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Promoting physical activity amongst disadvantaged and marginalised groups: a rapid review of individual level interventions

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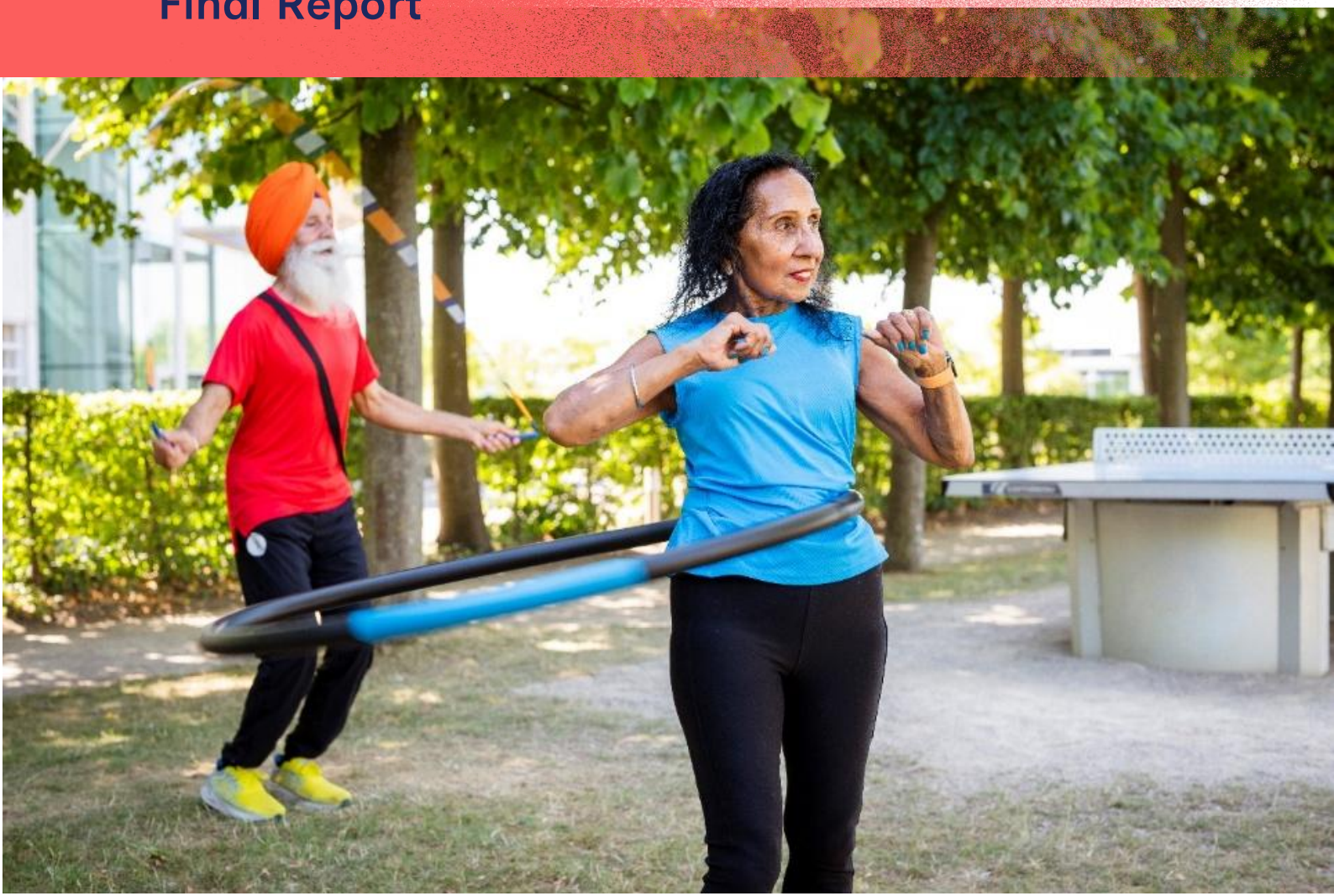
Final Report



Promoting physical activity amongst disadvantaged and marginalised groups: a rapid review of individual level interventions

Final Report

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One Page Summary

What is the problem?

Physical activity provides health benefits, but activity levels fall with age, especially amongst disadvantaged and marginalised older adults (aged 50+). Interventions to promote physical activity may fail to reach or engage disadvantaged older populations. Known barriers include a lack of financial, environmental and social resources. There is currently no consensus on which individual-level interventions are effective in increasing physical activity/reducing sedentary behaviour among disadvantaged and marginalised older adults, or how these groups experience such interventions.

What did we do?

We conducted a rapid systematic review to examine evidence for the effectiveness of *individual level interventions* in increasing physical activity/reducing sedentary behaviour among disadvantaged and marginalised older adults, as well as how these groups experience such interventions. The review included studies that: (a) evaluated interventions in older people (aged 50+) and compared outcomes between disadvantaged and non-disadvantaged groups; and (b) evaluated interventions in specific disadvantaged or marginalised individuals without comparison of outcomes with a broader reference group.

What did we find?

Studies evaluating interventions to promote physical activity directed at all older adults (this design provides insight into differential effects between groups)**:** It was not possible to determine the comparative effectiveness of interventions in disadvantaged vs non-disadvantaged groups. There is low certainty evidence (three studies) to suggest that behavioural interventions (that include components such as goal setting, activity tracking, peer support) may increase frequency and duration of physical activity in both women and men. We cannot have confidence in results of studies comparing outcomes based on educational level, marital status, and race/ethnicity/culture, as evidence was of very low certainty.

Studies evaluating interventions to promote physical activity directed at disadvantaged or marginalised older adults (this design cannot provide any insight into differential effects between groups): Evidence of moderate certainty (11 studies) suggested that physical activity, educational, and multicomponent interventions can increase physical activity in individuals from minoritised ethnic groups in the USA. Evidence on the effectiveness of multicomponent interventions in women is of moderate certainty (six studies), but findings are conflicting. Four studies reported no effect, and two studies demonstrated increases in physical activity. Evidence for interventions with individuals of low socioeconomic status or living in rural areas was of very low certainty. We found no studies with other disadvantaged and marginalised groups.

Qualitative findings highlight that barriers and enablers to physical activity are similar across disadvantaged/marginalised groups. Barriers to physical activity include caregiving, transport, and financial constraints. Enablers to physical activity include social support, and tailored, culturally relevant and flexible programmes. Overall, studies reported high levels of acceptability across a range of interventions.

What does it mean?

We can draw no firm conclusions from the current evidence on which individual level interventions are effective at promoting physical activity amongst disadvantaged and marginalised older adults. Interventions directed at minoritised ethnic groups could be feasibly adapted and implemented within the UK's localised, community-focussed policy framework, but rigorous evaluation of new or ongoing interventions is needed. It is also important to consider the possibility that interventions may widen inequalities if uptake and effectiveness vary by social disadvantage.

Executive Summary

Context

Engaging in physical activity and minimising sedentary behaviour offer both physical and mental health benefits[1–3]. However, activity levels decline with age, and may be even lower in those with low socioeconomic status[4]. Interventions to promote physical activity may have limited reach amongst disadvantaged older people, who often lack resources (e.g. social, cultural, financial, environmental) to participate[5], thus increasing the risk of widening health inequalities. Addressing low activity levels in older, disadvantaged and marginalised groups requires interventions that aim to promote physical activity at both individual- and population-levels. Individual-level interventions are those that target either individuals or groups of individuals in order to improve engagement in physical activity, while population-level interventions target entire communities or geographical areas[6].

Interventions that aim to promote physical activity may be delivered to an unselected population of older adults, including those considered marginalised/disadvantaged. Such approaches have the potential to benefit larger numbers of people in society, however they also run the risk of introducing "intervention generated inequalities", if the interventions are more accessible, more frequently adopted, more closely followed, or more effective among socioeconomically advantaged groups[7]. Studies evaluating this type of approach may report comparative effectiveness between disadvantaged vs non-disadvantaged groups to overcome this potential limitation. Alternatively, interventions may be used specifically in disadvantaged groups. Studies evaluating this type of intervention strategy are unable to compare outcomes with non-disadvantaged groups, or between levels of disadvantage, thus it is not possible to know whether these interventions would potentially exacerbate health inequalities if delivered to the broader population.

A review published in 2017[8] focused on the impact of interventions on social inequalities in physical activity among older adults. That review identified 59 studies undertaken in the general population of older adults. Only 11 of these reported differential effects of interventions by comparing effectiveness between those considered disadvantaged vs non-disadvantaged. Effects were most often analysed by gender/sex, age, education, marital status, and race/ethnicity. Five studies indicated gender/sex- or age-specific intervention effects, suggesting that some interventions affect men and women, and younger and older individuals differently. The objective of this review was to update and expand on these findings by drawing on individual-level evidence from studies undertaken in unselected populations of older adults, and those undertaken with disadvantaged or marginalised older adults.

This review aimed to:

1. Summarise evidence from individual level intervention studies delivered to unselected older adults, on promotion of physical activity amongst those considered disadvantaged vs non-disadvantaged (e.g. low vs high SES; low vs high education; men vs women).
2. Summarise evidence from individual level interventions directed at disadvantaged and marginalised older adults on promotion of physical activity in these groups (e.g. low-SES; low education; women).
3. Summarise the experience of disadvantaged and marginalised older adults engaging in individual-level interventions to promote physical activity (e.g. relating to uptake, adherence, acceptability, barriers and enablers).

Methods

We conducted a rapid systematic review following Cochrane guidelines and the PRISMA-Equity 2012 Extension for systematic reviews with a focus on health equity (PRISMA-E)[9]. We operationalised disadvantage/marginalisation using the PROGRESS-Plus framework[10] which represents the following categories: Place of residence (including urban, rural, coastal regions), Race/ethnicity/culture, Occupation, Gender/Sex, Religion, Education, Socio-Economic Status (SES), Social capital, Unpaid carer status, marital status, and living situation (living alone vs living with others).

Review criteria

We applied the following eligibility criteria:

- Population: Older people aged 50+
- Intervention: Individual level interventions designed to promote physical activity (e.g. exercise classes; education/motivation support; technology support)
- Comparator: Any comparator or none
- Outcomes: Frequency, duration, and intensity of physical activity (self-report or device-assessed)
- Studies: Intervention studies directed at either unselected or disadvantaged/marginalised individuals; studies published from 2015, set in high-income countries; Any evaluative study design, or qualitative data relating to a process evaluation for an intervention.

Search Strategy

Searches were conducted in three databases (MEDLINE, Embase, and Cinahl Plus), using a strategy based on keywords and headings. Sources of grey literature were searched, including websites for relevant charities and non-governmental organisations.

Study Selection

Titles and abstracts were screened for relevance. All screening was undertaken by one reviewer and 20% by a second reviewer, with disagreements resolved through discussion with a third person.

Quality appraisal

Risk of bias was assessed for all studies using the Mixed Methods Appraisal Tool (MMAT) and GRADE was used to assess the overall certainty of the evidence.

Data extraction and synthesis

We extracted summary data including study and intervention characteristics, estimates, measures of central tendency, confidence intervals and/or p-values for all eligible outcomes, as well as qualitative data on acceptability, barriers and enablers relating to an intervention. A narrative synthesis was used, aided by forest plots (without pooling) to illustrate the direction of effect for each outcome. Data were synthesised separately based on the type of study (unselected vs disadvantaged or marginalised individuals only), and categories of disadvantage/marginalisation (PROGRESS-Plus).

Results

Study Characteristics

After screening, 47 studies were included in the review. Findings in relation to the following PROGRESS-Plus characteristics were reported: Gender/Sex (n=22 studies), Race/Ethnicity/Culture (n=15), Socioeconomic Status (SES) (n=10), Place of Residence (n=10), Education (n=3), Living situation (n=1), Marital status (n=1), and Unpaid carer status (n=1). No studies reported findings in relation to occupation, religion, or social capital. Most data came from intervention studies directed at disadvantaged/marginalised individuals, with a small proportion of the data coming from intervention studies directed at unselected individuals (with subgroup comparisons). Two studies were directed at

disadvantaged/marginalised individuals and also included subgroup comparisons based on additional criteria of disadvantage/marginalisation.

Effectiveness and participant experience of interventions

Evidence for the effectiveness of interventions delivered to unselected individuals in the general population of older adults) was limited. Very few studies (n=6) reported differential effects of interventions comparing disadvantaged and non-disadvantaged groups, and evidence was low to very low certainty.

- Low certainty evidence suggests behavioural interventions (that include components such as goal setting, activity tracking, peer support) may increase the frequency and duration of physical activity by similar levels amongst women and men.
- We cannot be sure if there are true differences in intervention effectiveness in studies comparing outcomes based on education level, marital status, and race/ethnicity/culture. We found no evidence for differences in outcomes in relation to other PROGRESS-Plus factors.

Evidence for the effectiveness of interventions delivered to marginalised/disadvantaged individuals only was mixed:

- We are moderately confident that physical activity, educational, and multicomponent interventions are effective in increasing physical activity in minoritised ethnic groups based in the USA.
- We found mixed evidence on the effectiveness of multicomponent interventions in women.
- Evidence for interventions in those with low socioeconomic status or living in rural areas came from studies with serious limitations, making us uncertain about the effects, and we found no evidence on effectiveness of interventions in other disadvantaged/marginalised groups.

Barriers and enablers to physical activity are similar across disadvantaged/marginalised groups. Barriers include caregiving, transport, and financial constraints. Enablers include social support, and tailored, culturally relevant programmes. Studies reported high levels of acceptability across a range of interventions.

Implications for policy

To address health inequalities effectively, the 10 year health plan for England advocates for collaborative, cross-sector strategies, particularly realised through place based/neighbourhood approaches and tailored to local communities[11,12]. Any interventions aimed at improving levels of physical activity amongst older people implemented as part of the national strategy should include rigorous evaluation mechanisms to determine their impact on disadvantaged compared to non-disadvantaged groups, thus preventing the inadvertent widening of health inequalities. Interventions could be feasibly adapted and implemented within the UK's localised, community-focussed policy framework for minoritised ethnic groups (moderate certainty evidence), and could include components such as group based physical activity, motivational tools such as activity tracking, and education about physical activity, as well as delivery through participants' first language. However, rigorous evaluation of adapted interventions would be needed. Qualitative evidence emphasises that any interventions designed to promote physical activity in disadvantaged or marginalised groups should enhance social support, reflect individual preferences and cultural context, directly address structural barriers (e.g. transport/financial constraints), and integrate physical activity into everyday routines.

Conclusion

Evidence on effectiveness of interventions to promote physical activity for disadvantaged or marginalised groups is mainly of low to very low certainty. Any interventions introduced for the general older population should be carefully evaluated to understand their impact across both disadvantaged and non-disadvantaged groups, to avoid unintentionally increasing health inequalities. Community-based interventions with minoritised ethnic groups may be effective in increasing physical activity and could be applied at the local level, but these need to be evaluated in the UK context.

Promoting physical activity amongst disadvantaged and marginalised groups: a rapid review of individual level interventions

Context

Engaging in physical activity while reducing periods of inactivity offers both physical and mental health benefits[1–3]. However, as people age, their activity levels tend to drop, often falling short of the recommendations set by the UK's Chief Medical Officers and the World Health Organization. Physical activity levels also tend to be higher amongst older people with high socioeconomic status, with those with greater wealth being four times more likely to be persistently active[4]. Interventions to promote physical activity may have limited reach amongst disadvantaged older people, who often lack resources (e.g. social, cultural, financial, environmental) to participate[5].

Addressing low activity levels in older, disadvantaged and marginalised groups requires interventions that aim to promote physical activity at both individual- and population-levels. Individual-level interventions are those that target individuals or groups of individuals in order to improve engagement in physical activity, while population-level interventions target entire communities or geographical areas[6].

Interventions that aim to promote physical activity may be delivered to unselected groups of older adults, including those considered marginalised/disadvantaged. Such approaches have the potential to benefit larger numbers of people in society, however they also run the risk of introducing "intervention generated inequalities", if the interventions are more accessible, more frequently adopted, more closely followed, or more effective among socioeconomically advantaged groups[7]. Studies applying such approaches allow for the comparison of outcomes between those considered disadvantaged vs. non-disadvantaged. As such, studies that report subgroup comparisons of the effectiveness of the intervention in disadvantaged vs. non-disadvantaged groups can provide useful insights into differential effects of interventions between these groups, thus informing us about inequalities. Even if these interventions appear to be successful at increasing physical activity in older people generally, they may inadvertently widen health inequalities between different social groups. Alternatively, interventions may be used specifically in disadvantaged groups. Studies evaluating this type of intervention strategy are unable to compare outcomes with non-disadvantaged groups, thus it is not possible to know whether these interventions would potentially exacerbate health inequality if delivered more broadly.

A review published in 2017[8] focused on the impact of interventions on social inequalities in physical activity among older adults. The review identified 59 studies that investigated the effectiveness of interventions to promote physical activity in older adults. Only 11 of these reported differential effects of interventions by comparing effectiveness between those considered disadvantaged vs non-disadvantaged. Effects were most often analysed by gender/sex, age, education, marital status, and race/ethnicity. Five studies indicated gender/sex- or age-specific intervention effects, suggesting that some interventions affect men and women, and younger and older individuals differently. The objective of this review was to update and expand on these findings by drawing on individual-level evidence from studies undertaken in unselected groups of older adults, and those undertaken in disadvantaged or marginalised older adults.

This review aimed to:

1. Summarise evidence from individual-level intervention studies delivered to unselected older adults, on promotion of physical activity amongst those considered

disadvantaged vs non-disadvantaged (e.g. low vs high SES; low vs high education; men vs women).

2. Summarise evidence from individual-level interventions directed at disadvantaged and marginalised older adults on promotion of physical activity in these groups (e.g. low-SES; low education; women).
3. Summarise the experience of disadvantaged and marginalised older adults engaging in individual-level interventions to promote physical activity (e.g. relating to uptake, adherence, acceptability, barriers and enablers).

Box 1. Glossary of Key Terms

Health Inequality	Any measurable aspect of health that varies across individuals or according to socially relevant groupings[13].
Health Inequity	Unequal access to available care for equal need[14]. In this sense, health inequities are systematic differences in health that could be avoided by reasonable means[15].
Individual Level Interventions	Those that target individuals in order to improve engagement in physical activity. These may include assessment of individual risk.
Population Level Interventions	Those that target entire communities or geographical areas, irrespective of individual risk
Disadvantage/Marginalisation	Unfavourable social, economic, or political conditions systematically experienced by certain groups, often resulting in a restricted ability to participate fully in society. Operationalised using the PROGRESS-Plus framework.
Intervention Generated Inequalities	An intervention produces inequality if it is (a) more accessible to, (b) adopted more frequently by, (c) adhered to more closely by, or (d) more effective in socioeconomically advantaged groups, such as those with more resources or education
MET (Metabolic Equivalent)	METs are units used to express physical activities as multiples of resting metabolic rate. One MET is equivalent to the energy expenditure of sitting quietly[16]
Physical activity	Any bodily movement produced by skeletal muscles that requires energy expenditure above resting metabolic rate
Sedentary behaviour	Any waking behaviours characterised by very low energy expenditure (≤ 1.5 Metabolic Equivalents of Task [METs]), while in a sitting, reclining, or lying posture

Methods

Rapid systematic review methods were used, following Cochrane guidelines[17]. These methods reflect those of a systematic review, with aspects expedited. The methods are reported according to the PRISMA-Equity 2012 Extension for systematic reviews with a focus on health equity (PRISMA-E)[9]. Although this was a rapid review, we drew on the principles of equity focused review protocols to inform our methods. This included specifying our dimensions of marginalisation/disadvantage, how we intended to ascertain inequality in the data, and the development of a logic model.

Disadvantage and marginalisation can be defined as unfavourable social, economic, or political conditions systematically experienced by certain groups, often resulting in a restricted ability to participate fully in society[18]. Our operationalisation of disadvantaged and marginalised communities is based on the populations defined by the PROGRESS-Plus framework[10]. The PROGRESS acronym represents the following eight categories that stratify health opportunities and outcomes:

- Place of residence (including urban, rural, coastal regions)
- Race/ethnicity/culture
- Occupation, Gender/Sex
- Religion
- Socio-Economic Status (SES)
- Education (a frequently used proxy of SES[19])
- Social capital (defined by PROGRESS plus as social relationships and networks, and endorsed by Cochrane[10,20])

The “Plus” component considers other characteristics that may be associated with marginalisation and disadvantage. For the purposes of this review, we define the ‘plus’ as the following characteristics:

- unpaid carer status
- marital status
- living situation (living alone vs living with others).

These were selected as older people who provide unpaid care, are unpartnered, or living alone, are more likely to be excluded from physical activity[21–26].

We developed an initial equity-focused logic model[27] to illustrate the pathways between interventions, outputs and outcomes (**Figure 1**). We developed this model using lower socio-economic status as an example[28,29]. We intended to use data from the review to amend the logic model, if appropriate.

In addition to PROGRESS-Plus, we applied the Kunonga Framework[30] across all stages of our review. This framework was developed in response to a lack of consensus in methodological approaches in health inequality and inequity focused reviews[31]. It provides structured guidance for researchers conducting equity-focused reviews at the screening, data extraction, analysis, and reporting phases. It places particular emphasis on intersectionality, guiding researchers in how to examine overlapping social determinants of inequity in outcome.

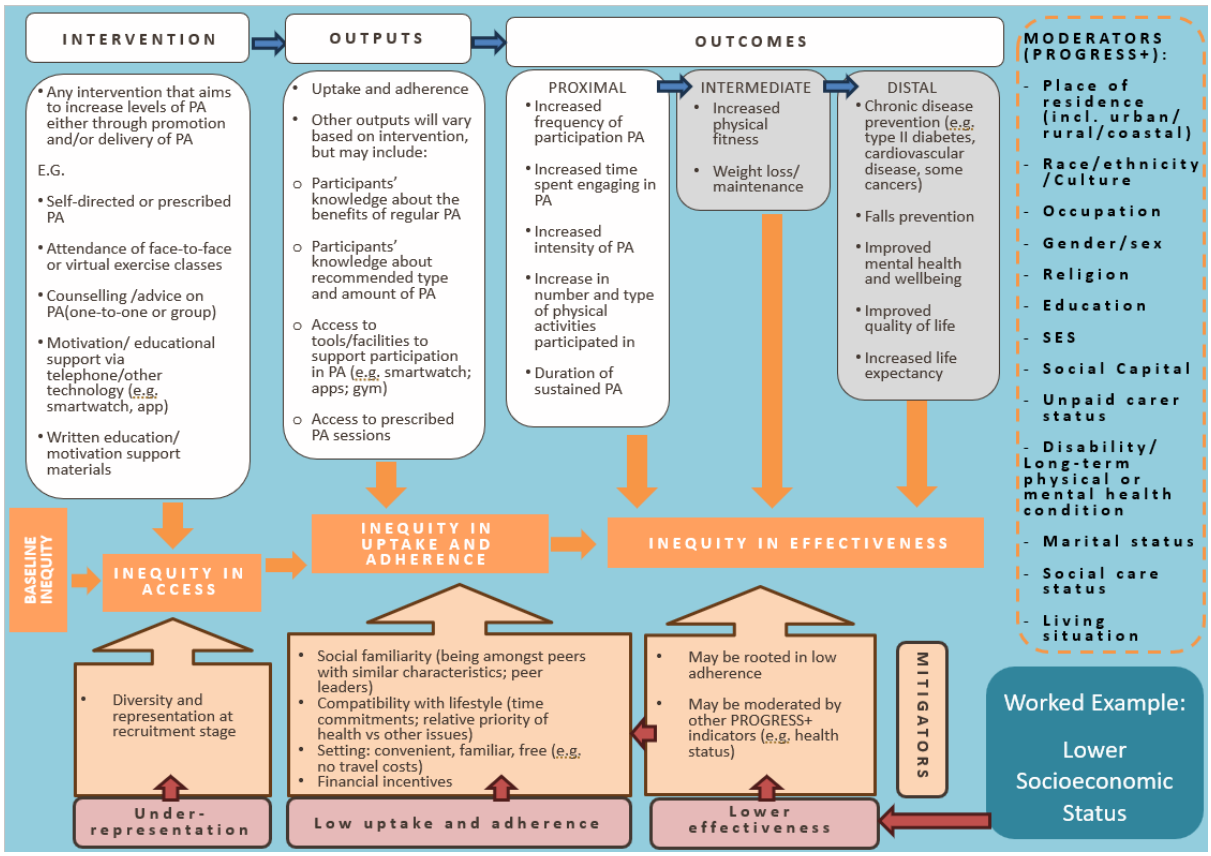

Figure 1. Equity-based logic model (using example of lower socioeconomic status) to illustrate the pathways between physical activity interventions, outputs and outcomes.
Note: we only focused on proximal outcomes as part of this review, and intended to update the model, based on review findings, if appropriate.

Review Criteria

The inclusion and exclusion criteria are summarised here and reported in full in **Appendix A**. Eligible studies were those that evaluated individual-level interventions designed to promote physical activity (whether delivered one-to-one or in group format). Intervention studies that included older people aged 50+ were eligible. We included studies that:

a) evaluated interventions in general older populations (unselected) but also used differential analyses (testing interaction effects, stratifying effect analyses) to examine outcomes for one or more disadvantaged or marginalised groups compared to the non-disadvantaged population

b) evaluated interventions directed at specific disadvantaged or marginalised groups of older adults, without comparison of outcomes with a broader reference group.

Example interventions (one-to-one or group) include, but are not limited to, structured physical activity (e.g. exercise classes); directed or self-directed physical activity; counselling/advice; online/app/telephone support; education/motivation support material. No restrictions on intervention characteristics or follow-up duration were applied. Multicomponent interventions were also considered.

We included both physical activity and sedentary behaviour outcomes. Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure above resting metabolic rate, and sedentary behaviour is defined as any waking behaviours characterised by very low energy expenditure (≤ 1.5 METs), while in a sitting, reclining, or lying posture[3]. It is possible to be physically active, but still engage in high levels

of sedentary behaviour, thus WHO recommends that both should be targeted for optimal health[3]. Outcomes included any measure of physical activity participation that assessed change in frequency, duration, intensity or number and type of activities participated in. We also included outcomes that reported change in sedentary behaviour (e.g. time spent sedentary).

We included any randomised controlled trials (RCTs) or non-randomised evaluative study designs, with and without control groups. We included quantitative and qualitative studies that evaluated participants' experiences of interventions to promote physical activity, as part of a process evaluation.

A previous review on this topic used a search range of 2005-2015[8]. To avoid unnecessary duplication of this work, we limited eligible studies to those published from 2015. To ensure findings were relevant to the UK context we limited the search to literature from high income countries[32].

Search Strategy

Searches were conducted in November 2024 in three databases (MEDLINE, Embase, and Cinahl Plus), using a strategy based on keywords and headings (**Appendix B**).

Sources of grey literature were searched, including websites for relevant charities and non-governmental organisations. Where possible, we searched both English language and non-English language websites using translated versions of relevant search terms (**Appendix C**).

Study selection

Titles and abstracts were screened for relevance. The full texts of selected records were retrieved and assessed against the review criteria. For both stages, all screening was undertaken by one reviewer and 20% by a second reviewer. Disagreements were resolved through discussion or consensus with a third person. Records were managed using Rayyan, an online platform to manage reviews[33].

Risk of bias

Risk of bias was assessed for qualitative, quantitative and mixed methods studies using the Mixed Methods Appraisal Tool (MMAT)[34]. We adapted the tool to incorporate additional guidance from the JBI[35], NIH[36], and CASP[37] tools to enhance rigour for RCTs, quasi-experimental, and qualitative studies. A scoring system was applied to categorise overall risk of bias: studies meeting 4-5 criteria were rated as Low Risk, 3 as Moderate Risk, and 0-2 as High Risk of Bias.

GRADE

GRADE was used to assess the overall certainty of the evidence (high, moderate, low, very low)[38]. The following factors were considered in relation to downgrading the evidence: (i) risk of bias, (ii) inconsistency, (iii) imprecision, (iv) indirectness, and (v) publication bias. As meta-analysis was not possible, we followed guidelines for conducting GRADE in the absence of a single estimate of effect[39]. For the assessment, we grouped physical activity outcomes (frequency, duration, intensity) and sedentary behaviour outcomes separately, and according to intervention type. In line with rapid review methods, all assessments were carried out by a single reviewer and verified by a second reviewer.

Data extraction

A data extraction form was developed using Excel, and piloted and refined. We extracted the following:

- Summary study data including country, population, intervention type, outcome and study design

- All eligible outcome data including estimates, measures of central tendency (means; medians) and variability (standard deviations; inter-quartile ranges), confidence intervals and/or p values
- Any sub-group or stratification analysis that reported effectiveness of interventions for the PROGRESS-Plus subgroups
- We categorised the types of exercise/physical activity using the ProFANE taxonomy[40]
- High level qualitative data on acceptability, barriers and/or enablers relating to an intervention

Synthesis

Where data were available for pooling, meta-analysis was used to quantify a summary effect size for the effectiveness of interventions. Where data could not be pooled, a narrative synthesis was used, aided by forest plots (without pooling) to illustrate the direction of effect for each outcome. Data were synthesised separately based on the type of study (unselected vs disadvantaged/marginalised individuals only) and categories of disadvantage/marginalisation as defined by PROGRESS-Plus.

A narrative synthesis summarised data on acceptability, barriers and enablers in relation to interventions. We produced a thematic summary of qualitative data, noting contextual factors where relevant.

Results

After screening, 47 studies were included in the review (**Appendix D**).

Study Characteristics

A detailed overview of study characteristics is provided in **Appendix E**. Of the included studies, there were 24 RCTs (including feasibility and pilot RCTs), two non-randomised controlled before-after studies, six uncontrolled before-after studies, eight qualitative studies, and seven mixed methods studies. Studies were conducted in the following countries: USA (n=22), Australia (n=9), United Kingdom (n=6), Canada (n=4), the Netherlands (n=2), Germany (n=1), Japan (n=1), Singapore (n=1), and Spain (n=1). All studies were conducted in community settings.

Findings in relation to the following PROGRESS-Plus characteristics were reported: Gender/Sex (n=22 studies), Race/Ethnicity/Culture (n=15), SES (n=10), Place of Residence (n=10), Education (n=3), Living situation (n=1), Marital status (n=1), and Unpaid carer status (n=1). No studies reported findings in relation to occupation, religion, or social capital (**Table 1**). Most data came from intervention studies directed at disadvantaged/marginalised individuals, with a small proportion of the data coming from intervention studies directed at unselected individuals (with subgroup comparisons). Two studies[41,42] (one quantitative, one qualitative) were directed at disadvantaged/marginalised individuals and also included subgroup comparisons based on additional criteria of disadvantage/marginalisation.

Most studies (n=38) reported on the effectiveness of interventions on physical activity and/or sedentary behaviour outcomes. These included change in duration of physical activity (n=23) and sedentary behaviour (n=12), frequency of physical activity (n=3) and sedentary behaviour (n=1), step count (n=14), levels of physical activity (n=2), and “MET minutes” of physical activity per week (n=6) (a composite measure incorporating frequency, duration and intensity of physical activity). Common assessment tools included accelerometer-assessed time spent active or sedentary, and self-report questionnaires such as the International Physical Activity Questionnaire (IPAQ), Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire, Sedentary Behaviour Questionnaire, or Longitudinal Aging Study Amsterdam Physical Activity Questionnaire (LAPAQ). Other reported outcomes

were adherence (n=11), attrition (n=36), acceptability (n=12), and barriers and enablers (n=12).

Table 1. Summary of Type of Evidence Found

PROGRESS-Plus Factor	Unselected individuals*, w/ subgroup comparison	Disadvantaged/ marginalised individuals, w/ subgroup comparison	Disadvantaged/ marginalised individuals
Place or residence	0	0	10
Race/ethnicity/Culture	1	2	12
Occupation	0	0	0
Gender/sex	8	1	13
Religion	0	0	0
Education	2	1	0
Socio-economic status	2	0	8
Social capital	0	0	0
Unpaid carer status	1	0	0
Marital status	0	1	0
Living situation	0	0	1

*Unselected individuals=study population is general population of older adults, included both disadvantaged and non-disadvantaged individuals.

