# Implementation and Scalability of Physical Activity Interventions Delivered Within Primary Care: A Narrative Review

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# Implementation and Scalability of Physical Activity Interventions Delivered Within Primary Care: A Narrative Review

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## ABSTRACT

**Primary Aim:** To describe the features of implementation in the setting of primary care (PC) for physical activity (PA) interventions that improved total and moderate to vigorous PA (MVPA).

**Secondary Aim:** To assess the scalability potential of effective PC PA interventions.

**Method:** A comprehensive search was conducted across multiple electronic databases to identify relevant studies published between 2012 and 2023. Implementation-related features were extracted, and the scalability potential of effective PC PA interventions was assessed using the Intervention Scalability Tool (ISAT) as a framework.

**Results:** Twenty-six studies met the inclusion criteria after screening. Analysis of the implementation-related features revealed that effective PC PA interventions showed promising reach with a mean participation rate of 43%. Effective PC PA interventions that increased PA were mostly delivered by nurses and were underpinned by the behavioural change techniques (BCTs) of goal setting, feedback and self-monitoring. The scalability assessment revealed that remote-based interventions and those delivered by nurses had moderate to high scores in the scalability domains of fidelity, reach and acceptability, delivery setting and workforce, implementation infrastructure and sustainability.

**Conclusion:** PC PA interventions, whether delivered remotely or face-to-face, show promise for increasing PA, especially when incorporating BCTs like goal setting and feedback. Using the ISAT, most interventions displayed promise for implementation at scale, but further examination is needed concerning the delivery setting, implementation infrastructure and sustainability of these interventions. Remote-based (automated PA advice and mailed instructions) PA interventions and those delivered in contact with a nurse showed high scalability potential. Further work that examines the acceptability and effectiveness of other healthcare professionals in intervention delivery would be worthwhile, and more work is needed to assess the utility and effectiveness of remote-based PA interventions in PC.

## 1 | Introduction

The evidence supporting physical activity (PA) for the management and prevention of non-communicable diseases, such as diabetes, hypertension and depression, is compelling [1]. Despite this, approximately 25% of adults globally are insufficiently physically active [2]. Consequently, the World Health Organization (WHO) has set a target to reduce physical inactivity by 15% by 2030 [3]. This target includes a recommendation to integrate PA promotion into primary care (PC) settings [3]. In the United Kingdom, adults visit their general practitioner (GP) approximately five times per year, with half of these contacts related to the management of long-term health conditions [4]. The PC setting is an opportunity to reach a large segment of the population with health promotion efforts.

PA delivered within PC has been identified as a cost-effective strategy to reduce the incidence of non-communicable diseases [5]. According to the National Institute for Health and Care Excellence (NICE), PA promotion in PC can range from verbal advice, discussion, negotiation or encouragement, with or without written or other support [6]. Several reviews have explored the effectiveness of brief PA interventions in the PC setting [7–10]. These reviews found that brief PA advice delivered within PC (either in-person visits or telephone consultations) with or without other supplements (e.g., written prescription, information pamphlet, use of pedometers) have shown were effective in improving PA [7–10]. Despite this, the implementation of interventions into routine practice in PC has been a challenge. In the United Kingdom, only 15% of GPs report providing PA advice and about 35% of patients report receiving PA advice [11–13]. Barriers are reported at individual and organisational levels [14]. At the individual level, health professionals report insufficient confidence and knowledge about PA promotion [15, 16]. Organisational-related barriers relate to a lack of time, lack of training and technical support (e.g., provision of high-quality print materials to reinforce verbal messages) [17–19]. There is a need for practical guidance on how to effectively scale up PC PA interventions. The PRACTIS (PRACTical planning for Implementation and Scale-up) guide addresses this gap by detailing how to anticipate and address potential barriers and facilitators to effective implementation and scale-up [20]. It begins by examining the features of the implementation setting, which include the intervention population (individual level), implementers (provider level), delivery setting (organisational level) and intervention factors (intervention design/underlying principles, delivery format, duration, resources required, fidelity/adaptation). Together these factors determine outcomes relating to intervention reach, acceptability, adoption, delivery and sustainability in practice. A clear understanding of these features for PC will help to promote planning and accountability for future implementation of PA interventions and could enhance scale-up efforts.

Whilst some of the related features of implementation, such as the number of contacts needed to deliver effective PA interventions in PC, have been previously described [10], the intervention reach, acceptability, intervention content, fidelity, adaptation and scale-up of PC PA interventions have not been systematically explored. This narrative review therefore describes the features of implementation in the setting of PC for PA interventions that improved total and moderate to vigorous PA (MVPA). The review also provides a structured, systematic and comprehensive assessment of the scalability potential of effective PC PA interventions.

## 2 | Methods

### 2.1. Eligibility Criteria

Studies were selected based on the following criteria: (i) Participants: Adults aged ≥18 years. (ii) Recruitment: through PC (i.e., recruited from patients attending or registered with a general practice, family practice or PC clinic). The PC settings were broadly defined as the first point of contact in the healthcare system providing accessible and coordinated care. (iii) Intervention: PA interventions delivered in person or remotely (e.g., leaflets, email or phone calls). Trials were included if they were embedded within PC (i.e., delivered within or out of PC (e.g., interventions involving written prescriptions sent to patients via email) rather than referred or outsourced to a community or local PA service). We excluded studies examining multifactorial interventions, such as promoting dietary modification in addition to PA. Trials evaluating exercise referral schemes were also excluded because PC health professionals would only be acting as referral mechanisms rather than being directly involved in delivering interventions. (iv) Design: Randomised controlled trials. (v) Outcome: PA intervention designed to increase time spent in light intensity physical activity, MVPA and total physical activity (e.g., metabolic equivalent (MET), steps/day, minutes in total PA). (vi) No restrictions were made on the method used to assess PA with data from self-report (subjective) and device measures (objective) included.

Articles not available in the English Language, unpublished studies, protocols and dissertations were excluded.

### 2.1 | Search Strategies

The search approach combined intervention and setting keywords with pre-existing randomised controlled trial filters, and this was developed and evaluated in Medline and across the following databases: PsycINFO, CINAHL and The Cochrane Library (CENTRAL) (see Supplementary file 1 for search strategies). The search was conducted between 2012 and 2023 to access recent evidence on PA promotion within PC. In addition, this timeframe allows us to ascertain the most recent developments of interventions since the publication of the NICE guidelines on PA promotion in PC in 2012 [6]. We used RefWorks [21] (a reference management tool) and Microsoft Excel (version 2403) to collect and organise references. As this review was part of a Ph.D. project, a single-handed screening was chosen because it allows for the completion of screening within a limited time frame. The first author (JO) screened the titles and abstracts using the specified inclusion criteria. Two other authors (AM and AL) then reviewed 10% of the titles and abstracts to ensure consistency of screening.

### 2.2 | Data Extraction

Implementation characteristics were extracted from studies based on three implementation characteristics: (i) individual level: The

size of the target population, eligibility criteria, participation and attrition rates and interventionists; (ii) intervention factors: theories/models, delivery format, duration, outcomes, number of interventions contact resources required (Fitbit, diaries, etc.) and intervention fidelity and or adaptations; (iii) Effectiveness: This was defined in terms of the measure of PA (MVPA or total PA) and how it was assessed (device measured or self-reported).

### 2.3 | Risk of Bias and Quality of Evidence Assessment

The risk of bias (RoB) was assessed using the Cochrane tool (RoB 2) [22]. The RoB was assessed single-handedly by the first author with 10% of studies independently assessed by a second reviewer and checked for consistency. Any disagreement between the reviewers was discussed with a third reviewer and afterwards resolved through consensus by referring to the full text.

### 2.4 | Scalability Assessment

For the purposes of the review, scalability is defined as the ability of a health intervention shown to be efficacious on a small scale and or under controlled conditions to be expanded under real-world conditions to reach a greater proportion of the eligible population, while retaining effectiveness [23]. While there are several scalability assessment frameworks/tools, most do not provide a score to compare interventions for scalability [24]. The Intervention Scalability Assessment Tool (ISAT) [25] was chosen because it contains scalability domains consistent with what has been reported in the scalability literature [24–26]. In addition, the ISAT was selected because it offers a practical guide to conduct a structured, systematic and comprehensive scalability assessment.

Table 1 outlines the ISAT domains and the criteria used to assess questions within each scalability domain. The ISAT is designed to evaluate the scalability of interventions by considering various factors across 10 domains. These domains are divided into two parts: Part A focuses on the context of the intervention, while Part B addresses implementation planning and feasibility. After completing Parts A and B, Part C provides a summative assessment based on scoring from the previous sections. This assessment generates a radar plot to visualise the intervention's readiness for scale-up and helps stakeholders make informed decisions about scalability. Final recommendations can be merits scale up, promising but further information/planning is warranted or does not merit scale up.

All sections of the included studies, such as the introduction, methods, results, discussion, conclusions and appendices/supplementary material, were thoroughly reviewed for relevant scalability data. Each domain includes optional questions at the end to assess readiness based on the provided information. These questions help identify strengths and weaknesses across domains. Additionally, the ISAT offers preparatory questions to consider before answering the readiness questions. Questions in the ISAT are scored from 0 to 3, with 0 representing 'not at all scalable' and 3 indicating 'scalable to a large extent'. If a question is not applicable, it can be marked as 'N/A' and not scored. To calculate the final score for each domain, the average score across the questions (if multiple) is taken.

