: *A scoping review was conducted between April and June 2025, following PRISMA guidelines. PubMed, Embase, Scopus, and the Cochrane Library were systematically searched for studies published between 2010 and 2025. Eligible studies included randomized controlled trials, cohort, and cross-sectional studies evaluating walking as an aerobic intervention in postmenopausal women and reporting outcomes on LDL-C (primary outcome), body mass index (BMI), or glucose (secondary outcomes). Two reviewers independently screened studies and assessed risk of bias using RoB 2 and the Newcastle–Ottawa Scale.*

Results: *Nine studies comprising 3,629 postmenopausal women aged 45–75 years met the inclusion criteria, with walking defined as aerobic physical activity performed at a moderate intensity threshold. Interventions varied in duration, intensity, and supervision. Only two studies reported significant reductions in LDL-C, whereas six found no significant change. BMI reductions were observed in three studies, and all three studies reporting glucose outcomes demonstrated improvement. Substantial heterogeneity in study design and intervention protocols limited comparability, and most studies were judged to be at high risk of bias.*

Conclusion: *Walking-based aerobic interventions may improve some cardiometabolic markers in postmenopausal women; however, effects on LDL-C are inconsistent. Future studies should employ standardized walking protocols, ensure adequate intervention duration and supervision, and consistently assess LDL-C over time to clarify its role as a cardiovascular risk marker in this population.*

Introduction

Cardiovascular disease (CVD), particularly among postmenopausal women, remains the leading cause of morbidity and mortality worldwide, with increased rates in developed countries (Roeters van Lennep et al., 2023). During this stage, characterized as 12 or more consecutive months of amenorrhea, lean muscle mass decreases while central adiposity increases, raising mortality risk even in women with normal BMI. The SWAN study (El Khoudary et al., 2019) provided key evidence showing that increases in total cholesterol, HDL cholesterol (HDL-C), LDL cholesterol (LDL-C), triglycerides, apolipoprotein B, metabolic syndrome risk, and vascular remodeling are driven more by menopausal transition (MT) than by aging. In contrast, blood pressure, insulin, and

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Received: September 10, 2025 **Accepted:** December 17, 2025
Published: January 16, 2026
Editor: Felipe Fregni
Reviewers: Arturo Tamayo, David Coelho, Lucas Mena, Klaus Ficher
Keywords: walking, postmenopausal women, LDL cholesterol, cardiometabolic risk, aerobic exercise
DOI: https://doi.org/10.21801/ppcrj.2025.113.9

glucose increases are more linked to chronological aging (El Khoudary et al., 2019).

Given their heightened vulnerability to CVD, postmenopausal women are a top public health priority (El Khoudary et al., 2020; Kase et al., 2020; Nappi et al., 2022; Rodriguez de Morales & Abramson, 2024; Roger et al., 2020; Stevenson et al., 2019). However, the absence of clear recommendations from health authorities on intervention protocols, outcome measures, and population selection has contributed to inconsistent findings in the literature (Bravata et al., 2007; Hanson & Jones, 2015; Lee et al., 2021; Murtagh et al., 2010, 2015; Oja et al., 2018; Qiu et al., 2014; Soares-Miranda et al., 2016; Writing Committee Members et al., 2023). Walking, in particular, offers a widely applicable and low-cost strategy with promising potential for postmenopausal women's public health campaigns (Badon et al., 2021; Lee et al., 2021; Writing Committee Members et al., 2023).

LDL-C is a feasible, standardized, low-cost endpoint, making it a potential biomarker for assessing cardiovascular risk in postmenopausal women. Currently, the effects of walking on overall cardiovascular risk in this subpopulation are not well established in the literature, nor is its specific impact on LDL-C and other surrogate markers (Bernal et al., 2025). Therefore, this scoping review intends to analyze the effectiveness of this simple intervention in that patient subgroup, evaluating the influence of walking at the aerobic exercise threshold on LDL-C as the primary outcome and on BMI and glucose levels, as secondary outcomes.