Note. Totals do not sum to n=47 due to multiple categories in individual studies

Types of Interventions

A detailed overview of interventions is provided in **Appendices F and G**. Interventions were grouped into four broad categories, described in detail below:

1. Physical activity (n=12): Interventions that deliver actual structured physical activity, e.g. exercise classes (in person or via technology); dance classes; sports programmes. Interventions that provide directed physical activity, e.g. participants asked to perform specific activities at a specified frequency, duration and/or intensity.
2. Behavioural (n=6): Interventions that use behaviour change techniques to encourage and sustain physical activity (e.g. goal setting; social support; activity tracking; financial incentives). Behavioural interventions do not deliver structured or directed physical activity (as per physical activity interventions described above). Rather, they are intended to influence the determinants of behaviour, and in turn influence self-directed physical activity (e.g. participants encouraged to set daily step count goals may increase daily step count).
3. Educational (n=3): Interventions to provide knowledge and information about physical activity (e.g. lectures, workshops, print materials providing information on health benefits; optimal levels of physical activity, etc). Educational interventions are intended to influence self-directed physical activity. There is some overlap between educational interventions and behavioural interventions, as education about physical activity (providing knowledge and information) may be considered a behaviour change technique.[43] However, as educational interventions alone have been shown to be less likely to lead to increases in physical activity in the general adult population compared to other behavioural approaches[44], for the purposes of this review we report findings from these interventions separately.
4. Multicomponent (n=26): A mix of two or more of the above categories. For example, an intervention that provides exercise classes that also incorporate goal setting would be an example of a multicomponent intervention with physical activity and behavioural components.

Most studies (n=38) evaluated multicomponent or physical activity interventions.

Quality of the evidence

Detailed results of the risk of bias assessment are provided in **Appendix H**. Using the MMAT tool we rated the quality of the evidence for RCTs, quasi-experimental studies (i.e. non-randomised controlled before-after studies; uncontrolled before-after studies) and qualitative studies. Seven studies[45–51] reported both qualitative and quantitative data, but as none of these studies described themselves as mixed methods, nor set out to integrate qualitative and quantitative findings in order to answer their research question/s, we did not rate them against the "mixed methods" checklist of the MMAT. Instead, we conducted two separate ratings for each of the qualitative and quantitative components.

Randomised Controlled Trials (n=29)

The majority of RCTs (n=23) were rated as high or moderate risk of bias, with six studies rated as low risk of bias. The most common sources of bias were in relation to blinding of the intervention and adherence to the intervention. Most studies (n=19) either did not blind outcome assessors to the intervention or did not report on this. Nearly two thirds of studies (n=18) either reported poor adherence to the intervention or did not report on adherence.

Quasi-experimental studies (n=10)

Over half of the studies (n=6) were rated as high or moderate risk of bias, with four rated as low risk of bias. The most common sources of bias related to the representativeness of participants and the completeness of outcome data. In six studies participants did not appear to be representative of the target population or it was unclear whether or not they were representative. Seven studies either did not have complete outcome data or did not make it clear whether or not outcome data were complete.

Qualitative studies (n=14)

The majority of studies (n=8) were rated as low risk of bias, with six studies rated as high or moderate risk of bias. The most common source of bias related to whether or not qualitative methods were adequate to address the research question. Six studies were rated as high risk or unclear on this criterion.

Adherence and Attrition

Seventeen out of 47 studies reported on adherence to the intervention. Across studies, adherence was commonly operationalised as either the proportion of physical activity sessions attended, self-reported or accelerometer-assessed completion of physical activity, or high engagement with/use of intervention components such as websites or activity trackers. Adherence was variable, but moderate to high for the majority of studies, which were mostly group-based interventions. Three of the 17 studies[52–54] had an intervention duration greater than 6 months, and still demonstrated moderate to high adherence (average class attendance greater than 60%; 89% adhered to accelerometer use). Thirty-six studies reported on attrition (both early dropout and loss to follow-up). Attrition rates varied considerably, but most fell in the 10%-30% range. Very low attrition rates (approximately 5% or less) were observed in studies that used technology[55–57] and studies that were culturally tailored[58,59]. Overall, most studies reported attrition of 30% or less, but long-term interventions (over 18 months) saw the greatest losses. One study[60] investigating an activity coaching intervention, reported an overall attrition rate of 11%, and noted that discontinuation varied by educational attainment: 21% attrition for those with secondary education or less; 13% at least some trade/technical/college; 4% at least some university. Details of adherence and attrition for each study are provided in **Appendix I**.

Effectiveness of Interventions

Findings in relation to the effectiveness of interventions are outlined below, organised by the type of evidence (unselected vs disadvantaged/marginalised individuals only), PROGRESS-

Plus grouping, and intervention type. A detailed overview of results on effectiveness of interventions, and the GRADE assessment of the certainty of the evidence, are provided in **Appendices I and J**. **Appendices K and L** present forest plots for the analyses.

Unselected populations with subgroup comparisons (i.e. studies providing insight into differential effects between groups)

Education:

Two studies conducted analyses comparing effectiveness of interventions to promote physical activity between people with low/medium levels of education and those with high levels of education.

Multicomponent Interventions (n=1)

One RCT[61] investigated the effectiveness of two different multicomponent interventions on time spent in moderate to vigorous physical activity (MVPA) and time spent sedentary. As the evidence is very low certainty, we cannot have confidence in the reported results, which suggest that neither intervention significantly improved physical activity or sedentary behaviour outcomes. Furthermore, there were no significant differences in outcomes between those with high vs low levels of education (although the treatment effect in relation to duration of physical activity and sedentary time, for one of the interventions only, appears larger for those with high education) (**Appendix K, Figures 1 and 2**).

Behavioural Interventions (n=1)

One uncontrolled before-after study[60] reported that a behavioural intervention was effective in increasing physical activity in the general older adult population, and that there was no significant difference between those with high vs low levels of education, but this is very low certainty evidence.

Gender/Sex:

Six studies conducted analyses comparing effectiveness of interventions to promote physical activity based on gender/sex.

Behavioural interventions (n=3)

Two RCTs[47,62] and one uncontrolled before-after study[60] provide low certainty evidence (i.e. the true effect may be different from the estimated effects) on the effectiveness of behavioural interventions in men vs women. One RCT[47] reported the intervention was effective in increasing physical activity for the entire sample, and the other was not effective[62]. In both RCTs, the treatment effect was larger for men than women, but this difference was not statistically significant (**Appendix K, Figures 3 and 4**). The uncontrolled before-after study[60] reported the behavioural intervention was effective in increasing physical activity, and there was no significant difference between men and women.

Physical activity interventions (n=2)

There is very low certainty evidence (i.e. we have very little confidence in the effect estimates) from two RCTs[63,64] on the effectiveness of physical activity interventions by gender/sex. One study reported that women, but not men, significantly increasing walking activity over a 24-month period[64] and the other[63] found no significant differences between men and women in time spent sedentary following a physical activity intervention (both men and women reduced their sedentary time) (**Appendix K, Figures 4 and 5**).

Multicomponent interventions (n=1)

There is very low certainty evidence (i.e. we have very little confidence in the effect estimates) from one RCT[61] on the effectiveness of two different multicomponent interventions on physical activity and sedentary behaviour. Neither intervention significantly improved outcomes and there were no significant differences between men and women, although physical activity gains appear larger in men than women (**Appendix K, Figures 3 and 5**).

Disadvantaged/marginalised population with subgroup comparisons
Education, Marital Status, and Race/Ethnicity/Culture

One RCT[41] in a sample of women, compared effectiveness in relation to sedentary behaviour, based on education, marital status and ethnicity. The study reported the physical activity intervention was not effective in reducing sedentary time, nor were there significant differences between any of the subgroups. This is very low certainty evidence (i.e. we have very little confidence in the effect estimates).

Disadvantaged/marginalised populations only (i.e. studies providing no insight into differential effects between groups)
Socioeconomic Status (Low SES):

Four studies investigated the effectiveness of interventions to promote physical activity in low SES groups. All evidence was very low certainty (i.e. we have very little confidence in the effect estimates). Forest plots (without pooling) illustrating the direction of effects are provided in **Appendix L (Figures 1 and 2)**.

Behavioural Interventions (n=1)

A non-randomised, controlled before-after study[65] investigated three intervention conditions and reported that two interventions (designated walking routes; walking groups) were effective in increasing total walking and utilitarian walking (goal-oriented walking, e.g. to complete a task or errand) compared to controls.

Educational interventions (n=1)

An uncontrolled before-after study[66] reported that the intervention was effective in increasing MET minutes per week (a composite of frequency, duration and intensity of physical activity).

Physical activity interventions (n=1)

An uncontrolled before-after study[46] reported that moderate physical activity and vigorous physical activity significantly increased, and weekday sedentary behaviour significantly decreased post-intervention.

Multicomponent interventions (n=1)

A pilot RCT[49] was not powered to detect change, but results suggest an increase in MVPA in the intervention group.

Race/Ethnicity/Culture (minoritised ethnic groups):

Eleven studies investigated the effectiveness of interventions to promote physical activity in minoritised ethnic groups. Forest plots (without pooling) illustrating the direction of effects are provided in **Appendix L** (**Figures 3, 4 and 5)**.

Educational interventions (n=2)

There is moderate certainty evidence from two RCTs (Chinese Americans[58]; Vietnamese Americans[67]) to suggest that educational interventions may be effective in increasing self-

reported physical activity duration. In both studies, the intervention group was more likely to meet the recommended guidelines for physical activity duration than the control group.

Physical activity interventions (n=3)

There is moderate certainty evidence from three studies, two in American Hispanic/Latino/Latina populations[45,53] (a pilot RCT and an RCT) and one RCT in African Americans[68] showing physical activity interventions may be effective in increasing physical activity in minoritised ethnic groups. All three studies reported significant increases in physical activity in the intervention groups compared to controls: increases in step count[68], MVPA[45,53,68], and duration of dance, leisure and total physical activity[53]. The pilot RCT[45] also found the intervention increased sedentary time in the intervention group compared to control, possibly due to a compensation effect of increased MVPA, but very low certainty evidence means we have little confidence in this estimate.

Multicomponent interventions (n=6)

There is moderate certainty evidence from six studies showing that multicomponent interventions may be effective in increasing physical activity in minoritised ethnic groups. Two studies[69,70] (an RCT and an uncontrolled before-after study) involved American Hispanic/Latin/Latina populations, two[55,71] (an uncontrolled before-after study and an RCT) involved African American populations, one[59] (non-randomised, controlled before-after study) involved Chinese Americans, and one[72] (RCT) involved a population of mixed ethnicities in the USA (Latino/Latina, Korean, Chinese, and Black Americans). Across four studies, the interventions were successful in increasing physical activity: step count[69,72] and duration of physical activity.[55,70] Two studies[59,71] found no significant intervention effects. One uncontrolled before-after study[70] (American Hispanic/Latino/Latina populations) suggests no effect of the intervention on sedentary behaviour, but very low certainty evidence means we have little confidence in this estimate.

Place of Residence (rural):

Five studies investigated the effectiveness of interventions to promote physical activity in rural areas. Forest plots (without pooling) illustrating the direction of effects are provided in **Appendix L (Figures 6, 7 and 8)**.

Multicomponent interventions (n=4)

There is very low certainty evidence from four studies meaning we have little confidence in the estimates: Two RCTs reported increased moderate-vigorous physical activity[73,74] and moderate physical activity[73], and an uncontrolled before-after study[50] reported increased frequency of physical activity. Two studies, an RCT[73] and an uncontrolled before-after study,[75] reported no significant effect of the intervention on sedentary time.

Physical activity interventions (n=1)

Findings from a pilot RCT[56] suggest improvements in physical activity and sedentary time post-intervention, but very low certainty evidence means we have little confidence in the estimate.

Gender/Sex (women):

Eight studies investigated the effectiveness of interventions to promote physical activity in women. Forest plots (without pooling) illustrating the direction of effects are provided in **Appendix L (Figures 9, 10 and 11)**.

Multicomponent interventions (n=6)

There is moderate certainty evidence from six studies reporting on the effectiveness of multicomponent interventions in women[51,57,76–79]. Two studies reported significant between group differences in daily step count (pilot RCT[51]), and self-reported moderate, vigorous, and total physical activity (RCT[78]) favouring the intervention group, and four studies (feasibility RCT[57], two RCTs[76,77], pilot RCT[79]) reported no significant differences in response to the intervention. There is very low certainty evidence (i.e. we have little confidence in the estimates) from three studies[51,78,79] (one RCT and two pilot/feasibility RCTs) suggesting multicomponent interventions are not effective in reducing sedentary time.

Behavioural interventions (n=1)

There is very low certainty evidence (i.e. we have little confidence in the estimate) from one RCT[80] suggesting a behavioural intervention is not effective in increasing daily step count in women.

Physical activity interventions (n=1)

There is very low certainty evidence (i.e. we have little confidence in the estimate) from one RCT[41] suggesting a physical activity intervention significantly increased total physical activity time, but had no effect on sedentary time.

More than one PROGRESS-Plus group:

Four studies investigated the effectiveness of interventions to promote physical activity in participants with more than one characteristic of disadvantage/marginalisation (as defined by PROGRESS-Plus). Two studies were RCTs[81,82], one was a cluster RCT[83], and one was an uncontrolled before-after studies[54].

Multicomponent interventions (n=3)

There is very low certainty evidence (i.e. we have little confidence in the estimates) from three RCTs investigating the effectiveness of multicomponent interventions in groups with the following characteristics: African American women[81] (Ethnicity & Gender/Sex); rural-dwelling women[83] (Place of Residence & Gender/Sex); and rural, low-SES communities[82] (Place of Residence & Socioeconomic Status). Two studies[82,83] reported significant increases in physical activity and one study[81] found no significant intervention effects. There is low certainty evidence from two RCTs[82,83] suggesting multicomponent interventions were not effective in reducing sedentary time.

Behavioural interventions (n=1)

There is very low certainty evidence (i.e. we have little confidence in the estimate) from one study[54], conducted in a population of rural dwelling older women (PROGRESS-Plus groups: Place of Residence & Gender/Sex) suggesting the intervention increased physical activity.

Qualitative findings in relation to experience of engaging in interventions to promote physical activity in disadvantaged and marginalised older people (acceptability, barriers and enablers)

Fourteen studies provide data on participants' experiences of engaging in interventions to promote physical activity (n=13 provide qualitative data; n=1[48] provides qualitative and quantitative data). The core findings are summarised below, organised using the same structure as the effectiveness studies. Rather than GRADE assessment of overall certainty of evidence to guide interpretation we report overall risk of bias assessed for each study using the MMAT tool (i.e. low, moderate or high risk of bias). Findings in relation to

acceptability, barriers and enablers are summarised, and supporting quotations presented, in **Appendices M and N**.

Unselected populations with subgroup comparisons

Socioeconomic Status (SES)

One study[84] (moderate risk of bias) provides data: Findings from this study highlight social cohesion (sense of belonging to a group) as a crucial moderating factor. Individuals in higher SES areas appear to benefit from stronger social networks that support participation, whereas those in lower SES settings face challenges such as weaker community ties, limited resources, and transportation barriers.

Gender/Sex

One study[84] (moderate risk of bias) provide data: The study identified caregiving responsibilities as a gendered barrier, with female carers reporting difficulty leaving spouses to attend sessions, an issue not noted among male carers.

Unpaid care

One study[84] (moderate risk of bias) provides data: Unpaid caregiving responsibilities, especially among female caregivers emerge as a significant barrier to participation in physical activity and multicomponent interventions. The analysis highlights gendered disparities (as summarised in the section on Gender/Sex, above), with caregiving cited as a challenge primarily by women, while male caregivers did not report this as a barrier.

Disadvantaged/marginalised populations with subgroup comparisons

Race/Ethnicity/Culture

One study[42] (low risk of bias), from a sample of low SES older adults, provides data: While some practical and programme-related barriers and enablers to physical activity participation were identified, no race, ethnicity, or culture-specific influences emerged from the reviewed study.

Gender/Sex

One study[42] (low risk of bias), from a sample of low SES older adults, provides data: While some practical and programme related barriers, and practical, social and health related enablers were identified, minimal gender differences were observed.

Disadvantaged/marginalised populations only

Socioeconomic Status (low SES):

Five studies[42,46,49,52,85] (four low, one high risk of bias) provide data: This analysis highlights both barriers and enablers to participation in physical activity and multicomponent interventions among individuals from low socioeconomic status (SES) backgrounds. Common barriers included health-related limitations, transportation difficulties, and time constraints, particularly among the oldest age groups. Enablers such as perceived health benefits, accessible and convenient locations, social and peer support, and well-designed, tailored programme features including appropriate scheduling and instructor quality were critical in supporting engagement. Social cohesion in group-based interventions also played a significant role.

Race/Ethnicity/Culture (Latino/Latina only):

One study[45] (high risk of bias) provides data: Culturally relevant, dance-based physical activity interventions show strong potential for engaging Latino/Latina populations in the

USA, with participants responding positively to energetic instructors and joyful music as key motivators. These elements were central to fostering enjoyment and sustained participation. Because of the specificity of the minoritised ethnic population studied here the results may not be generalisable to UK.

Place of residence (rural):

Three studies[50,86,87] (two low, one high risk of bias) provide data: Identified barriers included weather conditions, limited access to healthcare, and programme costs. Strong social support, perceived health benefits from outdoor activity, and inclusive, socially engaging programmes were key enablers.

Living situation (living alone):

One study[88] (low risk of bias) provides data: This study of a physical activity intervention for individuals living alone provided insights into practical barriers such as time constraints and a lack of upper body exercises. Perceived health benefits and the flexibility of the intervention were motivators.

Gender/sex (women):

Two studies[51,89] (one low and one high risk of bias) provide data: Women's participation in behavioural and educational interventions is influenced by a complex mix of personal, social, and cultural factors. Social support emerged as a key facilitator, while barriers often arose when programme designs did not align with individual preferences or fit in with life changes around menopause.

More than one PROGRESS-Plus group:

One study[48] (moderate risk of bias) provides data: This multicomponent study in women of low SES provided insights into the acceptability of group sessions and non-traditional exercises. Quantitative findings from a post-study questionnaire further indicate high levels of acceptability, with over 75% saying they would take part in the programme again and would recommend it to a friend. However, there were some challenges, such as participants declining the offer of follow-up telephone calls (stating they already received too many calls or had an aversion to answering calls from unknown numbers) and a preference for exercising alone.

Studies with findings on both effectiveness and experience

Of the 14 studies that provided data on participants' experiences of engaging in interventions to promote physical activity, five of these also reported quantitative findings on the effectiveness of the interventions[45,46,49–51]. All studies reported that the interventions were both effective (in relation to at least one physical activity/sedentary behaviour outcome) and acceptable to participants. Two studies, one pilot RCT[43] (quantitative study rated as moderate risk of bias, and qualitative study rated as low risk) and one uncontrolled before and after study[46] (quantitative study rated as high risk of bias, and qualitative study rated as low risk) were conducted in the UK and involved older people with low SES. Both involved group-based activity (walking groups and dance classes, respectively) and included a social component (peer led walking and engagement with mentors, and a social gathering with friends and family to share the dance following classes). The remaining studies involved women in Australia[51] (feasibility RCT; quantitative study rated as low risk of bias, qualitative study rated as high risk); older people living in rural areas in the Netherlands[50] (uncontrolled before-after study; both study components rated as high risk of bias), and Latina/Latino older adults (pilot RCT; quantitative study rated as moderate risk, qualitative study rated as high risk). Two involved group-based physical activity (culturally tailored dance classes[45] and a

group based exercise club with peer coaching[50]), and one involved an online educational intervention with motivational support in the form of text messages and emails[51].

Discussion

Summary of findings

The aim of this rapid review was to identify and synthesise evidence about the effectiveness of individual level interventions to promote physical activity among disadvantaged and marginalised older adults. In addition, we aimed to summarise the experiences of disadvantaged and marginalised older adults engaging in individual level interventions.

We found limited evidence from studies of interventions delivered to unselected older adults. Few studies (n=6) reported differential effects of interventions comparing disadvantaged and non-disadvantaged groups, and evidence is of low or very low certainty. There is low certainty evidence to suggest that behavioural interventions[47,60] may increase the frequency and duration of physical activity by similar levels amongst women and men. We cannot be sure if there are true differences in intervention effectiveness in studies comparing outcomes based on education level, marital status, and race/ethnicity/culture, as this evidence is all of very low certainty. We found no studies in relation to other disadvantaged/marginalised groups (as defined by PROGRESS-Plus). Forest plots illustrating the direction of effects on physical activity indicate that effect sizes are larger in those with high vs low/medium education[61] (**Appendix K, Figure 1**), and in men vs women[47,61,62] (**Appendix K, Figures 3 and 4**). However, these differences between groups were not statistically significant and therefore inconclusive. Larger, higher quality studies are needed to ascertain whether interventions are equitable across men and women, and by levels of education.

We are moderately confident that interventions directed at marginalised/disadvantaged groups are effective in increasing physical activity in minoritised ethnic groups based in the USA. We found mixed evidence on the effectiveness of multicomponent interventions in women. Evidence for interventions in those with low socioeconomic status and those living in rural areas came from studies with serious limitations. We found no evidence on effectiveness of interventions in other disadvantaged/marginalised groups.

Findings in relation to intervention effectiveness are in line with those of a previous review[8] that used a search range of 2005-2015. That review also found that most studies evaluating the effects of interventions on physical activity in older adults have not assessed differences in outcomes between disadvantaged and non-disadvantaged groups. Our review indicates that this pattern persists in the literature from 2015 to present.

Qualitative findings highlight the important role of social support (group activities; peer or mentor support when engaging in activities) in encouraging participation in physical activity interventions among disadvantaged older adults. Interventions should be tailored to the social and structural contexts of disadvantaged communities. Despite barriers like caregiving, transport, and finances, tailored, culturally relevant, and flexible programmes reportedly appear more successful in engaging participants. What is clear overall from the qualitative research, is that most themes are not unique to any specific PROGRESS-Plus group. In fact, they are similar to the core issues identified in recent reviews of the qualitative literature related to physical activity promotion amongst older people[90–92]. The only exception to this is that for women, caring responsibilities and menopause emerged as potential barriers to participation in activities. Overall, our review suggests that in order to promote activity amongst minoritised ethnic groups, culturally sensitive interventions must be offered, something well recognised in the existing literature[90–92]. Interventions also need to be accessible, not only in terms of physical access and transport, but also in terms of psycho-social access (e.g. “being for people like me”). Cost is also very important; both the cost of the actual physical activity offer and the cost of getting there - again issues identified in the more general literature.

As part of this review we also developed an initial logic model, which has the potential to provide a simple and accessible means of presenting complex relationships to the general population, however there was insufficient evidence to adapt the model based on the findings from this review.

Strengths and limitations

The review was rigorously conducted, following Cochrane rapid review guidelines and PRISMA-E reporting guidelines. Limited reporting of standardised physical activity outcomes across studies (MET mins per day/week) meant we were unable to perform meta-analysis. However, we narratively synthesised the evidence and applied GRADE to assess the certainty of the evidence. Due to the rapid nature of the review we were unable to assess the quality of subgroup analyses[93] conducted in studies evaluating interventions in the general older adult population. Evidence from evaluations reporting on barriers and enablers to physical activity interventions is limited by the small number of studies and the high-level nature of reported data. To ensure relevance, we included only qualitative studies that were linked to an evaluation of an intervention. Qualitative studies exploring attitudes to and experiences of physical activity more generally were beyond the scope of this review. However, this is not a limitation for our work as other recently published reviews have already explored and synthesised this evidence in older groups. Although the PROGRESS-Plus framework is a useful tool to stratify the determinants of inequality/inequity into discrete groups, it does not take into account complexity, such as intersectionality between multiple characteristics of disadvantage or marginalisation[31,94]. For example, individuals from low socioeconomic backgrounds who also belong to minoritised ethnic groups, may face layers of disadvantage, requiring substantially different interventions to improve their outcomes. We applied the Kunonga Framework[30] across all stages of our review, but were unable to interrogate intersectionality beyond the descriptive level (i.e. reporting the presence of overlapping characteristics of disadvantage, but not the impact on outcomes) due to lack of reporting of relevant data in primary studies.

Further research

A critical gap identified by this review is the lack of evidence about whether interventions to promote physical activity are of benefit across social groups. Future evaluations could substantially enhance the current evidence base by integrating health equity methods, such as those outlined by the Kunonga Framework,[30] into analyses of effectiveness. Such methods are necessary in order to judge whether interventions risk widening health inequalities between the most and least advantaged groups.

Insights from qualitative research suggest that interventions should be tailored to the social and structural contexts of disadvantaged communities. Building on this, future research could explore barriers and potential mitigations to participation among groups who experience multiple forms of marginalisation. Caregiving appeared as a barrier for women[84], but not men. In line with the Women's Health Strategy for England[95], this highlights the need for more gender-sensitive research that explores how gender intersects with other forms of disadvantage, and how these dynamics influence the acceptability and accessibility of various types of interventions beyond standalone physical activity programmes. Given the diversity of ageing populations in the UK and the likelihood that cultural values and experiences shape health behaviours, further research is needed to explore how race/ethnicity/culture may impact engagement in physical activity and multicomponent interventions.

Implications for policy

The recently published '*Fit for the Future: The 10 Year Health Plan for England*'[11] recognises the vital role physical activity plays in improving physical and mental health, reducing pressures on NHS services and addressing disparities in health outcomes. To address

health inequalities effectively, the plan advocates for collaborative, cross-sectoral strategies, particularly realised through place based/neighbourhood approaches and tailored to local communities[11,12].

Given this policy context, the lack of robust evidence on effective individual level interventions for disadvantaged or marginalised older people becomes increasingly critical. Any general population interventions implemented as part of the national strategy delivery should prioritise collection of data on SES and include rigorous evaluation mechanisms to determine intervention impact on disadvantaged compared to non-disadvantaged groups, thus preventing the inadvertent widening of health inequalities.

Furthermore, the findings of this review suggest moderate confidence in interventions being targeted specifically at minoritised ethnic groups. Core components identified include group-based physical activity, motivational strategies (such as activity tracking), culturally appropriate educational content, and the delivery of interventions in participants' first language. All of which could be feasibly adapted and implemented within the UK's localised, community-focussed policy framework.

With regard to the qualitative evidence, this supports the design of interventions that enhance social support, reflect individual preferences and cultural context, directly address structural barriers (such as transportation or financial constraints), and integrate physical activity into everyday routines. Future policy delivery plans should prioritise incorporating these evidence-based components into interventions designed for disadvantaged or marginalised groups to maximise the potential for sustainable behaviour change and equitable health outcomes.

Conclusion

There is limited evidence on the effectiveness of interventions to promote physical activity among disadvantaged or marginalised older groups. Community-based interventions with minoritised ethnic groups may be effective in increasing physical activity and could be applied at the local level to improve physical activity outcomes. Critically, future evaluations of interventions to promote physical activity in older groups must consider effectiveness by key population sub-groups. This is necessary in order to identify approaches least likely to widen health inequalities in later life.

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Appendix A – Review Criteria

	Include	Exclude
Population	Older adults (50+ years) from disadvantaged or marginalised groups (as defined by PROGRESS-Plus)	Interventions targeted at those under 50 years); or where data are not reported separately for 50+ years old populations. Studies of participants selected due to their athletic ability or fitness (e.g. professional or amateur athletes; sports students)
Intervention	Any individual-level intervention designed SPECIFICALLY to promote, increase and/or maintain **physical activity,** and/or reduce **sedentary behaviour** as the primary outcome. Example interventions (one-to-one or group) include, but are not limited to, counselling/advice; structured, self-directed or prescribed physical activity; attendance of face-to-face or virtual exercise classes; telephone support; technology use (e.g. smartwatch; app), written education/motivation support material.	Studies where promoting, increasing and/or maintaining physical activity, and/or reducing sedentary behaviour is not the primary aim of the intervention, even when physical activity is the pathway to the primary outcome (e.g. exercise as a way of reducing depression). Population-level interventions
Comparator	Any comparator or none.	
Outcome	Any measure of physical activity participation that assessed change in frequency of participation (e.g. days per week), duration of physical activity/sedentary behaviour (e.g. time spent engaging in activity/time spent sedentary; duration of sustained physical activity), or number and type of physical activities participated in. These may be collected through self- or interview-administered questionnaires (e.g. CHAMPS or PASE), activity diary/log, or device (e.g. smartwatches; pedometers, accelerometers). Any measure of change in intensity of physical activity (e.g. Light, Moderate or Vigorous Physical Activity). This may be indicated by Metabolic Equivalents (METs) and related measures such as oxygen consumption (VO_2 max), calorie consumption[1], or heart rate.	Studies that only report outcomes related to physical function (e.g. gait speed, muscle function) or physical health outcomes not directly related to exercise intensity (e.g. blood pressure, cholesterol). Studies which only report mental health outcomes (e.g. depression, anxiety) Studies reporting acceptability, barriers and enablers to engaging

[1] Calorie consumption refers to the amount of energy expended during physical activity/exercise

	Any quantitative or qualitative process evaluation outcomes (e.g. adherence, attrition, acceptability, barriers and enablers to intervention engagement and uptake).	with physical activity that are not related to an intervention
Study design	Any evaluation study design, including randomised controlled trials, quasi-experimental designs, controlled and uncontrolled before-and-after studies, interrupted time series studies. Qualitative study data were eligible if they provided process evaluation findings for an intervention. Primary studies published from 2015 in any language. To ensure findings were relevant to the UK context we limited the search to literature from high income countries[32].	Observational studies, cross-sectional studies, systematic and non-systematic reviews, case studies, conference abstracts, commentaries, theses. Studies from low-middle income countries.