In the assessment for scalability, the authors initially determined the appropriateness of ISAT domain questions needed to evaluate the scalability of the included studies. Following this, authors (JO, AM and SH) deliberated on each item to achieve consensus regarding the interpretation of the domain questions. While the ISAT offers preparatory questions, they are not directly relevant to PC PA interventions. As a result, suitable criteria were developed (see Table 1) for the context (i.e., PA interventions in PC) when addressing the scalability domain questions. If information was absent to answer applicable questions, these items were deemed indeterminate (IN). After reaching a consensus on question suitability, interpretations and scoring criteria, the first author (JO) extracted relevant information from effective intervention studies and assessed scalability based on the agreed interpretation and criteria. Subsequently, the authors (JO, AM and SH) reviewed the assessment conducted by the first author (JO) and reached a consensus on the scalability assessment.

## 3 | Results

A total of 3224 studies were identified from searches and 1580 titles, and abstracts were screened after removing duplicates. Twenty-six studies met the inclusion criteria (see Figure 1 for the PRISMA flow diagram of studies included in the review).

### 3.1 | Quality Assessment

Thirteen (50%) studies in this review showed some concerns in the domain-assessing deviations from intended interventions. Overall, most studies in this review ($n = 21$; 81%) were judged to have some concerns based on the Cochrane RoB tool [22] (see Supplementary file 2).

### 3.2 | Recruitment Strategies and Reach of the Included Studies

Table 2 describes the study characteristics. The recruitment strategies of participants were either opportunistic (during routine visits to PC) or systematic (mail invites, flyers or phone calls). Twenty-four studies reported on the recruitment processes. Eighteen (69%) studies employed a systematic approach to participant recruitment [27–44]. Systematic recruitment was the dominant method in 11 (85%) [28, 29, 32–34, 36, 38–40, 43, 44] out of the 13 studies that demonstrated effectiveness in improving PA outcomes. The participation rate (PR), a measure of 'reach' was higher with systematic recruitment (15–80%) when compared to opportunistic (12–53%). Amongst the 13 studies that showed effectiveness in improving PA outcomes, eight (62%) [32, 34, 36, 38, 40, 43–45] reported on PR and this was in the range of 18–80% (mean PR = 43%). These interventions [32, 34, 36, 38, 40, 43–45] were all characterised by systematic recruitment, with only one intervention having both opportunistic and systematic recruitment [40]. The largest participation rate (80%) [43] involved participants with diabetes who were recruited systematically.

**TABLE 1** | Description of ISAT domains and criteria [25].

| Domain | Domain questions | ISAT scoring consideration | Authors scoring considerations[a] |
|---|---|---|---|
| The problem (A1) | Is the problem of sufficient concern to warrant the scale-up of an (the) intervention/programme to address it? | What is the problem and who does it affect?<br>Describe the nature and scope of the problem using epidemiological data.<br>How does the problem impact on the health of the population?<br>What is the current practice to address the issue? | This domain will be scored 3 (largely scalable) considering physical inactivity is a global public health issue and that PA has been shown to improve health outcomes. |
| The intervention (A2) | Will the outcomes delivered by this intervention address the needs of the target group (and/or) problem? | Describe the aims/objectives and intended outcomes of the intervention proposed for scale-up.<br>Describe the key elements of the primary care PA intervention proposed for scale-up (including the process of delivery). What are the key intervention components? (e.g., frequency and intensity of the intervention, etc.). | This domain will be scored 3 (largely scalable) considering that the health outcomes of the PA intervention (such as prevention and management of non-communicable diseases) will address the health needs of participants |
| Strategic and political context (A3) | Is addressing the problem consistent with policy/strategic directions or priorities?<br>Will scaling up this programme/intervention up be strategically useful to funders/ funding agencies? | Is addressing the problem consistent with national, state or regional policy directions or priorities?<br>Is addressing the problem an identified need of funding agencies?<br>How well will the intervention proposed for scale-up align with the broader strategic and/or political context? | This domain will be scored 3 (largely scalable) across all interventions. This is because PA promotion within the PC care setting is a strategic priority of health organisations such as the WHO [3] |

(Continues)

**TABLE 1** | (Continued)

| Domain | Domain questions | ISAT scoring consideration | Authors scoring considerations[a] |
|---|---|---|---|
| Evidence of effectiveness (A4) | Is there compelling evidence from the literature to indicate that the intervention is effective in addressing the problem in the target population? | A statistically significant difference, though a good start, is not necessarily a difference of policy/clinical significance. What was the size of the intervention effect (if known)? (Mean difference, relative risk, odds ratio, hazard ratio, sensitivity, specificity and statistical significance). Is the effect size of the intervention meaningful from a population health policy perspective?<br>What is the strength of evidence of effectiveness for the intervention in addressing the problem described in domains A1 and A2, based on the literature? | This was scored by comparing with existing evidence in the primary care PA intervention literature. Recent systematic reviews and meta-analysis [10] found that PA interventions delivered or prompted by health professionals in PC increased MVPA by 14 min/week. Thus, our scoring was:<br>Less than 30 min/week increase in MVPA (scored 1)<br>30–60 min/week in MVPA (scored 2)<br>Greater than 60 min/week increase in MVPA (scored 3) |
| Intervention costs (A5) | Is there evidence that the benefits of the intervention exceeded the costs? | What were the intervention costs reported (if available)? Consider costs associated with start-up (e.g., building infrastructure, conducting training), costs associated with ongoing delivery as well as cost per participant or cost per unit of outcome.<br>Was there any evidence of benefit outweighing the costs? | |

(Continues)

**TABLE 1** | (Continued)

| Domain | Domain questions | ISAT scoring consideration | Authors scoring considerations[a] |
|---|---|---|---|
| Fidelity and adaptation (B1) | Will the core components of the scaled-up intervention be consistent with what was previously shown to be effective?<br>If the core components of the programme/intervention are to be modified from its original form during scale-up, will the impact of the modification likely be favourable? (NA).<br>Can programme fidelity be monitored and/or maintained when implemented at scale? | Will there be any changes and/or adaptations made to the intervention from what was described in Domain A2 if the intervention is scaled up?<br>Are those changes and/or adaptations likely to have any impact on the intended outcomes of the intervention as described in Domain A2?<br>How will intervention fidelity be monitored and maintained? | It is likely that PA interventions delivered face-to-face and underpinned by BCTs (e.g., goal setting, self-efficacy, addressing barriers, etc.) or delivered using MI techniques will be time consuming and may not be consistently delivered per protocol when implemented at scale.<br>Maintaining fidelity monitoring: Consider fidelity monitoring via direct assessment (i.e., observer report using video or audio tape) and indirect assessment (i.e., self-report using pencil and paper surveys, or technology based. It will be more feasible to monitor fidelity in remote-based PA interventions such as automated PA advice.<br>Intervention involving face-to-face contact with the healthcare provider is likely not to be delivered per protocol because of the high chance of human error. On the other hand, interventions delivered through automated PA advice reduce the chance of human error.<br>Based on the number of intervention components, it will be easier to monitor the intervention fidelity of single components when compared to multi-component. For instance, it will be much easier to monitor fidelity of an intervention involving only face-to-face PA advice compared to interventions involving PA advice and follow-up supports such as telephone calls, use of pedometers and referral to a walking group.<br>Interventions without direct human involvement, like automated PA advice, are more likely to be delivered per protocol due to the absence of human interference that could affect fidelity. |
| Reach and acceptability (B2) | Does the selected intervention have the potential to reach the intended target population at scale?<br>Is the selected intervention likely to be acceptable to the target population? | How will the intended target group be identified and recruited at scale? | Consider the attrition rate of the intervention group. The attrition rate (AR) has been reported as an objective measure of intervention acceptability. Thus, an intervention with an AR less than 10% (3 = largely scalable); 10–20% (2 = somewhat scalable); greater than 20% (1 = scalable to some extent)<br>Identifying target population: Consider the recruitment strategies used to recruit participants for the PC PA intervention. The use of mixed recruitment strategies (opportunistic and systematic) is more likely to recruit a more diverse population. The use of opportunistic recruitment alone will be scored 2. Systematic recruitment alone: scored 1 |

(Continues)

**TABLE 1** | (Continued)

| Domain | Domain questions | ISAT scoring consideration | Authors scoring considerations[a] |
|---|---|---|---|
| Delivery setting and workforce (B3) | Is the delivery setting(s) selected to deliver the programme at a scale consistent with that used in previous studies?<br>Is the delivery workforce selected to deliver the programme at a scale consistent with that used in previous studies?<br>Is the intervention likely to be acceptable to the delivery workforce involved in its delivery at scale?<br>If the intervention requires integration into existing organisational or community structures, how likely is it to be acceptable? | Who will deliver the intervention at scale?<br>Is the intervention likely to be acceptable to the delivery workforce involved if implemented at scale?<br>Is the intervention likely to be acceptable to the delivery workforce involved if implemented at scale?<br>Who will deliver the intervention at scale?<br>Are there any foreseeable facilitators and/or barriers for the delivery settings as part of the scale-up process? Will the intervention burden health workers by adding to their workload? | Consider the delivery workforce required for the implementation of the PC PA intervention. Are they front-line PC health practitioner (GPs, practice nurses) or allied professionals working in primary care (Health counsellors, exercise professionals and health educators)?<br>Consider the duration and number of contacts with the interventionists involved in the delivery of the primary care PA intervention. Duration of PA intervention has been reported as a major determinant of the promotion of PA within primary care. A very brief intervention (less than 5 min) will be scored (3) because it is likely to be more acceptable to front-line primary care practitioners such as GPs. Contact: Remote-based PA interventions involving no contact are more likely to be acceptable to the delivery workforce. This will be scored 3. |
| Implementation infrastructure (B4) | Are the implementation infrastructure requirements of the intervention/programme feasible for scale-up? | Describe the infrastructure requirements for the delivery of the programme/ intervention, that is, classrooms, clinic facilities, sporting fields, community centres, IT equipment, etc.<br>Describe the operational requirements for delivery of the intervention, that is, training, education, monitoring and feedback systems, accreditation processes, etc.<br>Are there any foreseeable facilitators and/or barriers to building implementation infrastructure as part of the scale-up process?<br>Facilitators or barriers in this case can be in terms of acceptability to the workforce, changes to practice, workload, etc. | It is likely that interventions involving face-to-face contact with an interventionist or the use of telephone calls are likely to involve training of health personnel and other operational and infrastructural demands.<br>The use of allied health professionals could also mean the need for more funds to employ them.<br>Use of digital support tools such as Fitbit and signposting to PA websites requires less infrastructural support compared to follow-up telephone calls.<br>PA interventions delivered solely remotely (no face-to-face contact with an interventionist) such as use of sending automated PA advice require little infrastructural support.<br>Group sessions are likely to require more operational requirements compared to individual sessions. |