Materials and Methods

This scoping review was conducted from April to June 2025 using Covidence (Covidence Pty Ltd., Melbourne, Australia) and followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). Extensive evidence identifies low-density lipoprotein cholesterol (LDL-C) as a critical determinant of cardiovascular events, with epidemiologic, genetic, and randomized controlled trial data consistently demonstrating its causal role. Elevated LDL-C is associated with adverse cardiovascular outcomes across populations and risk strata (Grundy et al., 2019; Hadjiphilippou & Ray, 2019; Rosenzweig et al., 2019). This association is evident in both primary and secondary prevention settings, reinforcing the principle that lower LDL-C levels confer greater cardiovascular benefit (Grundy et al., 2019; Hadjiphilippou & Ray, 2019; Jackson et al., 2025a; Jackson et al., 2025b; Mhaimeed et al., 2024; Rosenzweig et al., 2019).

A comprehensive literature search was performed across four electronic databases: PubMed, Cochrane Library, Scopus, and Embase. The search strategy was developed using a combination of controlled vocabulary (e.g., MeSH terms in PubMed) and free-text keywords related to menopause, regular physical activity, walking-based aerobic exercise, and LDL-C. Boolean operators were adapted to each database's syntax. To ensure sensitivity, a broader search strategy was applied for LDL-related terms. Detailed search strategies for each database are provided in Supplementary File 1 (Table 3).

Randomized controlled trials, cohort studies, and cross-sectional studies were eligible for inclusion. Studies enrolling women aged 45 to 75 years who engaged in regular physical activity explicitly associated with walking at an aerobic intensity and that reported outcomes for LDL-C, body mass index (BMI), or glucose were included. In this review, the aerobic threshold was operationalized pragmatically as walking at the fastest sustainable pace compatible with comfortable conversation rather than a laboratory-defined physiological cut-point.

Studies that do not exclusively feature postmenopausal women or clearly differentiate this population from other groups were excluded. Studies combining physical activity with major anaerobic exercise, dietary or pharmacological interventions were excluded, unless the isolated effect of the aerobic exercise was explicitly reported. Additionally, preclinical studies, reviews, editorials, and opinion papers were not considered, as well as studies shorter than 8 weeks in duration, not published in English, or those published before 2010. The [9] search was restricted to studies published from 2010 onwards (until mid-May 2025) to ensure that the evidence synthesized reflects contemporary diagnostic criteria, methodological standards, and clinical practices; earlier studies were excluded because they may not be directly comparable to more recent work.

Covidence (Covidence Pty Ltd., Melbourne, Australia) was the tool used in the screening and data extraction process. Two reviewers independently screened titles and abstracts for eligibility according to the predefined inclusion and exclusion criteria. Full-text articles were then assessed independently by the same reviewers. Discrepancies at this stage were addressed by a third independent reviewer. The study selection process was documented following the PRISMA 2020 guidelines (Page et al., 2021), which details the number of records identified, screened, and excluded, with the respective rationale.

Data extraction was also performed independently by two reviewers using a pre-piloted, standardized Excel form or Covidence (Covidence Pty Ltd., Melbourne, Australia). Extracted variables included bibliographic information (author, title, year, journal),

First Author	Study Design	Year	Number of participants	Exposure	Age (years)	LDL (mg/dL)		HDL (mg/dL)		BMI (kg/m2)	
						Pre	Post	Pre	Post	Pre	Post
Bucciarelli	Cross-sectional	2021	43	Moderate walking 4x/week	57.1 ± 4.7	145.5 (128 - 168)	144.5 (127-170)	62.5 (53 - 78)	62.5 (53 - 78)	26.1 ± 3.7	26 ± 3.5
Colpani	Nested, Cross-sectional	2013	358	Over 6000 steps a day was considered active	57.11 ± 5.36	127.61 ± 38.82	133.82 ± 42.54	53.51 ± 13.34	53.75 ± 12.17	28.34 ± 7.07	27.18 ± 5.64
Garnier	Prospective cohort	2015	200	Moderate walking 3x/week	60.32 ± 5.69	–	–	–	–	–	–
Badon	Longitudinal cohort	2021	2789	Moderate physical activity	45.9 ± 2.7	116 ± 31	–	57 ± 15	–	–	–
Merino	Nested, Quasi-exerimental	2013	47	Low intensity physical alctivity 2x/week	62	139.6 ± 39.1	137.4 ± 34.4	50.3 ± 25.5	49.9 ± 22.8	29.94 ± 4.48	29.87 ± 4.79

Values are mean ± SD or median (Q1,Q3). For Merino, the HDL and LDL values were converted from mmoL/L to mg/dL. BMI, body mass index; HDL, high density lipoprotein; LDL, low-density lipoprotein.

