

Review article

Preventive health measures in small and medium-sized enterprises: A scoping review on implementation strategies

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ARTICLE INFO

Keywords:

Implementation
Preventive health measures
Scoping review

ABSTRACT

Objective: To describe implementation strategies for preventive health measures in SMEs and the effectiveness of the strategies on implementation outcomes.

Methods: A literature search was performed in multiple electronic databases. Studies published between 2000 and 2021 that evaluated the implementation of preventive health measures in SMEs were included. Classification of implementation strategies was based on two complementary classification systems.

Results: Nineteen studies, of which 5 RCTs were included. Eighteen distinct implementation strategies were reported. All studies applied a combination of implementation strategies, and nearly all reported a positive effect on one or more implementation outcomes: sustainability, acceptability, feasibility, penetration, fidelity, adoption, and appropriateness.

Conclusions: Overall, a positive effect of combined implementation strategies on the implementation outcome(s) was found. The 'distribution of educational materials' and 'provide ongoing consultation' combined show positive effects on sustainability.

1. Introduction

Non-communicable diseases such as cardiovascular diseases, cancer, and chronic respiratory diseases are a major cause of disability, illness, health-related retirement and premature death in the European Union (EU). (Commission) This leads to significant social and economic costs (Vos et al., 2020). A large part of these diseases, however, can be prevented with preventive health measures, amongst others by workplace health promotion programs that target healthy lifestyle habits such as a healthy diet, physical activity and smoking cessation (Budreviciute et al., 2020).

The workplace has been identified as one of the most promising settings to implement preventive health measures since the average person spends more time at work than any other daily activity of life (Stoewen, 2016). There are numerous preventive health measures that can be implemented in the workplace setting. Preventive measures may indeed involve individual level measures that target behavioral changes, for example a healthy lifestyle, but also involve measures at the organizational level. For example, measures that target the work

organisation (e.g. creating more variety in the work or better allocation of tasks) and working conditions (reducing job demands, providing social support and more job autonomy), as well as the availability of an occupational physician for preventive advice (Benning et al., 2022). However, these measures are often insufficiently implemented, particularly in small and medium-sized enterprises (SMEs) with 250 or less employees (Fan et al., 2020; Walters et al., 2018; Howard and Albertsen, 2019). For example, the European Survey of Enterprises on New and Emerging Risks (ESENER) demonstrated that 54% of enterprises with 250 or more employees had an action plan to prevent work-related stress. However, this was the case in only 31% of enterprises with 10–49 employees and 40% of enterprises with 50–249 employees. Additionally, while 69% of enterprises with 250 or more employees had used the services of an expert to assist with the ergonomic design and set-up of workplaces, this was the case in only 40% of enterprises with 10–49 employees and 56% of enterprises with 50–249 employees (Howard and Albertsen, 2019).

Previous studies on reasons for inadequate implementation of preventive health measures in SMEs have been performed (Benning et al.,

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<https://doi.org/10.1016/j.apergo.2024.104303>

Received 24 August 2023; Received in revised form 23 April 2024; Accepted 26 April 2024

Available online 6 May 2024

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2022; Fan et al., 2020). For example, the study of Benning et al. (2022) reported that a lack of resources in the form of finances and staff was the main reason of inadequate implementation. Furthermore, difficulties in communicating prevention- or health-related information and a lack of openness for preventive health measures (especially in settings with predominantly male blue collar workers) were mentioned. In addition, the study of Fan et al. (2020) showed, among others, isolation of the enterprise, low unionisation rates and poor employment relations, as well as a lack of financial, human and temporal resources as main reasons for inadequate implementation.