(Continues)

**TABLE 1** | (Continued)

| Domain | Domain questions | ISAT scoring consideration | Authors scoring considerations[a] |
|---|---|---|---|
| Sustainability (B5) | Is the level of integration of the intervention into delivery settings required for implementation at scale sustainable?<br>Is the level of resourcing required to implement the intervention at scale sustainable?<br>Is the delivery workforce selected for implementation at scale sustainable? | What level of integration into existing service delivery settings or organisations will the intervention require if scaled up? Also, consider whether the level of integration is feasible or sustainable.<br>If the intervention is implemented at scale, will it require a large commitment of funds (initial or ongoing)?<br>Is the proposed delivery workforce required for implementation at scale sustainable (e.g., financially and/or in terms of supply)? | It will be more likely to sustain intervention involving less infrastructure resources. For example, an intervention involving use of pamphlets is more sustainable than those involving telephone calls or face-to-face interactions with a healthcare provider.<br>It is likely that interventions involving health professionals (such as health counsellors and fitness coaches) will require additional resources in terms of employment and integration into existing PC practice. |

*Note:* 3, largely scalable; 2, somewhat scalable; 1, scalable to some extent; N/A, not applicable.

[a]Not part of the ISAT.

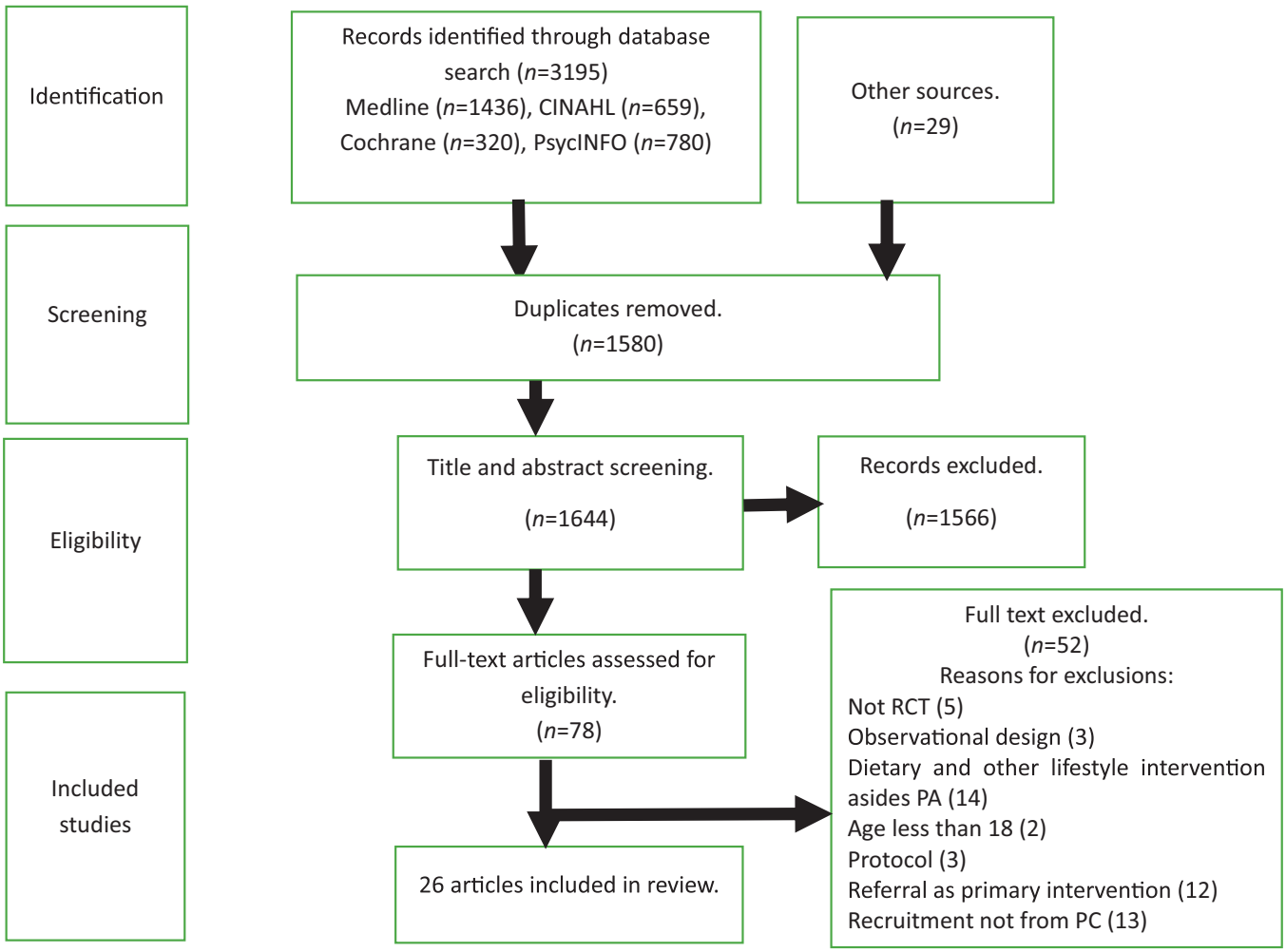


**FIGURE 1** | PRISMA flow diagram.

### 3.3 | PA Intervention Contents, Contact, Mode of Delivery and BCTs

Twenty-one (81%) interventions in this review were delivered face-to-face with additional intervention supports (use of activity monitors for self-monitoring, written prescription, walking plan, online and community PA supports). Only five interventions (19%) [27, 28, 35, 36, 46] were delivered remotely. These studies involved the use of an activity device/pedometer for PA self-monitoring, written prescription, automated PA advice, telephone calls, email communication, individualised text message feedback and the use of PA logs or action plans as additional intervention supports. Twelve (46%) studies, [33, 35, 36, 40–44, 47–50] reported on the duration of face-to-face contact with interventionists. The mean time per contact was 26 min for interventions involving face-to-face contact with the interventionist, whilst group-based face-to-face contacts averaged 2 h. The content (see Table 2) of the face-to-face PA counselling included information on recommended PA guidelines, the benefits of PA, health implications of physical inactivity, online and community PA support, goal setting, action planning and feedback from step count or PA questionnaire.

Different types of PC PA interventions were effective including remotely delivered [28, 36] and face-to-face [29, 32–34, 36, 38–40, 43–45, 51] interventions with varying components such as the use of pedometers for self-monitoring, written PA prescription, follow up telephone calls, use of PA diaries and step charts. Goal setting, feedback and self-monitoring were the most common BCTs reported, and this was evident in 15 (94%) [29, 30, 32, 33, 36, 38, 40–46, 50, 52] out of the 16 studies that reported on BCTs. Among the 13 studies [28, 29, 32–34, 36, 38–40, 43–45, 51] that increased PA, eight (62%) [28, 29, 33, 36, 40, 43, 45, 53] reported the BCTs utilised, while five (38%) [32, 34, 39, 40, 45] outlined the intervention delivery techniques employed. The most prevalent BCTs in these effective interventions were self-monitoring, feedback and goal setting. Effective interventions without a specified BCT made use of the 5As (assess, advise, agree, assist and arrange) of the health promotion delivery model and motivational interviewing (MI).

### 3.4 | Interventionists

Most interventions were delivered by nurses ($n = 9$) [27, 29, 33, 34, 36, 42, 44, 49, 54] or researchers ($n = 8$) [35, 37, 39–41, 45, 51, 55]. Other interventionists included primary care physicians (PCPs) ($n = 3$) [32, 45, 47], counsellors ($n = 2$), [32, 56], exercise specialists (n = 2) [30, 39] and other healthcare providers ($n = 2$) [43, 48]. Effective interventions were characterised by either contact with