Appendix B – Database Search Strategy

Name of the Database	No of hits
Pubmed – Ovid	3408
Embase – Ovid	4967
Cinahl	852
TOTAL	9227
Deduplication	2511
Total studies	6716

Database(s): **Ovid MEDLINE(R) ALL** 1946 to October 29, 2024 – Date of Search 31/10/2024
Search Strategy:

#	Searches	Results
1	((promot* or encourag* or boost* or elevat* or develop* or increas*) adj1 (physical activit* or exercis* or fitness or train*)).ti,kf.	5581
2	Exercise/	152234
3	Exercise Therapy/	52608
4	1 or 2 or 3	197605
5	((ag* adj3 ("50" or "65" or fifty or sixty)) or senior* or older adult* or aged person* or advanced age or senescen* or old ag* or geriatric* or senium or frail elder* or elderly or middle aged).kf,tw.	839715
6	exp aged/ or middle aged/	5756348
7	5 or 6	6070205
8	((physical activit* or physical exercise* or PA) adj2 (score? or level? or calculat* or moderate or vigorous or ratio? or increas* or index* or indices or measur* or pedomet* or accelerometer* or MVPA or PASE or intensi* or METs or "heart rate" or VO2max or "calori* consumption*" or "metabolic equivalent*" or IPAQ or CHAMPS or SQUASH or BPAQ or actigraph*)).kf,tw.	68230
9	Accelerometry/	8265
10	Actigraphy/	5071
11	8 or 9 or 10	76502
12	4 and 7 and 11	14287
13	Humans/ not (Animals/ and Humans/)	20021699
14	12 and 13	14128
15	health promotion/ or healthy people programs/ or weight reduction programs/	87799
16	((intervention* adj8 (physical or activi* or exercis* or fitness or train* or app or health* or promot*)) or program*).mp.	1486342

17	15 or 16	1534055
18	14 and 17	5255
19	limit 18 to yr="2015 -Current"	3408

Database(s): **Embase** 1974 to 2024 October 30 – Date of Search 31/10/2024
Search Strategy:

#	Searches	Results
1	((promot* or encourag* or boost* or elevat* or develop* or increas*) adj1 (physical activit* or exercis* or fitness or train*)).ti,kf.	6600
2	exercise/	372680
3	physical activity/	243076
4	1 or 2 or 3	574260
5	((ag* adj3 ("50" or "65" or fifty or sixty)) or senior* or older adult* or aged person* or advanced age or senescen* or old ag* or geriatric* or senium or frail elder* or elderly or middle aged).kf,tw.	1170304
6	aged/	3961183
7	middle aged/	2266032
8	5 or 6 or 7	5812571
9	((physical activit* or physical exercise* or PA) adj2 (score? or level? or calculat* or moderate or vigorous or ratio? or increas* or index* or indices or measur* or pedomet* or acceleromet* or MVPA or PASE or intensi* or METs or "heart rate" or VO2max or "calori* consumption*" or "metabolic equivalent*" or IPAQ or CHAMPS or SQUASH or BPAQ or actigraph*)).kf,tw.	90963
10	exp accelerometer/	20360
11	actimetry/	13543
12	*exercise intensity/	2956
13	exp metabolic equivalent/	6157
14	9 or 10 or 11 or 12 or 13	122532
15	4 and 8 and 14	26376
16	Humans/ not (Animals/ and Humans/)	20399319
17	15 and 16	19915
18	((intervention* adj8 (physical or activi* or exercis* or fitness or train* or app or health* or promot*)) or program*).mp.	2134887
19	health promotion/	116928
20	weight loss program/	3648
21	18 or 19 or 20	2206117

22	17 and 21	6124
23	limit 22 to yr="2015 -Current"	4967

Database(s): **Cinahl Database** – Date of Search 31/10/2024
Search Strategy:

#	Query	Limiters/Expanders	Last Run Via	Results
S21	(S16 AND S20)	Limiters - Publication Date: 20150101-20241031 Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	852
S20	(S17 OR S18 OR S19)	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	561,419
S19	(MH "Weight Reduction Programs")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	3,509
S18	(MH "Health Promotion")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	83,320
S17	TI (((intervention* N4 (physical or activi* or exercis* or fitness or train* or app or health* or promot*)) or program*)) OR AB (((intervention* N4 (physical or activi* or exercis* or fitness or train* or app or health* or promot*)) or program*))	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	499,312

S16	S12 AND S15	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	3,505
S15	S13 NOT (S13 AND S14)	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	2,805,916
S14	(MH "Animals+")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	100,655
S13	(MH "Human")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	2,815,545
S12	(S5 AND S8 AND S11)	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	4,148
S11	(S9 OR S10)	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	35,620
S10	(MM "Actigraphy") OR (MM "Accelerometry") OR (MM "Physical Activity (Omaha)")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	2,078
S9	TI (((physical activit* or physical exercise* or PA) N2 (score? or level? or calculat* or moderate or vigorous or ratio? or increas* or	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	34,297

	index* or indices or measur* or pedomet* or acceleromet* or MVPA or PASE or intensi* or METs or "heart rate" or VO2max or "calori* consumption*" or "metabolic equivalent*" or IPAQ or CHAMPS or SQUASH or BPAQ or actigraph*))) OR AB (((physical activit* or physical exercise* or PA) N2 (score? or level? or calculat* or moderate or vigorous or ratio? or increas* or index* or indices or measur* or pedomet* or acceleromet* or MVPA or PASE or intensi* or METs or "heart rate" or VO2max or "calori* consumption*" or "metabolic equivalent*" or IPAQ or CHAMPS or SQUASH or BPAQ or actigraph*)))			
S8	S6 OR S7	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	330,538
S7	(MM "Middle Age") OR (MM "aged")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	1,692
S6	TI (((ag* N3 ("50" or "65" or fifty or sixty)) or senior* or older adult* or aged person* or advanced age or	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	329,756

	senescen* or old ag* or geriatric* or senium or frail elder* or elderly or middle aged)) OR AB (((ag* N3 ("50" or "65" or fifty or sixty)) or senior* or older adult* or aged person* or advanced age or senescen* or old ag* or geriatric* or senium or frail elder* or elderly or middle aged))			
S5	S1 OR S2 OR S3 OR S4	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	216,144
S4	(MH "Therapeutic Exercise+")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	67,224
S3	(MM "Physical Activity")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	31,643
S2	(MH "Exercise+")	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	134,028
S1	TI (((promot* or encourag* or boost* or elevat* or develop* or increas*) N3 (physical activit* or exercis* or fitness or train*))) OR AB (((promot* or encourag* or boost* or elevat* or develop* or increas*) N3 (physical	Expanders - Apply equivalent subjects Search modes - Proximity	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	49,993

activit* or exercis* or
fitness or train*)))

Appendix C – Grey Literature Search Strategy

Search Methodology

Specific keyword combinations were employed to locate grey literature.

Search terms used:

1. (((promot* or encourag* or boost* or elevat* or develop* or increas*) AND ("physical activit*" or exercis* or fitness or train*)) AND (senior* or "older adult*" or "aged person*" or "advanced age" or senescen* or "old ag*" or geriatric* or senium or "frail elder*" or elderly or "middle aged"))
2. ((promot* or encourag* or boost* or elevat* or develop* or increas*) AND ("physical activit*" or exercis* or fitness or train*))
3. physical activity AND promotion AND Elderly
4. physical activity AND promotion AND older

Below is a summary of the PA grey literature searches that were conducted.

Grey Literature Databases, Key Websites, and other resources

Database	Description	URL
GreyNet	An international network providing access to grey literature.	GreyNet International
BASE (Bielefeld Academic Search Engine)	A powerful academic search engine for open-access documents.	BASE
SSRN (Social Science Research Network)	An open-access repository of social science research papers.	SSRN
The King's Fund Library	Collection of health and social care resources.	The King's Fund Library

Organisations

Organisation	Description	URL
Sport England	Promotes sports and physical activity across England.	Sport England
Richmond Group	A coalition of health and social care organizations promoting physical activity.	Richmond Group
Age UK	A charity focused on improving the lives of older adults, including physical activity initiatives.	Age UK
American Heart Association	Nonprofit organisation advocating for cardiovascular health and physical activity.	American Heart Association
AARP	U.S. advocacy group for older adults, providing health resources including physical activity.	AARP
ParticipACTION	Canadian organization promoting physical activity and health across the country.	ParticipACTION
Canadian Society for Exercise Physiology (CSEP)	Canada's leading authority on exercise physiology and fitness guidelines.	CSEP
Sport New Zealand	National sports organisation promoting physical activity and wellness.	Sport New Zealand

The King's Fund	Provides insights and reports on healthcare, including physical activity strategies for older adults.	The King's Fund
The Health Foundation	A UK-based charity providing reports on public health interventions.	The Health Foundation
Robert Wood Johnson Foundation (RWJF)	A U.S. foundation dedicated to public health improvement, including physical activity research.	RWJF
World Health Organization (WHO)	International organization promoting global health and physical activity guidelines.	WHO
European Public Health Association (EUPHA)	Non-governmental organization focused on public health promotion in Europe.	EUPHA
Community Research and Development Information Service (CORDIS)	European Commission website focusing on EU funded research and innovation	CORDIS

Government Agencies

Website	Description	URL
National Health Service (NHS)	The UK's publicly funded healthcare system, promoting health and physical activity.	NHS
Department of Health and Social Care (UK)	UK government department focusing on health services and public health policy.	DHSC
Health.gov (USA)	The official U.S. website for health policies and guidelines, including physical activity.	Health.gov
U.S. Department of Health and Human Services (HHS)	Government body overseeing health programs and initiatives.	HHS
Government of Canada – Health	Canadian government's health portal, promoting public health and physical activity.	Canada Health
Australian Government Department of Health	Australian government department responsible for public health and physical activity programs.	Health
Australian Sports Commission	Government body supporting sports and physical activity in Australia.	Australian Sports Commission
New Zealand Ministry of Health	New Zealand government department promoting health and well-being.	Ministry of Health NZ
National Institute on Aging	U.S. government agency focused on ageing research and health interventions.	National Institute on Aging
Office for Health Improvement and Disparities (OHID)	UK governmental body (part of Department of Health and Social Care) focused on public health issues including physical activity.	OHID
Public Health England (PHE) (Legacy Papers)	UK governmental body focused on public health issues including physical activity.	Public Health England
Centers for Disease Control and Prevention (CDC)	U.S. agency providing health guidelines and data, including on physical activity.	CDC
National Institutes of Health (NIH)	U.S. health agency providing research reports on physical activity and health promotion.	NIH
Public Health Agency of Canada (PHAC)	Canadian government agency focused on public health and wellness initiatives.	PHAC

Professional Associations

Organisation	Description	URL
British Association of Sport and Exercise Sciences (BASES)	UK's leading professional body for sport and exercise sciences.	BASES
Royal Society for Public Health (RSPH)	UK-based organization promoting public health and wellness, including physical activity programs.	RSPH
American College of Sports Medicine (ACSM)	U.S. organization promoting sports medicine and exercise science research.	ACSM
Society of Behavioral Medicine (SBM)	Promotes interdisciplinary research in behavioral medicine and physical activity.	SBM
Canadian Public Health Association (CPHA)	Canadian organization focused on public health promotion, including physical activity.	CPHA
European College of Sport Science (ECSS)	European organization for sport science research, including physical activity studies.	ECSS
International Society for Physical Activity and Health (ISPAH)	International society promoting global initiatives on physical activity and health.	ISPAH

Additional Sources for Disadvantaged Groups

Source	Description	URL
RAND Corporation	A think tank providing research reports on health interventions for marginalised populations.	RAND
bioRxiv	Repository of preprints on health research, including studies on physical activity and public health.	bioRxiv

Electronic Databases

Database	Description	URL
Google Scholar	A freely accessible search engine for scholarly articles and literature.	Google Scholar
OpenSIGLE	A database for grey literature from Europe.	OpenSIGLE
Web of Science	A multidisciplinary citation database covering journals, books, and conference proceedings.	Web of Science
Prospero	An international register of systematic reviews.	Prospero
Centre for Reviews and Dissemination (CRD)	Resource for systematic reviews and disseminating health-related research.	CRD
Cochrane Collaboration	A global independent network providing systematic reviews in healthcare.	Cochrane Collaboration
Google	Additional searches using Google search engine	
HMIC, Proquest and Web of Science databases.	Scholarly articles and literature	

Appendix D – PRISMA Flow Diagram

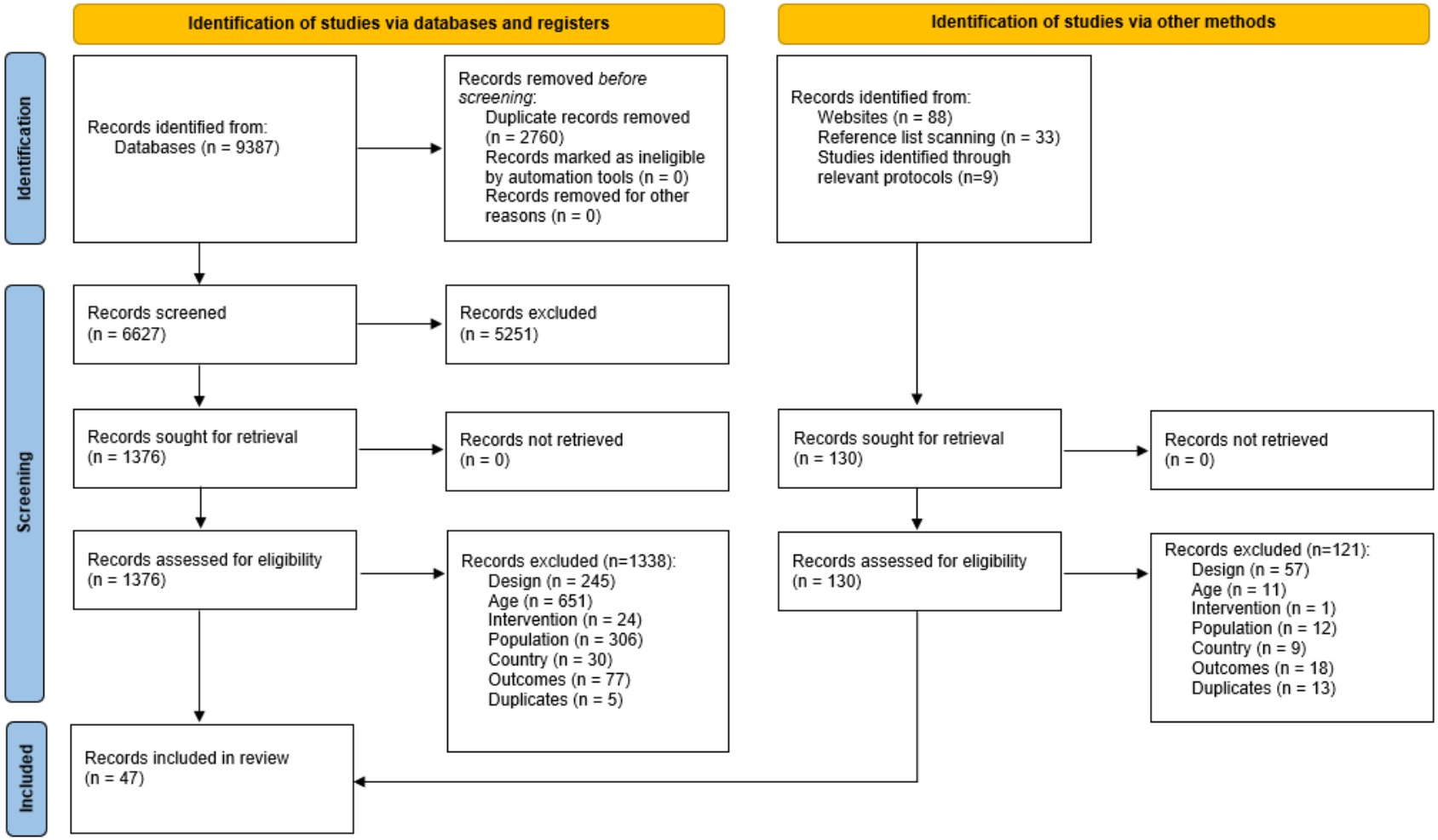


Figure 1. PRISMA flow diagram[96]

Appendix E – Study Characteristics

Author	Year	Country	Setting	PROGRESS-Plus Grouping	Study design	Total Sample Size	Number of arms	Length of follow-up	Outcomes assessed
Aguinaga	2021	United States, USA	Community	Race/ethnicity/Culture	Uncontrolled before-and-after (pre-post) study (feasibility)	20	1	16 weeks	Physical activity (accelerometer and self-report); sedentary behaviour (accelerometer and self-report)
Aparicio-Ting	2015	Canada	Community	Gender/Sex	RCT	320	2	12 months	Physical activity (self-report); Adherence
Balbim	2022	USA	Community	Race /Ethnicity/Culture	Mixed methods (Pilot RCT with debriefing session [no detail on method])	57	2	6 months	Physical activity (self-report and accelerometer); Adherence
Blackford	2016	Australia	Community	Place of residence; SES	RCT	310	2	6 months	Physical activity (self-report)
Britten	2017	UK	Community	SES	Mixed methods (Uncontrolled before-and-after (pre-post) study and Focus groups	22	1	2 months	Physical activity and Sedentary Behaviour (self-report); Adherence
Cadmus-Bertram	2015	USA	Community	Gender/Sex	RCT (feasibility)	51	2	16 weeks	Physical activity (accelerometer); Acceptability of the intervention

Chu	2019	USA	Community	Gender/Sex	RCT (pilot)	37	2	6 weeks	Physical activity and sedentary behaviour (accelerometer) Adherence to intervention
Cyriac	2021	USA	Community	Race/Ethnicity/Culture	Uncontrolled before-and-after (pre-post) study (pilot)	45	1	28 weeks	Physical activity (self-report); Barriers to physical activity
Dabkowski	2021	Australia	Community	Place of residence	Qualitative (focus groups and interviews)	23	NA	NA	Perceived benefits of the programme
Fazzino	2017	USA	Community	Gender/Sex; Place of residence	Uncontrolled before-and-after (pre-post) study	142	2	18 months	Physical activity (accelerometer & self-report) Adherence to accelerometer use
Gell	2024	USA	Community	Place of residence	RCT (pilot)	39	2	16 weeks	Physical activity (accelerometer) Adherence
Hardcastle	2024	Australia	Community	Place of residence	RCT	87	2	12 weeks	Physical activity and sedentary time (accelerometer)
Harris	2015	United Kingdom	Community	Gender/Sex	Mixed methods (cluster RCT and semi-structured interviews)	298	2	12 months	Physical activity (accelerometer) (Note. Data from qualitative interviews gave no insights into PROGRESS-Plus groups and was not included in analyses)

Irvine	2024	Scotland, UK	Community	Place of residence	Qualitative (semi-structured interviews)	9	1	12 weeks	Barriers and enablers
Jancey	2020	Australia	Community	Place of Residence	Uncontrolled before-and-after (pre-post) study	151	1	6, 12, 18 months	Physical activity and sedentary behaviour
Jansons	2023	Australia	Community	Living situation	Qualitative (semi-structured interviews)	15	NA	12 weeks	Barriers and enablers to intervention engagement
Jih	2016	USA	Community	Race/Ethnicity/Culture	Cluster RCT	756	2	6 month	Physical activity (self-report)
Jih	2020	USA	Community	Race/Ethnicity/Culture	Cluster RCT	640	2	Not reported	Physical activity (self-report)
Katigbak	2024	USA	Community	Race/Ethnicity/Culture	Non-randomised, controlled before-and-after (pre-post) study	62	2	12 weeks	Physical Activity (self-report and accelerometer); Acceptability
Lawlor	2019	Northern Ireland	Community	Gender/Sex; SES	Mixed methods (Feasibility RCT, and post-study exit questionnaire /focus group)	40 for RCT, 26 for focus groups	2	9 weeks, 16 weeks, 6 months	Engagement and acceptability
Leone	2016	USA	Community	Race/Ethnicity/Culture	Cluster RCT	712	2	6 months	Physical activity (self-report); adherence
Lo	2020	USA	Community	SES	Qualitative (focus groups)	41	NA	1 year	Experiences of the intervention
Maddock	2022	USA	Community	Gender/Sex; Place of residence	Cluster RCT	182	2	24 weeks	Physical activity and sedentary behaviour (accelerometer and self-report)
Manson	2017	Canada	Community	Gender/Sex;	Qualitative (focus groups)	87	NA	NA	Promotors and challenges to enrolling in the intervention

				SES; Race/Ethnicity/Culture					
Marquez	2022	USA	Community	Race/ethnicity/Culture	RCT	333	2	8 months	Physical activity (self-report and accelerometer) Adherence
McKay	2018	Canada	Community	Gender/Sex; Education	Uncontrolled before-and-after (pre-post) study	458	1	Not reported	Physical activity (self-report)
McMahon	2016	USA	Community	Place of residence	Cluster RCT (feasibility)	30	2	1 and 9 weeks	Physical activity (self-report and accelerometer); Adherence; Acceptability
McNeil	2018	Canada	Community	Gender/Sex; Race/Ethnicity/Culture; Marital status; Education	RCT	400	2	6, 12 and 24 months	Physical activity and sedentary behaviour (self-report and accelerometer)
Menkin	2019	USA	Community	Race/Ethnicity/Culture	RCT	233	2	1 , 2 months	Physical activity (accelerometer)
Muellmann	2019	Germany	Community	Gender/Sex; Education	RCT	589	3	12 weeks	Physical activity (accelerometer); participant satisfaction/acceptability
Newton	2022	USA	Community	Race/Ethnicity/Culture	RCT	56	2	12 weeks	Physical activity (self-report and accelerometer); Acceptability; Adherence
Olson	2022	Australia	Community	Gender/Sex; SES	Qualitative (semi-structured interviews)	9	NA	NA	Acceptability and barriers/facilitators

Pekmezi	2017	USA	Community	Gender/Sex Race/Ethnicity/Culture	RCT	84	2	6 months	Physical activity (accelerometer and self-report) Participant satisfaction with intervention
Piedra	2018	USA	Community	Race/Ethnicity/Culture	RCT	572	2	24 months	Physical activity (accelerometer and self-report)
Prins	2019	The Netherlands	Community	SES	Non-randomised, controlled before-and-after (pre-post) study	644	4	3, 9 months	Physical activity (self-report)
Sánchez Mascuñano	2019	Spain	Community	SES	Uncontrolled before-and-after (pre-post) study	22	1	8 weeks	Physical activity (self-report)
Swartz	2018	USA	Community	Gender/Sex	RCT (secondary analysis)	120	2	12 weeks	Physical activity and sedentary behaviour (accelerometer)
Tully	2019	UK	Community	SES	Mixed methods (pilot RCT with interviews)	50	2	6 months	Physical activity (self-report and accelerometer); acceptability
van de Vijver	2018	The Netherlands	Community	Place of residence	Mixed methods (Uncontrolled before-and-after (pre-post) study, with interviews)	63 and 2 peer coaches	1	18 months	Physical activity (self report); Barriers and motivators
Van Ravenstein	2018	USA	Community	SES	Qualitative (semi-structured interviews)	21	NA	12 weeks	Perceptions of the intervention
Varma	2016	USA	Community	Gender/Sex	RCT	123	2	12 and 24 months	Physical activity (accelerometer)

Wallbank	2022a[51]	Australia	Community	Gender/Sex	Mixed methods (feasibility RCT with open-ended survey)	62	2	3 months	Physical activity (accelerometer); Acceptability; Barriers
Wallbank	2022b[77]	Australia	Community	Gender/Sex	RCT	126	2	3 months	Physical activity (accelerometer and self-report); Intervention engagement
Wallbank	2022c[89]	Australia	Community	Gender/Sex	Qualitative (semi-structured interviews)	20	NA	NA	Views and experiences
Wong	2021	Singapore	Community	Gender/Sex	Cluster RCT	682	2	6 months	Physical activity and sedentary behaviour (accelerometer and self-report)
Yamashita	2021	Japan	Community	Gender/Sex	RCT	39	2	6 months	Physical activity (accelerometer)
Zhang	2024	UK	Community	Gender/Sex	RCT	176	2	12, 18 months.	Physical activity (self-report)

Appendix F – Overview of Interventions

Author	Year	Intervention	Intervention category	Type of exercise/PA if part of intervention and reported	Duration of intervention
Aguinaga	2021	BAILA TECH intervention, integrating BAILAMOS Latin dance program with mHealth	Multicomponent (PA and behavioural)	Latin dance	4 months
Aparicio-Ting	2015	Exercise intervention	Multicomponent (PA, behavioural and educational)	Endurance; Aerobic	3 months
Balbim	2022	Dance programme	Physical activity	Dance	4 months
Blackford	2016	Home-based physical activity, diet, and healthy weight management intervention	Multicomponent (behavioural and educational)	NA	6 months
Britten	2017	Dance programme	Physical activity	Dance	2 months
Cadmus-Bertram	2015	Fitbit-based physical activity intervention	Multicomponent (PA and behavioural)	Walking and other PA not specified	4 months
Chu	2019	Individual exercise intervention	Multicomponent (PA and educational)	Balance and strength	6 weeks
Cyriac	2021	Theory-informed, culturally tailored mHealth lifestyle intervention	Multicomponent (behavioural and educational)	NA	10 weeks
Dabkowski	2021	Gippsland Health and Wellbeing Program to improve mobility, balance, and well-being	Multicomponent (PA, behavioural and educational)	Tai Chi, balance, mobility	1 year
Fazzino	2017	Weight loss and physical activity intervention	Behavioural	Walking	18 months
Gell	2024	Enhance Fitness (tele-EF) delivered remotely via Zoom	Physical activity	Aerobic, strength, balance, and flexibility	4 months
Hardcastle	2024	Health coaching sessions	Multicomponent (PA, behavioural and educational)	Moderate intensity, but type not specified	10 weeks
Harris	2015	Primary care nurse consultation-based intervention	Behavioural	Walking	3 months
Irvine	2024	Group outdoor health walks	Multicomponent (PA and behavioural)	Walking	3 months
Jansons	2023	Home based exercise snacking using ALEXA	Physical activity	Strength and balance	3 months

Author	Year	Intervention	Intervention category	Type of exercise/PA if part of intervention and reported	Duration of intervention
Jancey	2020	Home-based physical activity and nutrition program	Multicomponent (PA and behavioural)	Strength, flexibility and aerobic	6 months
Jih	2016	2 Chinese-language nutrition and PA lectures + Chinese-language print materials	Educational	NA	6 months
Jih	2020	Lay Health Workers were recruited and trained to give advice on healthy eating and physical activity	Educational	NA	Not reported
Katigbak	2024	A culturally and linguistically tailored walking programme	Multicomponent (PA, behavioural and educational)	Walking	3 months
Lawlor	2019	Face-to face group education sessions	Multicomponent (behavioural and educational)	NA	6 weeks
Leone	2016	Church-based ACTS of Wellness intervention	Multicomponent (PA, behavioural and educational)	Walking and exercise classes	6 months
Lo	2020	Mind Body-Wellness in Supportive Housing (Mi-WiSH)	Physical activity	Tai Chi	1 year
Manson	2017	Tai Chi	Physical activity	Tai Chi	Not specified
Maddock	2022	Community-based exercise and nutrition education classes	Multicomponent (PA, behavioural and educational)	Aerobic, strength	6 months
Marquez	2022	Latin dance program (BAILAMOS)	Physical activity	Latin dance	8 month
McKay	2018	Choose to Move intervention with activity coaches	Behavioural	Various, personalised	6 months
McMahon	2016	Ready~Steady intervention to reduce falls	Multicomponent (PA and behavioural)	Strength and balance	2 months
McNeil	2018	Exercise sessions	Physical activity	Moderate to vigorous activity. Exercise not otherwise specified	3 months
Menkin	2019	Worth the Walk intervention to promote walking and stroke knowledge	Multicomponent (behavioural and educational)	Walking	1 month
Muellmann	2019	Instruction to engage in exercise	Intervention 1: Multicomponent (PA,	General physical activity	10 weeks

Author	Year	Intervention	Intervention category	Type of exercise/PA if part of intervention and reported	Duration of intervention
			behavioural [diary], educational) Intervention 2: Multicomponent (PA, behavioural [FitBit + diary], educational)		
Newton	2022	Group and home-based exercise sessions	Physical activity	Strength, balance, flexibility, dance	3 months
Olson	2022	Theory-based peer-led group walking intervention	Multicomponent (PA and behavioural)	Walking	4 months
Pekmezi	2017	HIPP intervention using behavioural strategies to increase physical activity	Multicomponent (behavioural and educational)	Individually tailored, but included walking and strength	6 months
Piedra	2018	¡Caminemos! community-based exercise program	Multicomponent (PA, and behavioural)	Strength, balance, endurance	1 month + 11 month
Prins	2019	Peer-led neighbourhood and designated walking groups	Intervention 1. Behavioural (designated walking routes) Intervention 2. Behavioural (walking groups - social) Intervention 3. Behavioural (designated walking routes; walking groups - social)	Walking	3 months
Sánchez Mascuñano	2019	Workshops to educate on the adoption of healthy habits	Educational	NA	2 months
Swartz	2018	Pedometer based intervention	Physical activity	Walking	3 months
Tully	2019	Peer-led walking intervention ('Walk with Me')	Multicomponent (PA and behavioural)	Walking	3 months
van de Vijver	2018	Peer-coaching group based intervention	Multicomponent (PA and behavioural)	Strength, balance, endurance	18 months

Author	Year	Intervention	Intervention category	Type of exercise/PA if part of intervention and reported	Duration of intervention
Van Ravenstein	2018	Telehealth PA programme	Physical activity	Balance and strength	3 months
Varma	2016	Volunteering in public school	Physical activity	Walking	2 years
Wallbank	2022a[51]	Active Women over 50 – online programme	Multicomponent (behavioural and educational)	NA	3 months
Wallbank	2022b[77]	Active Women over 50 – face-to-face information sessions, activity tracker, and video-conference option	Multicomponent (behavioural and educational)	General physical activity	3 months
Wallbank	2022c[89]	Active Women over 50 - face-to-face information sessions, activity tracker, and video-conference option	Multicomponent (behavioural and educational)	NA	3 months
Wong	2021	SPANS intervention to improve the health behaviours and outcomes	Multicomponent, behavioural and educational)	Moderate intensity PA. Exercise not otherwise specified	6 months
Yamashita	2021	Financial and/or social network incentives	Behavioural	Walking	3 months
Zhang	2024	Healthy Conversation Skills programme	Behavioural	NA	9 months

Appendix G – Intervention components

Author	Year	Exercise/PA (Not specified if solo or group)	Exercise/PA: solo	Exercise/PA: group-based	Provision of information /education	Goal setting, self-monitoring, progress review	Social support/ motivational support/ counselling, consultations	Equipment/ technology	Included dietary/weight management component?	Other
Aguinaga	2021									
Aparicio-Ting	2015									
Balbim	2022									
Blackford	2016									
Britten	2017									Social event
Cadmus-Bertram	2015									
Chu	2019									Bladder training, falls prevention
Cyriac	2021									
Dabkowski	2021									
Fazzino	2017									
Gell	2024									
Hardcastle	2023									
Harris	2015									
Irvine	2024									
Jancey	2020									
Jansons	2023									
Jih	2016									
Jih	2020									
Katigbak	2024									CBT
Lawlor	2019									
Leone	2016									Church events
Lo	2020									

Author	Year	Exercise/PA (Not specified if solo or group)	Exercise/PA: solo	Exercise/PA: group-based	Provision of information /education	Goal setting, self-monitoring, progress review	Social support/ motivational support/ counselling, consultations	Equipment/ technology	Included dietary/weight management component?	Other
Manson	2017									
Maddock	2022									
Marquez	2022									
McKay	2018									
McMahon	2016									Fall prevention
McNeil	2018									
Menkin	2019									
Muellmann	2019									
Newton	2022									
Olson	2022									
Pezmeki	2017									Culturally tailored.
Piedra	2018									
Prins	2019									Designated walking routes and walking groups
Sánchez Mascuñano	2019									
Swartz	2018									
Tully	2019									
van de Vijver	2018									
Varma	2016									Volunteering in schools
VanRavenstein	2018									
Wallbank	2022a[51]									

Author	Year	Exercise/PA (Not specified if solo or group)	Exercise/PA: solo	Exercise/PA: group-based	Provision of information /education	Goal setting, self-monitoring, progress review	Social support/ motivational support/ counselling, consultations	Equipment/ technology	Included dietary/weight management component?	Other
Wallbank	2022b[7] [7]									One free trial exercise class
Wallbank	2022c[8] [9]									One free trial exercise class
Wong	2020									
Yamashita	2021									Financial incentives and social networks
Zhang	2024									Healthy conversations involved listening rather than giving information

Appendix H – Risk of Bias Assessment (MMAT tool)

Appendix Table 1. Randomised Controlled Trials

Study	Is randomisation appropriately performed?	Are the groups comparable at baseline?	Are there complete outcome data?	Are outcome assessors blinded to the intervention provided?	Did the participants adhere to the assigned intervention?	Overall
Aparicio-Ting 2015	Low	Low	Low	Low	High	Low
Balbim 2022	Low	Low	High	Low	High	Moderate
Blackford 2016	Unclear	Low	High	Unclear	High	High
Cadmus-Bertram 2015	Low	Low	Low	Unclear	Low	Low
Chu 2019	Unclear	Low	Low	Unclear	Low	High
Gell 2024	High	Low	Low	Unclear	Low	High
Hardcastle 2024	Low	Low	High	Unclear	High	High
Harris 2015	Low	Low	Low	Low	Unclear	Low
Jih 2016	Low	Low	Low	Low	Low	Low
Jih 2020	Unclear	High	Low	Unclear	Unclear	High
Lawlor 2019	Low	Unclear	High	High	Unclear	High
Leone 2015	Unclear	High	Unclear	High	High	High
Maddock 2022	Low	Low	Low	Unclear	High	Moderate
Marquez 2022	Unclear	Low	High	Low	High	High
McMahon 2016	Low	High	Low	Unclear	Unclear	High
McNeil 2018	Unclear	High	High	Unclear	High	High
Menkin 2019	Low	High	Low	Low	High	Moderate
Muellmann 2019	Unclear	Low	High	Unclear	Low	High
Newton 2022	Low	Low	Low	Low	Low	Low
Pekmezi 2017	Unclear	Low	Low	High	High	High
Piedra 2018	Low	Low	Low	Low	Low	Low
Swartz 2018	Unclear	Low	Low	Unclear	High	High

Tully 2019	Low	High	Low	Unclear	Low	Moderate
Varma 2016	Low	Low	High	Unclear	Unclear	High
Wallbank 2022a[51]	Low	Low	Low	Low	Low	Low
Wallbank 2022b[77]	Low	Low	Low	Unclear	Unclear	Moderate
Wong 2021	Low	High	Low	Unclear	High	High
Yamashita 2021	Unclear	Unclear	Unclear	Low	High	High
Zhang 2024	High	High	Low	High	Low	High