Better implementation of evidence-based interventions increases their effectiveness, thus it is evident that the implementation gap in SMEs needs to be improved (Moir, 2018). This is especially true against the background that employees' health complaints not only affect the health and quality of life of the individual, but also burden enterprises and society as a whole. This is caused by lost productivity due to incapacity to work, sickness-related absenteeism from paid and unpaid work, and presenteeism (i.e. reduced productivity while at work) (Bevan, 2015; Christensen et al., 2020). As SMEs generate more than half (52%) of total value in the non-financial sector, the financial burden for society when employees develop health complaints is substantial (Muller et al., 2022). So, based on the crucial (mechanistic) role of the implementation in the success/effectiveness of interventions, and often reported inadequate implementation (Fan et al., 2020; Walters et al., 2018; Howard and Albertsen, 2019) as a reason for absence of effect, the focus of our study was on the effect of implementation strategies.

Implementation strategies are defined as methods or techniques used to enhance the adoption, implementation, and sustainability of a (clinical) programme or practice (Proctor et al., 2013). Effective implementation strategies might reduce the difference in implementation of preventive health measures between SMEs and larger companies. To date, however, there is no overview available on the variety of implementation strategies and their effectiveness in the context of implementing preventive health measures in SMEs. As implementation outcomes help disentangle the process of implementation and may influence the effectiveness of the implementation strategy for the preventive health measure on the ultimate target, improving health, the focus of the current review was on implementation outcomes. Only if effective on implementation outcomes, an effect on the health outcome can be expected.

Therefore, a scoping review was conducted to gather and scrutinise implementation strategies in the scientific literature on the implementation of preventive health measures in SMEs. The main objective of this scoping review was to descriptively summarise implementation strategies that have been applied in SMEs, and second, to provide insight into the evidence on the effectiveness of implementation strategies on implementation outcomes.

2. Material and methods

2.1. Study design

This scoping review is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018).

2.2. Search strategy

In December 2020, a comprehensive literature search for published peer-reviewed literature was performed using the electronic databases PubMed, Embase, Web of Science, PsycINFO, and international bibliography of the social sciences (IBSS). Articles published in English were eligible. A time-limited search (starting in 2000) was conducted because contextual factors (i.e. socio-political context) may have changed over time. The searches were performed by one author (FB) who was guided by an experienced information specialist from the library. The search

terms were grouped into four concepts: 1) implementation, 2) small and medium-sized, 3) workplace, 4) preventive health measure. Of these four concepts, synonyms and abbreviations were added. In all five databases, the search was conducted using Boolean search method with the Boolean operators "AND" and "OR". The full version of the search strategy is provided in Additional file 1.

2.3. Selection of studies

All identified citations from the searched databases were uploaded to Rayyan software (Mourad et al., 2016). An integrated duplication detection tool was used to identify duplicates. All suggested duplicate pairs were screened for correctness by one reviewer (FB) and subsequently deleted. Two authors (DS, FB) then independently screened all titles and abstracts. Full-texts of all potentially relevant or unclear articles were obtained and one author (FB) independently reviewed each article against the inclusion and exclusion criteria (see Table 1). Disagreements at each stage were resolved by discussion between two authors (DS, FB) and, where required, by consulting a third author (SvO).

2.4. Types of studies

Primary studies evaluating any strategy to improve the implementation of preventive health measures in SMEs (with up to 250 employees) were eligible for inclusion. Workplaces could be from any occupational sector. To be included, studies were required to report the impact of an implementation strategy on an implementation outcome. Studies that examined implementation outcomes performing quantitative methods (e.g. questionnaires) or qualitative methods, i.e. focus groups or (semi-) structured interviews, were included. Because of the expected scarcity of randomised controlled trials (RCT), other types of intervention studies (single-arm intervention studies or quasi-experimental studies) evaluating an implementation strategy and reporting on implementation outcomes were also included. Studies were excluded if they were not original publications, were not published in English or were not accessible in full-text.