**TABLE 2** | Characteristics of included studies.

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Reed et al., 2019/USA | 19 and 65 years, not meeting recommended PA levels/week | Fitbit and electronic PA action PA and weekly text message reminder plan. | Action plan sent monthly. | Practice nurse set up the Fitbit, sent. Electronic PA action plans and feedback. | Step Count using Fitbit. | 15% | 10%/12 weeks | Telephone, text message invite following PA screening In routine consultation | 5As health promotion model | NR |
| Agarwal et al., 2020/Canada | 18–79, attended a periodic health assessment. | Face-to-face PA consultation and support (online, community PA prescription | One physical contact at baseline length of 2–5 min | PCP reviewed automated PA prescription sent a customised toolkit with tailored messaging | Total PA measured subjectively | NR | 18.9%/24 weeks | During a routine periodic assessment | Health Action Process | Only 25% of the patients received a tool kit |
| Riera-Sampol et al., 2021/Spain | age 35–75, with at least two cardiovas-cular risk factors were included Patients with dementia or cognitive impairment, with major active illness, were excluded | MI individualised prescription of PA using health assets | At baseline and four follow-up visits (2, 6, 9 and 12 months). Duration: NR | Primary care nurses assessed and carried out MI | Adherence to at least 150 min of total PA weekly and self-reported PA levels using the IPAQ | NR | Intervention group (44%) control (8%) | | Trans-theoretical model of change, MI | NR |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Gao et al., 2015/USA | one primary care visit in the 12 months prior to screening, at least 18 years overweight or obese | Face-to-face PA counselling and electronic feedback reports. | Nine electronic PA feedback | Mailed expert feedback PA counselling, PA self-help booklet and newsletter sent following filled postal PA readiness questionnaire | Spent in moderate intensity PA using accelerometer | 43% | 13% and 16% at 6 and 12 months, respectively/6 and 12 months | Phone calls following medical record screening | NR | NR |
| Hardeman et al., 2020/UK | 40 and 74 years, no diagnosis of vascular disease and not on a care pathway for known risk factors | Face-to-face discussion, provision of a pedometer and accelerometer, a Step Chart for self-monitoring and a Step it Up Booklet. | One face-to-face meeting at baseline Lasting 3 min and 9 s | Healthcare practitioner (HCP) (Specific HCP NR) Provided PA counselling | Total PA and step count (number of minutes per day spent in MVPA measured objectively | 17% | 16%/12 weeks. | Mail Invite | Goal setting, action planning, feedback and self-monitoring | 60%, (9 out of 15 components of the BCT were delivered at 3 months |
| Harris et al., 2015/UK | 60−74 years and had no contra-indications to increasing PA | PA consultations incorporating pedometer step-count and accelerometer PA intensity feedback, and an individual PA diary and walking plan | Four face-to-face contact Duration NR | Nurses Provided PA counselling and supported with the use of pedometers | Time spent in MVPA measured objectively | NR | 3% and 6% lost to follow-up at 3 and 12 months, respectively | Mailed Invitation following GP screening | Goal setting, self-monitoring, building self-efficacy and social support, overcoming barriers, preventing relapses and building lasting habits | NR |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Heron et al., 2014/UK | 35–75 years, inactive based on a questionnaire No contra-indications to PA | Group 1: information on their baseline step count, leaflet on PA, follow-up MI telephone Group 2; Group 1 intervention but with a specific, uniform daily step-count goal (2500 steps/day above baseline) | At baseline, with four follow-up telephone calls | GP trainee (who was the researcher) carried out the MI | Total PA pedometer step count | NR | 5%/12 weeks | Routine consultation | Theory of planned behaviour' 5As' model BCT (establishing rapport, agenda setting, assessing importance and confidence, scaling questions, pros and cons, brainstorming solutions, negotiating attainable goals and follow-up) | NR |
| Hinrichs et al., 2016/Switzer-land | 70 and older, diagnosed with at least one chronic disease (DM, osteoarthritis, etc.), report mobility consultations | Exercise therapist PA consultation with GP motivational support | Eight consultations with the exercise specialist (five at the GP practice and three over-the-phone consultations) Duration of Consultation NR. | Exercise therapist | Pedometer PA step count/day | 65%. | 22% and 39% at 6 and 12 months, respectively | Mailed invitation following medical record screening | NR | NR |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Kolt et al., 2012/New Zealand | 65 or older, ability to walk and freedom from health conditions that contraindicate participation in PA | Initial face-to-face then followed up telephone counselling sessions by trained physical activity counsellors and Pedometers | One initial counselling At baseline in PC and three telephone counselling Duration of physician initial counselling NR Telephone counselling by trained counsellors lasted 10-30 min | PCP and PA counsellors delivered PA counselling | Moderate PA (MPA) intensity/subjective. | 57% | 13% and 15% at 3/4 and 12 months, respectively | Mail to patients | Trans theoretical model of behaviour change and MI | NR |
| Mutrie et al., 2012/UK | Living independently and not meeting PA recommendations | PA consultations and supports (PA booklet and pedometer) | Two face-to-face contacts lasting an average of 30 min | Nurses delivered the consultations and fitted the pedometer | Pedometer and ActivPal (monitor) recorded the average daily step count | NR. | 10% of all randomised participants/24 weeks | Letter sent following screening of medical records | Cognitive model of behaviour change | NR |
| Yaacob et al., 2018/Malaysia | Aged 35–45 years determined to lead a sedentary lifestyle on the 7-day physical activity questionnaire and who have no chronic illness | Pedometer and support (log diaries and support groups, follow-up monthly meeting) | Four face-to-face contacts | Researcher provided PA counselling and -follow-up meetings | Total PA level (step/day) measured objectively | NR | 29% in both intervention and control groups/12 weeks | NR | NR | NR |



(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| van der Weegen et al., 2015/The Netherlands | 40 and 70 years old, type 2DM or COPD, BMI >25 and not having at least 30 min of MVPA patient with coexisting medical conditions were excluded | Group 1: participants tool (Personal Activity Monitor) and self-management support programme (SSP) (four individual consultations) Group 2: SSP Group 3: Usual care | Four face-to-face contacts Duration: NR | Nurses delivered the PA counselling | Average minutes per day in MVPA with the PA monitor | 37%. | Group 1: 14% Group 2: 12% Group 3 (usual care): 9%/12 weeks. | Mail invite | 5As model | Group 1: 12 Participants did not receive the minimal intervention (at least three consultations as intended Group 2: Seven participants did not receive the minimal intervention as intended |
| Vetrovsky et al., 2018/Czech Republic | Over 18 years of age, were physically inactive | Pedometer group (PED): given a pedometer Pedometer and email (PEMAIL): Pedometer and email communication based on self-monitoring, action planning, goal setting and personalised feedback. | E-mail counselling was sent on average six times | Researcher sent email motivational counselling | Change in mean total daily step count | 49%. | No attrition/12 weeks | During routine practice, screening | Based on MI principles BCT self-monitoring, action planning, goal setting and personalised feedback | |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Young et al., 2019/USA | Inactive, having either prediabetes or diabetes without insulin | Telephone-based MI and accelerometer and individualised support (tips for motivation and reducing barriers, a 24-week PA log and a PA personal action plan) | Seven MI calls were scheduled. MI calls varied from 5 to 25 min. | Researcher made the calls and delivered MI-based email counselling. | Accelerometry MVPA step count | NR. | 21% /24 weeks | Telephone call following electronic medical screening. | Self-determination theory | NR |
| Harris et al., 2017/UK | Eligible patients were 45–75 years old without contraindications to increasing MVPA | Postal group: Pedometer and written instruction for 12 weeks posted out to the patient Nurse support: Pedometer written instruction and tailored PA consultation Usual care: instructed to continue with their usual PA | Three face-to-face intervention lasting 10-20 min | Practice nurse provided written PA instruction and counselling | Average daily step-count, assessed by accelerometry and changes in step-counts spent weekly in MVPA in 10-min | 42% | 8% and 7% for postal and nurse support intervention groups, respectively/12 months | Mail invite following a medical screening | BCT: goals and planning, self-monitoring and feedback and encouraging social support, addressing barriers and relapse anticipation | NR |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Knight et al., 2014/Canada | Adults aged 55–75 years who were generally healthy, with no diagnosis (e.g., hypertensive, diabetic, obese) | Exercise group: (EX), participants received PA prescription (high-intensity activity) Sedentary behaviour (SB group: participants received PA prescription targeting reductions in sedentary behaviour) Comprehensive counselling group: participants received an activity prescription targeting both increases in high-intensity activity and reductions in sedentary behaviour. All groups had a PA self-monitoring device | One face-to-face contact at baseline Duration of contact NR Number of exercise prescription sent NR | Researcher provided a written prescription | Total PA Step count measured by a device | NR | No attrition/12 weeks | During a scheduled clinic visit | NR | NR |

(Continues)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Gallegos-Carrillo et al., 2016/Mexico | Aged 35–70 years, mild hypertension, not meeting up to 150 min of moderate to vigorous PA (MVPA)/week | Brief counselling (BC) group: provision of written and verbal information to the patient, regarding PA benefits and advice on how to increase PA levels safely and progressively Referral group (ER): referral to local PA support | Three counselling session contact lasted 15 min | Brief counselling was provided by a primary care nurse | Accelerometry time spent in MVPA | 73% | 10% and 9% for BC and ER groups, respectively/24 weeks | NR | NR | NR |
| Miriam et al., 2012/USA | One visit in the previous 12 months, impaired glucose tolerance be free from a diagnosis of diabetes, have a haemoglobin A1c (HbA1c) below 7% and not be on diabetes medications. A body mass index (BMI) between 25 and 45 kg/m$^2$ | One in-person baseline counselling session and regular telephone counselling, primary care provider endorsement in clinic and monthly automated telephone system for encouragement and tailored mailed PA support feedback | One contact at baseline Three telephone counselling every 2 weeks for 6 weeks followed by monthly calls over the entire 1-year intervention period. Duration of phone call NR | Baseline counselling consultation and telephone counselling with a trained health counsellor (baseline counselling telephone counselling) Primary care provider (specific provider not mentioned) provided endorsement physically and via telephone | Moderate intensity PA/subjective | 21% | 9% /12 months | Recruited by phone following screening of medical records | Elements of social cognitive theory (modelling, self-monitoring, goal setting, reinforcement and cognitive reframing) Trans-theoretical model of change | NR |