Table 1: *Observational studies.*

First Author	Study Design	Year	Number of participants		Intervention	Control Group	Age (years)		LDL (mg/dL)		LDL (mg/dL)		HDL (mg/dL)		HDL (mg/dL)		BMI (kg/m2)		BMI (kg/m2)	
			Exercise	Control			Exercise	Control	Pre Exercise	Control	Post Exercise	Control	Pre Exercise	Control	Post Exercise	Control	Pre Exercise	Control	Post Exercise	Control
Jo	RCT	2020	22	21	Moderate to vigorous walking	Sedentary postmenopausal women	57.3 ± 8.4	62.5 ± 13.9	77.3 ± 17.9	80.2 ± 18.2	–	–	54.2 ± 7.3	52.3 ± 11.5	–	–	27.0 ± 3.0	27.3 ± 4.6	26.7 ± 2.8*	27.0 ± 4.7
Hagner-Derengowska	Prospective Controlled Trial	2015	88	20	Nordic Walking 3x/week	Overweight or obese postmenopausal women maintaining their phisical activity level	58.4 ± 5.8	59.0 ± 6.0	138.3 ± 48.9	143 ± 29	115.6 ± 37.3*	145.1 ± 26.2	55.3 ± 12.2	47.2 ± 7.8	59.8 ± 13.4*	46.5 ± 8.1	31.4 ± 5.04	28.9 ± 2.2	29.4 ± 5.1*	29.0 ± 2.2
Rezende	RCT	2016	19	21	Moderate walking 2x/week	Sedentary postmenopausal women with NAFLD maintaining their lyfestyle	56.2 ± 7.8	54.5 ± 8.9	131.26 ± 41.6	119.62 ± 31.65	120.89 ± 49.60	118.85 ± 40.5	50.37 ± 12.71	50.24 ± 12.15	60.05 ± 24.36*	51.05 ± 15.16	34.16 ± 4.49	32.07 ± 5.05	33.61 ± 4.58	31.82 ± 4.79
Akwa	RCT	2017	10	10	Walking 3x/week	Healthy sedentary postmenopausal women maintaining their usual activities	61.25 ± 7.45	61.3 ± 7.81	143.1 (119.9 - 174)	88.9 (69.6 - 158.5)	108.3 (85.1-139.2)	112.6 (102.0-146.9)	61.9 (54.1 - 73.5)	81.2 (61.9 - 85.1)	73.5 (69.6-81.2)	81.2(65.7-88.9)	31.95 (28.1 - 36.5)	30.6 (25.3 - 31.6)	32.0 (27.8-35.5)	30.8 (25.5-33.1)

Values are mean ± SD or median (Q1,Q3) . For Akwa, the HDL and LDL values were converted from mmoL/L to mg/dL. BMI, body mass index; HDL, high density lipoprotein; LDL, low-density lipoprotein.* P < 0.05

Table 2: *Controlled trials.*

	Studies Included	Key Features
Duration	**>6 months:** Badon et al. (2021); Colpani et al. (2013) **24 weeks:** Rezende et al. (2016) **8–12 weeks:** Hagner-Derengowska et al. (2015); Garnier et al. (2015); Jo et al. (2020); Bucciarelli et al. (2021); Akwa et al. (2017); Merino et al. (2013)	Long-term cohorts (16–17 years) were unsupervised and observational in nature. Medium-term RCTs (24 weeks) and short-term trials (8–12 weeks) were structured interventions with defined protocols.
Intensity	**Moderate-to-vigorous:** Rezende et al. (2016); Jo et al. (2020) **Moderate:** Hagner-Derengowska et al. (2015); Garnier et al. (2015); Bucciarelli et al. (2021); Akwa et al. (2017); Colpani et al. (2013); Badon et al. (2021) **Low-to-moderate:** Merino et al. (2013)	Moderate intensity was the most frequent approach; only two studies reached moderate-to-vigorous levels using treadmill or progressive protocols.
Frequency	**3×/week:** Hagner-Derengowska et al. (2015); Garnier et al. (2015); Akwa et al. (2017); **2x/week:** Rezende et al. (2016); Merino et al. (2013) **4×/week:** Bucciarelli et al. (2021); **Unspecified:** Jo et al. (2020), Badon et al. (2021); Colpani et al. (2013)	Structured programs often prescribed 3 sessions per week of 30–60 min; observational studies relied on self-reported frequency.
Meets WHO Guidelines (≥150 min/week)	**Yes:** Rezende et al. (2016); Hagner-Derengowska et al. (2015); Garnier et al. (2015); Jo et al. (2020); Bucciarelli et al. (2021); Akwa et al. (2017) **No:** Merino et al. (2013**)** **Not assessable:** Badon et al. (2021); Colpani et al. (2013)	Majority of structured interventions achieved or exceeded WHO recommendations. Only Merino et al. (2013) prescribed <150 min/week.
Supervision Level	**Fully supervised:** Rezende et al. (2016); Hagner-Derengowska et al. (2015); Garnier et al. (2015); Bucciarelli et al. (2021); Akwa et al. (2017) **Partially supervised:** Jo et al. (2020); Merino et al. (2013) **Unsupervised:** Badon et al. (2021); Colpani et al. (2013)	Fully supervised interventions ensured adherence; partially supervised included home or unsupervised sessions; observational cohorts self-managed.