Appendix Table 2. Quasi-experimental studies

Study	Are the participants representative of the target population?	Are measurements appropriate regarding both the outcome and intervention (or exposure)?	Are there complete outcome data?	Are the confounders accounted for in the design and analysis?	During the study period, is the intervention administered (or exposure occurred) as intended?	Overall
Aguinaga 2021	Low	Low	Low	Low	Low	Low
Brittain 2017	High	Low	High	Low	Low	High
Cyriac 2021	Unclear	Low	Low	Low	Low	Low
Fazzino 2017	Low	Low	Unclear	Unclear	Unclear	High
Jancey 2020	Low	Low	High	Low	Low	Low
Katigbak 2024	Low	Low	Low	High	Low	Low
McKay 2018	Unclear	Low	Unclear	Low	Unclear	High
Prins 2019	High	Low	High	Low	Low	Moderate
Sánchez Mascuñano 2019	High	Low	High	High	Unclear	High
van de Vijver 2018	Unclear	Unclear	Unclear	Low	Low	High

Appendix Table 3. Qualitative studies

Study	Is the qualitative approach appropriate to answer the research question?	Are the qualitative data collection methods adequate to address the research question?	Are the findings adequately derived from the data?	Is the interpretation of results sufficiently substantiated by data?	Is there coherence between qualitative data sources, collection, analysis and interpretation?	Overall
Balbim 2022	Unclear	Unclear	Low	Low	Low	High
Brittain 2017	Low	Low	Low	Low	Low	Low
Dabkowski 2021	Low	Low	Low	Low	Low	Low
Irvine 2024	Low	Low	Low	Low	Low	Low
Jansons 2023	Low	Low	Low	Low	Low	Low
Lawlor 2019	Low	Unclear	Low	Low	Unclear	Moderate
Lo 2020	Low	Low	Low	Low	Low	Low
Manson 2017	Low	Low	Low	Low	Low	Low
Olson 2021	Low	High	Low	Low	Low	Moderate
Tully 2019	Low	Low	Low	Low	Low	Low
van de Vijver 2018	Low	Unclear	High	High	High	High
Van Ravenstein 2018	Low	High	Low	High	Low	High
Wallbank 2022a[51]	Low	High	High	High	Low	High
Wallbank 2022c[89]	Low	Low	Low	Low	Low	Low

Appendix I – Overview of Results

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
Aguinaga	2021	Daily step count; Duration of PA and SB	Accelerometer; CHAMPS questionnaire; Sedentary Behaviour Questionnaire (SBQ)	NR	NR	Significant increase from baseline to post-intervention in device-assessed: • MVPA minutes per week (mean difference 34.7 [95% CI: 17.7, 51.7], d = 0.69) Significant increase in self-reported: • light-leisure minutes per week (mean difference 507.8 [95% CI 417.3, 598.3], d = 1.91) • MVPA minutes per week (mean difference 208.9 [95% CI 141.2, 276.6], d = 1.05) • moderate-to-vigorous leisure PA minutes per week (mean difference 233.5 [95% CI 182.4, 284.6], d = 1.55) No significant differences on the following: accelerometer steps per day, light PA and time spent sedentary; self-report light PA, moderate PA, moderate leisure PA, and time spent sedentary on weekdays and weekends.	The study suggests an increase in PA levels and health-related outcomes of middle-aged and older Latinxs from participation in an mHealth-infused Latin dance intervention. A larger trial is needed to establish efficacy.
Aparicio-Ting	2015	Duration of PA and SB; Adherence	Past Year Total Physical Activity Questionnaire (PTY-PAQ) (converted to METs)	21.25%	26.25%	PA: 24 months (12 months following intervention): • Recreational PA (RPA): No statistical difference between the two groups; Intervention n=78 (62%) active, Control n=68 (58%) active, p=0.52. Intervention	Levels of recreational PA increased in both the exercise and control groups 12 months post intervention. The lack of a statistical difference in

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						n=48 (38%) inactive, n=50 (42%) inactive (no statistical test conducted to look at difference between those classed as 'inactive'). Adherence: women in the exercise group completed an average of 178 (SD = 76) exercise minutes per week and 71% participated in sufficient RPA to meet current public health guidelines of 150 minutes per week. Of the 320 women randomized, 126 (79%) women from the exercise group and 118 (74%) women from the control group responded to the 12 month follow-up questionnaires.	RPA may be due to non-response bias.
Balbim	2022	Duration of PA and SB; Adherence	Accelerometer; CHAMPS questionnaire	28%	27.60%	PA: Dance group significantly increased participation in leisure-time MVPA relative to control participants ($F[1,53] = 3.17$, $p = .048$, $\eta^2_G = .01$). SB: Dance group significantly increased device-assessed time spent in sedentary behaviour ($F[1,52] = 4.23$, $p = .028$, $\eta^2_G = .03$) compared to control participants Adherence: The average attendance was 67.93 ± 28.91%, and 61.68 ± 38.03% in the intervention (dance programme)	Intervention had positive impact on self-reported PA, but not on device-assessed SB. Intervention participants might demonstrate compensation effects, increasing participation in SB due to increased participation in leisure-time moderate-to-vigorous PA.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						and control (health education programme), respectively. Specifically, 59% (N = 17) of intervention participants attended more than 75% of the classes, and 61% (N = 17) of the control participants attended more than 75% of the classes.	
Blackford	2016	Frequency, duration and intensity composite (MET min/week of PA)	International Physical Activity Questionnaire – Short Form (IPAQ-SF)	24.90%	19.50%	• Moderate MET min/week: Compared to the control group, the intervention group showed a small improvement in moderate MET min/week. GEE Coef (SE) 0.29 (0.15), p=0.049 • Walking MET min/week: There was no significant difference in change between groups on walking MET min/week. GEE Coef (SE) −0.10 (0.16), p=0.524 • Vigorous MET min/week: There was no significant effect of the intervention on vigorous MET min/week. GEE Coef (SE) 0.15 (0.24), p=0.537 • Total MET/min per week: There was no significant effect of the intervention on total MET min/week. GEE Coef (SE) 0.11 (0.12) p=0.335 • Sitting hours/day: There was no significant effect of the intervention on sitting hours per day. GEE Coef (SE) 0.15 (0.34), p=0.224	The intervention improved time spent in moderate PA in the intervention group compared to the control group

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
Britten	2017	Duration of PA and SB; Adherence	International Physical Activity Questionnaire (IPAQ)	15%	NA	PA: walking, moderate and vigorous PA increased between baseline and the end of the dance programme, however, only moderate physical activity levels ($t(21) = 2.19$, $p < 0.05$) and vigorous physical activity ($t(21) = 2.59$, $p < 0.005$) increased significantly. SB: sitting time decreased during both the weekdays and at weekends, however, only the former decreased significantly ($t(21) = 1.81$, $p < 0.05$ $d = 0.20$) Adherence: mean global adherence rate was 84.3 ± 17.03%.	The dance programme increased moderate and vigorous PA levels, and decreased sedentary behaviour during the week.
Cadmus-Bertram	2015	Daily step count; Duration of PA; Adherence; Acceptability	Accelerometer	0%	7.69%	PA: Although the intervention group increased their PA, there were no significant between-group differences: • total MVPA (p=.11, effect size d=.48), • bouts MVPA (p=.28, d =.28) • light intensity PA (p=.54, d=.09) • steps per day (p=.30, d=.24) Adherence/Acceptability: • 96% of participants reported wearing the tracker ≥4 days/week. • median days of any wear (≥2,000 steps accrued) was 106 of 112 prescribed days.	A Fitbit-based intervention was associated with increased PA, with no change observed in the Pedometer Group. Although between-group tests did not reach significance, this may be due to sample size. The increase of 62 minutes/week of MVPA observed in the Fitbit

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						• 88% used the website, with 52% logging in ≥2–3 days/week. • Participants were most engaged with the device itself (72% viewing tracker data ≥1 time/day), using a passive approach to the website (viewing feedback but not changing goals or manually logging behaviours). • 96% of women liked the Fitbit website, and 100% liked the tracker. 76% would recommend the Fitbit to a friend. • 96% rated the Fitbit as "somewhat or very" helpful for increasing PA, compared to only 32% of the Pedometer Group who found the basic pedometer "somewhat or very" helpful.	arm is substantial, particularly if maintained over time.
Chu	2019	Step count; Frequency of PA and SB; Duration of PA and SB; Adherence	Accelerometer	10.50%	11.10%	PA & SB: No significant between-group differences in change in physical activity or sedentary behaviour at follow-up. Adherence: The median number of sessions completed was 13 (range, 0-21), or about 72% of the number of recommended sessions. Two participants (11%) achieved complete adherence (≥18 sessions/6 weeks); however, no participant achieved 3 sessions/week for the entire 6-week	Home-based physical exercise and bladder-training intervention is feasible in older women with UI. Further research needed in full scale RCT regarding effectiveness. Behavioural support for exercise adherence would be needed.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						period. Ten participants (53%) achieved at least 70% adherence.	
Cyriac	2021	Duration of PA; Barriers to PA	Electronic survey	0%	NA	The change in moderate-intensity PA per week (MPA) was modest (Mean difference +30 minutes; IQR: −12.5 to 122.5; 99%CI−52.5 to 92.5; p=0.04, d=0.22) No change in perceived barriers to PA: (mean difference 0.0 (SD 0.5; 99%CI−0.2 to 0.2)	The FAITH! app pilot intervention is promising for increasing PA among African Americans. The findings support the potential of culturally tailored mHealth interventions, though larger randomised trials are needed for definitive evidence.
Dabkowski	2021	Perceived benefits of the intervention	Interviews and focus groups	NA	NA	High acceptance of the programme. Barriers included cost and access. Enablers included a social component and an experienced instructor	The community-based exercise programme was found to be highly acceptable. Its success was attributed to the combination of structured exercise, social engagement, and tailored instruction. The authors recommend incorporating Tai Chi into future programmes and ensuring

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
							accessibility for participants of all abilities.
Fazzino	2017	Duration of PA; Adherence	Accelerometer; Paffenbarger Physical Activity Questionnaire (PPAQ)	NR	NR	PA: Summary of the change in physical activity over 18 months for the intervention group, including significance levels: • Accelerometer-measured MVPA: - Baseline to 6 months: Increased from 18.4 to 65.3 minutes/week (P = 0.001; 350% increase) - 6 to 18 months: Decreased from 65.3 to 38.1 minutes/week (P = 0.01; 42% decrease) - 18 months vs. baseline: Increased from 18.4 to 38.1 minutes/week (P = 0.001; 210% increase) • Self-reported MVPA: - Baseline to 6 months: Increased from 0 to 227.5 minutes/week (P = 0.001; 227% increase) - 6 to 18 months: Decreased from 227.5 to 150.0 minutes/week (P = 0.001; 34% decrease) - 18 months vs. baseline: Increased from 0 to 150.0 minutes/week (P = 0.001; 150% increase) • Comparison: - Self-reported MVPA was significantly	The intervention improved MVPA min/wk at 6 months, with partial maintenance of effects at 18 months. Self-reported physical activity changes were more than triple those of the accelerometer measured changes, suggesting that measurement is crucial for accurately specifying the magnitude of physical activity changes.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						higher than accelerometer-measured MVPA at both 6 months (P = 0.001) and 18 months (P = 0.001). Adherence to accelerometer use: The percentage of participants who provided valid accelerometer data was high (89%-92%) and in line with national cohort research that used accelerometers to measure physical activity	
Gell	2024	Step count; Duration of PA and SB; Adherence	Accelerometer	5%	5.26%	There were significant improvements in the intervention group for time spent in MVPA [change 3.2(5.0), p=0.02] and LPA [change 38.5(53.8), p=.001], step counts [change 1976.9(2247.0), p=0.003], and a reduction in time spent being sedentary [change -56.3(79.6), p=0.01]. There were no significant changes in the control group for the same outcomes; MVPA change 0.8(6.9), p=0.65; LPA change 0.5(66.4), p=0.98; sedentary change 18.4(65.3), p=0.26; steps change 33.2(1929.5), p=0.94). The between-group comparison showed significant differences in the physical activity outcomes for LPA (p = 0.03, d = 0.72), sedentary time (p = 0.001, d = 0.81), and total step count (p = 0.01,	The intervention is feasible and effective for improving physical activity in older rural cancer survivors. Supports wider implementation.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						d = 0.96) but not MVPA (p=0.32, d =0.53). Adherence: Median class attendance rate was 87%.	
Hardcastle	2024	Duration of PA and SB	Accelerometer	23.30%	6.80%	MVPA: Compared with controls, the intervention group had a significant net mean increase in MVPA of 49.8 min/week (95% confidence interval (95%CI): 13.6 to 86.1, p = 0.007). MV10: Compared with the controls, the intervention group had a significant net mean increase in MVPA bouts (i.e., MVPA performed in bouts of 10 min) of 39.5 min/week (95%CI: 11.9 to 67.1, p = 0.005) . Moderate PA: Compared with the controls, the intervention group had a significant net mean increase in moderate PA of 49.5 mins/week (95% CI:13.0 to 85.9), p=0.008 Light PA: There was no significant difference between groups (net mean increase: 30.5 95%CI 143.7 to 204.8), p=0.731 Sedentary time: There was no significant difference between groups (net mean reduction: -65.2 95% CI -2707 to 140.4),	The intervention yielded a significant and clinically meaningful increase in MVPA compared to controls, displaying promise for the use of low-intensity and purely distance-based interventions using smart wearables.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						p=0.534 Sedentary time bouts: There was no significant difference between groups (net mean reduction: -55.6 95%CI -271.8 to 160.7), p=0.615 Limiting the sample to only those insufficiently active, the net intervention effect was reduced to 30.4 min/week MVPA (95%CI: 4.2 to 65.0, p = 0.085).	
Harris	2015	Daily step count	Accelerometer	Combined attrition for full sample: 3% at 3 months, 6% at 12 months	Combined attrition for full sample: 3% at 3 months, 6% at 12 months	TOTAL SAMPLE: At 3 months, the intervention group had significantly higher step counts (+1,037 steps/day; p<0.001) and MVPA (+66 min/week; p<0.001), with most of the MVPA in 10-minute bouts (+63 min/week; p<0.001). At 12 months, the intervention group still had higher step counts (+609 steps/day; p=0.018) and MVPA (+40 min/week; p=0.009). GENDER: Daily Step-Count at 3 Months: Men: Increased by 1,534 steps/day (95% CI: 775–2,294). Women: Increased by 591 steps/day (95% CI: –125 to 1,307). Subgroup Interaction: The difference between genders was not statistically significant (p=0.08).	Neither gender nor participation type reached statistical significance as effect modifiers, but trends suggested stronger effects for men and couples.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
Irvine	2024	Acceptability ; Barriers	Semi-structured interviews	33%	NA	Intervention was acceptable to participants. Barriers included health constraints and weather concerns.	Group Outdoor Health Walks (GOHW) intervention effectively promoted physical activity and fostered social connections among older adults.
Jancey	2020	Frequency, duration and intensity composite (MET min/week) of PA; Duration of SB	International Physical Activity Questionnaire (IPAQ)	54%	NA	Physical activity levels remained stable across time points (no significant differences between t2, t3, and t4, both from paired samples t-tests and repeated measures ANOVA) Differences between t2 and t3 (paired samples t-test): - Walking MET min/week: There was no significant difference in walking MET min/week between t2 (mean = 577.50; SD = 742.50) and t3 (mean = 495.00; SD = 1188.00), p = 0.513. - Moderate MET min/week: There was no significant difference in moderate MET min/week between t2 (mean = 480.00; SD = 850.00) and t3 (mean = 540.00; SD = 1275.00), p = 0.819. - Vigorous MET min/week: There was no significant difference in vigorous MET min/week between t2 (mean = 217.52; SD = 460.19) and t3 (mean = 285.00; SD =	Although the initial 6-month intervention yielded significant improvements, PA remained stable between 6, 12, and 18 months. This suggests that while behaviour change can be initially achieved, maintaining long-term improvements is challenging. Future interventions should consider embedding booster strategies and community-based supports to sustain changes.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						571.36), p = 0.676. - Total MET min/week: There was no significant difference in total MET min/week between t2 (mean = 1332.00; SD = 1624.88) and t3 (mean = 1687.50; SD = 2783.38), p = 0.615. - Sitting minutes per day: There was no significant difference in sitting minutes per day between t2 (mean = 319.66; SD = 162.71) and t3 (mean = 308.98; SD = 152.77), p = 0.111. Differences between t3 and t4 (paired samples t-tests): - Walking MET min/week: There was no significant difference between t3 (mean = 495.00; SD = 1188.00) and t4 (mean = 552.75; SD = 767.25), p = 0.877. - Moderate MET min/week: There was no significant difference between t3 (mean = 540.00; SD = 1275.00) and t4 (mean = 480.00; SD = 1410.00), p = 0.576. - Vigorous MET min/week: There was no significant difference between t3 (mean = 285.00; SD = 571.36) and t4 (mean = 499.11; SD = 1302.62), p = 0.186. - Total MET min/week: There was no significant difference between t3 (mean = 1687.50; SD = 2783.38) and t4 (mean =	

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						1439.50; SD = 3114.00), p = 0.534. - Sitting minutes per day: There was no significant difference between t3 (mean = 308.98; SD = 152.77) and t4 (mean = 338.18; SD = 169.26), p = 0.261.	
Jansons	2023	Barriers and enablers	Semi-structured interviews	NA	NA	Barriers included lack of choice around type of exercise, lack of time and motivation. Enablers included perceived health benefits and efficiency/flexibility of the intervention	Future trials of the intervention should consider providing participants exercise equipment, incorporate whole-body exercises, and establish participant preferences on achieving three or more exercise snacks per day
Jih	2016	Duration of PA; Adherence	Survey	0.01%	0.8%	PA: In analyses adjusting for sociodemographic and health factors, the intervention group were more likely to meet the guidelines for physical activity compared to control group (AOR= 1.93 (1.54, 2.42) Adherence: Mean attendance among participants in intervention and control groups respectively was 7.3 (SD = .82) and 7.1 (SD = .86) out of 8 sessions	In-language print materials, alone and combined with lectures, increased nutrition and physical activity knowledge and behaviors among older Chinese Americans

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
Jih	2020	Duration of PA	Telephone survey	2.8%	1.3%	The intervention group had a greater increase than the comparison group in the odds of meeting the weekly physical activity recommendation (AOR = 2.2; 95% CI, 1.4–3.6).	In a sample of older, limited–English-proficient Vietnamese Americans, those who received the lay health worker HEPA educational intervention had significant increases in self-reported behaviors meeting recommended PA guidelines, and these increases were greater than increases in the comparison group.
Katigbak	2024	Daily step count; PA levels; Acceptability	Accelerometer; International Physical Activity Questionnaire Short Form – Chinese version (IPAQ-C)	3%	NA	Overall, the enhanced walking group improved their average daily step-counts from baseline to follow-up by 244 steps. In comparison, the control group's average steps decreased by 1899 steps in this same timeframe [it is not made clear whether this was a significant difference between groups]. Finally, there was a significant (p=0.02) two-way interaction between time and group assignment where the reduction in	The enhanced walking group (intervention) had fewer steps at baseline and less of a reduction in steps by 12 weeks as compared with the walking only (control) condition.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						steps from post-intervention (week 8) to follow-up (week 12) was greater for the control group. (see Mean SD columns for values). Acceptability: The intervention was well-received, with high satisfaction and retention rates (97%)	
Lawlor	2019	Engagement; acceptability	Post study exit questionnaire	NR	NR	Engagement and uptake: 77.5% participants attended all three education sessions; 7.5% accepted the offer of motivational follow-up telephone calls; 27.5% participants wore an accelerometer as requested and returned data at all time points; Acceptability: 85% stated they were somewhat/very satisfied with the information they were given about the study (participant information letter and verbal explanation). 77.5% reported that they would recommend the programme to a friend 75% said they would be involved in the programme again; 72.5% were very satisfied with the information leaflet;	The delivery of a trial of this PA intervention using pre-existing groups within socio-economically disadvantaged areas is feasible, although refinement of intervention components and methods of delivery is required.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						72.5% reported that having a buddy was a great benefit.	
Leone	2016	Duration of PA; Adherence	Questionnaire developed and validated for the WATCH study (Campbell et al., 2004)	Combined attrition rate for entire sample: 25.4%	Combined attrition rate for entire sample: 25.4%	There were no significant overall differences in changes in all the three PA outcomes. MET-hours/week MVPA, mean (95%CI) Follow-up: p=0.15 Minutes/week MVPA, mean (95% CI) Follow-up: p=0.22 Meeting Recommendation of ≥150 minutes/week MVPA, % (change from baseline) p=0.34 Adherence: 11% of intervention participants participated in exercises at church.	Overall, the intervention did not improve PA or CRC screening in an urban church population. These findings support previous research indicating that structured PA opportunities are necessary to promote change in PA and churches need more support to initiate effective peer counselor programs
Lo	2020	Experiences of the intervention; Adherence	Focus groups	7.3%	NA	Tai Chi was highly acceptable to participants. Barriers included health conditions and caring responsibilities. Enablers included convenient location and social support. Adherence: Average class attendance was 64.3%	Not reported

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
Maddock	2022	Duration of PA and SB; Frequency, duration and intensity composite (MET min/week) of PA	Accelerometer; International Physical Activity Questionnaire Short Form (IPAQ-SF); Sedentary Behaviour Questionnaire (SBQ)	19.5%	32.6%	In the subsample of participants 60 years and older, intervention participants improved compared to controls in average MVPA measured via accelerometer at 12 weeks (increase of 8.2 min per day, 95%CI: 2.2 to 14.1 P=0.008) and 24 weeks (increase of 7.0 min, 95%CI: 0.7 to 13.4, P=0.031). No other statistically significant findings.	The intervention successfully increased accelerometer assessed MVPA in rural women aged over 60
Manson	2017	Barriers and enablers to enrolement	Focus groups	NA	NA	Barriers included accessibility, travel, weather and facility. Enablers included perceived health benefits, time of day and social support	In our focus group investigations, we discovered six categories, four relating to promotion and two relating to barriers of enrolment. Adding to this, we also found no specific barriers or promoters that related to gender and specific cultural limitations
Marquez	2022	Duration of PA; Adherence	Accelerometer; CHAMPS questionnaire	Combined attrition rate for entire sample: 34.5%	Combined attrition rate for entire sample: 34.5%	Self-reported PA: Significant time × group interaction for MVPA (d = 0.25–0.37), dance PA (d = 0.81–1.16), leisure PA (d = 0.36–0.46), and total PA (d = 0.25–0.34) at 4 and 8 months. Accelerometery: No significant differences.	Latin dance programs are effective in increasing PA among older Latinos. Efforts are needed to make dancing programs

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						Adherence: Across sites participants attended 60.5% of initial program classes, and 32.8% of maintenance program classes.	available and accessible, and to find ways for older Latinos to add more PA to their daily lives.
McKay	2018	Frequency of PA	CHAMPS questionnaire	11%[a]	NA	TOTAL SAMPLE: PA increased significantly during the active intervention phase (baseline to 3 months) in both younger (60-74 year olds) (+1.6 days/week; p<0.001) and older (75+ year olds) (+1.0 days/week; p<0.001) participants. However, the increase was sustained at 6 months in younger participants only, who remained significantly more active than at baseline (+1.4 days/week; p<0.001). GENDER/SEX: There were no significant interaction effects for sex (data not reported) EDUCATION: There were no significant interaction effects for educational level (data not reported).	No conclusions made as to moderation effects.
McMahon	2016	Duration of PA; Adherence; Acceptability	Accelerometer; CHAMPS questionnaire	Combined attrition rate for entire	Combined attrition rate for entire	Significant group by time interactions on CHAMPS (Total PA hours/week), F1,26 = 5.09, p = .03 (confirmed with accelerometer data, F1,23 = 6.97, p = .01), show that change over time in PA	The Ready-Steady intervention was feasible as evidenced by low attrition and good attendance and

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
				sample: 6.7%	sample: 6.7%	behaviour differed by treatment group. Follow-up analyses of simple main effects showed the intervention group improved significantly more than the control group in CHAMPS (Total PA hours/week), and accelerometer PA measures: F1,27 = 11.92, p=.002, F1,24=6.33, p=.02, respectively. The correlation of total PA as measured by CHAMPS and accelerometery was positive and became stronger between T1 and T2, T1 r (25) = .33, p = .095, and T2 r (23) = .43, p = .03. Mean attendance (intervention/control)= 7.3 (SD 0.82)and 7.1 (SD 0.86) out of 8 sessions. Mean score of intervention acceptability items ranged from 4.54 to 4.68 (total possible range is 1 disagree-5 agree; GS note: I think 5 is favourable, 1 not favourable).	implementation, as well as positive effects on targeted outcomes and theoretical mechanisms of change.
McNeil	2018	Frequency, duration and intensity composite (MET hours/day/w	Accelerometer	30%	28.5%	PA: (note: data for moderation analysis obtained from authors) FULL SAMPLE (Women only): Statistically significant increases in total physical activity time (Intervention: 1.03 [0.82, 1.23] MET-hours/day; Active control: 0.73	These findings suggest that total physical activity time in post menopausal women can be increased with greater volumes of prescribed exercise.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
		eek) for PA and SB				[0.52, 0.95] MET-h/d) were noted in both groups at 12-months compared to baseline. The increase in total physical activity time was greater in the intervention versus active control group at 6-months (LS group difference [mean, 96% CI]: 0.46 (0.16, 0.76) MET-h/d), and borderline significant at 12-months (group difference: 0.29 [-0.0002, 0.59] MET-h/d, P = 0.05), compared to baseline. ETHNICITY: PA subgroup analysis for sedentary behaviour outcome only (minutes per week): There were no significant intervention moderation effects by ethnicity (least squares means=0.008, CI: -0.28, 0.29) MARITAL STATUS: PA subgroup analysis for sedentary behaviour outcome only (minutes per week): There were no significant intervention moderation effects by marital status (least squares means=0.007, CI: -0.29, 0.28) EDUCATION:	However, physical activity and sedentary time returned to baseline levels following study completion, thus highlighting the challenges in implementing these types of exercise interventions or recommendations into the real world. Additional support and resources (e.g. use of self-monitoring activity trackers) may be beneficial to promote the maintenance of increased physical activity and reduced sedentary time over the long-term following study completion. No conclusions made as to moderation effects.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						PA subgroup analysis for sedentary behaviour outcome only (minutes per week): There were no significant intervention moderation effects by education (least squares means=0.008, CI: -0.29, 0.28) Adherence (obtained from exercise logs): There was no statistical difference in the number of completed supervised (2.2 ± 0.7 versus 2.1 ± 0.7 sessions/week; P = 0.4) and unsupervised (1.6 ± 0.6 versus 1.5 ± 0.6 sessions/week; P = 0.8) sessions between groups. For participants included in the accelerometery analyses, the intervention group recorded greater exercise time during the intervention (two-sample t-test; P < 0.0001), with 12-month median (quartiles 1, 3) adherence values of 239 (193, 264) and 132 (115, 139) minutes/week. The median adherence rates for the intervention and active control groups for weeks 13–52 (full exercise prescription following the ramp-up period) were 262 (203, 292) and 140 (121, 150) minutes/week, respectively (two-sample t-test; P < 0.0001).	

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
Menkin	2019	Daily step count	Accelerometer	11.6%	8%	The intervention group had better walking change scores than the control group at T1 (coef=887 [CI:233–1540], p=0.008). At T2, there was no statistically significant difference between intervention and control (coef=947, [CI: 27–1867], p=0.044). NB Bonferoni adjustment on probability threshold (0.025).	Among an ethnically diverse group, short-term walking change scores were better for intervention participants than control-group participants. The effect was small and not sustained at T2.
Muellman n	2019	Duration of PA and SB; Adherence; participant satisfaction/ acceptability	Accelerometer; Self-administered satisfaction questionnaire	IG1: 31% IG2: 40%	22%	PA TOTAL SAMPLE: Overall, neither intervention yielded significant increases in MVPA or reductions in sedentary time compared to the control group. PA GENDER/SEX: MVPA (10-min bouts per week): In men, IG1 participants showed a significant decrease of 40.82min/week (β = –40.82, 95% CI: –70.23 to –11.40) while men in IG2 had a non-significant change (β = –7.06, 95% CI: –38.51 to 24.38). In women, IG1 experienced a decrease of 30.20min/week (β = –30.20, 95% CI: –56.49 to –3.92), compared to a non-significant increase in IG2 (β = 6.65, 95% CI: –11.58 to 24.89). However, the interaction tests did not reach statistical significance (p > 0.05). Sedentary Time (30-min bouts per week):	The web-based interventions did not significantly change objectively measured PA or sedentary time in this relatively active sample of older adults; future studies should target initially inactive persons and tailor intervention components more closely to participant needs. High baseline PA levels (≈90 min/day MVPA) likely due to self-selection and a potential Hawthorne effect; seasonal effects

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						Men in IG1 reduced sedentary time by 182.62min/week (β = –182.62, 95% CI: –352.85 to –12.41) versus an increase of 130.86min/week in IG2 (β = 130.86, 95% CI: –144.25 to 405.97). Women in IG1 showed a decrease of 57.99min/week (β = –57.99, 95% CI: –236.84 to 120.85) compared to an increase of 162.41min/week in IG2 (β = 162.41, 95% CI: –30.59 to 355.42). These differences were not statistically significant (p > 0.05). PA EDUCATION Education-Based Subgroup Analysis: MVPA (10-min bouts per week): Among participants with low/medium education, IG1 had a time difference of 10.11min/week (95% CI: –11.95 to 32.17) with a group-by-time interaction of –39.57min/week (95% CI: –72.20 to –6.93), resulting in an estimated intervention effect of –29.45min/week (95% CI: –54.05 to –4.85). In IG2, the estimated effect was –21.88min/week (95% CI: –45.48 to 1.72). In the high education subgroup, differences between IG1 and IG2 were smaller and non-significant, with the interaction F-test yielding F = 1.71 (p = 0.18) compared to F = 2.77 (p = 0.06) in the	(data mainly collected in spring/summer) and a low overall participation rate (only 7% of those contacted) may have also influenced outcomes. Although the interventions were generally acceptable, the technical challenges and high dropout rates highlight the need for more user-friendly, tailored solutions.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						low/medium group, indicating a trend toward a greater decline in MVPA in the lower educated participants in IG1. Sedentary Time (30-min bouts per week): For those with low/medium education, IG1 participants experienced a significant reduction in sedentary time (β = –153.87, 95% CI: –301.00 to –6.74), while the differences in IG2 led to a significant interaction effect (F = 3.40, p = 0.03), indicating a greater reduction in sedentary time in IG1 relative to IG2. In the high education subgroup, there was no significant difference (F = 0.00, p = 0.99). Adherence: approximately 80% used the PA diary regularly; 70% used it at least weekly; 71% attended weekly group meetings Participant satisfaction: User satisfaction was modest to high: over half rated the group exercises as (very) helpful, though usage of other website features (e.g., friend's function, online forum) was low. Barriers included difficulties using the website and/or Fitbit technology, reported lack of time, and health-related issues; these factors likely contributed to higher	

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						attrition rates in the intervention groups. Facilitators included the availability of weekly group meetings (which provided technical support, social interaction, and health education) and, in IG2, the additional feedback from the objective monitoring (Fitbit), which appeared to benefit some participants.	
Newton	2022	Daily step count; Duration of PA; Acceptability ; Adherence	Accelerometer; CHAMPS questionnaire	NR	NR	PA: Significant increase in step count and MVPA in the intervention group (PAG) compared to the control group (SAG) The increase in ActiGraph-derived steps per day (1085.3 ± 265.6 vs 34.7 ± 274.3; P = 0.008) and daily minutes of moderate-to-vigorous physical activity (MVPA; 6.2 ± 1.6 vs 0.3 ± 1.7; d = 0.68; P = 0.01), and self-reported CHAMPS Questionnaire MVPA bouts (3.5 ± 0.77 vs 0.33 ± 0.79; P < 0.001) were significantly greater within the PAG than the SAG. ActiGraph-derived minutes of daily MVPA and steps as well as Fitbit-derived steps per day were significantly greater on days when PAG participants engaged in group sessions compared with days when they self-reported home-based exercise or no exercise (P < 0.016). Satisfaction: Participants in both study arms reported high levels of satisfaction	The intervention increased physical activity, was well attended, and resulted in high satisfaction. Future studies should assess long-term sustainability in this population

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						(>4- on 5-point Likert scale) Adherence: Participants attended an average of 93% and 86% of the PAG and SAG group sessions, respectively.	
Olson	2022	Acceptability ; Barriers and enablers	Semi-structured interviews	NA	NA	Social cohesion was an important factor that drove intervention engagement. Participants who lived in more affluent villages tended to describe villages as socially cohesive and supportive, in contrast to those who lived in less affluent villages. None of the participants living in less affluent villages described strong social bonds with fellow residents. Females who cared for their spouses expressed difficulties leaving them to engage in the physical activity intervention. None of the male participants caring for a spouse described this as a barrier.	Not reported
Pekmezi	2017	Duration of PA; Participant satisfaction	Accelerometer; interview administered 7-d physical activity recall; 18-item participant satisfaction questionnaire	9.3%	9.8%	There was no significant difference between intervention and control in changes in self-reported MVPA (p=0.22), accelerometer MVPA (p=0.25), and self-reported strength exercise (p=0.93). Satisfaction: 91.7% were “satisfied” or “very satisfied” with the intervention; 80.6% read the materials and 91.7% found	The intervention was well received and resulted in more moderate intensity exercise than the control (this difference was not statistically significant).