(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Khunti et al., 2021/UK | 40–74 years for White Europeans or 25–74 years for those from an ethnic minority, previously recorded plasma glucose | Walking away (WA); annual group-based support Walking away plus (WAP) walking away and support (group-based support and mobile prompt pedometer use, feedback and biannual telephone calls) Control: information leaflet. | Four sessions: Group educational session at baseline. Four follow-up sessions Text messages were sent at least weekly over the first 6 months and then monthly. Annual follow-on sessions lasted 2.5 h | Trained educators delivered the group PA sessions | Time spent in MVPA/ objective | 12.6% | 12 months: 25.3% and 25.7% for WA and WAP, respectively, compared. 24 months: 33.8% and 31.1% for WA and WAP, respectively, compared to 18.9% for control/12 and 48 months | Routine visit | Social cognitive theory, common sense model, dual process theory BCT: Consequences of behaviour, identification/ problem-solving barriers, goal setting, action plan, set graded tasks | NR |
| Lewis et al., 2020/USA | 55–74 years with a body mass index of 25–35 kg/m$^2$, fewer than 60 min of planned exercise a week | Pedometer group (PED): A's PA counselling and exercise prescription and pedometer and a logbook to record PA steps Electronic activity monitoring (EAM) group: 5A's PA counselling and exercise prescription and activity monitor | One face-to-face contact Duration of PA counselling NR | A researcher with a background in exercise physiology and training in motivational interviewing delivered the 5A's PA counselling | Total PA was measured across using a sense wear armband | NR | 10% and 5% at 12 weeks for PED and EAM groups respectively/12 weeks | Routine visits and flyers | 5A's health promotion model | NR |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Rossen et al., 2021/Sweden | 40−80 years, prediabetes or diagnosed with type 2 diabetes with a duration of ≥1 year | Multicom-ponent group: Pedometer and directed to a website for self-monitoring and PA consultations Self-monitoring of steps without counselling support | Twelve group consultations and nine face-to-face consultations Multi-component group had 45 min with their diabetes nurse consisting of counselling and study assessments | Researcher and diabetic nurse delivered group PA counselling sessions The diabetic nurse delivered the individualised PA counselling session | Objectively measured MVPA | 53% | 9% and 11% at 12 and 24 months respectively for all randomised groups/12 and 24 months | During regular visits and mailed invitation | Health belief model, the stages of change model and the social cognitive theory MI techniques | The intervention was delivered as intended as measured by MI logs |
| Takahashi et al., 2016/USA | 18 years old, overweight or obese and had multiple medical comorbid conditions | Immediate pedometer group: Pedometer and setting PA goals based on step count at each visit and a digital versatile disc on exercise and journal for activity self-entry Delayed pedometer group: pedometer, educational materials and behavioural goal setting | Three intervention visits lasting 30–90 min | Researcher delivered PA counselling (goal setting) | Total PA step counts measured by a pedometer | 15% | 17% and 10% for the immediate and delayed group respectively / 16 weeks | Mailed invite | Social cognitive theory | NR |



(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Pears et al., 2016/UK | 40–74 years and not previously diagnosed with heart disease, stroke, diabetes or kidney disease | All groups received face-to-face consultations and written materials (feedback on current PA) Motivational very brief intervention (MVBI); PA counselling (importance of PA, action plan using a diary) Pedometer VBI (PVBI); PA counselling (the 10,000 steps per/day recommendation, use a pedometer to monitor Combined VBI; motivational and pedometer VBI (CVBI) Control: Health check consultation only | Two contacts with interventionists (baseline and at 4 weeks) Mean delivery time was 6 min and 48 s for the MVBI, 5 min and for the PVBI and 9 and 35 min for the CVBI | Practice nurses and healthcare assistants delivered PA counselling and written prescription | Step counts/day and average number of minutes per day spent in light moderate and vigorous activities | 18% | MVB1: 26.5% PVBI: 31% CVBI: 20% Control: 21.1%/4 weeks | Mailed invite and during a visit | Goal setting (behaviour), action planning, feedback on behaviour and self-monitoring of behaviour | Mean Overall fidelity ranged from 62% for the MVBI, 72 % for the P VBI and 74% for the CVBI |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Westland et al., 2020/ The Netherlands | Aged 40–75 years, at risk of CVD, did less than 30 min of MVPA on 5 or more days a week | PA counselling Consultations included (use of an activity log, forms for action planning, information useful websites, apps for PA, awareness) and an accelerometer device to -monitor their PA level | Four consultations with a duration of 20–30 min | Primary care nurses provided PA consultation | Change in minutes of MVPA/ objective | NR | 31.1% and 6.8% for intervention and control groups. respectively/24 weeks | Mail invite | BCTs (goals setting, action planning, feedback on behaviour, self-monitoring and problem solving) | NR |
| Yates et al., 2016/UK | 18 and 74 years of age inclusive and above the 90th percentile of the calculated diabetes (Leicester Practice Risk Score) risk score | Structured group educational programme and pedometer and short telephone contact to provide further support | Two Face-to-face group education programme were delivered lasting 2 h. Three telephone contacts (around 15 min) | Educator | Time MVPA intensity (count/min)/ objective | 80% | Intervention group: 15.6%, 22.9%, 27.1% at 12, 24 and 36 months respectively/12, 24 and 36 months | Mailed invite | BCT (self-efficacy, identifying barriers and promoting self-regulatory skills through pedometer use | NR |

(Continues)

**TABLE 2** | (Continued)

| Author, Year/ country | Eligibility criteria | Intervention component and content | Contact duration and number of contacts | Interventionists and PA intervention components delivered | PA outcome measure | Participation rate | Attrition rate/ follow-up. | Recruitment procedure | Theory/ Behavioural change technique (BCT)/model | Fidelity |
|---|---|---|---|---|---|---|---|---|---|---|
| Huebschmann et al., 2022/USA | Type 2 DM, Not meeting PA Guideline | PA tracking/ accountability through Fitbit and PA logs<br>PA coaching phone calls (identifying PA motives, weighing pros and cons for PA, engaging social support for PA reminders/ rewards, relapse management)<br>PA face-to-face visit (follow-up to ensure safety of exercises)<br>Each patient received a Fitbit | Six phone calls and three in-person monthly primary care visits with a clinician | Clinic staff (PC staff involved in health and well-being) delivered the PA coaching calls<br>Primary care clinician (one physician assistant and one doctor of medicine (MD) supervised the intervention safety | Total PA was measured by an accelerometer | 20.6% | 6% of all participants (attrition of intervention and control group NR)/12 weeks | NR | BCTs (goal setting, self-monitoring, accountability from others' monitoring with awareness, problem-solving, and social support) | NR |

Abbreviations: BCT, Behavioural change technique; MI, motivational interview; NR, Not reported; PA, physical activity; PCP, Primary care physician; UK, United Kingdom; USA, United States of America.

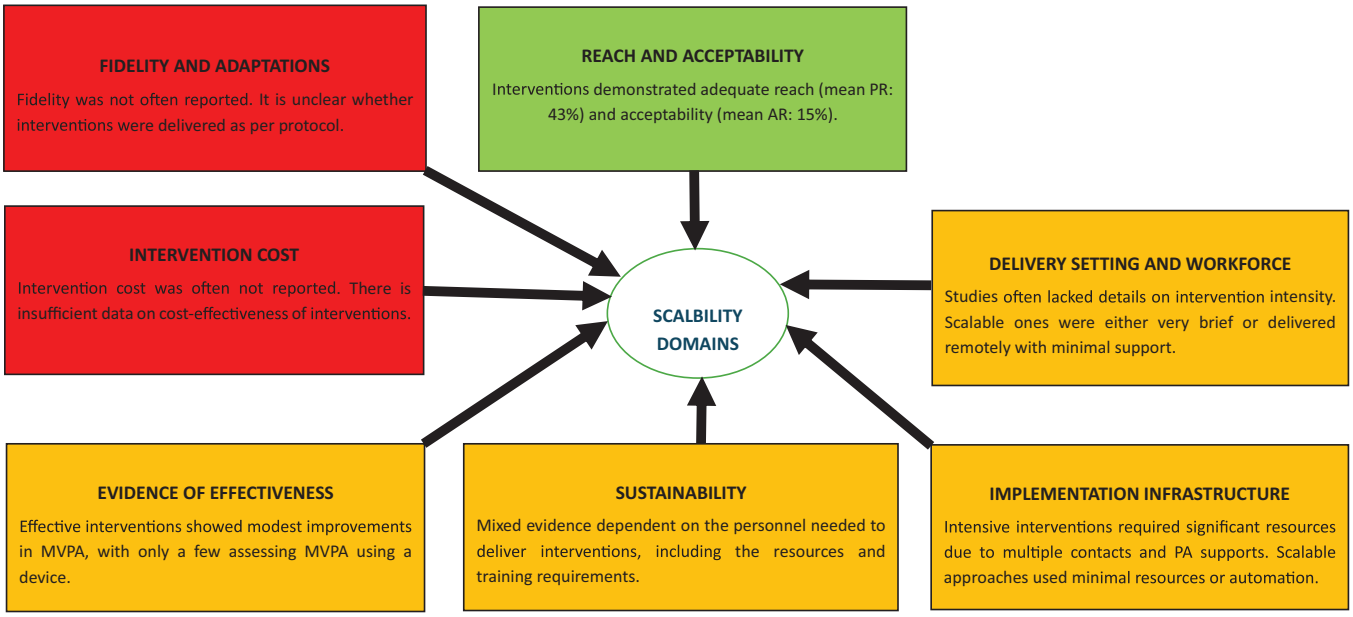


**FIGURE 2** | Overview of the scalability domain assessment of effective PC PA interventions. Red denotes that further work is needed to ascertain scalability. Amber denotes mixed findings but promising for scale-up. Green denotes adequate evidence of scalability.

a nurse ($n = 5$) [29, 34, 36, 40, 44], a PCP ($n = 2$) [32, 45], an educator ($n = 1$) [43], a counsellor ($n = 2$), [32, 38], exercise specialist ($n = 1$) [39] or a researcher ($n = 3$) [39, 40, 45].