Table 3: *Summary of intervention components and key findings.*

study characteristics (design, country, sample size, blinding, follow-up), population details (age, comorbidities, menopausal status), intervention characteristics (type, frequency, duration, intensity, supervision), and outcomes (LDL, glucose, BMI), including effect sizes and timepoints. Any disagreements were resolved by consensus.

For the extraction and verification of information contained in the reports or documents included in the analysis, two reviewers independently reviewed each article to ensure the most accurate analysis possible and facilitate data comparison. Covidence (Covidence Pty Ltd., Melbourne, Australia) was used as the tool for review, data extraction, and quality assessment of the information. When outcome data were incomplete, additional sources such as linked documents, appendices, or supplementary files were reviewed to retrieve the missing information, whenever available. Observational and non-randomized interventional studies were evaluated using the Newcastle-Ottawa Scale (Ottawa Hospital Research Institute, n.d.-a), while cross-sectional studies were assessed using a modified version of the NOS adapted for cross-sectional designs (Blanchard et al., 2024). Randomized controlled trials were assessed with the Risk of Bias 2.0 (RoB 2) tool developed by the Cochrane Collaboration (Higgins et al., 2011).

All assessments were conducted independently by two reviewers, who had no access to each other's evaluations during the process. For interventional studies, assessments were performed using the Covidence (Covidence Pty Ltd., Melbourne, Australia). For observational studies, a structured Microsoft Excel template was used to record NOS domains. In case of discrepancies, reviewers met to reach a consensus and determine the final decision.

Results

A total of 482 records were initially identified through database searches across PubMed (94), Cochrane (156), Scopus (156), and EMBASE (76). After removing duplicates, 413 records were screened by title and abstract, which led to 64 records being assessed for full-text eligibility. Following full-text review, 9 studies were ultimately included in the qualitative synthesis. Reasons for exclusion at each stage are detailed in the PRISMA flow diagram (Figure 1). The final set of included studies consisted of 4 controlled trials, 1 nested quasi-experimental study, 2 cohort studies, and 2 cross-sectional studies, as shown in Tables 1a and 1b. The studies originated from diverse geographic regions: Europe (4), North America (2), Asia (2), and South America (1). The 3,629 postmenopausal women included in the studies had a mean age of 45 to 62 years, with individual sample sizes varying widely from 20 to 2,798 participants. Menopause was consistently defined as 12 or more consecutive months of amenorrhea in 6 of the 9 included studies. Of the included participants, 1,491 engaged in a physical activity intervention (primarily walking), while 2,325 were sedentary at baseline. Cardiometabolic comorbidities were prevalent across the cohorts. Colpani et al. (2013), Rezende et al. (2016), and Merino et al. (2013) included both diabetic (9.1 -84%) and hypertensive (36.4 - 63%) women, while Garnier et al. (2015) and Hagner-Derengowska et al. (2015) focused on overweight or obese participants.

Overall, race and ethnicity were frequently underreported. In cases where this information was missing, only implicit assumptions could be made based on the study setting or population. Badon et al. (2021) included a diverse group composed of White (49%), Black (32%), Japanese (10%), and Chinese (9%) women, while Colpani et al. (2013) reported that 83.9% of participants were white.