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						materials helpful; 86.1% found materials enjoyable; 97% reported they gained knowledge about exercise; 91.7% wore pedometers; 87.9% found pedometers helpful; 100% reported the intervention was 'appealing and relevant' to African American women.	
Piedra	2018	Weekly step count; PA levels; Adherence	Acceleromter; Yale Physical Activity Survey (YPAS)	11.7%	14.8%	PA: By 24 months, participants in both arms of the intervention maintained greater than 10,000 mean steps/day, but the difference between the groups was not statistically significant. In analyses adjusted for age, sex, education, income, health status, and acculturation, participants in both trial arms increased their mean numbers of steps at 12 and 24 months, with the treatment group showing a greater number of mean steps compared to the controls at 12 months. No between group differences found for self-report measures. Adherence: Attendance rates were 80% for both arms of the intervention. Each group attended 80% of the group discussions and the exercise classes.	In this group of physically inactive older Hispanics/Latinos, attribution retraining in combination with an exercise class was superior to the exercise class alone with regard to increasing walking behaviour. This success was sustained at 12 months (the pre-defined primary study outcome) but not at 24 months. For older Hispanics/Latinos, enrolment in an attribution-retraining exercise program can improve an inactive lifestyle.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
Prins	2019	Duration of PA	International Physical Activity Questionnaire (IPAQ)	Combined attrition rate for entire sample: 46% [b]	Combined attrition rate for entire sample: 46% [b]	Total Walking: Physical: Increased total walking compared to baseline (T1 IRR=1.46, T2 IRR=1.42). Social: Increased total walking compared to baseline (T1 IRR=1.52). Combined: No significant effects. Utilitarian Walking: Physical: Increased utilitarian walking compared to baseline (T1 IRR=1.60) Social: Increased utilitarian walking compared to baseline (T1 IRR= 1.62) Combined: no significant effects Recreational Walking: No significant effects	Small-scale physical/social interventions increased total and utilitarian walking. No effect from combined interventions.
Sánchez Mascuñano	2019	Frequency, duration and intensity composite (MET mins/week) of PA	International Physical Activity Questionnaire (IPAQ)	22.7%	NA	METs per week significantly increased post intervention (=-0.004).	The intervention showed improvements in physical activity
Swartz	2018	Duration of SB	Accelerometer	NR	NR	Results for GENDER/SEX from mixed effects models: There were no significant differences between men and women in total time spent sedentary (hours per day).	Data from this study suggested that after the physical activity intervention, females decreased the number of

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						Within the intervention group, males showed a statistically significant pre-post intervention decrease in the percentage of total sedentary time accounted for by bouts greater than the weighted median (mean = 0.17, SD = 0.032, p = .0374), and females in the STEP group significantly decreased the number of sit-to-stand transitions (mean = 4.011, SD= 12.726, p = .0176).	sit-to-stand transitions by possibly spending more time in activity. Males reduced the percent of total sedentary time in bouts that were longer than the weighted median sedentary bouts, thereby reducing the time spent in bouts longer than approximately 2-minutes. These results, along with other research, suggest that successful interventions to reduce sedentary time and to change the pattern of SB accumulation may require different intervention strategies for males and females.
Tully	2019	Step count; Duration of PA; Adherence	Accelerometer	16.7%	11.54%	PA: The study was not powered to detect change, so only descriptive statistics are reported. There did appear to be an	There is a lack of evidence of the effects of peer-led walking

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						increase in MVPA at 12 weeks and 6 months in the intervention group (7.42 ± 10.79 minutes/day and 6.30 ± 16.60 minutes/day, respectively), but the control group showed a decrease at 12 weeks (–8.02 ± 24.41 minutes/day) and a slight increase at 6 months (1.51 ± 29.54 minutes/day). Mixed findings were found for other outcomes, with a high degree of variability. Adherence: At baseline, all 50 participants agreed to wear the accelerometer, and 48 (96%) returned valid accelerometer data at baseline. At 12 weeks, of the 43 participants still in the study, two did not return valid accelerometer data, meaning that 95% (n/N = 41/43) of accelerometer data sets at 12 weeks were available for analysis. Finally, at 6 months, 40 (93%) of the 43 participants who wore an accelerometer returned valid data.	programmes in older adults.
van de Vijver	2018	Frequency of PA; Barriers and motivators	Self-reported days with more than 30 minutes exercise	12.70%	NA	Statistically significant increase in Days with more than 30 min of physical activity per week: Before mean (SE) 1.8 (0.3); after mean (SE) 3.5 (0.2), p<.01.	The members perceive improvements in health that are in line with improvements in a physical function test.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						Acceptability: Overall positive experience of the intervention. Enablers included health benefits and social interaction. Barriers not reported.	
Van Ravenstein	2018	Perceptions of the intervention	Semi-structured interviews	NA	NA	Acceptable to most participants. Barriers included lack of socialisation. Enablers included personalised approach and feeling part of the community.	Mental health, not just physical health, has to be considered when attempting to engage older adults in group activities. Mental health plays a role in physical health as well as socialisation and is a key component to healthy aging in place.
Varma	2016	Daily step count	Accelerometer	30.8% overall: 38.9% in men; 12.2% in women	31%	GENDER/SEX results: At 12 months there were no significant intervention effects on walking activity in women. At 24 months, women in the intervention group averaged 1,500.3 (95% CI=77.6, 2922.9) greater steps/day than women in the control group. Over the duration of the study, women in the intervention group maintained levels of walking activity similar to baseline. Women in the control group declined by 1,191.6 (95% CI= − 2243.7, −139.5) steps/day at 24 months compared with baseline levels.	Over a 24-month period, women, but not men, in the intervention showed increased walking activity compared to their sex-matched control groups. Additionally, although women in the intervention group maintained walking activity levels over 24 months, women in the

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						At 12 and 24 months, there were no significant intervention effects on walking activity in men, and intervention and control groups did not show significant declines in walking activity compared to baseline levels	control group declined significantly. Positive intervention effects were found in women only. The high percentage of attrition among men - 38.9% of men in the intervention group included in the analysis dropped out of the intervention prior to placement in the schools, compared with 12.2% of women - may explain these findings.
Wallbank	2022a[51]	Daily step count; Acceptability; Barriers; Adherence	Accelerometer; Global measure of acceptability; Post study survey (closed ended questions on barriers)	9.70%	6.50%	PA: At 3 months post randomisation, device-measured physical activity showed a significant between-group difference in the proportion of participants taking 2000 or more daily steps than at baseline that favoured the intervention group (OR: 6.31 95%CI: 1.22 to 32.70, p = .028, Table 3). There was also a tendency for the intervention group to spend more time in light-intensity physical activity (p = .075) and be more likely to increase moderate-vigorous intensity physical activity by at	This behaviour change intervention supported women over 50 who were active to be more active. High acceptability and feasibility of the Active Women over 50 Online program was demonstrated, and the impact on increasing daily steps warrant

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						least 120 min/week compared to controls (p = .11). There were no significant between-group differences for the secondary outcome measures Adherence: Participants accessed the website (intervention) at their own discretion so there was no predefined criteria by which to measure adherence. However, interaction with the website was considered to be high. Global measure of acceptability: Overall, participation in the study was acceptable regardless of whether the intervention was received immediately or after 3 months. Of the 52 respondents, 43 (83%) participants (intervention: 22/25; control: 21/27) indicated they would recommend participation to another person at 3 months postrandomization with no between-group differences detected ($\chi 2$ [1] = 2.95, p = .229). Barriers (data from closed ended questions in post study survey): The most common barriers to achieving physical activity goals were lack of time (n = 10 participants,	further testing in a larger trial. Further work is needed to better understand the motivators for people who are physically inactive to better reach and support them for healthy aging

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						40%), sickness or injury (n = 6, 24%), lack of energy (n = 5, 20%), lack of willpower (n = 5, 20%), fear of injury (n = 2, 8%), and lack of resources (n = 2, 8%).	
Wallbank	2022b[7] [7]	Daily step count; Duration of PA; Intervention engagement	Accelerometer; International Physical Activity Questionnaire (IPAQ)	26.15%	13.11%	No between-group differences were detected in the primary outcome, proportion achieving ≥ 10,000 steps/day (OR = 1.39, 95% CI 0.61 to 3.18, P = .44) or other secondary outcomes: Actigraph number of steps per day between-group difference 260.27 (95% CI -519.24 to 1039.77), P = .51 Actigraph MVPA, mins/week between group difference 15.84 (95% CI -33.41 to 65.08), P = .53 Actigraph VPA mins/week between group difference -3.03 (95% CI -10.38 to 4.32), P = .42 Proportion meeting lower limit of WHO MVPA guidelines ≥150 mins/week OR = 1.76 (.55 to 5.67), P = .345 IPAQ total PA hours/week -.29 (95% CI -5.45 to 4.86), P = .911 However, at follow-up intervention, participants reported significantly more vigorous PA compared to controls on the questionnaire-based IPAQ (1.04 hours, 95%	Significantly improved self-reported vigorous PA and showed a trend for participants to achieve the upper limit of the WHO MVPA guidelines when device measured. No statistically significant between-group differences for primary (proportion achieving 10,000 steps/day) and other secondary outcomes.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						CI 0.24 to 1.85, P = .01), a difference which was not significant when device-measured via the Actigraph. Also, 14% more intervention participants achieved 300 mins/week of MVPA when device-measured (baseline/follow-up change = 10% intervention, -4% control, OR = 1.98, 95% CI 0.89 to 4.36, P = .09) but this between-group difference did not reach statistical significance. Engagement: 53(82%) gave feedback about intervention engagement. 48(91%) attended the information session; 31(60%) used an activity tracker; 10(19%) investigated the workplace fitness facility. The most popular strategy used to support PA was 'technology-delivered', such as websites, smartphone applications, activity trackers and fortnightly study emails and investigated by 41 (79%) participants and adopted by 32 (62%). Other adopted strategies included exercising with others (25, 48%), structured PA (21, 40%), setting a PA goal (39, 74%), and making future PA plans (53, 100%).	

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						Exploratory subgroup analysis of participants lost to follow-up showed lower average device-measured PA compared to participants with completed measures.	
Wallbank	2022c[8] [9]	Views and experiences of the intervention	Semi-structured interviews	NA	NA	Barriers: Physical activity participation was challenged by personal, life-stage and cultural factors, alongside a tension of the self-responsibility discourse which also impacted the program experience. Enablers: Social factors and finding a suitable strategy for motivation were deemed integral aspects of being active	Future physical activity promotion programs targeting this population should offer a range of strategies and structural supports that address different circumstances and levels of agency
Wong	2021	Frequency, duration and intensity composite (MET min/week) for PA and SB	Global Physical Activity Questionnaire – Short Form (GPAQ-SF)	16%	13.9%	After controlling for confounders and inherent clustering, moderate PA, vigorous PA and Total PA increased significantly more for the intervention group compared to the control group (all P<0.001). There was no statistically significant difference for walking PA (0.454) and sitting time (0.190).	The SPANS intervention (for women) improved moderate and vigorous PA, but not walking PA or sitting time.
Yamashita	2021	Daily step count	Accelerometer	14.3%	8.7%	Compared to the control group, the Financial Incentives (FI) and Social Network (SN) group showed an increase in mean steps per day over the intervention period (p=0.02). FI and SN group: Physical activity (steps/day; mean SD): Pre: 6194.7 ±	Social network incentives combined with financial incentives are more effective for promoting physical activity among older women than financial incentives alone

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						1879.6; post 3 months: 7014.6 ± 2098.6; post 6 months: 7353.5 ± 1908.2** FI group: pre: 6102.9 ± 1728.6; post 3 months: 6696.0 ± 2714.6; post 6 months 6073.4 ± 2335.5 Main effect of time: 0.02 Interaction effect: 0.02 simple main effect compared to pre intervention, p < 0.01	
Zhang	2024	Duration of PA; Adherence	Longitudinal Ageing Study Amsterdam Physical Activity Questionnaire (LAPAQ)	12.60%	11.20%	PA: In sex-pooled analyses, no statistically significant differences in outcomes between the trial arms were observed (p>0.07 for all associations). There were also no significant differences for men or women in the intervention group compared with the control group. Differences in annual changes in outcomes from baseline to 1-year follow-up between trial arms: Men: Estimate 6.7 mins/day (95%CI -22.7, 36.1) p=0.649 Women: Estimate -1.0 mins/day (95% CI -22.2, 20.3) p=0.928 Adherence: All participants received the “healthy conversations” telephone call , and	No statistically significant difference in annual change in the LAPAQ score between trial arms. Separate analyses for men and women also showed no statistically significant difference in LAPAQ score annual change for both men and women. Note: other scores for non-eligible outcomes (diet and physical functioning) differed between men and women.

Author	Year	Outcomes assessed	Measures	Inter-vention attrition rate	Control attrition rate	Main results	Authors conclusions
						additional phone calls at various stages throughout the intervention.	

[a]Discontinuation varied by educational attainment: 21% secondary or less; 13% at least some trade/technical/college; 4% at least some university ($p < 0.01$)
[b]Compared to people not in a relationship, people in a relationship were twice as likely to drop out of the study (OR: 2.0.1; 95%CI: 1.2–3.3). Also, compared to participants born in the Netherlands, participants born in a non-Western country were four times as likely to drop-out of the study (OR: 3.9; 95%CI: 2.4;7.3).
PA=Physical Activity; SB=Sedentary Behaviour; VPA=Vigorous Physical Activity; MVPA=Moderate to Vigorous Physical Activity; OR=Odds Ratio; CI=Confidence Interval; SD=Standard Deviation; SE=Standard Error; IRR=Incidence Rate Ratio; AOR=Adjusted Odds Ratio; IG=Intervention Group.

Appendix J – GRADE Assessment of Certainty of the Evidence

Studies involving unselected populations (general older adults), with subgroup comparisons

Education (Low vs High)

Table 1. GRADE assessment of the evidence for effectiveness of interventions in low vs high education groups

Certainty Assessment							N		ES (95% CI) or descriptive summary	Certainty	
No. of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Low Education	High Education			
Behavioural Interventions to increase physical activity*											
1 (McKay 2018)	Uncontrolled before-after study**	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	114	344	Frequency of PA (No. of days in past week ≥30 min PA): Effect sizes not reported. There were no significant interaction effects for education	Very Low	⊕ϒϒϒ
Multicomponent interventions to increase physical activity[†]											
1 (Muellmann 2019[‡])	RCT	Very serious risk of bias *(-2)*[a]	No serious inconsistency	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	284	245	Intervention 1: MVPA (10-min bouts per week) 3 months: Low/Medium Education: -39.57 (-72.20, -6.94) High Education: 20.75 (-14.25, 55.75) Non-significant, favouring high education. Intervention 2:	Very Low	⊕ϒϒϒ

									MVPA (10-min bouts per week) 3 months: Low/Medium Education: -11.83 (-44.74, 21.08) High Education: 37.03 (-0.68, 74.74) Non-significant, favouring high education.		
Multicomponent Interventions to decrease sedentary behaviour[†]											
1 (Muellmann 2019[‡])	RCT	Very serious risk of bias *(-2)*[a]	Serious inconsistency *(-1)*[c]	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	284	245	Intervention 1: Sedentary time (30-min bouts per week) 3 months: Low/Medium Education: 231.46 (6.70, 456.22) High Education: -12.34 (-226.78, 202.10) Non-significant, favouring high education. Intervention 2: Sedentary time (30-min bouts per week) 3 months: Low/Medium Education: -57.60 (-285.21, 170.01) High Education: -14.02 (-245.57, 217.53) Non-significant, no discernible difference between low and high education.	Very Low	⊕ϒϒϒ

*Starting point for assessment was Low Certainty evidence (RCTs contribute <50% of total participants)

[†]Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[‡]Muellmann 2019 had two intervention conditions (1. Multicomponent intervention with physical activity and behavioural components; 2. The same multicomponent intervention with the addition of an activity tracker). Thus, we rated on inconsistency as part of the GRADE assessment.

[a]Only one study, rated as high risk of bias

[b]Only one study

[c]Direction of effect differed between interventions

Gender/Sex (Men vs Women)

Table 2. GRADE assessment of the evidence for effectiveness of interventions in men vs women

Certainty Assessment							N		ES (95% CI) or descriptive summary	Certainty	
No. of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Men	Women			
Behavioural Interventions to increase physical activity*											
3 (Harris 2015; Zhang 2024; McKay 2018)	2 RCTs; 1 Uncontrolled before-after study	Serious risk of bias *(-1)*[a]	No serious inconsistency – Results from the two RCTs were consistent	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Serious imprecision *(-1)*[b]	No serious publication bias detected	325	586	Harris 2015 (daily step count) 3 months: Men: 1534 (774.51, 2293.49) Women: 591 (-124.99, 1308.99) – non-significant, favouring men Zhang 2024 (mins/day of PA) 12 months: Men: 6.70 (-22.70, 36.10) Women: -1.00 (-22.25, 20.25) – non-significant, favouring men McKay 2018 (No. of days in past week ≥30 min PA): No effect sizes reported. There were no significant interaction effects for sex	Low	⊕⊕ϒϒ
Physical Activity Interventions to increase physical activity*											
1 (Varma 2016)	RCT	Very serious	N/A	No serious indirectness –	Very serious imprecision	No serious publication	36	78	Daily step count 12-months:	Very Low	⊕ϒϒϒ

		risk of bias *(-2)*[c]		participants, intervention and outcome all provide direct evidence to answer the research question	*(-2)*[d]	bias detected			Men: -1539.70 (-3993.05, 913.65) Women: -302.30 (-1726.72, 1122.12) – non-significant, favouring women Daily step count 24-months: Men: -2367 (-4983.45, 249.45) Women: 1500.30 (77.68, 2922.92) – significant, favouring women		
Physical Activity Interventions to decrease sedentary behaviour*											
1 (Swartz 2018)	RCT	Very serious risk of bias *(-2)*[c]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[d]	No serious publication bias detected	29	91	Sedentary time (hours per day) 3-months: Men: -0.13 (-1.63, 1.36) Women: 0.34 (-0.30, 0.97) – non-significant, negligible difference between groups	Very Low	⨁ϒϒϒ
Multicomponent interventions to increase physical activity*											
1 (Muellmann 2019[†])	RCT	Very serious risk of bias *(-2)*[c]	No serious inconsistency	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the	Very serious imprecision *(-2)*[d]	No serious publication bias detected	230	299	Intervention 1: MVPA (10-min bouts per week) 3-months: Men: 10.87 (-30.14, 51.88) Women: -30.20 (-56.48, -3.92), non-significant, favouring men Intervention 2:	Very Low	⨁ϒϒϒ

				research question					MVPA (10-min bouts per week) 3-months: Men: 26.95 (-17.92, 71.82) Women: -8.66 (-35.38, -18.06), non-significant, favouring men		
Multicomponent Interventions to decrease sedentary behaviour*											
1 (Muellmann 2019[†])	RCT	Very serious risk of bias *(-2)*[c]	Serious inconsistency *(-1)*[e]	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[d]	No serious publication bias detected	230	299	Intervention 1: Sedentary time (30-min bouts per week) 3-months: Men: 124.63 (-117.10, 366.36) Women: 100.19 (-92.69, 293.07), non-significant, negligible difference between men and women. Intervention 2: Sedentary time (30-min bouts per week) 3-months: Men: 7.53 (-258.49, 273.55) Women: -64.60 (-260.95, 131.75), non-significant, favouring women.	Very Low	⊕ϒϒϒ

*Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[†]Muellmann 2019 had two intervention conditions (1. Multicomponent intervention with physical activity and behavioural components; 2. The same multicomponent intervention with the addition of an activity tracker). Thus, we rated on inconsistency as part of the GRADE assessment.

[a]Harris 2015 had low risk of bias; Zhang 2024 and McKay had high risk of bias ratings.

[b]CIs of the two RCTs are wide and include no effect

[c]Only one study, rated as high risk of bias

[d]Only one study

[e]Direction of effect differed between interventions

Studies involving disadvantaged/marginalised populations, with subgroup comparisons

Education (Low vs High)

Table 3. GRADE assessment of the evidence for effectiveness of interventions in women with low vs high education

Certainty Assessment							N		ES (95% CI)	Certainty	
No of studies	**Design**	**Risk of bias**	**Inconsist-ency**	**Indirectness**	**Imprecision**	**Publication bias**	**Low education**	**High education**			
Physical Activity Interventions to decrease sedentary behaviour*											
1 (McNeil 2018)	RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	NR	NR	Sedentary time (mins per week) 6-months: least squares mean difference=0.008 (95%CI -0.30, 0.28), non-significant.	Very Low	⨁ϒϒϒ

*Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[a]Only one study, rated as high risk of bias

[b]Only one study

Marital Status (Married vs other)

Table 4. GRADE assessment of the evidence for effectiveness of interventions in women by marital status (married vs other)

Certainty Assessment							N		ES (95% CI)	Certainty	
No of studies	**Design**	**Risk of bias**	**Inconsist-ency**	**Indirectness**	**Imprecision**	**Publication bias**	**Married**	**Other**			
Physical Activity Interventions to decrease sedentary behaviour*											
1 (McNeil 2018)	RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	NR	NR	Sedentary time (mins per week) 6-months: least squares mean difference= -0.007 (95%CI -0.30, 0.28), non-significant.	Very Low	⨁ϒϒϒ

*Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[a]Only one study, rated as high risk of bias

[b]Only one study

Ethnicity (Caucasian vs other)

Table 5. GRADE assessment of the evidence for effectiveness of interventions in women based on ethnicity (Caucasian vs other)

Certainty Assessment							N		ES (95% CI)	Certainty	
No of studies	**Design**	**Risk of bias**	**Inconsist-ency**	**Indirectness**	**Imprecision**	**Publication bias**	**Causasian**	**Other**			
Physical Activity Interventions to decrease sedentary behaviour*											
1 (McNeil 2018)	RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	NR	NR	6-months: least squares mean difference= -0.009 (95%CI -0.28, 0.30), non-significant.	Very Low	⨁ϒϒϒ

*Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[a]Only one study, rated as high risk of bias

[b]Only one study

Studies involving disadvantaged/marginalised populations only

Low Socioeconomic Status (SES)

Table 6. GRADE assessment of the evidence for effectiveness of interventions in low SES groups

Certainty Assessment							N		ES (95% CI) or descriptive summary	Certainty	
No. of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Publication bias**	**Intervention**	**Control**			
Behavioural Interventions to increase physical activity*											
1 (Prins 2019[†])	Non-randomised controlled before-after study	Serious risk if bias *(-1)*[a]	No serious inconsistency	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious *(-2)*[b]	No serious publication bias detected	526	194	Participants living in areas to which the physical condition or the social condition was assigned had an increase in their total walking between baseline and first follow-up that was twice as large as participants in the control group. Total Walking (mins/week): Intervention 1: Increased total walking compared to baseline (3 months IRR=1.46; 9 months IRR=1.42). Intervention 2: Increased total walking compared to baseline (3 months IRR=1.52). Intervention 3: No significant effects. Utilitarian Walking (mins/week):	Very low	⊕ϒϒϒ

									Intervention 1: Increased utilitarian walking compared to baseline (3 months IRR=1.60). Intervention 2: Increased utilitarian walking compared to baseline (3 months IRR= 1.62) Intervention 3: no significant effects Recreational Walking: No significant effects		
Physical Activity Interventions to increase physical activity*											
1 (Britten 2017)	Uncontrolled before-after study	Very serious risk of bias *(-2)*[c]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious *(-2)*[b]	No serious publication bias detected	22	N/A	8 weeks: - Moderate physical activity (t (21) = 2.19, p < 0.05), significant increase - Vigorous physical activity (t (21) = 2.59, p < 0.005), significant increase	Very low	⊕ϒϒϒ
Physical Activity Interventions to decrease sedentary behaviour*											
1 (Britten 2017)	Uncontrolled before-after study	Very serious risk of bias *(-2)*[c]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious *(-2)*[b]	No serious publication bias detected	22	N/A	8 weeks: - Sitting time weekdays (t(21) = 1.81, p < 0.05 d = 0.20), significant decrease	Very low	⊕ϒϒϒ
Multicomponent Interventions to increase physical activity*											

1 (Tully 2019)	Pilot RCT	Serious risk if bias *(-1)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious *(-2)*[b]	No serious publication bias detected	24	26	Increase in MVPA at 12 weeks and 6 months in the intervention group (7.42 ± 10.79 minutes/day and 6.30 ± 16.60 minutes/day, respectively), but the control group showed a decrease at 12 weeks (–8.02 ± 24.41 minutes/day) and a slight increase at 6 months (1.51 ± 29.54 minutes/day). Mixed findings were found for other outcomes, with a high degree of variability (note. The authors state the study was not powered to detect change)	Very low	⊕ϒϒϒ
Educational Interventions to increase physical activity*											
1 (Sánchez Mascuñano 2019)	Uncontrolled before-after study	Very serious risk of bias *(-2)*[c]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious *(-2)*[b]	No serious publication bias detected	17	N/A	MET mins/week significantly increased post intervention (=-0.004).	Very low	⊕ϒϒϒ

*Starting point for assessment was Low Certainty evidence (RCTs contribute <50% of total participants)

[†]Prins 2019 had three intervention conditions (1. Behavioural – provided participants with designated walking routes; 2. Behavioural – linked participants with walking groups; 3. Behavioural – combined interventions 1 and 2). Thus, we rated on inconsistency as part of the GRADE assessment.

[a]Only one study rated as moderate risk of bias

[b]Only one study

[c]Only one study rated as high risk of bias

Minoritised Ethnic Groups

Table 7. GRADE assessment of the evidence for effectiveness of interventions in minoritised ethnic groups

Certainty Assessment							N		ES (95% CI) or descriptive summary	Certainty	
No. of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Publication bias**	**Intervention**	**Control**			
Physical Activity Interventions to increase physical activity*											
3 (Balbim 2022; Marquez 2022; Newton 2022)	2 RCTs; 1 Pilot RCT	Serious risk of bias *(-1)*[a]	No serious inconsistency	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	No serious imprecision	No serious publication bias detected	223	223	Marquez 2022: - Self-reported PA: Significant time × group interaction for MVPA (d = 0.25–0.37), dance PA (d = 0.81–1.16), leisure PA (d = 0.36–0.46), and total PA (d = 0.25–0.34) at 4 and 8 months. - Accelerometer PA duration: No significant differences between intervention and control. No effect sizes reported. Newton 2022 (12 weeks): - Significant increase in step count and MVPA in the intervention group compared to the control group. The increase in ActiGraph-derived steps per day (1085.3 ± 265.6 vs 34.7 ± 274.3; P = 0.008) and daily minutes of moderate-to-vigorous physical activity (MVPA; 6.2 ± 1.6 vs 0.3 ± 1.7; d = 0.68; P = 0.01), and self-reported CHAMPS Questionnaire MVPA bouts (3.5 ± 0.77 vs 0.33 ± 0.79; P < 0.001)	Moderate	⊕⊕⊕ϒ

									were significantly greater within the intervention than the control. Balbim 2022 (6 months): - CHAMPS leisure-time MVPA: Dance group significantly increased relative to control participants (F[1,53] = 3.17, p = .048, η2G = .01). - No significant between group differences in CHAMPS leisure time light and moderate PA, light and moderate PA, total PA, total leisure PA, or accelerometer assessed light, moderate or MVPA.		
Physical Activity Interventions to decrease sedentary behaviour[†]											
2 (Balbim 2022; Newton 2022)	Pilot RCT; RCT	Serious risk of bias *(-1)*[b]	N/A	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[c]	No serious publication bias detected	73	75	Balbim 2022: 12 months: - Accelerometer sedentary time (mins/day): Dance group significantly increased device-assessed time spent in sedentary behaviour (F[1,52] = 4.23, p = .028, η2G = .03) compared to control participants Newton 2022: 12 months: - No significant difference between groups on time spent sedentary	Very low	⊕ϒϒϒ
Multicomponent Interventions to increase physical activity*											

6 (Aguinaga 2021; Menkin 2019; Piedra 2018; Katigbak 2024; Cyriac 2021; Leone 2016)	3 RCTs; 2 uncontrolled before-after study; 1 non-randomised controlled before-after study	No serious risk of bias[d]	Serious inconsistency *(-1)*[e]	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	No serious imprecision	No serious publication bias detected	860	767	Aguinaga 2021: - accelerometer MVPA (mins/week): mean difference 34.7 [95% CI: 17.7, 51.7], d = 0.69, significant, favouring intervention -self-report light-leisure (mins/week): mean difference 507.8 [95% CI 417.3, 598.3], d = 1.91, significant, favouring intervention - self-report MVPA (mins/week): mean difference 208.9 [95% CI 141.2, 276.6], d = 1.05, significant, favouring intervention - self-report moderate-to-vigorous leisure PA (mins/week): mean difference 233.5 [95% CI 182.4, 284.6], d = 1.55, significant, favouring intervention - no significant differences on the following: accelerometer steps per day and light PA; self-report light PA, moderate PA, moderate leisure PA. Menkin 2019: The intervention group had better walking change scores than the control group at 1 month follow-up (coef=887 [CI:233–1540], p=0.008). At 2 month follow up, there was no statistically significant	Moderate	⊕⊕⊕ϒ

									difference between intervention and control (coef=947, [CI: 27–1867], p=0.044.) Piedra 2018: - 12 months: accelerometer weekly steps – significant difference between control and intervention groups, favouring intervention. No significant between group differences in YPAS time spent on prespecified activities. - 1 and 24 months: No significant between group differences in accelerometer weekly steps and YPAS time spent on prespecified activities Katigbak 2024: - 12- weeks: The intervention group had fewer steps at baseline and less of a reduction in steps by 12 weeks as compared with the control condition. But overall the intervention did not increase step count. Cyriac 2021: - 28-weeks: Moderate-intensity PA (mins/week) significantly increased (Mean difference +30 minutes; IQR: −12.5 to 122.5;		

									99%CI−52.5 to 92.5; p=0.04, d=0.22) Leone 2016: There were no significant differences in PA outcomes after 13 months: - MVPA MET-hours/week p=0.15 - MVPA (mins/week) p=0.22 - Meeting Recommendation of ≥150 minutes/week MVPA p=0.34		
Multicomponent Interventions to decrease sedentary behaviour[†]											
1 (Aguinaga 2021)	1 uncontrolled before-after study	No serious risk of bias[f]	N/A	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[c]	No serious publication bias detected	20	N/A	No significant differences pre- to post-intervention on the following: accelerometer time spent sedentary; self-report time spent sedentary on both weekdays and weekends (effect sizes not reported)	Very low	⊕ϒϒϒ
Educational Interventions to increase physical activity*											
2 (Jih 2016; Jih 2020)	2 RCTs	Serious risk of bias *(-1)*[g]	No serious inconsistency	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the	No serious imprecision	No serious publication bias detected	672	673	Jih 2016: The intervention group were more likely to meet the guidelines for physical activity compared to control group (AOR= 1.93 (1.54, 2.42) Jih 2020: The intervention group had a greater increase than the	Moderate	⊕⊕⊕ϒ

				research question					control group in the odds of meeting the weekly physical activity recommendation (AOR = 2.2; 95% CI, 1.4–3.6).		

*Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[†]Starting point for assessment was Low Certainty evidence (RCTs contribute <50% of total participants)

[a]Newton 2022 had low risk of bias; Balbim 2022 had moderate risk of bias; Marquez 2022 had high risk of bias

[b]Only one study rated as moderate risk of bias

[c]Only one study

[d]Aguinaga 2021, Piedra 2018, Katigbak 2014 and Cyriac 2021 had low risk of bias; Menkin 2019 had moderate risk of bias; Leone 2016 had high risk of bias

[e]Magnitude and direction of effects differs across studies, with trends towards significance favouring intervention

[f]Aguinaga 2021 had low risk of bias

[g]Jih 2016 had low risk of bias; Jih 2020 had high risk of bias

Place of Residence (Rural)

Table 8. GRADE assessment of the evidence for effectiveness of interventions in rural-dwelling older adults

Certainty Assessment							N		ES (95% CI) or descriptive summary	Certainty	
No. of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Publication bias**	**Intervention**	**Control**			
Physical Activity Interventions to increase physical activity*											
1 (Gell 2024)	1 pilot RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	20	19	16 weeks: Significant differences between intervention and control groups in light PA (p = 0.03, d = 0.72), and total step count (p = 0.01, d = 0.96), but not MVPA (p=0.32, d =0.53).	Very low	⊕ϒϒϒ
Physical Activity Interventions to decrease sedentary behaviour*											
1 (Gell 2024)	1 pilot RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	20	19	16 weeks: The between-group comparison showed significant between group differences in sedentary Time, favouring intervention (p = 0.001, d = 0.81)	Very low	⊕ϒϒϒ
Multicomponent Interventions to increase physical activity*											
4 (Hardcastle 2024; McMaho	1 RCT; 1 feasibility RCT;	Serious risk of bias *(-1)*[c]	No serious inconsistency	No serious indirectness - participants, intervention	Serious imprecision *(-1)*[d]	No serious publication bias detected	239	41	Hardcastle 2024 (12 weeks): - Accelerometer MVPA (mins/week): Compared with controls, the intervention group	Very low	⊕ϒϒϒ

n 2016; Jancey 2020; van de Vijver 2018)	2 uncontrolled before-after studies			and outcomes all provide direct evidence to answer the research question					had a significant net mean increase of 49.8 min/week (95% confidence interval (95%CI): 13.6 to 86.1, p = 0.007) - Accelerometer MVPA (10-min bouts) (mins/week): Compared with the controls, the intervention group had a significant net mean increase of 39.5 min/week (95%CI: 11.9 to 67.1, p = 0.005) - Accelerometer moderate activity (mins/week): Compared with the controls, the intervention group had a significant net mean increase of 49.5 mins/week (95% CI:13.0 to 85.9), p=0.008 -Accelerometer light activity (mins/week): There was no significant difference between groups (net mean increase: 30.5 95%CI 143.7 to 204.8), p=0.731 McMahon 2016: Significant group by time interactions on CHAMPS (Total PA hours/week), F1,26 = 5.09, p = .03 (confirmed with accelerometer data, F1,23 = 6.97, p = .01), show that change over time in PA behaviour differed by treatment group. Follow-up analyses of simple main effects showed the intervention group improved		

									significantly more than the control group in CHAMPS (Total PA hours/week), and accelerometer PA measures: F1,27 = 11.92, p=.002, F1,24=6.33, p=.02, respectively. Jancey 2020 Physical activity levels remained stable across time points (no significant differences between 6-, 12- and 18-month follow-up in Walking MET min/week; Moderate MET min/week; Vigorous MET min/week; Total MET min/week) Van de Vijver 2018 Statistically significant increase in Days with more than 30 min of physical activity per week: Before (SE) 1.8 (0.3); after (SE) 3.5 (0.2), p<.01.		
Multicomponent Interventions to decrease sedentary behaviour*											
2 (Hardcastle 2024; Jancey 2020)	1 RCT; 1 uncontrolled before-after study	Serious risk of bias *(-1)*[e]	No serious inconsistency	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Serious imprecision *(-1)*[d]	No serious publication bias detected	184	41	Hardcastle 2024 (12 weeks): - sedentary time (mins/week): There was no significant difference between groups (net mean reduction: -65.2 95% CI -2707 to 140.4), p=0.534 - Sedentary time 20-min bouts (mins/week): There was no significant difference between groups (net mean reduction: -55.6 95%CI -271.8 to 160.7), p=0.615	Very low	⊕ϒϒϒ

									Jancey 2020 Sitting time remained stable across time points (no significant differences between 6-, 12- and 18-month follow-up in Sitting minutes per day)		

*Starting point for assessment was Low Certainty evidence (RCTs contribute <50% of total participants)

[a]Only one study rated as high risk of bias

[b]Only one study

[c]Hardcastle 2024, McMahon 2016, and van de Vijver 2018 had high risk of bias; Jancey 2020 had low risk of bias.

[d]Optimal information size <400

[e]Hardcastle 2024 (RCT) had high risk of bias and Jancey 2020 (uncontrolled before-after study) had low risk of bias.

Gender (women)

Table 9. GRADE assessment of the evidence for effectiveness of interventions in women

Certainty Assessment							N		ES (95% CI) or descriptive summary	Certainty	
No. of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Publication bias**	**Intervention**	**Control**			
Behavioural Interventions to increase physical activity*											
1 (Yamashita 2021)	RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	18	21	The intervention group showed an increase in mean steps per day over the intervention period (p=0.02), but there was no significant difference between intervention and control group.	Very low	⊕ϒϒϒ
Physical Activity Interventions to increase physical activity*											
1 (McNeil 2018)	RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	140	143	Total PA (MET hours/day) - 6-months: significant increase, favouring intervention group (LS group difference [mean, 96% CI]: 0.46 (0.16, 0.76) MET-h/d) - 12-months: borderline significant increase favouring intervention group (LS group difference: 0.29 [-0.0002, 0.59] MET-h/d, P = 0.05) - 24 months: no significant differences between groups MVPA (hours/day) and Light activity (hours/day)	Very Low	⊕ϒϒϒ

									- No significant differences between groups at 6-, 12- and 24-months		
Physical Activity Interventions to decrease sedentary behaviour*											
1 (McNeil 2018)	RCT	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	140	143	Sedentary time (hours/day) - No significant difference between groups at 6-, 12- and 24 months	Very Low	⊕ϒϒϒ
Multicomponent Interventions to increase physical activity*											
6 (Aparicio-Ting 2015; Cadmus-Bertram 2015; Chu 2019; Wallbank 2022a[51]; Wallbank 2022b[77]; Wong 2021)	3 RCTs; 3 pilot/feasibility RCTs	No serious risk of bias - Majority of studies rated as low or moderate RoB[c]	Serious inconsistency *(-1)*[d]	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	No serious imprecision	No serious publication bias detected	615	585	Aparicio-Ting 2015: (Recreational PA): - 24-months: No statistical difference between groups in terms of proportion classed as "active" (intervention: 62%; control 58%) and "inactive" (intervention: 38%; control 42%) Cadmus-Bertram 2015: Although the intervention group increased their PA, there were no significant between-group differences: - total MVPA (p=.11, effect size d=.48), - bouts MVPA (p=.28, d =.28) - light intensity PA (p=.54, d=.09)	Moderate	⊕⊕⊕ϒ

									- steps per day (p=.30, d=.24). Chu 2019: No significant between-group differences in change in physical activity at follow-up. Wallbank 2022a - 3 months: Accelerometer daily steps - significant between-group difference, favouring intervention (OR: 6.31 95%CI: 1.22 to 32.70, p = .028). No significant differences in light-intensity physical activity (p = .075) and MVPA (p = .11). There were no significant between-group differences for the secondary outcome measures Wallbank 2022b - 3 months: No between-group differences were detected in the primary outcome, proportion achieving ≥ 10,000 steps/day (OR = 1.39, 95% CI 0.61 to 3.18, P = .44) or other secondary outcomes Wong 2021 - 18 months: moderate PA, vigorous PA and Total PA increased significantly more for the intervention group		

									compared to the control group (all P<0.001). There was no statistically significant difference for walking PA (0.454).		
Multicomponent Interventions to decrease sedentary behaviour*											
3 (Chu 2019; Wong 2021; Wallbank 2022a[51])	1 RCT; 2 pilot/feasibility RCTs	Very serious risk of bias *(-2)*[e]	No serious inconsistency	No serious indirectness – participants, intervention and outcome all provide direct evidence to answer the research question	Serious imprecision *(-1)*[f]	No serious publication bias detected	399	380	Wallbank 2022a - 3 months Accelerometer sedentary time (hours/week): no significant between-group differences Wong 2021 - 18 months: There was no statistically significant difference for sitting time (0.190). Chu 2019 No significant between-group differences in change in sedentary behaviour at follow-up.	Very Low	⊕ϒϒϒ

*Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[a]Only one study, rated as high risk of bias

[b]Only one study

[c]Aparicio-Ting 2015 (RCT) was low risk of bias; Cadmus-Bertram 2015 (feasibility RCT) was low risk of bias; Chu 2019 (pilot RCT) was high risk of bias; Wallbank 2022a (feasibility RCT) was low risk of bias; Wallbank 2022b (RCT) was moderate risk of bias; Wong 2021 (cluster RCT) was high risk of bias

[d]Magnitude and direction of effect is mixed across studies, however the majority of RCT evidence (including the largest RCT) suggests multicomponent interventions to increase PA in woman are effective.

[e]Chu 2019 and Wong 2021 were both high risk of bias

[f]CIs of studies are wide and include no effect

More than one PROGRESS-Plus characteristic (Results cannot be segregated)

Table 10. GRADE assessment of the evidence for effectiveness of interventions in older adults with more than one PROGRESS-Plus characteristic

Certainty Assessment							N		ES (95% CI) or descriptive summary	Certainty	
No. of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Publication bias**	**Intervention**	**Control**			
Behavioural Interventions to increase physical activity*											
1 (Fazzino 2017)	Uncontrolled before-after study	Very serious risk of bias *(-2)*[a]	N/A	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Very serious imprecision *(-2)*[b]	No serious publication bias detected	142	NA	Accelerometer-measured MVPA: - Baseline to 6 months: Increased from 18.4 to 65.3 minutes/week (P = 0.001; 350% increase) - 6 to 18 months: Decreased from 65.3 to 38.1 minutes/week (P = 0.01; 42% decrease) - 18 months vs. baseline: Increased from 18.4 to 38.1 minutes/week (P = 0.001; 210% increase) Self-reported MVPA: - Baseline to 6 months: Increased from 0 to 227.5 minutes/week (P = 0.001; 227% increase) - 6 to 18 months: Decreased from 227.5 to 150.0 minutes/week (P = 0.001; 34% decrease) - 18 months vs. baseline: Increased from 0 to 150.0 minutes/week (P = 0.001; 150% increase)	Very low	⊕ϒϒϒ

Multicomponent Interventions to increase physical activity[†]											
3 (Pekmezi 2017; Blackford 2016; Maddock 2022)	2 RCTs; 1 Cluster RCT	Serious risk of bias *(-1)*[c]	Serious inconsistency *(-1)*[d]	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Serious imprecision *(-1)*[e]	No serious publication bias detected	190	196	Pekmezi 2017: There was no significant difference between intervention and control in changes in self reported MVPA (p=0.22), and accelerometer MVPA (p=0.25). Blackford 2016: - Moderate MET min/week: Compared to the control group, the intervention group showed a small improvement in moderate MET min/week. GEE Coef (SE) 0.29 (0.15), p=0.049 - There was no significant difference in change between groups on walking MET min/week, vigorous MET min/week, and total MET/min per week. Maddock 2022: In the subsample of participants 60 years and older, intervention participants improved compared to controls in average MVPA measured via accelerometer at 12 weeks (increase of 8.2 min per day, 95%CI: 2.2 to 14.1 P=0.008) and 24 weeks (increase of 7.0 min, 95%CI: 0.7 to 13.4, P=0.031). No other statistically significant findings.	Very low	⊕ϒϒϒ

Multicomponent Interventions to decrease sedentary behaviour[†]											
2 (Maddock 2022; Blackford 2016)	Cluster RCT; RCT	Serious risk of bias *(-1)*[c]	No serious inconsistency	No serious indirectness - participants, intervention and outcomes all provide direct evidence to answer the research question	Serious imprecision *(-1)*[e]	No serious publication bias detected	151	159	Blackford 2016: - Sitting hours/day: There was no significant effect of the intervention on sitting hours per day. GEE Coef (SE) 0.15 (0.34), p=0.224 Maddock 2022: - No significant differences in sedentary behaviour between groups (no effect sizes reported).	Low	⊕⊕ϒϒ

*Starting point for assessment was Low Certainty evidence (RCTs contribute <50% of total participants)

[†]Starting point for assessment was High Certainty evidence (RCTs contribute >50% of total participants)

[a]Only one study rated as high risk of bias

[b]Only one study

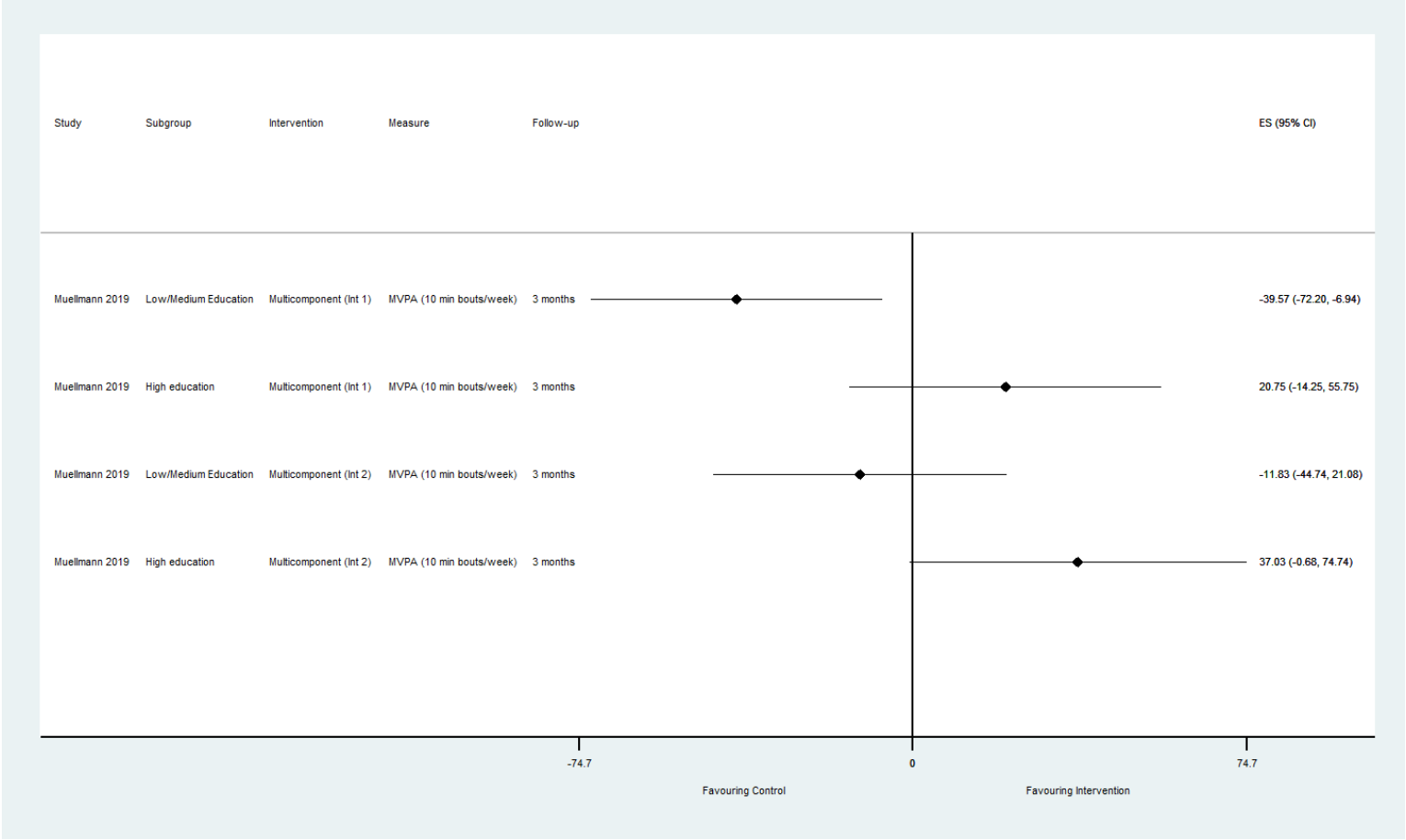
[c]Pekmezi 2017 and Blackford 2016 had high risk of bias; Maddock 2022 had moderate risk of bias

[d]Contradictory findings between two studies in relation to MVPA.

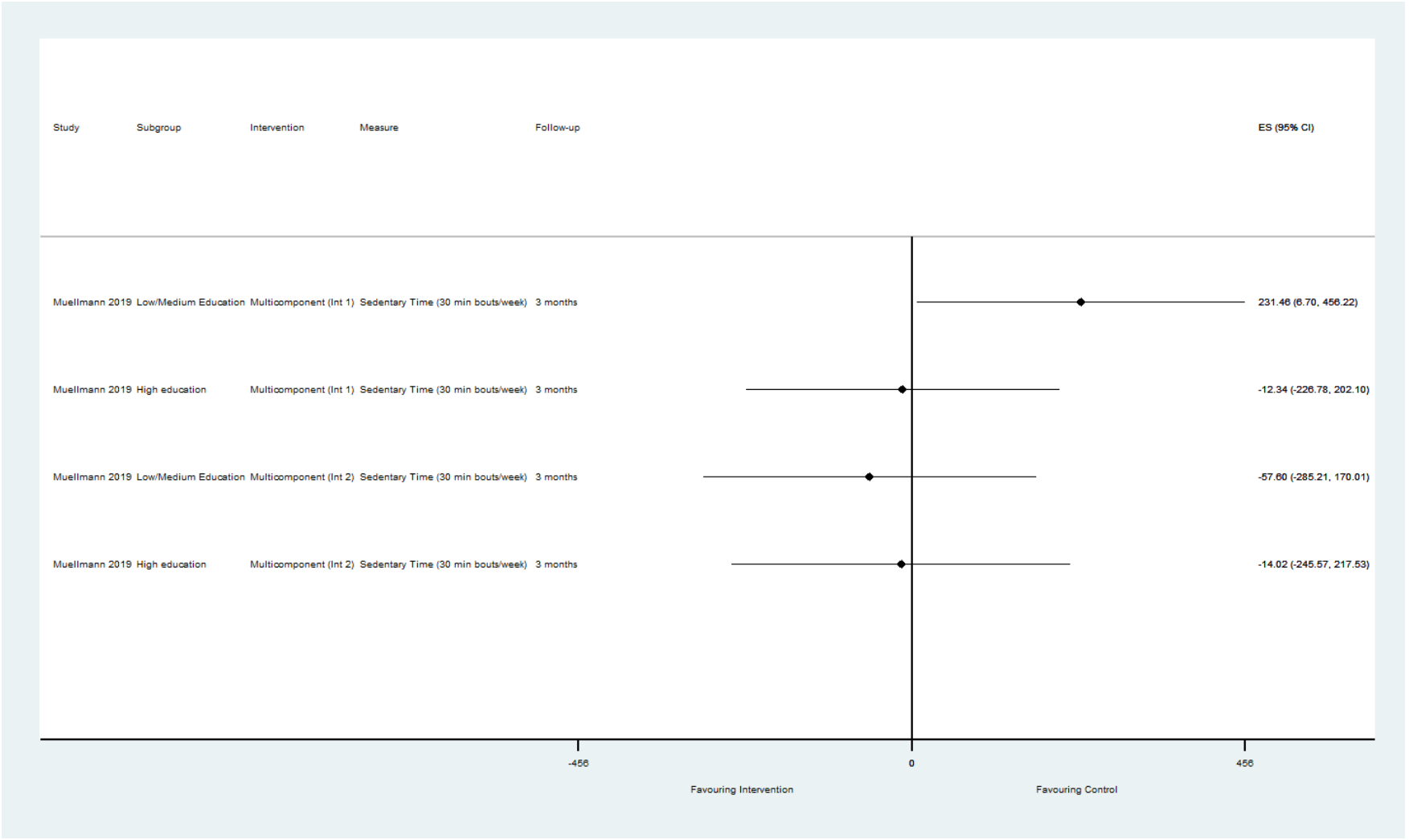
[e]Optimal information size <400

Note. Fazzino 2017 & Maddock 2022: conducted in sample of rural-dwelling women; Pekmezi 2017: conducted in sample of African American women; Blackford 2016: conducted in sample of rural-dwelling, low SES older adults.

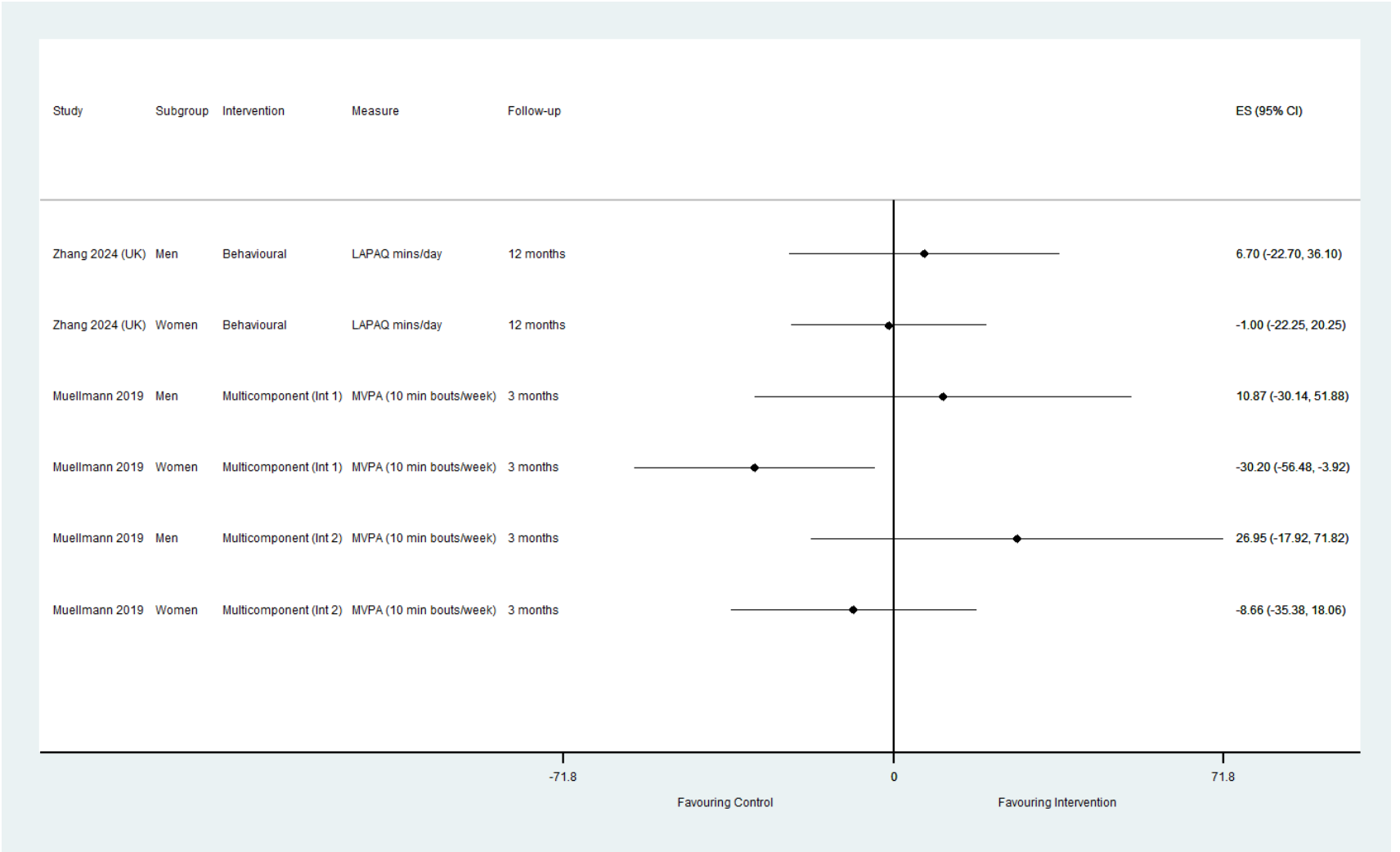
Appendix K – Forest plots (without pooling) for studies in unselected populations (with subgroup comparisons)



Appendix Figure 1. Forest plot (without pooling) showing direction of effects on duration of physical activity in those with high vs low/medium levels of education.
References: Muellmann 2019[61]
Note. Muellmann 2019 had two intervention conditions (1. Multicomponent intervention with physical activity and behavioural components; 2. The same multicomponent intervention with the addition of an activity tracker). Across all studies, there were no significant differences between groups.



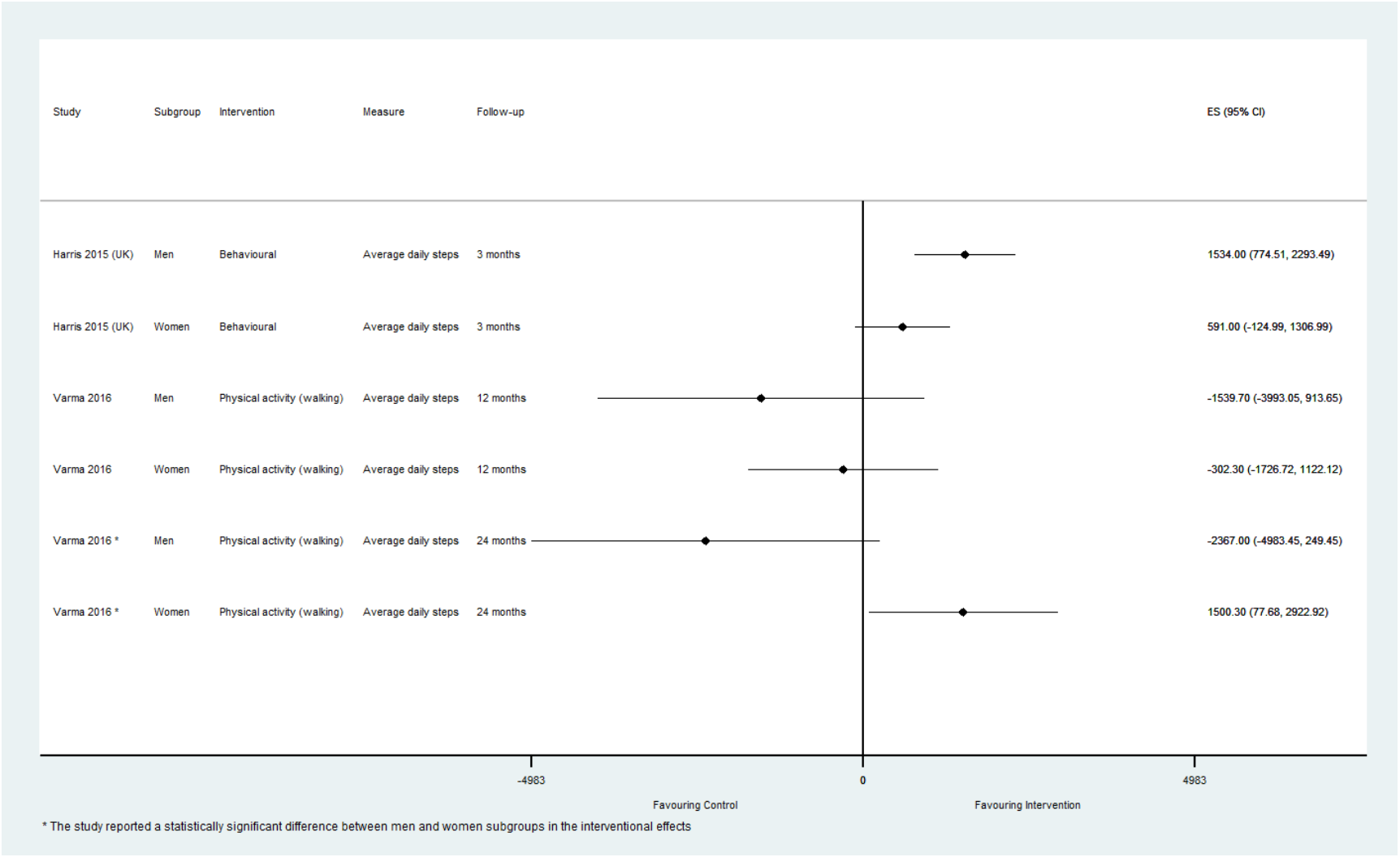
Appendix Figure 2. Forest plot (without pooling) showing direction of effects on sedentary time in those with high vs low/medium levels of education.
References: Muellmann 2019[61]
Note. Muellmann 2019 had two intervention conditions (1. Multicomponent intervention with physical activity and behavioural components; 2. The same multicomponent intervention with the addition of an activity tracker). Across all studies, there were no significant differences between groups



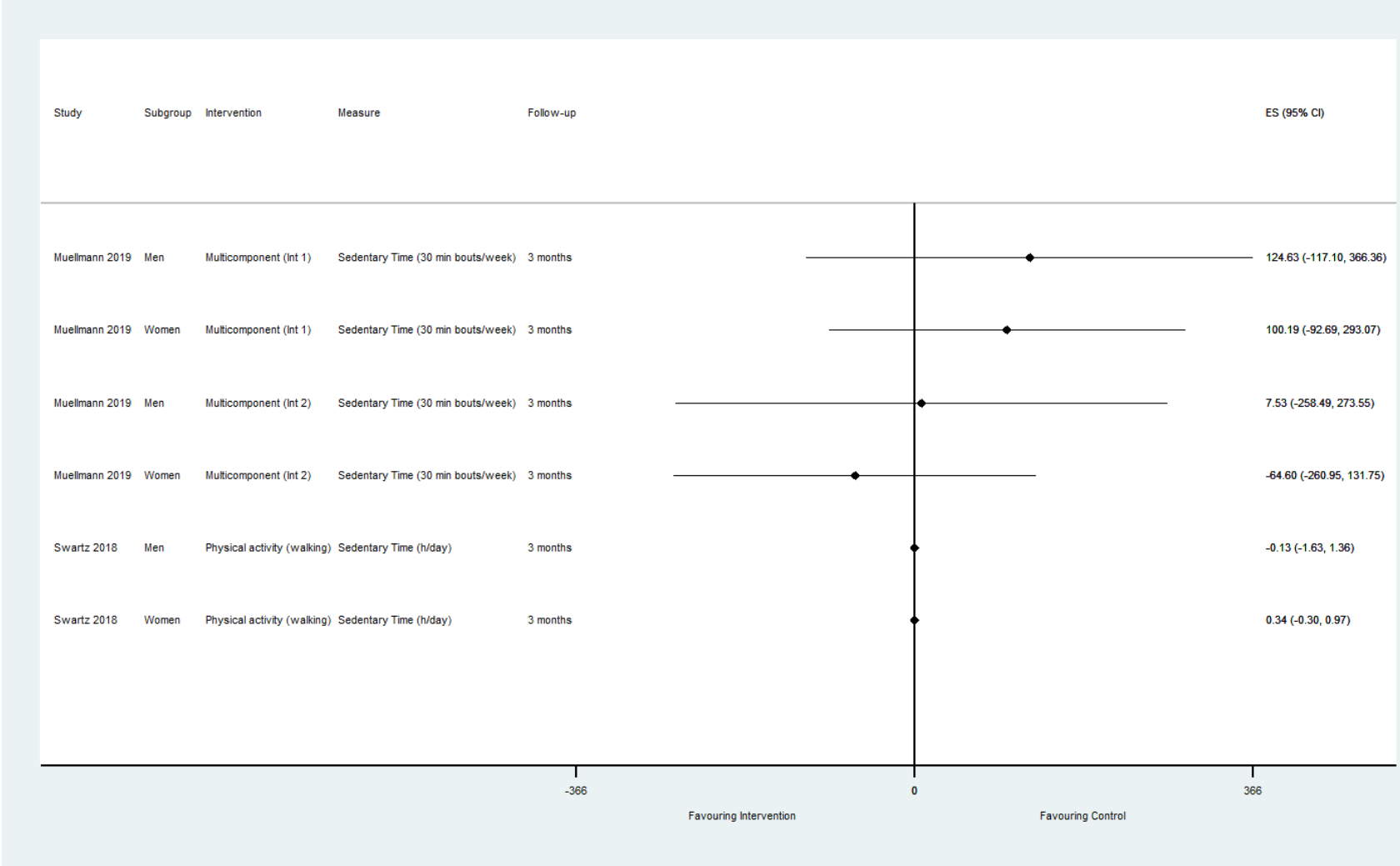
Appendix Figure 3. Forest plot (without pooling) showing direction of effects on duration of physical activity in men vs women

References: Muellmann 2019[61]; Zhang 2024[62]

Note. Muellmann 2019 had two intervention conditions (1. Multicomponent intervention with physical activity and behavioural components; 2. The same multicomponent intervention with the addition of an activity tracker). Across all studies, there were no significant differences between men and women.