### 3.5 | Intervention Fidelity

Intervention fidelity was the least reported implementation characteristic. Out of the 26 studies, only five [34, 40, 44, 47, 48] reported on intervention fidelity. These studies reported fidelity to the intervention in terms of the intervention dose delivered and received by participants. Specifically, only three (23%) [34, 40, 44] out of the 13 effective interventions reported on intervention fidelity. One of the studies [40] reported that the intervention was delivered as intended, while the other [34] reported that the intervention was not received by participants as intended.

### 3.6 | PA Intervention Outcomes and Measures

Table 3 describes PA outcomes of effective interventions. Out of the 13 effective interventions [28, 29, 32–34, 36, 38–40, 43–45, 51], eight (62%) [28, 29, 32, 34, 36, 38–40] and five (39%) [33, 43–45, 51] included MVPA and total PA steps as PA outcome measures respectively. Eleven (85%) [28, 29, 33, 34, 36, 39, 40, 43, 45, 51] studies that demonstrated effectiveness used device-based measures of PA, while two (15%) [32] used self-reported measures.

#### 3.6.1 | Objective MVPA

Six (46%) [28, 29, 34, 36, 39, 40] out of the 13 studies in this review that demonstrated effectiveness measured MVPA using a device. The majority ($n = 4$) (67%) of these interventions [29, 34, 36, 40] were delivered by a nurse, and they had an increase in the range of 33–84 min/week of MVPA compared to controls after 3–24 months follow-up. Furthermore, these interventions had an average of three to nine face-to-face contacts (mean = 5), and all involved an activity monitor for self-monitoring as a supporting component. Only two interventions were remotely delivered: one involved pedometer and written PA instructions sent by mail for 12 weeks [36] and the other involved mailed tailored PA feedback according to motivational readiness [28].

#### 3.6.2 | Objective Total PA

Five (39%) [33, 43–45, 51] out of the 13 studies that increased PA assessed PA used device-based measures (i.e., pedometers measuring steps/day). Generally, these interventions were underpinned by BCTs and were characterised by a lesser number of contacts and a greater magnitude of increase in minutes/week spent in total PA compared to effective interventions with objectively measured MVPA. Specifically, the intervention [45] with the largest increase in total PA had an increase of 182 steps/day (~130 min/week) when compared to controls. This intervention was delivered by a GP trainee (contact duration not reported) and delivered using the 5As model of health promotion and MI techniques.

## 4 | Scalability Assessment and Recommendations

Figure 2 provides an overview of the scalability domain assessment of effective interventions (domains A1–A3 were not included in this figure because all interventions scored the same). Overall, domains A1 (the problem), A2 (intervention), A3 (political/strategic context), and B2 (reach and acceptability) scored highly, demonstrating good evidence for scalability. Fidelity and cost-effectiveness were often not reported, making it difficult to assess scalability in these domains. Mixed scores were seen in the

domains of effectiveness, delivery setting and workforce, implementation infrastructure and sustainability, indicating potential for scale-up in these areas.

Table 3 provides a summary of the implementation characteristics of 15 effective interventions (representing 13 individual studies), their scalability assessment scores and recommendations. Four (27%) [28, 36, 44] (representing three studies) interventions were deemed to be highly scalable (merit scale-up). Two of these interventions [28, 36] were delivered remotely and scored moderate to high in the reach and acceptability domain (B2), and highly (largely scalable) in domains B1 (fidelity and adaptation), B3 (delivery setting and workforce), B4 (implementation infrastructure) and B5 (sustainability). The other interventions (two-arm treatment) [44] were delivered by a nurse (two face-to-face contacts with an average duration of 6 min with a pedometer and PA diary as follow-up support) and scored highly in domains B2 (reach and acceptability), B3 (delivery setting and workforce), B5 (sustainability), moderately in the domain B4 (implementation infrastructure) and low in domain B1 (fidelity and adaptation) (see Table 3 for other domain scoring).

Ten (67%) interventions [29, 32–34, 36, 39, 43, 45, 51, 56] were deemed as promising (requiring further information/planning). These interventions had moderate to high scores in domain B2 (reach and acceptability domain), low to moderate scores in domains B3 (delivery setting and workforce), B4 (implementation infrastructure) and B5 (sustainability). One intervention [40] was deemed not to merit scaling up. This intervention was characterised by an initial 12 group sessions delivered by a researcher followed by nine sessions of face-to-face MI sessions lasting 45 min. A radar plot diagram of scalability domain scoring can be seen in Supplementary file 3.

## 5 | Discussion

Most of the effective interventions were found to be highly scalable in the reach and acceptability domain, with a 15% average attrition rate, indicating that PC PA interventions are well-received by patients. Despite this, PA interventions delivered within PC yield modest results in improving MVPA [10], which are likely to reduce further when interventions are implemented at scale (scale-up penalty) [57]. While the need to identify PC PA interventions with a significant effect size is evident, exploring the reasons for the scale-up penalty is necessary. A possible reason for this penalty is likely due to the adaptations made during the scale-up process to better fit evidence-based interventions to user needs and delivery contexts [58]. For example, in a 2019 review of 10 obesity trials, adaptations during scale-up led to a 25% scale-up penalty, reducing intervention effects observed in pre-scale trials [59]. This highlights the need to find PC PA interventions with large effect sizes that require minimal adaptation for scale-up. Thus, careful consideration of scalability, delivery infrastructure and compatibility with the local context becomes apparent when designing interventions [60]. Furthermore, future work will also need to examine and report on intervention fidelity considering the lack of reporting on fidelity in studies included in the review.

The most scalable interventions, as assessed by ISAT, were either delivered remotely (automated PA advice and mailed instructions) or briefly in person by nurses. Digital interventions are cost-effective, reaching many people with fewer resources [61]. Additionally, the automated and algorithmic features of digital interventions ensure protocol-based fidelity, which presents less challenges than when relying on human interventionists [60]. In-person interventions, led by nurses, lasted under 10 min, making them highly feasible for scaling up. Research [62] indicates that nurses, compared to GPs, face fewer time constraints in promoting PA, highlighting their potential in supporting PA promotion within PC. Furthermore, nurse-led interventions were underpinned by BCTs including goal setting, self-monitoring and feedback, which have previously been shown to encourage behavioural change [63]. This further underscores nurses' capacity to deliver or support PA interventions within PC, highlighting the need to train more nurses in behaviour change and the implementation of evidence-based BCTs.

Most of the effective PA interventions in this review display promise to be scaled up but require further planning and consideration in terms of intervention duration, infrastructural demands and sustainability. Time constraints have been reported as a major barrier to the implementation of PA promotion within PC [15, 16]. It has been suggested that interventions that will be feasible to implement within routine PC should be very brief interventions (VBIs) which can be delivered within 5 min [64]. Most of the interventions deemed to be promising did not report on the duration of interventions and thus made it difficult to make a judgement on their feasibility for scale-up. The interventions that reported on intervention duration were in the range of 10–30 min and are likely to be less feasible within routine PC consultations. Lower scores were associated with intensive interventions (i.e., multiple contacts/lengthy contact and follow-up supports such as phone calls and or use of activity devices) due to the time commitments needed for delivery. Additionally, lower scores were linked to the involvement of additional healthcare professionals (such as exercise specialists and counsellors) due to the likely need for extra investment in training and employing these professionals to deliver PA services.

Generally, this review highlights that effective PC PA interventions showed promising reach with an average participation rate of 43%. Similar participation rates have been observed in PA interventions targeting type 2 diabetes patients in healthcare settings [61]. This review suggests that systematic recruitment methods may yield higher recruitment compared to opportunistic approaches. To enhance the reach of PC PA interventions, systematic recruitment of patients with comorbidities through methods such as postal invites, SMS or email for routine health checks is recommended. Periodic health checks could be supported by opportunistic PA counselling during routine consultations which have been shown to facilitate the recruitment of disadvantaged groups when compared to systematic recruitment [65]. Therefore, using multiple recruitment methods has the potential to increase overall reach and engagement, while also maximising recruitment from socially disadvantaged populations.

Furthermore, this review found that fewer interactions with interventionists are needed to improve participation in light intensity PA compared to MVPA, which supports the wider WHO message [66] of 'some movement is good, more is better'. This might also have positive implications for implementation, given

**TABLE 3** | Implementation features of effective PA interventions, scalability assessment scores and recommendations.

| Study/follow-up (attrition rate) | Outcome/measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/intervention component | Number of contact and duration | BCT/theory/model and technique of delivery | Fidelity | Effectiveness and magnitude of change/additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Gao et al., 2015/6 (13%) and 12 months (16%) | MVPA/objective | One primary care visit in the 12 months prior to screening, at least 18 years, overweight or obese /Systematic/43% | Mailed expert feedback PA counselling and PA self-help booklet and newsletter sent following filled postal PA readiness questionnaire<br>Use of pedometer for PA self-monitoring | Twelve months postal mail PA counselling feedback | Goal setting, self-efficacy, self-monitoring, decisional balance | NR | Significantly increased MVPA at 6 months ($p = 0.03$) and 12 months ($p = 0.053$)<br>(Actual minutes spent in MVPA NR) | Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 1<br>Domain A5 = IN<br>Domain B1 = 3<br>Domain B2 = 2<br>Domain B3 = 2.8<br>Domain B4 = 3<br>Domain B5 = 2.7<br>Recommendation: Merit |
| Harris et al., 2015/3(3%) and 12 months (6%) | MVPA/objective | 60–74 years had no contraindications to increasing PA/systematic/30% | Nurse/PA consultations and PA supports (pedometer for self-monitoring, PA handbook, PA diary and walking plan) | Four face-to-face contacts.<br>Duration: NR | Goal setting, self-monitoring, building self-efficacy and social support, overcoming barriers, preventing relapses and building lasting habits | NR | Increase in time spent in MVPA when compared to control was 66 min/week at 3 months<br>At 12 months increase was 40 min/week MVPA | Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 2<br>Domain A5 = IN<br>Domain B1 = 0.7<br>Domain B2 = 2.5<br>Domain B3 = 2<br>Domain B4 = 2<br>Domain B5 = 2<br>Recommendation: Promising but requiring further information/planning |