Among the nine studies reviewed, seven incorporated either fully or partially supervised regular walking-based exercise sessions, while the remaining two were unsupervised due to their observational nature (Badon et al., 2021; Colpani et al., 2013). Also, two studies used specialized activity formats: Nordic walking, which is walking with poles to engage the upper body in (Hagner-Derengowska et al., 2015). And exergaming, using a motion-based video platform (interactive video games that require full-body movement) in (Jo et al., 2020). Most interventions met or exceeded the World Health Organization (WHO) recommendations of at least 150 minutes of moderate-intensity aerobic activity per week (Akwa et al., 2017; Bucciarelli et al., 2021; Garnier et al., 2015; Hagner-Derengowska et al., 2015; Jo et al., 2020; Rezende et al., 2016). Only one study (Merino et al., 2013) prescribed a lower activity volume, and two observational studies (Badon et al., 2021; Colpani et al., 2013) did not allow direct assessment of adherence to these guidelines.

The duration of the interventions varied widely. Three studies lasted beyond six months: two longitudinal cohorts of 17 and 16 years (Badon et al., 2021; Colpani et al., 2013), and a 24-week randomized controlled trial (Rezende et al., 2016). The remaining trials were sustained for two to four months. The exercise intensity was predominantly moderate, as reported in five studies (Bucciarelli et al., 2021; Colpani et al., 2013; Garnier et al., 2015; Jo et al., 2020; Rezende et al., 2016). Only two reached moderate-to-vigorous levels— the treadmill group in Jo et al. (2020) and the progressive protocol in Rezende et al. (2016), approaching the respiratory compensation point.