Table 1
Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
<p>Population: SME (up to 250 employees) employees from any employment sector</p> <p>Concept: Implementation strategies for implementing preventive health measures in SMEs</p> <p>Context: Small and medium-sized enterprises</p> <p>Study type: Research comprising any kind of evaluation of an implementation strategy and reporting on an implementation outcome: observational studies, intervention/experimental studies, case studies, pilot studies (quantitative & qualitative)</p> <p>Type of publication: scientific peer reviewed published on PubMed, Embase, Web of Science, PsycINFO, IBSS</p> <p>Publication date: 2000–2021</p> <p>Language: English</p>	<p>Secondary and tertiary prevention (e.g. preventive activities targeting employees with diabetes, rehabilitation programmes)</p> <p>Implementation of interventions merely focusing on safety (i.e. avoiding accidents)</p> <p>Implementation of preventive measures outside work setting</p> <p>Synopses, systematic reviews, commentaries, conference summaries, book chapters, conceptual studies (conceptualizing new implementation strategy/framework) without any evaluation</p>

2.5. Types of implementation strategies

Based on a modified Delphi process in which 71 experts participated, Powell et al. (2015) created a set of implementation strategies (n = 73) as a result of the Expert Recommendations for Implementing Change (ERIC) project. This set was used to classify the implementation strategies that were utilised in the identified studies. An extensive list of the definitions of the implementation strategies according to Powell et al. (2015) is provided in Table 2.

2.6. Types of implementation outcomes

Proctor et al. (2011) created the following taxonomy of eight distinct implementation outcomes, which was used to classify the implementation outcomes of the included studies.

- Sustainability: the extent to which a newly implemented treatment is maintained or institutionalised within a service setting’s ongoing, stable operations;
- Acceptability: the perception among implementation stakeholders that a given innovation is agreeable, palatable, or satisfactory;
- Feasibility: the extent to which a new innovation can be successfully used or carried out within a given agency or setting;
- Penetration: the integration of a practice within a service setting and its subsystems;
- Fidelity: the degree to which an intervention was implemented as it was prescribed in the original protocol or as it was intended by the programme developer;
- Adoption: the intention, initial decision, or action to try or employ an innovation or evidence-based practice;
- Appropriateness: perceived fit, relevance, or compatibility of the innovation or evidence-based practice for a given practice setting, provider, or consumer, and/or perceived fit of the innovation to address a particular issue or problem;
- Cost: the cost impact of an implementation effort.

2.7. Data extraction

Data was extracted using a predefined data extraction form. Two authors (FB, TR) undertook classification of implementation strategies and outcomes against the classification of Powell et al. (2015) and Proctor et al. (2011) respectively. A third and fourth reviewer (DS, SvO) helped to resolve uncertainties in the classification. Two separate overview tables were created to differentiate between RCTs, and the single-arm intervention studies and quasi-experimental studies.

The following study characteristics were extracted and reported: study characteristics (date of publication, country, study design), study setting and population (occupational sector, number of worksites and employees), implementation strategies used, action targets, and actors, the latter being defined as a stakeholder who actually delivers the implementation strategy (Proctor et al., 2013). Action targets refer to a function of where the strategies are directed or attempt to impact, i.e. toward what or whom, and what level (Proctor et al., 2013). The implementation outcomes were also extracted. Due to the absence of effect sizes in the non-RCTs, the authors’ main conclusions on the outcomes were extracted. Consequently, the effect of the implementation strategies on implementation outcomes, graded as positive or negative, was based on the author’s main conclusions in non-RCTs. For RCTs, information on the outcome measurement instruments and the effect sizes was extracted and reported.

3. Results

3.1. Selection of studies

The search yielded 3892 studies of which 1867 were screened on

Table 2

Definitions of all identified implementation strategies in the included studies.