(Continues)

**TABLE 3** | (Continued)

| Study/ follow-up (attrition rate) | Outcome/ measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/ intervention component | Number of contact and duration | BCT/theory/ model and technique of delivery | Fidelity | Effectiveness and magnitude of change/ additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Heron et al., 2014/ 12 weeks (5%) | Total step[a] Count/objective | 35–75 years, inactive based on a questionnaire. No contraindications to PA/opportunistic/ 49.3 | GP trainee/ Group 1: MI PA counselling and leaflet on PA, pedometer and follow-up MI telephone No formal training in MI techniques was undertaken beyond that experienced within undergraduate medical training | One contact and four follow-up telephone calls Duration NR | Theory of planned behaviour, '5 As' model, BCT (establishing rapport, agenda Setting, assessing importance and confidence, pros and cons, brainstorming solutions), MI | NR | Group 1 achieved an average increase of over 2600 steps/day (182 min/week) from baseline, which was statistically significant compared with the increase in group 2 (748 steps/day (52 min/week) | Domain A1 = 3 Domain A2 = 3 Domain A3 = 3 Domain A4 = 3 Domain A5 = 1N Domain B1 = 0.7 Domain B2 = 2.5 Domain B3 = 2 Domain B4 = 2 Domain B5 = 2 Recommendation: Promising but requiring further information/planning |
| Kolt et al., 2012/4 months (13%) and 12 months (15%) | Moderate PA (MPA) intensity /subjective | 65 or older, ability to walk and freedom from health conditions that contraindicate participation in PA/systematic/57% | Primary care physician (PCP) and counsellor/pedometer green prescription (PGP) group; initial face-to-face counselling by PCP and telephone counselling by counsellor and pedometers | One face-to-face counselling by PCP (duration NR) and three telephone Counselling sessions over 3–4 months by trained counselling (lasting between 10 and 30 min) | Transtheoretical model, goal setting, preventing relapse, assessing PA progress | NR | The PGP group had a significant increase in time spent in moderate intensity (58 min/week) from baseline to 3/4 month when compared to the standard group increase of 30 min/week This initial increase (at 4 months) was followed by a decrease of 7 and 12 min/week MPA in the PGP and standard group respectively at 12 months | Domain A1 = 3 Domain A2 = 3 Domain A3 = 3 Domain A4 = 1 Domain A5 = IN Domain B1 = 0.7 Domain B2 = 2.5 Domain B3 = 2 Domain B4 = 2 Domain B5 = 1.3 Recommendation: Promising but requiring further information/planning |

(Continues)

**TABLE 3** | (Continued)

| Study/follow-up (attrition rate) | Outcome/measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/intervention component | Number of contact and duration | BCT/theory/model and technique of delivery | Fidelity | Effectiveness and magnitude of change/additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Mutrie et al., 2012/12 weeks (10%) and 24 weeks (10%) | Daily step[a] Count/objective | Living independently and not meeting current PA recommendation/Systematic/32% | Intervention group: PA consultations at baseline and support at 12 weeks (second PA consultation, walking group and PA booklet and pedometer) weeks (second PA consultation, walking group and PA booklet and pedometer) | Two face-to-face contacts with a trained practice nurse lasting an average of 30 min | Cognitive model of behaviour change. | NR | Significant increase when compared to control during the first 12 weeks (2119 steps/day (148 min/week) 24 weeks (6 months): 190 steps /day (13 min/week PA) increase in steps in the intervention group when compared to control, but not significant Qualitative findings: The findings suggest that the pedometer was easy to use and was an important motivational tool for many 'I think when you've got your meter on, you try to get a wee bit better … I feel it's like a challenge' The nurses had concerns about time | Domain A1 = 3 Domain A2 = 3 Domain A3 = 3 Domain A4 = 1 Domain A5 = IN Domain B1 = 0.7 Domain B2 = 2.5 Domain B3 = 2 Domain B4 = 2 Domain B5 = 2 Recommendation: Promising but requiring further information/planning |

(Continues)

**TABLE 3** | (Continued)

| Study/ follow-up (attrition rate) | Outcome/ measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/ intervention component | Number of contact and duration | BCT/theory/ model and technique of delivery | Fidelity | Effectiveness and magnitude of change/ additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Yaacob et al., 2018/ 12 weeks (29%) | Step count[a] /objective | aged 35 – 45 years determined to lead a sedentary lifestyle on the 7-day physical activity questionnaire and who have no chronic illness/NR | Researcher/ pedometer and support (log diaries and support groups, follow-up monthly meeting | Four physical contacts Duration: NR | NR | NR | At 12 weeks there was a significant increase in the step counts/day from baseline by 631 steps/day (44 min/week PA) of the intervention group compared to the control which had a decrease of 95 steps/day (7 min/week) from baseline | Domain A1 = 3 Domain A2 = 3 Domain A3 = 3 Domain A4 = 2 Domain A5 = IN Domain B1 = 0.7 Domain B2 = 0.5 Domain B3 = 1.3 Domain B4 = 2 Domain B5 = 1.3 Recommendation: Promising but requiring further information/planning |

(Continues)

**TABLE 3** | (Continued)

| Study/follow-up (attrition rate) | Outcome/measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/intervention component | Number of contact and duration | BCT/theory/model and technique of delivery | Fidelity | Effectiveness and magnitude of change/additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Van der Weegen et al., 2015/6 (14%) and 9 months (12%) | Minutes of MVPA/objective | 40 and 70 years old, type 2DM or COPD, BMI >25 and not having at least 30 min of MVPA/Systematic/37% | Practice nurses/group 1: activity monitor and self-management support programme (SSP) (individual consultations, automated PA feedback and use of booklet about PA) Practices nurses were trained on the execution of intervention and how to use the 5A model of PA promotion<br>Group 2: SSP<br>Group 3: Usual care | Four face-to-face contacts<br>Duration: NR | 5A model involving goal setting, awareness of the risk of physical inactivity | Group 1: 12 participants did not receive the minimal intervention | Group 1 showed a significant increase of 8 min/day (72 min/week) more MVPA than participants in group 2 and 12 min/day (84 min/week) more PA than- group 3 (usual care group) at 4–6 months. Group 2 increased nonsignificantly by 7 min/day (49 min/week) compared to control At 9 months: Group 1 showed a significant increase of 9 min/day (63 min/week) more than group 2 and 11 min/day (77 min/week), more than group 3 | Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 3<br>Domain A5 = IN<br>Domain B1 = 0.7<br>Domain B2 = 2<br>Domain B3 = 2<br>Domain B4 = 2<br>Domain B5 = 2<br>Recommendation: Promising but requiring further information/planning |

(Continues)

**TABLE 3** | (Continued)

| Study/ follow-up (attrition rate) | Outcome/ measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/ intervention component | Number of contact and duration | BCT/theory/ model and technique of delivery | Fidelity | Effectiveness and magnitude of change/ additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Harris et al., 2017/ 12 Months 8% (postal group), 7% (nurse group) | MVPA/ objective. | Eligible patients were 45–75 years old without contraindications to increasing MVPA /systematic/10% | Postal group: Pedometer, handbook, written instruction for 12 weeks posted out to a patient<br>Nurse support group: Pedometer, PA handbook, PA diary, written instruction, and tailored PA consultation | Nurse group received three physical contacts lasting 10–20 min | BCT: Goals and planning, self-monitoring, encouraging social support, addressing barriers, relapse anticipation | NR | Both nurse and postal group had a significant increase of MVPA (35 and 33 min/week, respectively) at 12 months from baseline compared to control (usual care) (5 min/week) | Postal group<br>Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 2<br>Domain A5 = IN<br>Domain B1 = 3<br>Domain B2 = 2.5<br>Domain B3 = 3<br>Domain B4 = 3<br>Domain B5 = 2.7<br>Recommendation: Merit<br>Nurse Group<br>Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 2<br>Domain A5 = IN<br>Domain B1 = 1<br>Domain B2 = 2.5<br>Domain B3 = 2<br>Domain B4 = 2<br>Domain B5 = 2.3<br>Recommendation: Promising but requiring further information/Planning |

(Continues)

**TABLE 3** | (Continued)

| Study/follow-up (attrition rate) | Outcome/measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/intervention component | Number of contact and duration | BCT/theory/model and technique of delivery | Fidelity | Effectiveness and magnitude of change/additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Miriam et al., 2012/12 months (9%) | Moderate intensity PA/subjective | Impaired glucose tolerance is free from a diagnosis of diabetes /Systematic/99% | Trained health counsellor and primary care provider (specific provider not mentioned) One in-person baseline counselling session, telephone counselling, primary care provider endorsement in clinic, monthly automated telephone system for encouragement and tailored mailed PA support feedback | One face-to-face contact (duration NR) and three telephone calls delivered by a counsellor (duration NR) Duration of PA endorsement by primary care provider) NR | Social cognitive theory (modelling, self-monitoring, goal setting, reinforcement and cognitive reframing) Transtheoretical model of change | NR | Moderate PA increased significantly by 60 min/week when compared to control time (no increase in MVPA) | Domain A1 = 3 Domain A2 = 3 Domain A3 = 3 Domain A4 = 1 Domain A5 = IN Domain B1 = 0.7 Domain B2 = 2 Domain B3 = 3 Domain B4 = 2 Domain B5 = 1.3 Recommendation: Promising but requiring further information/planning |

(Continues)