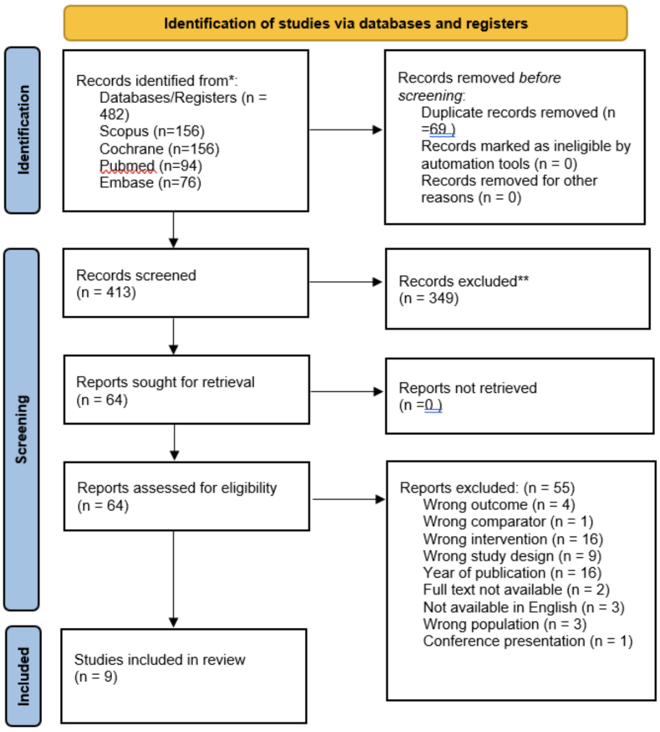

Figure 1: *PRISMA flow diagram.*

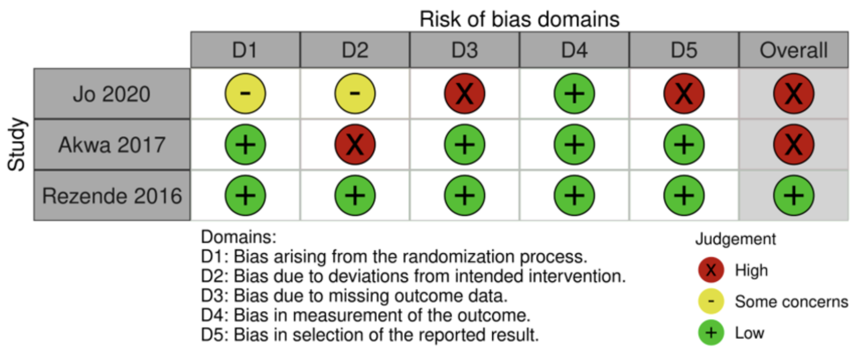

Figure 2: *Risk of bias traffic plot of randomized controlled trials.*

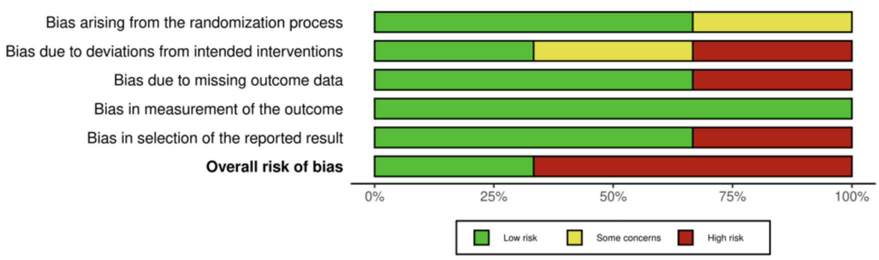

Figure 3: *Risk of bias summary plot of randomized controlled trials.*

Although all nine studies assessed at least one of the selected outcomes (LDL-c, glucose, or BMI), the overall findings were inconclusive due to substantial heterogeneity in study design, intervention characteristics, and participant adherence. LDL-c was reported in seven studies, but only Hagner-Derengowska et al. (2015) and Garnier et al. (2015) observed significant reductions in LDL-c along with increases in HDL. Furthermore, BMI was evaluated in seven trials, with four reporting significant decreases (Colpani et al., 2013; Garnier et al., 2015; Hagner-Derengowska et al., 2015; Jo et al., 2020), whereas the others found minimal or non-significant changes. Similarly, glucose was measured in three studies (Colpani et al., 2013; Garnier et al., 2015; Hagner-Derengowska et al., 2015), all of which showed post-intervention reductions. A summary of the above information can be found in the appendices, Table 2.

As summarized in Figures 2 and 3, the most common sources of bias were related to deviations from intended interventions (D2), missing outcome data (D3), and selective reporting (D5). These pervasive issues across the majority of studies indicate that the results should be interpreted cautiously, considering the potential bias introduced.

Discussion

This scoping review evaluated the current literature regarding the effect of aerobic physical activity, described as walking, on cardiovascular parameters in postmenopausal women across nine studies (RCTs, cohort, and cross-sectional). The results revealed that those interventions in postmenopausal women had inconsistent effects on cardiovascular risk factors, particularly on the selected outcomes, LDL-c levels, BMI, and glucose levels. To our knowledge, no scoping review has addressed so far the sole effects of walking in this specific population, so this is an original contribution to the literature. For instance, Xin et al. (2022) recently conducted a systematic review among postmenopausal women, but they analyzed the effects of resistance training on blood lipids and vascular function differently from us.

Tailoring physical activity interventions to enhance cardiometabolic health in postmenopausal women requires consideration of exercise type, intensity, structure, and adherence. Supervised and structured programs appear to be more effective in lowering LDL-c, indicating the importance of exercise monitoring and program design. Among the different studies, the benefits of exercise in the lipid profile were accentuated in sedentary, overweight, or women with a previous increased cardiovascular risk. Moreover, these findings suggest that the effects of aerobic walking may differ according to the baseline cardiovascular risk and race/ethnicity. For instance, the population in Akwa et al. (2017) presented considerably higher baseline HDL-c levels than women from other regions included in studies (81.2 mg/dL versus 50 mg/dL). Similarly, the variation in LDL-c values is also differently affected by the presence of these comorbidities. Nonetheless, given the current limited evidence, this assumption cannot be confirmed.

Studies showed significant variability regarding lipid response, however, reductions in BMI and glucose levels were more consistently observed, even with shorter or less frequent interventions. (Colpani et al., 2013; Garnier et al., 2015; Hagner-Derengowska et al., 2015; Jo et al., 2020) Similarly, in large-scale observational studies, the evidence also suggests no effect of regular aerobic physical activity on specific cholesterol-related biomarkers. In Colpani et al. (2013), regular walking was associated with lower BMI, waist circumference, and glucose levels, though effects on lipid profiles were not significant in a period of 16 years. Similarly, in the SWAN study, Badon et al. (2021) did not find a significant association between physical activity and LDL-c, HDL-c, or triglycerides during 17 years of observation.