Strategy	Definitions ^a
Distribute educational materials	Distribute educational materials (including guidelines, manuals, and toolkits) in person, by mail, and/or electronically
Provide ongoing consultation	Provide ongoing consultation with one or more experts in the strategies used to support implementing the innovation
Recruit, designate and train for leadership	Recruit, designate, and train leaders for the change effort
Use an implementation advisor	Seek guidance from experts in implementation
Conduct local needs assessment	Collect and analyse data related to the need for the innovation
Involve patients/consumers and family members	Engage or include patients/consumers and families in the implementation effort
Alter incentive/allowance structures	Work to incentivise the adoption and implementation of the clinical innovation
Identify and prepare champions	Identify and prepare individuals who dedicate themselves to supporting, marketing, and driving through an implementation, overcoming indifference or resistance that the intervention may provoke in an organisation
Promote network weaving	Identify and build on existing high-quality working relationships and networks within and outside the organisation, organisational units, teams, etc. to promote information sharing, collaborative problem-solving, and a shared vision/goal related to implementing the innovation
Build a coalition	Recruit and cultivate relationships with partners in the implementation effort
Use advisory boards and workgroups	Create and engage a formal group of multiple kinds of stakeholders to provide input and advice on implementation efforts and to elicit recommendations for improvements
Audit and provide feedback	Collect and summarise clinical performance data over a specified time period and give it to clinicians and administrators to monitor, evaluate, and modify provider behaviour
Change physical structure and equipment	Evaluate current configurations and adapt, as needed, the physical structure and/or equipment (e.g. changing the layout of a room, adding equipment) to best accommodate the targeted innovation
Conduct ongoing training	Plan for and conduct training in the clinical innovation in an ongoing way
Create a learning collaborative	Facilitate the formation of groups of providers or provider organisations and foster a collaborative learning environment to improve implementation of the clinical innovation
Capture and share local knowledge	Capture local knowledge from implementation sites on how implementers and clinicians made something work in their setting and then share it with other sites
Develop a formal implementation blueprint	Develop a formal implementation blueprint that includes all goals and strategies. The blueprint should include the following: 1) aim/purpose of the implementation; 2) scope of the change (e.g. what organisational units are affected); 3) timeframe and milestones; and 4) appropriate performance/progress measures. Use and update this plan to guide the implementation effort over time
Increase demand	Attempt to influence the market for the clinical innovation to increase competition intensity and to increase the maturity of the market for the clinical innovation

^a Definitions in accordance with the definitions of Powell et al. (2015)

titles and abstracts after removing 1744 duplicates and 281 articles with publication date before year 2000. Subsequently, 1814 references were excluded based on titles and abstracts, resulting in 53 studies eligible for full-text screening. Four articles could not be retrieved, therefore 49 articles were then reviewed on full-text. The selection process is illustrated in the flowchart (see Fig. 1). After excluding 30 articles with