**TABLE 3** | (Continued)

| Study/follow-up (attrition rate) | Outcome/measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/intervention component | Number of contact and duration | BCT/theory/model and technique of delivery | Fidelity | Effectiveness and magnitude of change/additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Lewis et al., 2020/12 weeks 5% | MVPA/objective | 55–74 years with a body mass index of 25–35 kg/m$^2$, fewer than 60 min of planned exercise a week, /Opportunistic and systematic 68% | Researcher (with a background in exercise physiology and training in MI) delivered the 5A's counselling Electronic activity monitoring (EAM) group: 5A's PA counselling and exercise prescription and activity monitor | One face-to-face contact Duration of PA counselling NR | 5 A model/MI | NR | The EAM intervention produced a significant increase of 11 min/day (79 min/week) from baseline to 12 weeks compared to the PED intervention which had an increase of 0.2 min/day (1.4 min/week) from baseline to 12 weeks. | Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 3<br>Domain A5 = IN<br>Domain B1 = 0.7<br>Domain B2 = 3<br>Domain B3 = 1.3<br>Domain B4 = 2<br>Domain B5 = 1<br>Recommendation: Promising but requiring further information/Planning |
| Rossen et al., 2021/12 (9%) and 24 Months (11%) | MVPA/objective | 40–80 years, prediabetes or diagnosed with type 2 diabetes with a duration of ≥1 year/Opportunistic and systematic/53% | Researcher and diabetic nurse/group session led by research staff. The diabetic nurse delivered the individualised PA counselling session based on MI Multicomponent group: Pedometer and directed to a website for self-monitoring and PA consultations | Twelve group consultations (duration NR) and nine face-to-face consultations lasting 45 min | Health belief model, the stages of change model and the social cognitive theory. MI technique | The intervention was delivered as intended as measured for MI logs | Multi-component vs. control group: significant increase of 56 min/week at 12 weeks when compared to control. There was an increase of 77 min/week at 24 months when compared to control | Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 1<br>Domain A5 = IN<br>Domain B1 = 0.7<br>Domain B2 = 2.5<br>Domain B3 = 1.3<br>Domain B4 = 1<br>Domain B5 = 1<br>Recommendation: Does not merit scale up |

(Continues)

**TABLE 3** | (Continued)

| Study/ follow-up (attrition rate) | Outcome/ measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/ intervention component | Number of contact and duration | BCT/theory/ model and technique of delivery | Fidelity | Effectiveness and magnitude of change/ additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Pears et al., 2016/4 weeks 26.5% (MVBI); 31% (PVBI) | Total PA[a]/objective | 40–74 years and not previously diagnosed with heart disease, stroke, diabetes or kidney disease/opportunistic and systematic/18% patients recruited during health check | Nurse/ motivational very brief intervention (MVBI); PA counselling and action plan using a diary)<br>Pedometer VBI (PVBI)<br>PA counselling, pedometer and Step Chart<br>Combined VBI (CVBI)<br>Motivational and pedometer VBI (CVBI) | MVBI: Two face-to-face contact<br>Mean delivery time was 6 min and 48 s<br>Pedometer VBI was delivered within 5 min<br>CVBI: delivered within 9 min and 35 s | Goal setting (behaviour), action planning, feedback on behaviour and self-monitoring of behaviour | Mean overall fidelity ranged from 62% for the MVBI, 72% for the PVBI | MVBI had an increase of 20.3 counts/minute when compared to control at 4 weeks.<br>PVBI had an increase of 23.5 counts/minute when compared to control at 4 weeks<br>CVBI had no increase in count/minute when compared to control at 4 weeks.<br>Cost-effectiveness;<br>£6.83 (US$10.06) per participant for the MVBI<br>£17.09 (US$25.17) for the PVBI<br>Qualitative enquiry:<br>Practitioners felt that the PVBI was the easiest and quickest to deliver<br>Participants confirmed that the health check was a good time to discuss PA and that the VBI was a good reminder of the importance of PA | PVBI Group<br>Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 1<br>Domain A5 = 2<br>Domain B1 = 1.3<br>Domain B2 = 1.5<br>Domain B3 = 2.8<br>Domain B4 = 2<br>Domain B5 = 2.7<br>Recommendation: Merit<br>MBVI<br>Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 1<br>Domain A5 = 3<br>Domain B1 = 1.3<br>Domain B2 = 2.5<br>Domain B3 = 2.5<br>Domain B4 = 2<br>Domain B5 = 2.7<br>Recommendation: Merit |

(Continues)

**TABLE 3** | (Continued)

| Study/follow-up (attrition rate) | Outcome/measure (objective/subjective) | Eligibility criteria/recruitment type/participation rate | Interventionist/intervention component | Number of contact and duration | BCT/theory/model and technique of delivery | Fidelity | Effectiveness and magnitude of change/additional remarks (e.g., qualitative findings) | Scalability domain score/scalability recommendations |
|---|---|---|---|---|---|---|---|---|
| Yates et al., 2016/12 (15%), 24(22.9%) and 36 months (27%) | Total PA[a]/objective | 18 and 74 years of age inclusive and above the 90th percentile of the calculated diabetes (Leicester Practice Risk/Systematic/97% | Educator/group educational programme and support (pedometer and telephone follow-up) Educators were recruited and trained to deliver the counselling sessions | Two group sessions lasting 2 h. Three telephone contacts (around 15 min) | BCT (self-efficacy, identifying barriers and promoting self-regulatory skills) | NR | Significant increase in ambulatory activity of 411 steps/day) (29 min/week) in the intervention group compared with control at 12 months. There was a decline in both groups with no difference between groups by 36 months | Domain A1 = 3<br>Domain A2 = 3<br>Domain A3 = 3<br>Domain A4 = 1<br>Domain A5 = IN<br>Domain B1 = 0.7<br>Domain B2 = 2<br>Domain B3 = 1<br>Domain B4 = 2<br>Domain B5 = 1.7<br>Recommendation: Promising but requiring further information/planning |

Abbreviations: MI, motivational interview; MVPA, moderate to vigorous physical activity; NR, not reported; PA, physical activity; PCP, primary care physician.

[a]Steps/day converted to minutes/week: (steps ÷ 100) × 7 (conversion of steps/day to moderate intensity PA).

Scoring: 0 (not at all), 1 (to a small extent), 2 (somewhat scalable), 3 (largely scalable), IN (indeterminate).

The problem (A1), the intervention (A2), strategic /political context (A3), evidence of effectiveness (A4), and intervention cost (A5) and B1 (fidelity and adaptation), B2 (reach and acceptability), B3 (delivery workforce and setting), B4 (implementation infrastructure) and B5 (sustainability).

health professionals might be more willing to promote a general message of increased movement, rather than a focused one on exercise intensity (i.e., the importance of MVPA).

### 5.1 | Strength and Limitations

To the best of the authors' knowledge, this study is the first to evaluate the scalability potential of effective PC PA interventions using a scalability assessment tool. Utilising the ISAT, we demonstrated that effective PC PA interventions exhibit scalability potential. The authors acknowledge the subjective nature of scalability assessment with the ISAT. Further refinement of scalability tools to develop a scoring system for evaluating the scalability of complex interventions such as PA promotion is needed. Despite attempts to locate scalability information from published companion papers, crucial details such as intervention duration, fidelity assessment and cost-effectiveness were often missing, hindering a comprehensive assessment.

Nurses were the main providers of effective PC PA interventions, indicating their potential to deliver or assist in PA interventions within PC. Further research on the utility and effectiveness of other healthcare professionals such as link workers, counsellors and exercise specialists in delivering PA interventions would be worthwhile. While a single-reviewer extraction system and a 10% independent screening check were pragmatically used, there may have been relevant articles that were missed. This narrative review aimed to provide a general overview of PC PA intervention implementation characteristics rather than conduct a systematic review. Despite rigorous methods, some relevant research may have been overlooked.

### 5.2 | Implication for Practice and Research

The inclusion of BCTs including self-monitoring, goal setting and feedback are likely to be important for increasing PA in PC, despite modest evidence concerning the effectiveness of PC-based PA interventions. PC health professionals are advised to use Moving Medicine resources by the UK Faculty of Sports and Exercise Medicine to deliver evidence-based PA interventions supported by BCTs [67].

Mixed findings exist regarding the optimal number of contacts and duration required for effective PC PA interventions to enhance total PA or MVPA. Considering known time constraints in PC, remote-based PA interventions are worth considering for broader implementation. However, due to limited literature on remote-based PA interventions in PC, further research is needed to assess their effectiveness. Additionally, with the introduction of new roles in PC such as link workers, community pharmacists, exercise specialists and first contact physiotherapists, additional research is necessary to evaluate the feasibility, sustainability and effectiveness of training these other PC staff to deliver PA interventions.

This study suggests that PC PA interventions have satisfactory reach. Promoting light-intensity PA may require less contact time than MVPA. Future research should explore PC healthcare providers' attitudes and practices regarding the promotion of light versus moderate intensity PA. Finally, future trial designs could be improved by using multiple recruitment strategies to broaden reach, engagement and inclusion of socially disadvantaged populations.

### 5.3 | Conclusion

PC PA interventions, whether delivered remotely or in person and utilising BCTs such as goal setting, self-monitoring and feedback, show promise for increasing PA. While most interventions demonstrate scalability potential, further examination is needed regarding the delivery settings, implementation infrastructure and sustainability. Remotely delivered PA interventions and those delivered by a nurse showed high scalability potential. Further work that examines the acceptability and effectiveness of other healthcare professionals in intervention delivery would be worthwhile, and more research is needed to assess the utility and effectiveness of remote-based PA interventions in PC.

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**Conflicts of Interest**

The authors declares no conflicts of interest.

**Data Availability Statement**

The data described in this article is currently openly available. Please contact the author for further information if required.

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## Supporting Information

Additional supporting information can be found online in the Supporting Information section.