In our study, a reduction in LDL-c was observed in studies involving supervised and structured exercise programs, such as walking (Garnier et al., 2015), Nordic walking (Hagner-Derengowska et al., 2015), and, to some extent, moderate-to-intense exercise sessions (Bucciarelli et al., 2021), although not statistically significant. These findings are aligned with a recent meta-analysis by Bernal et al. (2025), which found inconsistent results in postmenopausal women. For instance, a 16-weeks program of aerobic physical training increased HDL-c, reduced total cholesterol and LDL-c levels in obese postmenopausal women, while an 8-weeks program did not affect their lipid profile. Such variability may be partly explained by differences related to previous comorbidities and exercise duration, both of which appear to be important determinants of the observed outcomes. Furthermore, studies using self-reported physical activity (Badon et al., 2021; Garnier et al., 2015), less structured formats (Colpani et al., 2013), or low-frequency sessions(Rezende et al., 2016) showed limited or no significant changes in LDL-c.

On the other hand, a systematic review and meta-analysis including 53 RCTs by Huynh (Huynh et al., 2024) encountered positive effects of aerobic exercise in LDL-c, HDL-c, and BMI. However, the data presented a very low certainty of evidence according to the GRADE tool (Grading of Recommendations Assessment, Development, and Evaluation), which consists of a systematic approach measuring risk of bias, heterogeneity, indirectness, imprecision, and

Outcome	Evidence	Gap / Uncertainty
LDL-C	**Walking reduces LDL-C in overweight/obese postmenopausal women in some RCTs**	**Inconsistent effects in short-term interventions (<8 weeks); dose-response unclear**
HDL-C	**Moderate improvements observed after 12–16 weeks of aerobic/walking programs**	**Some studies show no change; long-term sustainability not well studied**
BMI	**Walking interventions reduce BMI and waist circumference in sedentary postmenopausal women**	**Effect sizes vary; impact of intensity and frequency not fully defined**
GLUCOSE	**Walking improves fasting glucose and in women with overweight/obesity or NAFLD**	**Few studies specifically in healthy postmenopausal women; heterogeneity in measurement methods**
CARDIOVASCULAR RISK	**Walking reduces cardiovascular biomarkers in overweight/obese postmenopausal women**	**Inconsistent results; role of specific markers such as LDL-c as a predictor of cardiovascular event is unclear**

Figure 4: *Summary of current evidence and gaps in the literature.*

the suspicion of publication bias (Badon et al., 2021; Prasad, 2024). It is important to note that pooling such diverse studies in systematic reviews and meta-analysis is a complex task. From the statistical perspective, it potentially increases the occurrence of type-I errors. Therefore, these findings must be carefully considered. A summary of current evidence and gaps in the literature is shown in Figure 4.

Overall, multiple limitations must be considered. There was notable variability in study design, intervention protocols, including differences in exercise intensity, duration, supervision, and adherence monitoring. Outcome measurements, particularly for LD-c, BMI, and glucose, lacked standardization across studies. Moreover, confounding factors such as diet, comorbidities, race/ethnicity, and adherence challenges were not always controlled for, introducing potential bias. Considering the overall moderate to high risk of bias and high heterogeneity among the included studies, the ability to generalize findings, recommend a standardized walking regimen, or define LDL-c as a reliable predictor of cardiovascular risk is still limited.

Conclusions

This scoping review aimed to map the gaps in the literature regarding aerobic exercise, particularly walking, reducing cardiometabolic risk in postmenopausal women. It succeeded to uncover important heterogeneity and limited comparability between studies. It also suggests the next steps in the development of this topic. Future research should follow the lines of long-term adherence strategies, investigating the influence of exercise intensity, frequency, duration, supervision, and modality on cardiovascular biomarkers. Additionally, LDL-c should be more consistently evaluated over time to determine its relevance as a prognostic factor of cardiovascular risk in postmenopausal women. Lastly, inclusive research on ethnically and socioeconomically diverse cohorts would strengthen the evidence base and guide more equitable public health interventions.

Acknowledgements

We are deeply grateful to Eric Katsuyama, Karen Mori, and Keiko Ueda for their unfailing kindness, encouragement, and generosity of time. Their support and availability have been invaluable, not only in advancing the progress of this work but also in making the process more meaningful and collaborative. We truly appreciate the openness with which they shared their insights and the thoughtful care they brought to every interaction.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

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