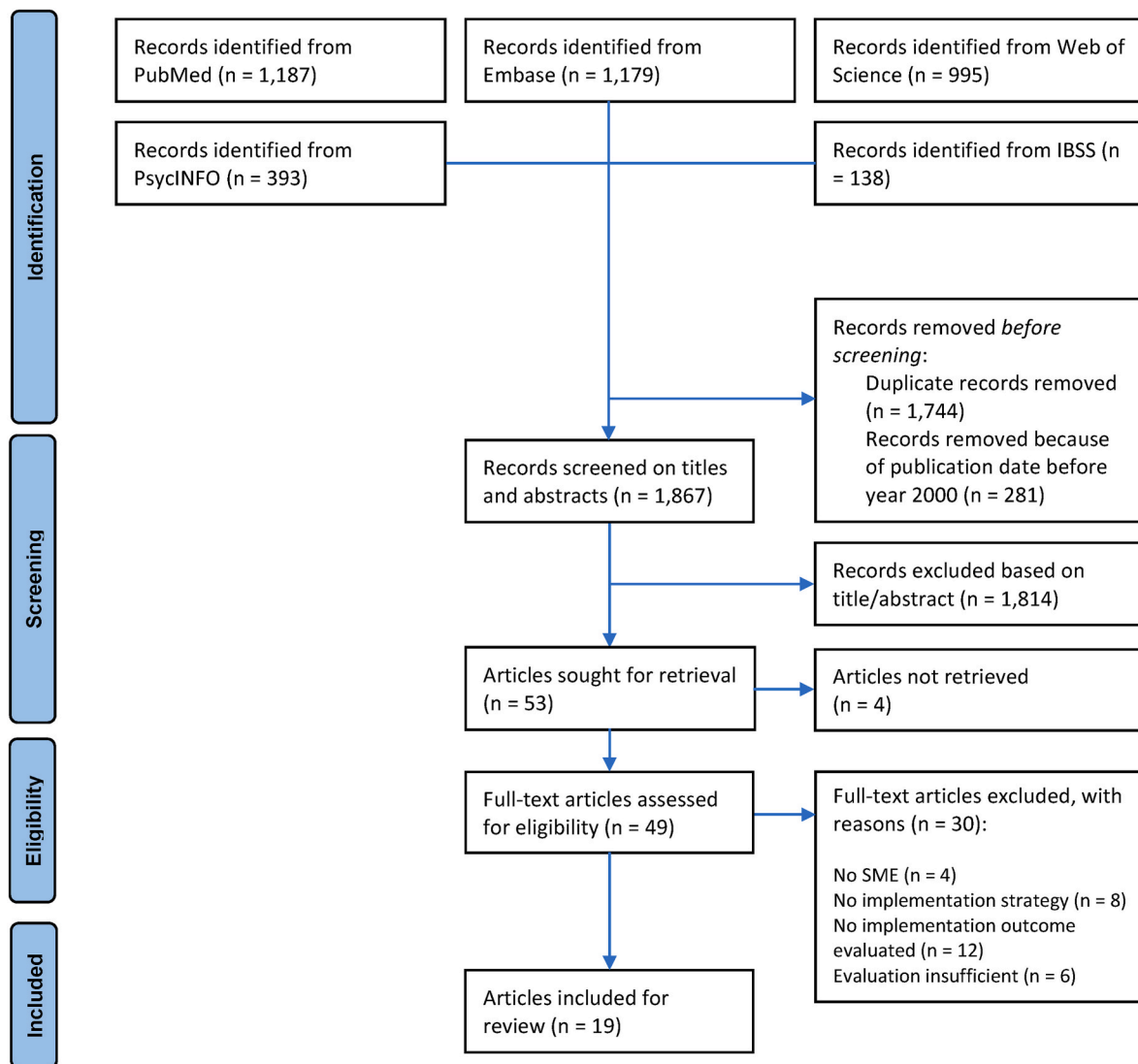


Fig. 1. Flowchart.

reasons provided in the flowchart, a total of 19 studies were included in this scoping review.

3.2. Characteristics of included studies

An overview of the included studies is presented in Table 3 (RCTs) and Table 4 (single-arm intervention studies and quasi-experimental studies). Twelve studies were conducted in the United States, (Hunt et al., 2000, 2007; Tessaro et al., 2000; Stokols et al., 2001; Taylor et al., 2010; Devine et al., 2012; Laing et al., 2012; Parker et al., 2015; Lang et al., 2017; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021) two in Australia, (Straker et al., 2004; Goode et al., 2019) two in the United Kingdom, (Edmunds et al., 2013; Edmunds and Clow, 2016) and one in Sweden (Gunnarsson et al., 2010), Norway, (Torp, 2008) and Germany (Wollesen et al., 2017). Most studies were non-RCTs ($n = 14$) of which 11 were single-arm intervention studies, and three were quasi-experimental studies (Stokols et al., 2001; Gunnarsson et al., 2010; Torp, 2008). Five studies were RCTs (Hunt et al., 2000, 2007; Helfrich et al., 2018; Hannon et al., 2019; Straker et al., 2004). Four studies had two study arms (one intervention and control condition) (Stokols et al., 2001; Hunt et al., 2007; Straker et al., 2004; Torp, 2008) and four studies had three study arms with two distinct intervention conditions and one control condition (Hunt et al., 2000; Helfrich et al.,