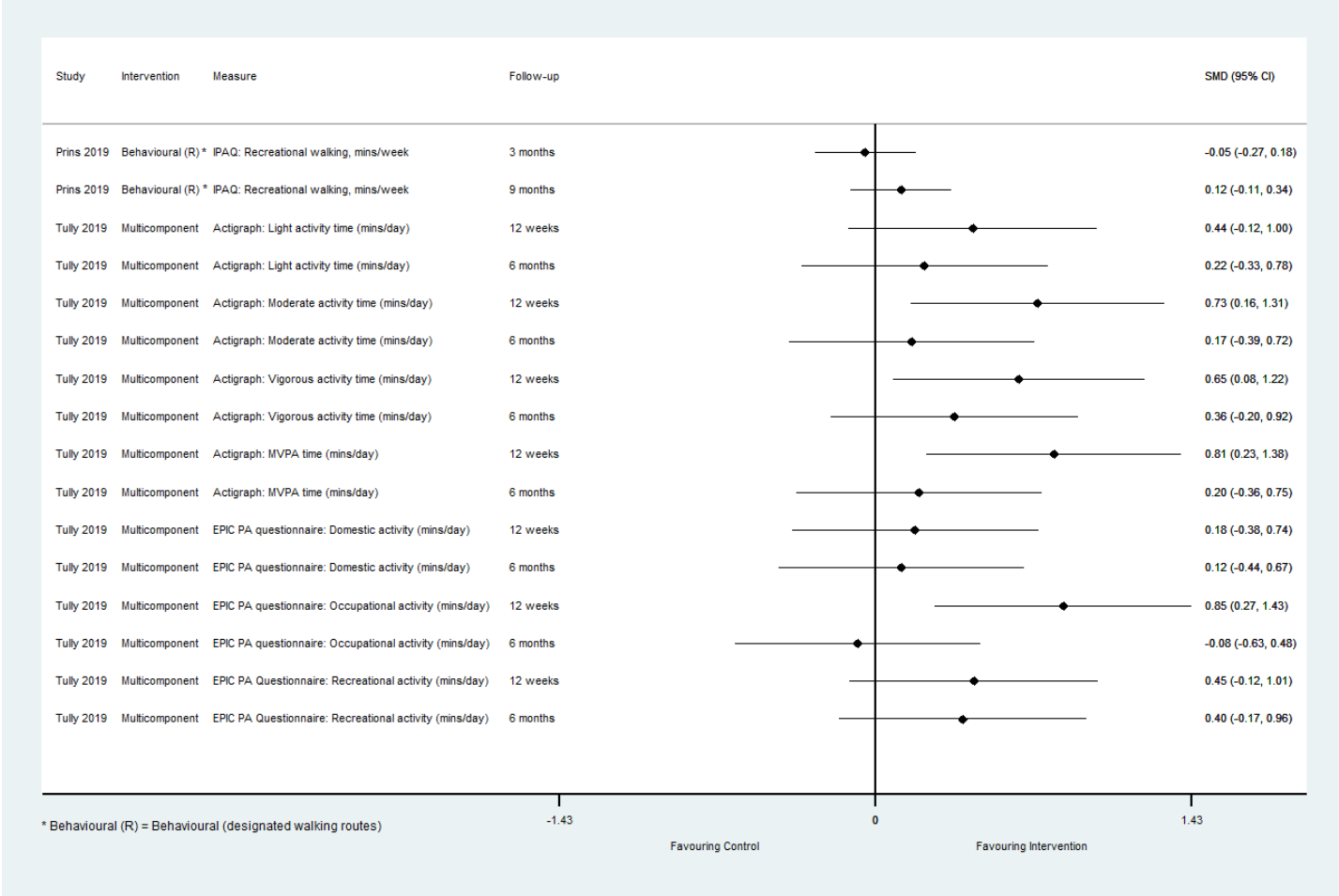


Appendix Figure 4. Forest plot (without pooling) showing direction of effects on daily step count in men vs women.
References: Harris 2015[47]; Varma 2016[64]
Note. No significant difference between men and women in Harris 2015[47]. Significant difference between men and women in Varma 2016[64] at 24 month follow-up.



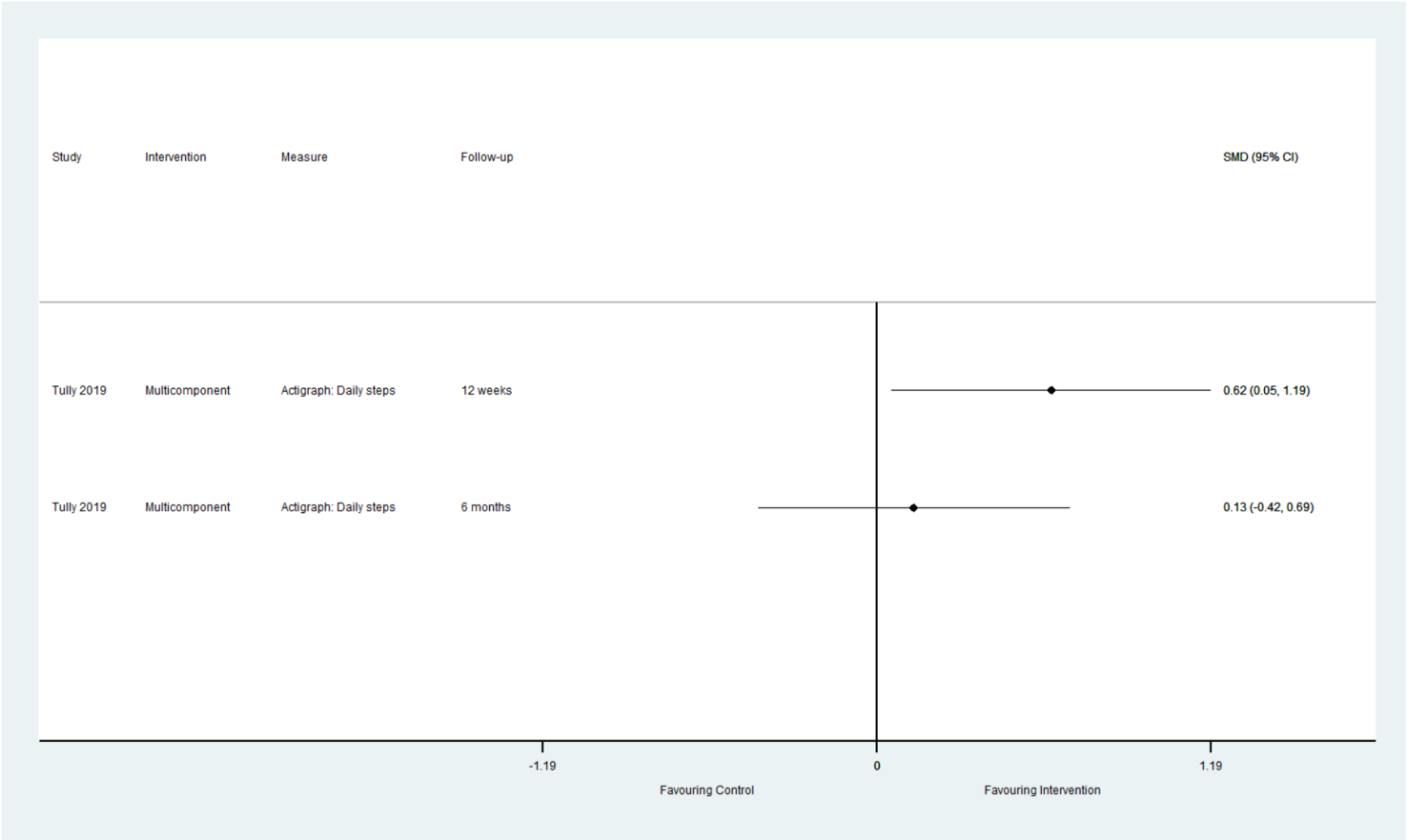
Appendix Figure 5. Forest plot (without pooling) showing direction of effects on sedentary time in men vs women.
References: Muellmann 2019[61]; Swartz 2018[63]
Note. Muellmann 2019[61] had two intervention conditions (1. Multicomponent intervention with physical activity and behavioural components; 2. The same multicomponent intervention with the addition of an activity tracker). Across all studies, there were no significant differences between men and women

Appendix L – Forest plots (without pooling) for studies in disadvantaged/marginalised populations only

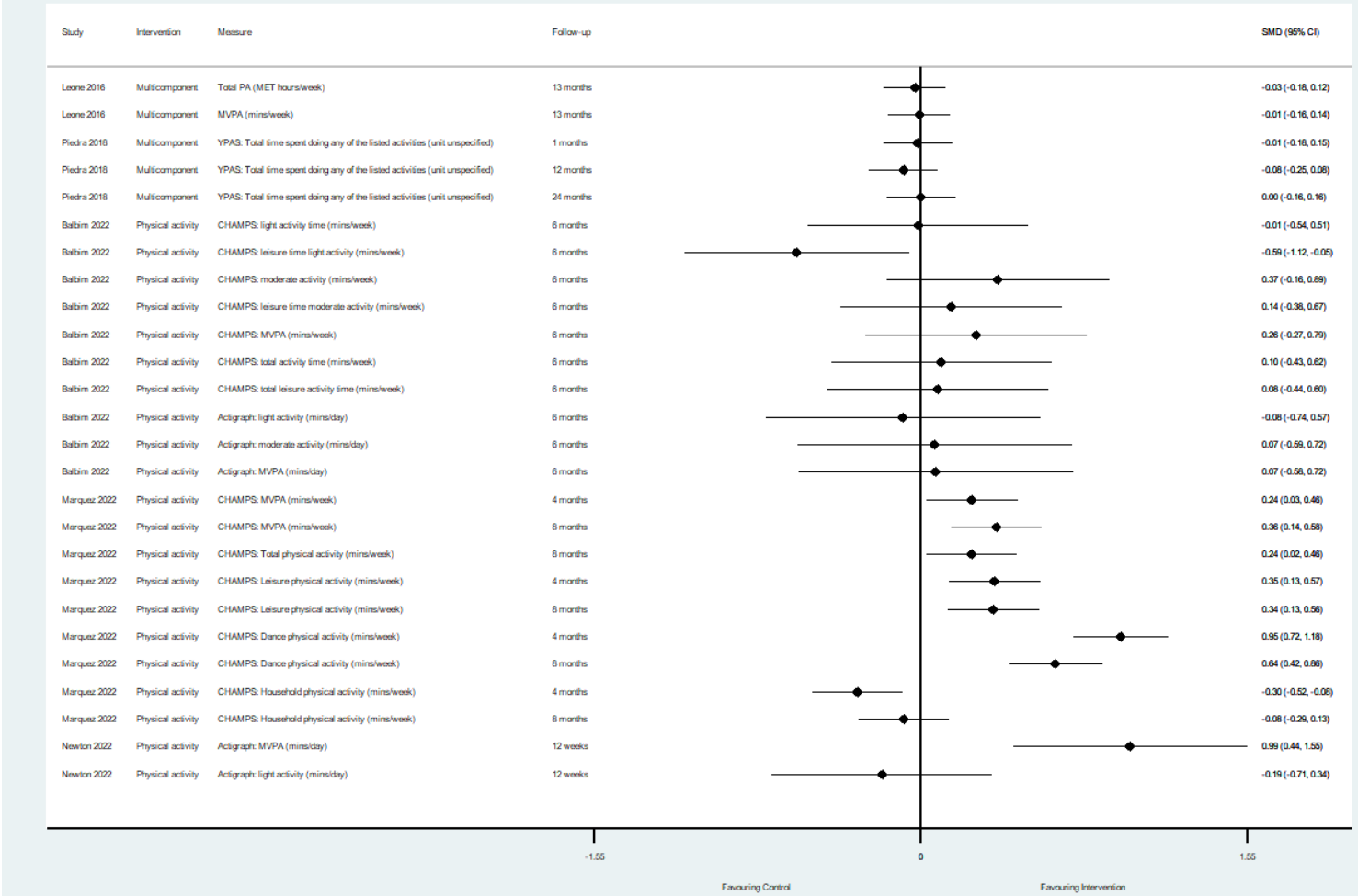


Appendix Figure 1. Forest plot (without pooling) showing direction of effects on physical activity duration in those with low SES.

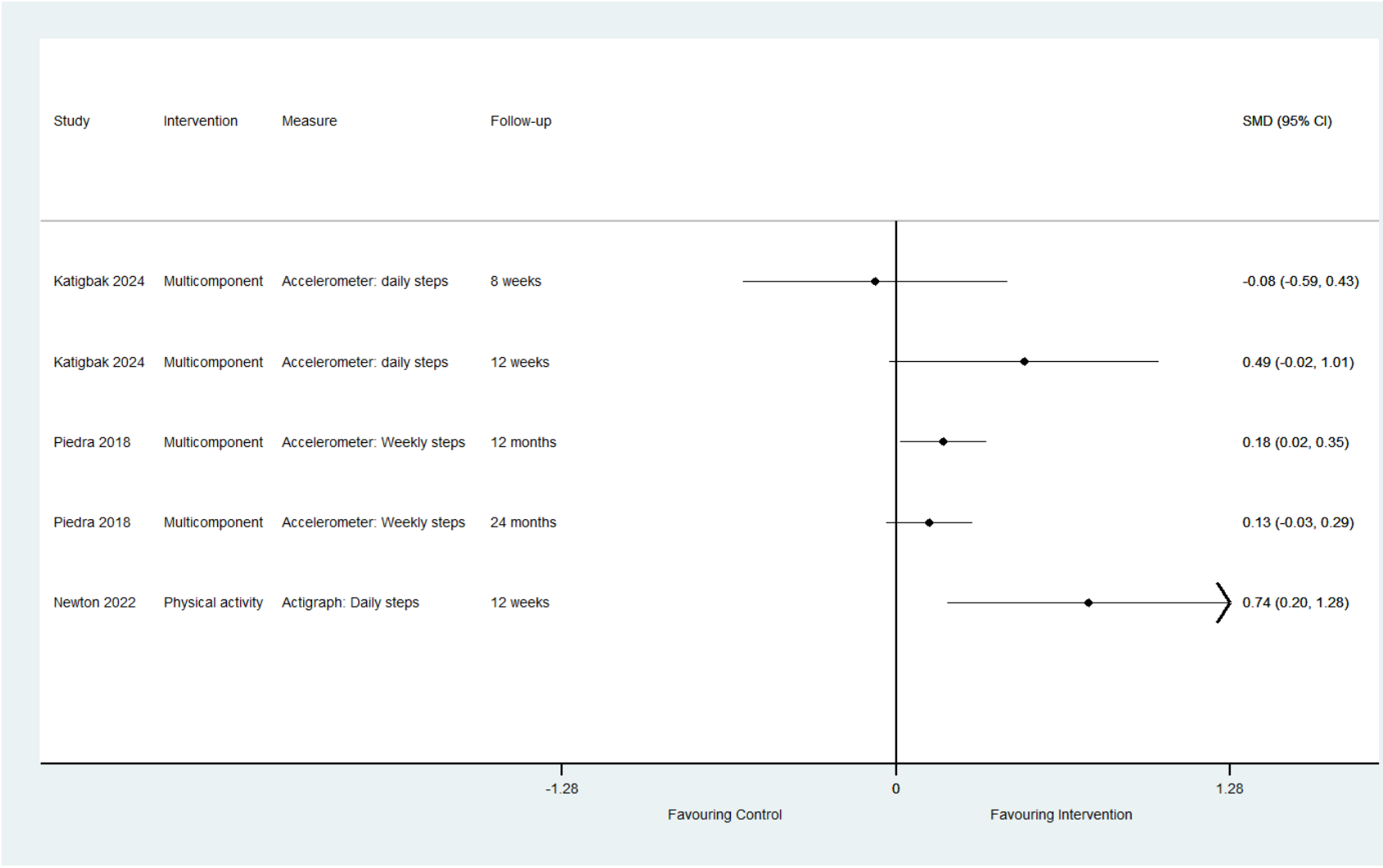
References: Prins 2019[65]; Tully 2019[49]
Note. Results from studies lacking adequate quantitative detail to compute comparable standardised mean differences are not displayed



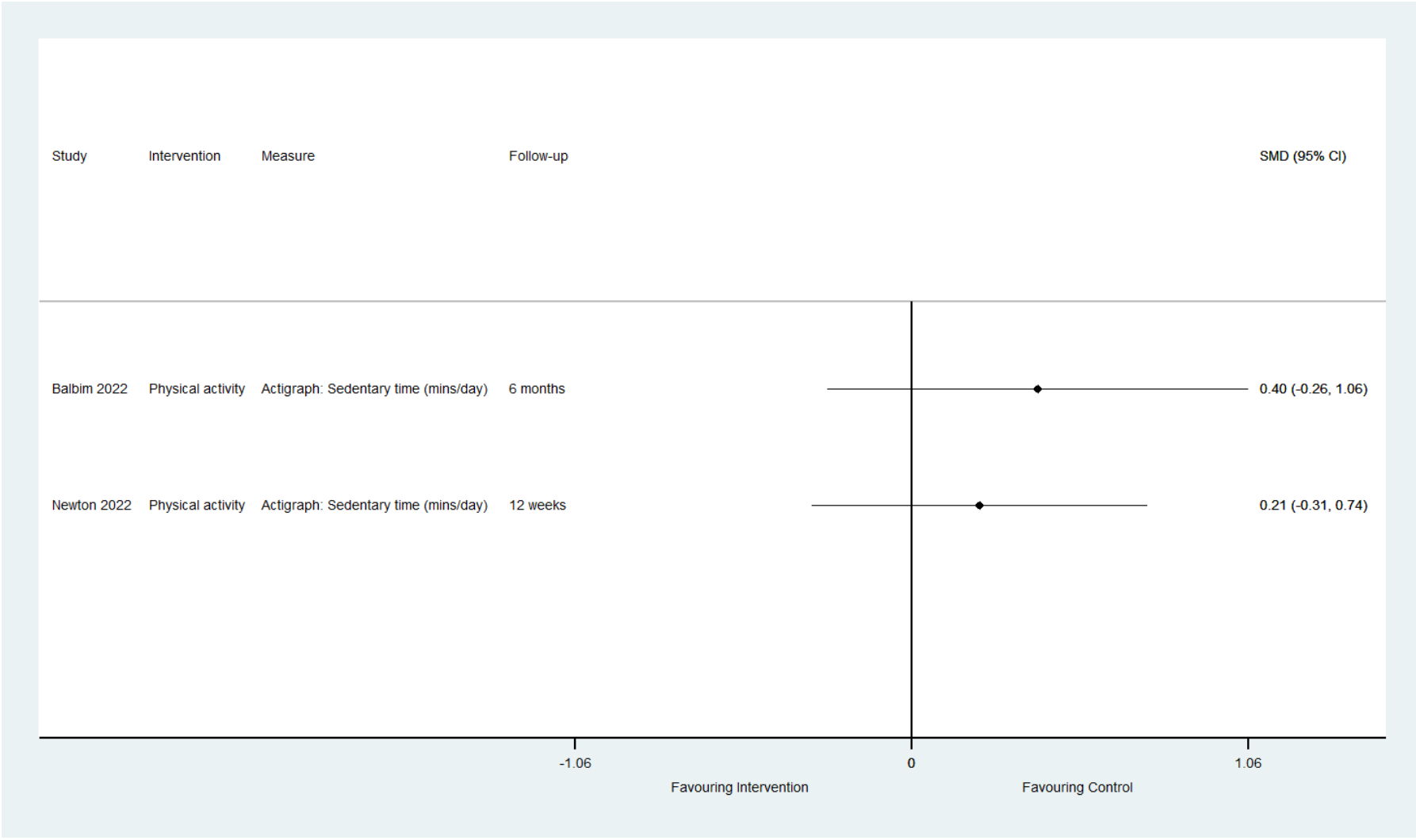
Appendix Figure 2. Forest plot (without pooling) showing direction of effects on step count in those with low SES.
References: Tully 2019[49]



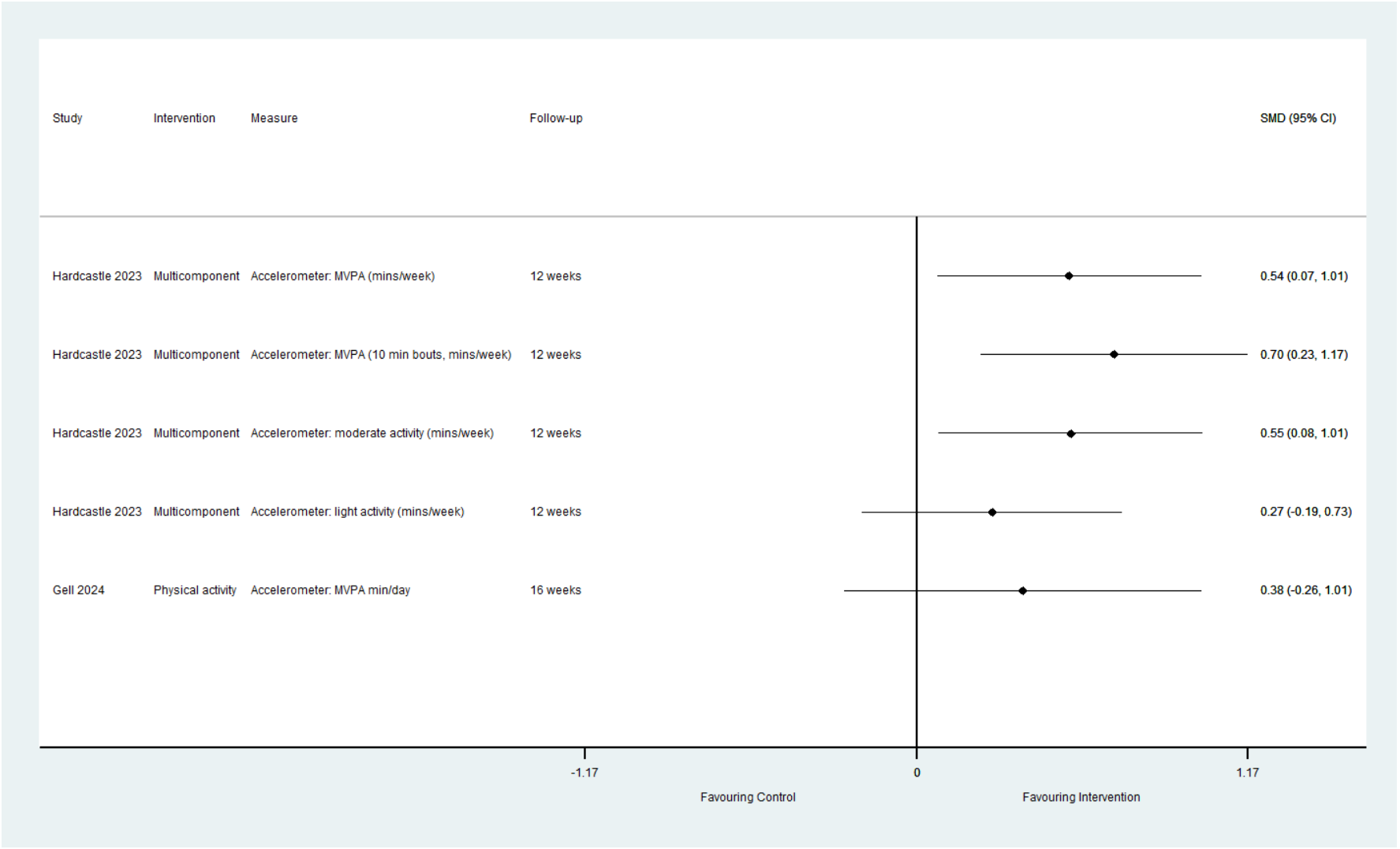
Appendix Figure 3. Forest plot (without pooling) showing direction of effects on physical activity duration in minoritised ethnic groups.
References: Leone 2016[71]; Piedra 2018[69]; Balbim 2022[45]; Marquez 2022[53]; Newton 2022[68]
Note. Results from studies lacking adequate quantitative detail to compute comparable standardised mean differences are not displayed



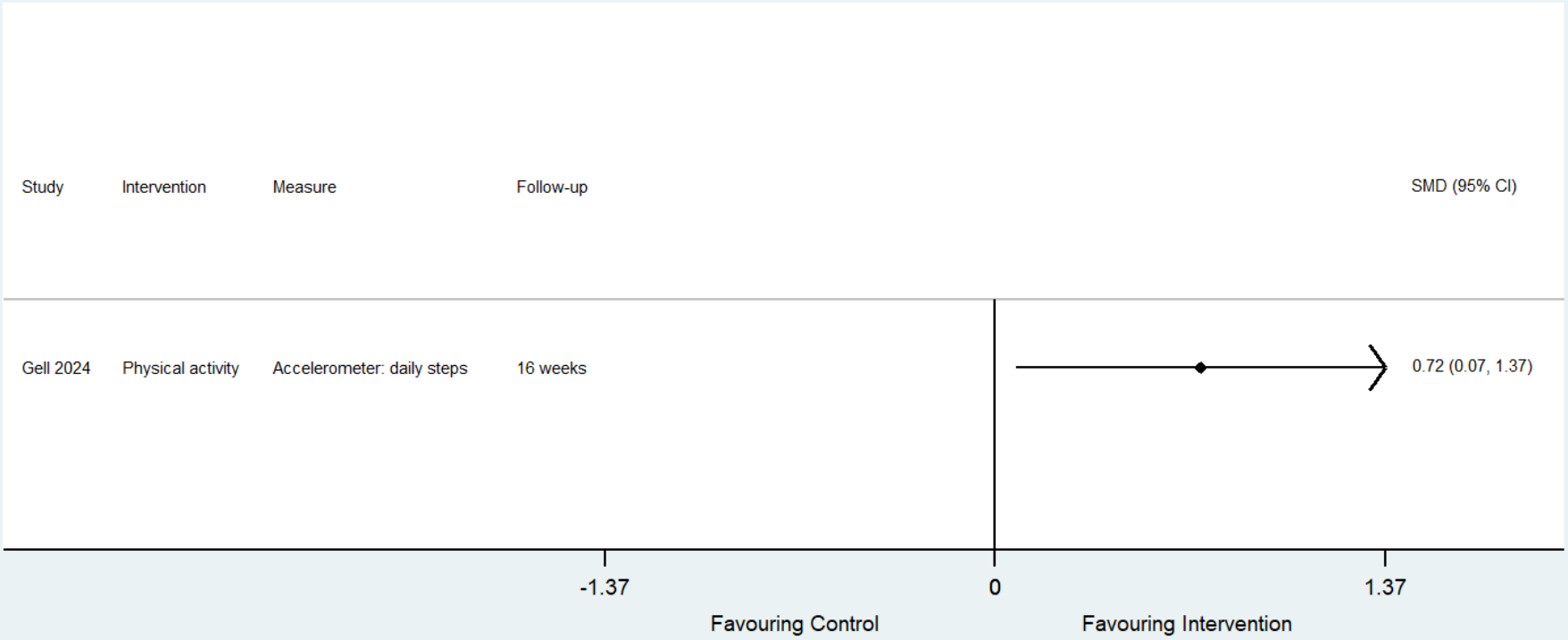
Appendix Figure 4. Forest plot (without pooling) showing direction of effects on step count in minoritised ethnic groups.
References: Katigbak 2024[59]; Piedra 2018[69]; Newton 2022[68]
Note. Results from studies lacking adequate quantitative detail to compute comparable standardised mean differences are not displayed



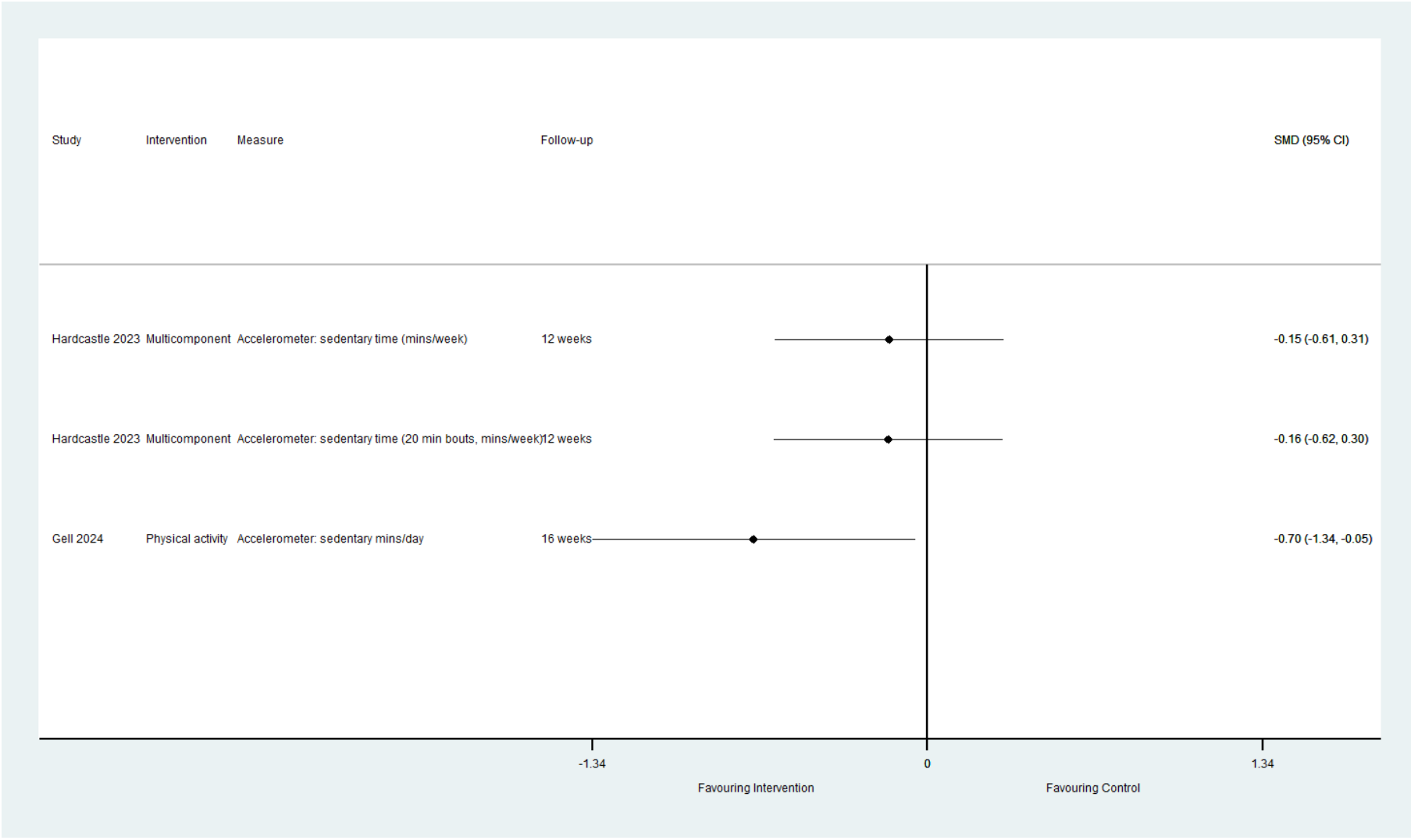
Appendix Figure 5. Forest plot (without pooling) showing direction of effects on sedentary behaviour in minoritised ethnic groups.
References: Balbim 2022[45]; Newton 2022[68]
Note. Results from studies lacking adequate quantitative detail to compute comparable standardised mean differences are not displayed