2018; Hannon et al., 2019; Gunnarsson et al., 2010). Follow-up ranged from six months (Taylor et al., 2010; Laing et al., 2012; Edmunds et al., 2013) to two years (Hunt et al., 2000; Stokols et al., 2001; Hannon et al., 2019; Torp, 2008). The amount of worksites under study ranged from one (Taylor et al., 2010) to 226 (Torp, 2008). Also, the occupational sectors varied widely with most studies performed in health care and social assistance (Hunt et al., 2000; Devine et al., 2012; Lang et al., 2017; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021; Straker et al., 2004; Edmunds et al., 2013; Edmunds and Clow, 2016), followed by the manufacturing sector (Tessaro et al., 2000; Stokols et al., 2001; Hunt et al., 2007; Lang et al., 2017; Straker et al., 2004; Gunnarsson et al., 2010). An overview of these occupational sectors is provided in Additional file 2 (see Table A1).

3.3. Implementation strategies

Eighteen distinct implementation strategies were used in the included studies. Table 5 provides an overview of these strategies and how often each strategy was used. Each study applied a combination of multiple strategies ranging from two (Stokols et al., 2001; Torp, 2008) to seven (Gunnarsson et al., 2010). The most frequently applied strategy was the 'distribution of educational materials' ($n = 15$, 79% of all included studies). This includes, for example: a web portal, posters,

Table 3
Overview of included randomised controlled trials.

#	Authors, year, country	Design	Occupational sector(s)	Worksites, n (employees, n)	Implementation strategies (conform Powell et al. (2015))	Actors	Action target	Effect on implementation outcomes ^a	Outcome measurement instrument(s)	Results
#1	Hunt et al., 2000, United States (Hunt et al., 2000)	RCT (3 arms), quantitative methods	Health care and social assistance	22 (Baseline: 1359 [R: 87%], follow-up: 1306 [R: 76%])	Arm 1: 1) use advisory boards and workgroups 2) increase demand 3) change physical structure and equipment 4) alter incentive/ allowance structures Arm 2: Arm 1 + involve patients/consumers and family members Arm 3 (control): 1) increase demand	Arm 1&2: interventionist, worksite leader, worker committee Arm 3:	Training and behavioural changes	Arm 1: Sustainability + Fidelity + Arm 2: Sustainability + Fidelity +	Sustainability: - Extend of intervention implementation with intervention tracking form (ITF) - Reach with employee survey Fidelity: Comparison of ITF and intervention protocol	Sustainability: Average participation per event (at two-years follow-up): -Arm 1: 35% (SD: 11) ^b -Arm 2: 29% (SD: 12) ^b Participation for at least one event (at two-years follow-up): -Arm 1: 81% ^b -Arm 2: 79% ^b Fidelity: Authors' conclusion: There was overall fidelity to intervention protocol in both arms, given the similar profile of educational activities as the intervention protocol.
#2	Straker et al., 2004, Australia (Straker et al., 2004)	RCT (2 arms), quantitative methods	Wholesale trade; manufacturing; Health care and social assistance	48 (NP)	Arm 1: 1) use an implementation advisor 2) involve patients/ consumers and family members 3) recruit, designate and train for leadership 4) distribute educational materials 5) provide ongoing consultation Arm 2: none	Arm 1: interventionist, management, worker committee Arm 2:	Changes in work organisation and working conditions	Sustainability ± ^c	Questionnaire: Manual Tasks Risk Assessment tool (ManTRA)	Sustainability: ^d Authors' conclusion: The number of actions taken tended to increase for both groups (follow-up of nine months). These effects, however, did not reach significance.
#3	Hunt et al., 2007, United States (Hunt et al., 2007)	RCT (2 arms), mixed methods	Manufacturing; administrative and support	24 (1717)	Arm 1: 1) recruit, designate and train for leadership 2) use advisory boards and workgroups 3) provide ongoing consultation 4) distribute educational materials 5) change physical structure and equipment Arm 2: none	Arm 1: interventionist, worksite leader, worker committee Arm 2:	Training and behavioural changes	Sustainability +	Employee survey	Sustainability: Overall participation in programmes or activities (at 18-months follow-up): -Arm 1: 74.3% (SD: 8.8) ^b -Arm 2: 29.0% (SD: 19.9) ^b
#4	Helfrich et al., 2018, United States (Helfrich et al., 2018)	RCT (3 arms), quantitative methods	Retail trade; educational services; health care and social assistance; accommodation and food services; arts, entertainment, and recreation; other services	72 (NP)	HealthLinks Arm 1: 1) conduct local needs assessment 2) use an implementation advisor 3) distribute educational materials 4) recruit, designate and train for leadership 5) provide ongoing consultation Arm 2: arm 1 + involve patients/consumers and	Arm 1: interventionist, management Arm 2: arm 1 + worker committee Arm 3:	Training and behavioural changes	Adoption - Sustainability +	Employee survey (readiness-to-change survey; single survey respondent per worksite, typically a human resources manager)	Adoption: Change in adoption (between baseline and 15-months follow-up): -Arm 1&2 ^c : 0.29 (P ≤ 0.05 ^f) -Arm 3: 0.39 (P ≤ 0.05 ^f) Sustainability: Difference in implementation-related efforts ^g between baseline

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Table 3 (continued)

#	Authors, year, country	Design	Occupational sector(s)	Worksites, n (employees, n)	Implementation strategies (conform Powell et al. (2015))	Actors	Action target	Effect on implementation outcomes ^a	Outcome measurement instrument(s)	Results
					family members Arm 3: none					and 15-months follow-up: - Arm 1&2 ^f : +0.73 (P ≤ 0.05 ^g) - Arm 3: +0.05 (NS ^g) Sustainability (total EBI scores): Baseline – 15-months – two-years follow-up: - Arm 1: 17% ^h – 51% ^h – 33% ^h - Arm 2: 19% ^h – 51% ^h – 37% ^h - Arm 3: 20% ^h – 23% ^h – 24% ^h Acceptability: ⁱ Baseline – 15-months – two-years follow-up: - Arm 1: 3.33 ^h – 3.56 ^h – 3.51 ^h - Arm 2: 3.34 ^h – 3.74 ^h – 3.68 ^h - Arm 3: 3.35 ^h – 3.39 ^h – 3.36 ^h
#5	Hannon et al., 2019, United States (Hannon et al., 2019)	RCT (3 arms), quantitative methods	Retail trade; educational services; health care and social assistance; accommodation and food services; arts, entertainment, and recreation; other services	68 (Baseline: 2678 [R: 58%], 15-months follow-up: 2613, two-years follow-up: 2328 [R: 51%])	HealthLinks Arm 1: 1) conduct local needs assessment 2) use an implementation advisor 3) distribute educational materials 4) recruit, designate and train for leadership 5) provide ongoing consultation Arm 2: arm 1 + 6) involve patients/consumers and family members Arm 3: none	Arm 1: interventionist, management Arm 2: arm 1 + worker committee Arm 3:	Training and behavioural changes	Arm 1: Sustainability + Acceptability + Arm 2: Sustainability + Acceptability +	Sustainability: Implementation Survey Acceptability: Employee Survey	

Abbreviations: EBI; evidence-based intervention, NP; not provided, NS; not significant, R; response rate, SD; standard deviation, SME; small and medium-sized enterprises.

^a The effect on implementation outcomes is graded as + (positive effect) or – (negative effect), which was determined according to the effect sizes found based on the statistical analysis. The effect was considered positive if there was a larger increase of the implementation outcome in the intervention condition or a higher implementation outcome compared with the control condition.

^b Significance was unclear due to no provided P value or confidence interval.

^c Effect on sustainability was not significant.

^d The authors provided a curve demonstrating sustainability but unfortunately they did not provide exact values.

^e Results are based on analyses that compared both intervention sites combined with the control sites since few differences were observed between the intervention sites.