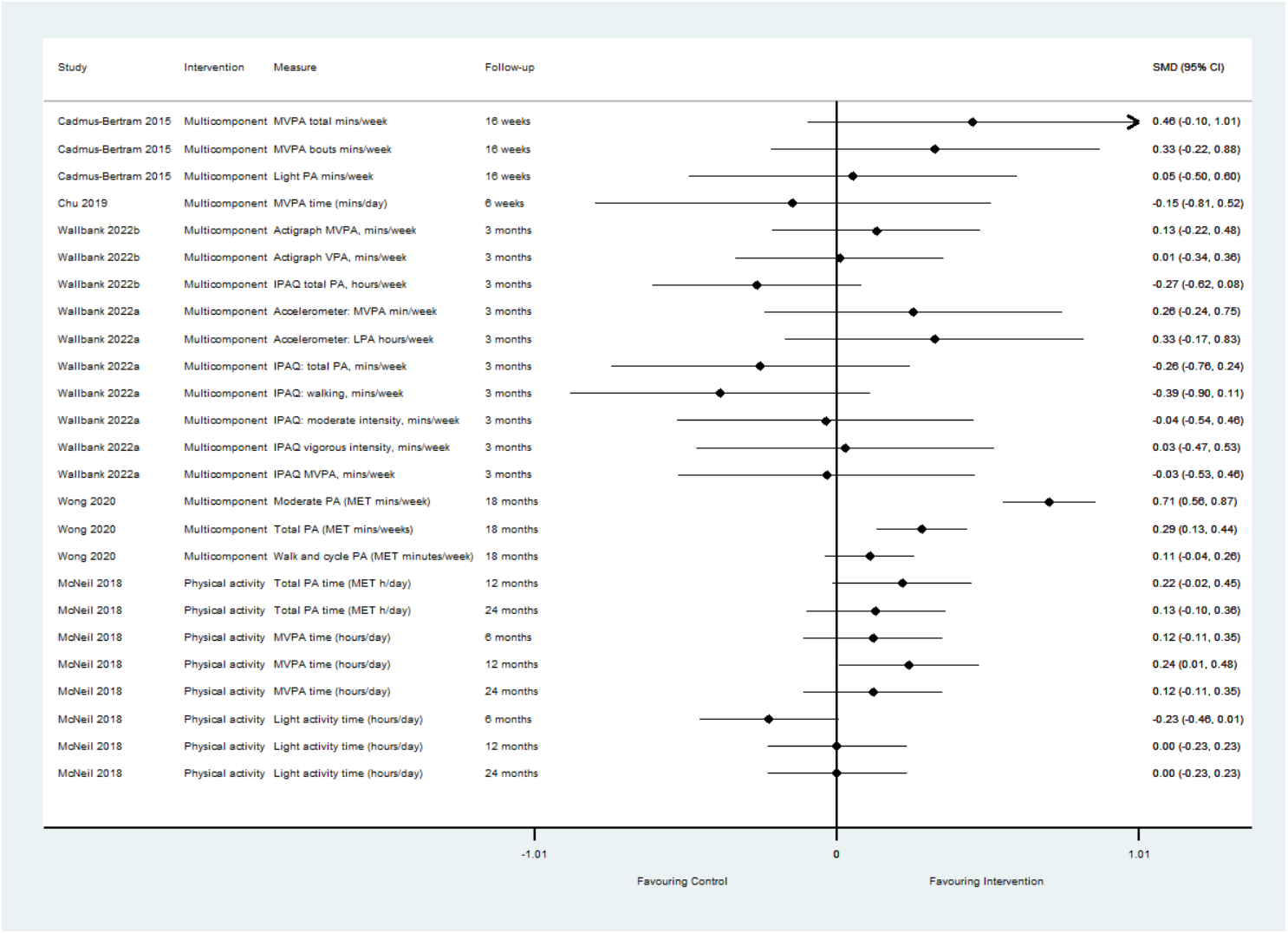
Appendix Figure 6. Forest plot (without pooling) showing direction of effects on physical activity duration in rural-dwelling older people.
References: Hardcastle 2023[73]; Gell 2024[56]
Note. Results from studies lacking adequate quantitative detail to compute comparable standardised mean differences are not displayed



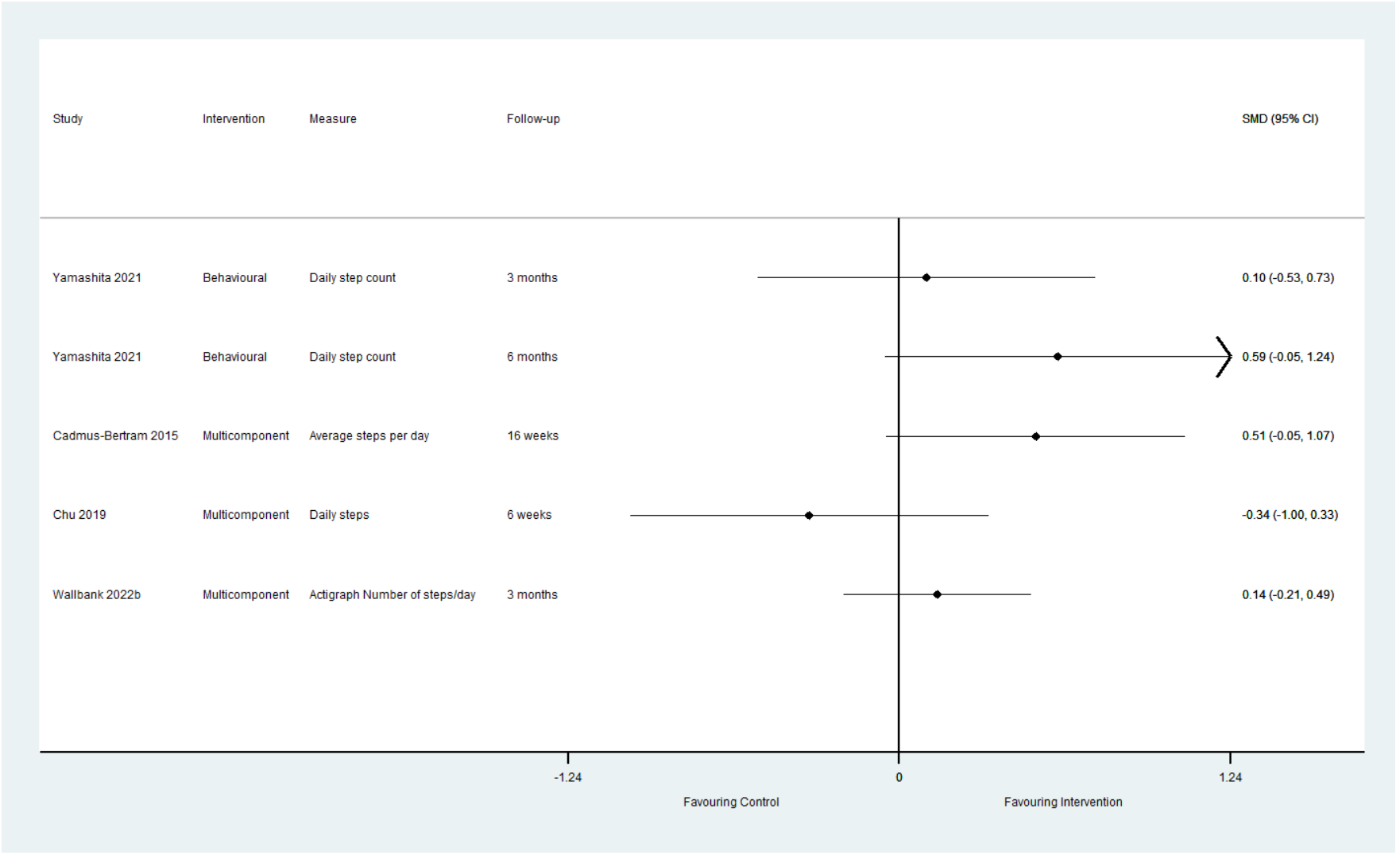
Appendix Figure 7. Forest plot (without pooling) showing direction of effects on step count in rural-dwelling older people.
References: Gell 2024[56]



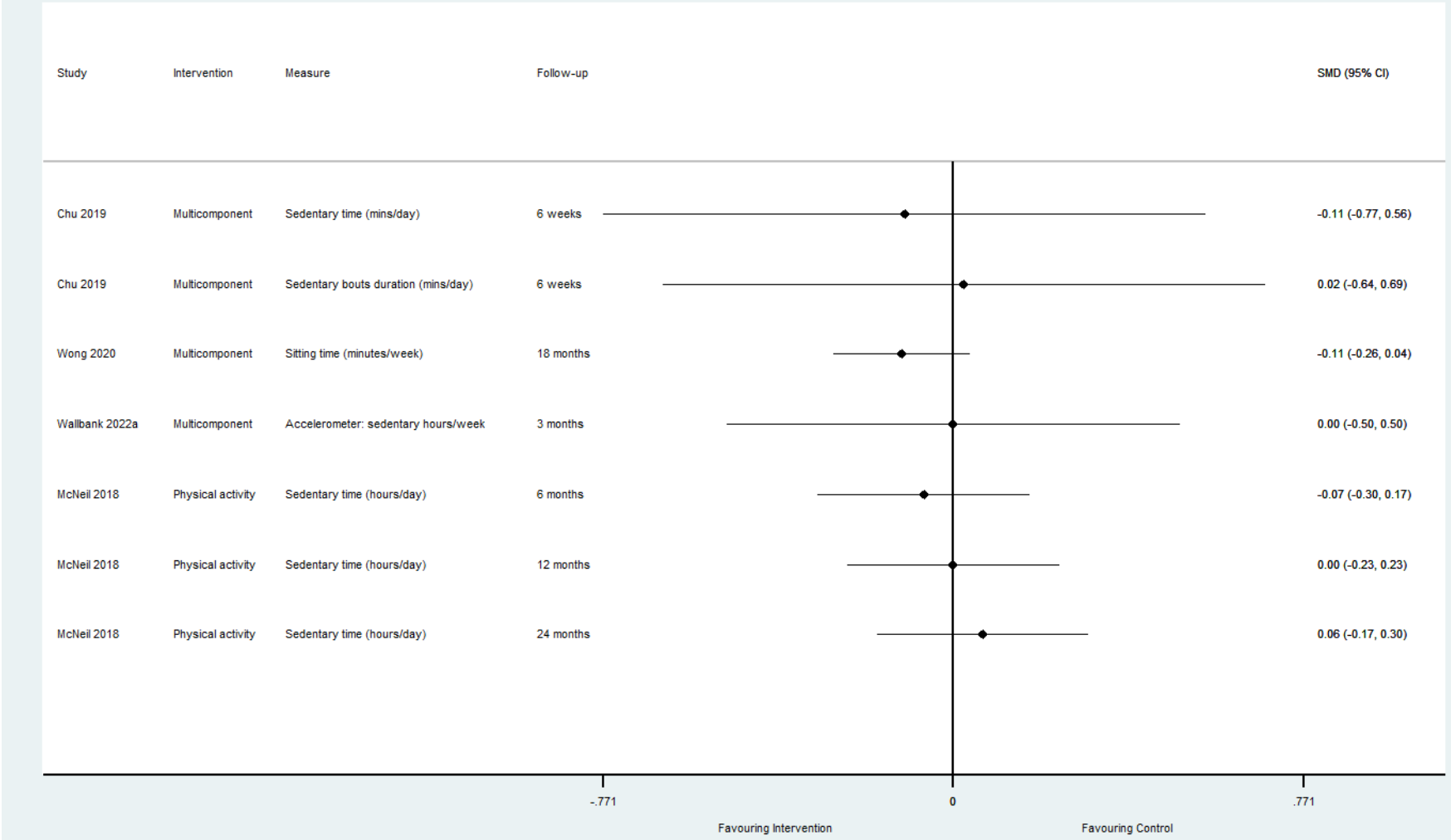
Appendix Figure 8. Forest plot (without pooling) showing direction of effects on sedentary behaviour in rural-dwelling older people.
References: Hardcastle 2023[73]; Gell 2024[56]



Appendix Figure 9. Forest plot (without pooling) showing direction of effects on physical activity duration in women.
References: Cadmus-Bertram 2015[57]; Chu 2019[79]; Wallbank 2022a[51]; Wallbank 2022b[77]; Wong 2020[78]; McNeil 2018[41]
Note. Results from studies lacking adequate quantitative detail to compute comparable standardised mean differences are not displayed



Appendix Figure 10. Forest plot (without pooling) showing direction of effects on step count in women.
References: Yamashita 2021[80]; Cadmus-Bertram 2015[57]; Chu 2019[79]; Wallbank 2022b[77]
Note. Results from studies lacking adequate quantitative detail to compute comparable standardised mean differences are not displayed



Appendix Figure 11. Forest plot (without pooling) showing direction of effects on sedentary behaviour in women.
References: Chu 2019[79]; Wong 2020[78]; Wallbank 2022a[51]; McNeil 2018[41]

Appendix M – Summary of qualitative findings on acceptability, barriers and enablers

	Acceptability	Barriers	Enablers
Unselected populations with subgroup comparisons			
Socioeconomic Status (SES)			
Physical Activity Interventions	NR	NR	
Multicomponent Interventions	NR	**Social barriers:** Participants from more affluent villages reported strong social support and community ties, which facilitated participation. In contrast, those from less affluent (low-SES) areas described weaker social bonds, suggesting that lower social cohesion acted as a barrier to engagement. None of the participants living in less affluent villages described strong social bonds with fellow residents (Olsen 2022; Australia).	**Social support:** Participants from more affluent villages reported strong social support and community ties, which facilitated participation. In contrast, those from less affluent (low-SES) areas described weaker social bonds, suggesting that lower social cohesion acted as a barrier to engagement (Olsen 2022; Australia).
Unpaid Care			
Physical Activity Interventions	NR	NR	NR
Multicomponent Interventions	NR	**Practical barriers:** Female caregivers reported difficulty leaving spouses due to unpaid caregiving responsibilities. Male caregivers did not report this as a barrier, indicating a gendered disparity (Olsen 2022; Australia) (Intersects with Gender/Sex)	NR
Gender/Sex			
Physical Activity Interventions	NR	NR	NR

Multicomponent Interventions	NR	**Practical Barriers:** Women who cared for spouses expressed difficulties in leaving them to engage in the physical activity intervention. None of the male participants caring for a spouse described this as a barrier (Olsen 2022; Australia) (intersects with unpaid care)	NR
Disadvantaged/marginalised populations with subgroup comparisons			
Race/Ethnicity/Culture			
Physical Activity Interventions	NR	**Practical barriers:** Barriers to enrolment included accessibility, travel, weather, and facility. There were no perceived ethnocultural barriers to enrolment (Manson 2017, Canada; All participants were low SES). **Programme features:** Barriers to enrolment included teacher appropriateness. There were no perceived ethnocultural barriers to enrolment (Manson 2017, Canada; All participants were low SES)	**Health benefits:** Enablers to enrolment included perceived health improvement (Tai Chi perceived as good PA, beneficial for older adults, fitness, and mental health). No perceived ethnocultural enablers to enrolment (Manson 2017, Canada; All participants were low SES). **Practical enablers:** Time of day considered important. Pairing with other programs was seen as an enabler. No perceived ethnocultural enablers to enrolment (Manson 2017, Canada; All participants were low SES). **Social Support:** Socialising and networking identified as enablers No perceived ethnocultural enablers to enrolment (Manson 2017, Canada; All participants were low SES).
Multicomponent Interventions	NR	NR	NR
Gender/Sex			

Physical Activity Interventions	NR	**Practical Barriers:** Accessibility, travel, weather, and facility access were barriers to enrolment, with minimal gender differences (Manson 2017, Canada; All participants were low SES). **Programme Features:** Teacher appropriateness was a barrier to enrolment with minimal gender differences (Manson 2017, Canada; All participants were low SES).	**Health Benefits:** Tai Chi perceived as beneficial for older adults - fitness and mental health. Minimal gender differences (Manson 2017, Canada; All participants were low SES). **Practical enablers:** The timing of sessions (time of day) was considered important. Pairing with other programmes that might be of interest was seen as an enabler. Minimal gender differences (Manson 2017, Canada; All participants were low SES). **Social Support:** Socialising and networking were identified as enablers. Minimal gender differences (Manson 2017, Canada; All participants were low SES).
Multicomponent Interventions	NR	NR	NR
Disadvantaged/marginalised populations only			
Socioeconomic Status (low SES)			
Physical Activity Interventions	Tai Chi was highly acceptable to participants. Participants in focus groups expressed satisfaction with the classes. Tai Chi participants perceived numerous benefits from practicing Tai Chi, e.g. increased confidence in movement, balance, and daily activities. They expressed greater control over physical actions (e.g., walking, avoiding falls) and perceived the programme as empowering (Lo 2020, USA).	**Practical barriers**: accessibility, travel, weather, facility issues. Financial cost and time conflicts (Manson 2017, Canada; Lo 2020, USA; Britten 2017, UK). Interfered with ability to care for their parent (Lo 2020, USA). **Health barriers:** health issues (physical and psychological) reduced participation (Manson 2017, Canada; Lo 2020, USA; Britten 2017, UK).	**Health Benefits:** Tai Chi was seen as good physical activity, especially for older adults, with benefits for fitness and mental health (Manson 2017, Canada). Similarly, perceived physical and psychological benefits motivated participation in dance (Britten 2017, UK). **Practical Enablers:** Time of day was considered important, and pairing with other interesting programmes supported enrolment (Manson 2017, Canada). A convenient

	Intervention viewed positively by participants (Britten 2017, UK). Most participants would welcome second programme (Van Ravenstein 2018, USA)	**Social barriers:** Lack of socialisation in the community that may contribute to poor mental health (van Ravenstein 2018, USA) **Programme features**: Teacher appropriateness (Manson 2017, Canada).	location was also a key enabler (Lo 2020, USA). Participants preferred community-based centres, with location identified as both a logistical barrier and facilitator (Britten 2017, UK). **Social Support:** Socialising and networking were identified as enablers (Manson 2017; Lo 2020, USA; Britten 2017, UK). Exercising as a community. Community "feel" (Van Ravenstein 2018, USA)
Multicomponent Interventions	Participants in the intervention group reported very high rates of satisfaction with the intervention and the helpfulness of their peer mentor. Some participants asked about the possibility of using smartphones or wrist-worn step counters instead of pedometers worn on the waist, suggesting that alternative methods of counting steps might enhance the acceptability of the intervention (Tully 2019, UK).	**Practical barriers:** Time and the weather emerged as potential barriers to participation in the study programme (Tully 2019, UK). **Programme features:** The paperwork involved had a negative impact on both peer mentors' and participants' experience of this study. It was not clear how peer mentors supported their participants in completing the paperwork; however, peer mentors' and participants' comments suggested that some additional support might be required (Tully 2019, UK).	**Programme features:** Peer mentors: participants stated they were still active with their peer mentor even after the end of the programme (Tully 2019, UK). Personalised approach for recruiting older people for exercise programmes (Van Ravenstein 2018, USA) **Personal Motivation:** Participants were positive about goal-setting and self-monitoring. Most liked these components as they provided a sense of achievement and helped them determine whether or not they were increasing their physical activity (Tully 2019, UK).
Race/Ethnicity/Culture (Latino/Latina only)			
Physical Activity Interventions	Participants thought that class frequency, duration, and time	NR	NR

	were enough and appropriate (debriefing sessions). They felt more energised, with better motor coordination, more motivated, a sense of discipline, new friendships, and impact on health reported. Reported liking instructor's energy, attention and ability to motivate. Found the music joyful and incited them to dance (Balbim 2022, USA).		
Multicomponent Interventions	NR	NR	NR
Place of Residence (Rural)			
Physical Activity Interventions	NR	NR	NR
Multicomponent Interventions	Overall positive experience of the intervention (van de Vijver 2018, The Netherlands). Positive reception - Participants reported increased physical activity, improved mental health, and enhanced social well-being (Irvine 2024, UK). High acceptance and appreciation of the multicomponent program. Participants valued the social aspect, tailored exercises, and the educational component. Overall, they were satisfied with the program's structure, delivery, and	**Practical barriers:** Weather constraints (Irvine 2024, UK). Cost concerns if the program was not free, with some participants also reporting difficulty accessing healthcare services in rural areas (Dabkowski 2021, Australia). **Health (physical and psychological) barriers:** Initial hesitation due to health concerns (Irvine 2024, UK).	**Health benefits:** To become physically fitter; outside activity (van de Vijver 2018, The Netherlands). **Programme features:** experienced instructor, inclusive design encouraged participation (Dabkowski 2021, Australia). **Social support:** Social interaction (van de Vijver 2018, The Netherlands). Strong social component (Dabkowski 2021, Australia).

	inclusive environment (Dabkowski 2021, Australia)		
Living Situation (Living Alone)			
Physical Activity Interventions	NR	**Practical barriers:** Barriers to engagement were a lack of time and motivation for completing exercise snacks more than three times per day (Jansons 2023, Australia). **Programme features:** Barriers to engagement were a lack of upper body exercise and omission of exercise equipment (Jansons 2023, Australia).	**Health benefits:** Enablers to intervention engagement were perceived health benefits (Jansons 2023, Australia). **Practical enablers:** Enablers to intervention engagement were efficiency, flexibility (Jansons 2023, Australia). **Personal motivation:** Enablers to intervention engagement were motivation (Jansons 2023, Australia).
Multicomponent Interventions	NR	NR	NR
Gender/Sex (women)			
Physical Activity Interventions	NR	NR	NR
Multicomponent Interventions	Physical activity participation was influenced by personal, life-stage, and cultural factors, as well as the internalised pressure of self-responsibility, which shaped the program experience. Social support and identifying motivational strategies were seen as crucial to staying active. - Post-intervention feedback from 81% of participants was largely positive, with many reporting increased awareness and motivation to be physically active.	**Programme features:** Some programme features did not suit all participants. One participant expressed a preference for subsidised personal training, while another sought more opportunities for social interaction, highlighting a mismatch between participant expectations and programme design (Wallbank 2022a[51], Australia).	**Social support:** Social support played a key role in promoting physical activity, as many participants preferred exercising with others. Feedback showed that social interaction encouraged physical activity, aligning with evidence that social networks offer supportive benefits. This was part of a multicomponent approach involving both behavioural and educational strategies (Wallbank 2022a[51], Australia).

	Participants felt the intervention could benefit other women in their age group (Wallbank 2022c[89], Australia).	Life changes such as menopause may also impact participation (Wallbank 2022c[89], Australia)	
More than 1 PROGRESS-Plus group			
Physical Activity Interventions	NR	NR	NR
Multicomponent Interventions	Positive feedback on group sessions and non-traditional forms of exercising (e.g., hoovering) (Lawlor 2019, Northern Ireland; Gender/Sex [women] and low-SES).	**Programme features**: Printed materials (maps of local walks): Most felt unsafe walking in parks or already knew local places. Buddy system: No focus group participants identified using a buddy; some preferred PA alone. Telephone calls: Aversion to receiving calls - Improvements: Need for organised activities and regular feedback on progress (Lawlor 2019, UK; Gender/Sex [women] and low-SES).	NR

Appendix N – Quotations from qualitative studies

Table 1. Overview of qualitative findings with quotations from papers reviewed illustrating the different themes identified*

Unselected populations with subgroup comparisons
Socioeconomic Status (SES): one study[84] (moderate risk of bias)
Theme: Social cohesion as moderating factor; higher SES have stronger social networks supporting participation.
Affluent participant[84]: "*It's good here… we all mingle with the different crowds and the ones that are on their own we end up pulling (in)… there's always something going on… table tennis, indoor bowls… it's a good place to be*." (p.792) Less affluent participants[84]: "*…people aren't interested in the community…" "We don't have a great community spirit*". (p.792) Study authors[84]: "*Differences in cohesiveness and community integration within the different retirement villages [affluent vs less affluent] appeared to be an important determining factor as to whether residents chose to participate in group walks*". (p.792)
Gender/Sex: two studies[42,84] (one[42] low and one[84] moderate risk of bias)
Theme: No real difference between genders[42]
Study authors[42]: "*There were minimal differences found between males and females…*" (p.599) "…we *found minimal differences between males and females…*" (p.601). Female participants[75]: "*OK to do classes with men*" (p.601) "*I would like the men to participate, to get these men out and exercising.*" (p.601)
Theme: Caregiving responsibilities as a gendered barrier for women[84]
Female participant[84] talking about participating in group walks: *"Well, it got difficult, yes because I really didn't feel happy leaving [her husband]. He couldn't do anything very much for himself… So, I faded away, and I haven't got back into it"*. (p.794)
Unpaid care: one study[84] (moderate risk of bias)
Theme: Unpaid caregiving responsibilities as barrier; see above re: gender/sex and caregiving
Disadvantaged/marginalised populations with subgroup comparisons
Race/Ethnicity/Culture: one study[42] (low SES individuals) (low risk of bias)
Theme: No race/ethnicity/culture influences emerged.
Study authors[42]: *"..no differences between cohort groups with no perceived ethno-cultural barriers to enrollment* (sic)." (p.599)
Gender/Sex: one study[42] (low SES individuals) (low risk of bias)
Theme: No real difference between low SES males and females
Study authors[42]: "*There were minimal differences found between males and females…*" (p.599) "…we *found minimal differences between males and females…*" (p.601). Female participants: "*OK to do classes with men*" (p.601) "*I would like the men to participate, to get these men out and exercising.*" (p.601)
Disadvantaged/marginalised populations only
Socioeconomic Status (low SES): five studies[42,46,49,52,85] (four low[42,46,49,52], one high[85] risk of bias)

Theme: Barriers; health-related limitations, transportation difficulties, time constraints,
Participant[46]: *"I suppose costs can be a problem, sometimes if you have to pay on a bus, you've got to consider people's journey and… appropriate timing. Obviously the cost of it- if it's -there is a cost to it…. Because some of the exercise classes can be quite expensive."* (p.8)
Participant[49]: "*Erm I think that one day I just done a bit too much and then fluid gathered on my knees. So, I need to be careful not to over do it*". (p.22)
Participants[42]: *"and then the subway then another bus to get here."* (p.601) "*A 30 minute walk is [my] limit."* (p.603). *"[I can come if I] do not have to make another trip*". (p.603)
Theme: Enablers; perceived health benefits, accessibility/convenience, peer support, programme design, scheduling, instructor; personalisation
Participant[49]: "*I'm conscious that I need… some sort of activity… And erm I've noticed I've put on weight and I have myself, a certain weight I will not go over…. And I am conscious that I need to be more active."* (p.23)
Participant[46]: "*My main reason for doing it is because I quite enjoy it… and I get to meet- and meet people while exercising."* (p5)
Participant[46]: "*It's local… locality is really important…anywhere else is awkward…"* (p.7)
Participant[46]: *"the emphasis [seems to be on]…. Your body. The things you can do with your body, the stretching and you know coordination and balance, which is exactly what I need. I feel better about; you know bending or moving about when shopping…"* (p.7)
Participant[49]: *"People feel safe out walking along with somebody else. Cause we're afraid of the dogs and young ones and all messing about in parks."* (p.24)
Participant[49]: *"I would have like to have gone out and having a walk. But that's like a barrier. I have to stay in and mind three children"* (p.24)
Participant[42]: "*good connection with leader of the group [important]"* (p.604)
Participant[85]: "*We're senior residents up here. And she approached me… but she stated what she wanted, and we all complied with that [participated]."* (p.6)
Theme: Group social cohesion
Participants[52]: *"You make that commitment and its very important to keep that commitment to the group".* (p.677) *"And the thing is… Because it's like we try to take care of one another. And I think that's it really… We've just formed a bond with all of us and it's wonderful*" (p.677)
Race/Ethnicity/Culture (Latino/Latina only): one study[45] (high risk of bias)
Theme: Energetic instructors and joyful music as key motivators
Participant[45]: *"I liked the music because it reminded me of past times, and remembering motivated me to enjoy it. Then, yes, all of this was very good for me".* (p.32)
Place of residence (rural): three studies[50,86,87] (two low[86,87]; one high risk of bias[50] [no quotes provided in paper])
Theme: Barriers; weather conditions, limited access to healthcare, programme costs

Participant[87]: "*It's very hard at the moment in this area to get a doctor's appointment…*" (p.1993)
Participant[86]: "*We meet up and if the weather's atrocious we just have a coffee…particularly during the winter."* (p.9) Participant[86]: "*While [Scotland] is a beautiful country…[the weather] can also turn… there is nothing worse than thinking 'Oh, it's a lovely day, I don't need a coat today', and you're half an hour from anywhere and all of a sudden you get hit by something [bad weather]".* (p.8) Participant[86]: *"they just built a new path. Before it was very treacherous…It was slippery sometimes and muddy but since they put the new thing in, we've done that twice now"* (p.9)
Theme: Enablers; social support, perceived health benefits, inclusive, socially engaging programme
Participants[87]: "*I've found it's improved my pain level…*" (p.1993). "M*y body feels better…*" (p.1993) *"I go through stages where I may take a walking stick with me because of security but then I find I'm walking without it because I'm feeling quite strong."* (p.1994)
Participant[87]: "*…because it's free, it's mixing people that perhaps would not come together otherwise."* (p.1994)
Participant[86]: [speaking of husband] "*…He looks much healthier…It's made a big difference to his health… he's out and about and not waiting for me all the time to do things."(p.14)*
Participant[86]: *"I saw the social side actually helped you to actually do it and motivated you into actually doing it…"* (p10)
Living situation (living alone): one study[88] (low risk of bias)
Theme: Practical barriers time constraints,
Participants[88]: *"it got a bit time critical… there are other things to do… there's just too many other things going on. Sometimes I was just unable to do them all, I was away visiting my daughter…"* (p.565). *"to make sure you fit it in, then it becomes taking over your schedule, your time,… then it just sort of takes over and becomes inconvenient".* (p565)
Theme: Motivators perceived health benefits, flexibility of the intervention, personal motivation
Participant[88]: *"The snacking* [short frequent sessions during day] *is a good concept.."* (p.564*)* *"I think it was a really, really good way to (get) you to do exercise because not everyone wants to get up and exercise for half an hour. And to be able to do it in little short bursts I think is really beneficial"* (p.564)
Participant[88]: *"Yeah so you're in control…. Which was not putting any pressure really. And if you wished to increase it you could."* (p.564)
Participant[88]: *"I found that I did become more flexible over time … and in general my knee became less painful".* (p.565) *"The positive thing is well that you realise after, I would say after six weeks I would say I realised that I get stronger."* (p.565)
Gender/sex (women): two studies[51,89] (one low[89] and one[51] [no quotes provided in paper] high risk of bias)
Theme: personal (gender specific), social, and cultural factors, social support

Participant[89]: "*When I first started swimming….I was a bit overweight and I was shy, embarrassed or shy about my body…"* (p.5) Participant[89]: "*One thing I really liked about the workshop was the videos…. For me that was much more relatable and I was really glad to see that it wasn't just all these extraordinary women. It was much more kind of real." (p.5)* Participant[89]: *"I also like the fact that the evidence was that it didn't all have to be hardcore gym… so that was very good to know that it didn't have to be costing you a fortune…I wanted to be able to not have to rely on other people. Just rely on myself."* (p.5)
Theme: barrier programme design not aligned with preferences (gender specific)
Participant[89]: "*…but the life changes, menopause happens. I've got a very big job, busy as we all are… [exercise was] a waste of time… I can't spend an hour going for a walk"* (p.5) Participant[89]: "oft*en people over 50, in particular women, are silently ignored…"* (p.5)
More than one PROGRESS-Plus group: one study[48] (moderate risk of bias)
Theme: barriers; health and social isolation.
No supporting quotations available.
Theme: acceptability of group sessions, non-traditional exercises.
Authors[48]: *"The informal delivery of sessions and group discussions was appreciated."* (p.8) Participant[48]: "you wouldn't class that as exercise… if you are doing the housework," (p.8)

*Paper reference number and page are presented for each quotation along with if it is a participant or author quotation

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