^f P value calculated with paired *t*-test.

^g Sustainability was defined as the collective effort of organisational members to execute a change, and is a function of both change commitment and change efficacy.

^h P < 0.001, P value reflects testing whether the average outcome in the intervention groups are different from the control group at both 15-months and 24-months follow-up, using the Wald test following models fit from generalised estimating equations.

ⁱ Acceptability was defined as employees' perception of overall worksite support for health behaviour, measured with a five-point Likert-type scale (1–5): 1 = strongly disagree, 5 = strongly agree.

Table 4
Overview of included single-arm intervention studies and quasi-experimental studies.

#	Authors, year, country	Design	Occupational sector(s)	Worksite(s), n (employees, n)	Implementation strategies (conform Powell et al., 2015)	Actor(s)	Action target(s)	Effect on implementation outcomes ^a	Authors' main conclusions
#6	Tessaro et al., 2000, United States (Tessaro et al., 2000)	Intervention (single arm), pre-post measurement, qualitative methods	Manufacturing	9 (637)	1) identify and prepare champions 2) distribute educational materials 3) conduct ongoing training	Interventionist, worksite leader	Training and behavioural changes	Acceptability + Sustainability + Feasibility + Penetration +	During 18 months of implementation, natural helpers expanded the diffusion of health promotion information (specifically designed for women) from close network members to co-workers. They "naturally" diffused information to others, i.e. they approached others or they were approached because of their knowledge and wisdom. Over time, natural helpers were more likely to be approached by their co-workers for information. Group activities at the worksite, particularly around PA, increased over time. This study demonstrates that women can be recruited and educated to successfully diffuse health promotion information to co-workers and support them for behavioural change. They were more successful with each succeeding worksite as they gained experience working with the natural helpers and an improved understanding of the barriers that prevented women from developing group activities.
#7	Stokols et al., 2001, United States (Stokols et al., 2001)	Quasi-experimental (2 arms), pre-post measurement, quantitative methods	Manufacturing; nonmanufacturing firms (not specified)	94 (NP)	1) recruit, designate and train for leadership 2) distribute educational materials Arm 2: none	Arm 1: Management Arm 2:	Changes in work organisation and working conditions; engineering activities for the modification or installation of plant and equipment	Acceptability + Sustainability +	This intervention aimed to enhance participants' knowledge of occupational safety and health regulations. After 12 months, the intervention group demonstrated a mean change in perceived knowledgeability of 1.20 compared with 0.51 in the control group, indicating a significant main effect on

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Table 4 (continued)

#	Authors, year, country	Design	Occupational sector(s)	Worksite(s), n (employees, n)	Implementation strategies (conform Powell et al., 2015)	Actor(s)	Action target(s)	Effect on implementation outcomes ^a	Authors' main conclusions
#8	Torp, 2008, Norway (Torp, 2008)	Quasi-experimental (2 arms), pre-post measurement, quantitative methods	Other services	226 (Baseline: 1559 [R: 75%], follow-up: 1370 [R: 70%])	Arm 1: 1) recruit, designate and train for leadership 2) audit and provide feedback Arm 2: none	Interventionist, management	changes in work organisation and working conditions	Sustainability +	participation in the intervention ($P < 0.03$). Of the 61 enterprises represented in the survey at four-months follow-up, 31 reported that they found the training programme very useful, 28 found it useful or somewhat useful, and two indicated that it had not been useful. After two years, the training resulted in significantly greater improvement of their health and safety (H&S) management system compared with the control group. Mean changes in H&S management index were 0.61 and 0.26 respectively ($P = 0.02^b$).
#9	Gunnarsson et al., 2010, Sweden (Gunnarsson et al., 2010)	Quasi-experimental (3 arms), pre-post measurement, mixed methods	Manufacturing	23 (446)	Arm 1: 1) provide ongoing consultation 2) use an implementation advisor 3) develop a formal implementation blueprint 4) involve patients/consumers and family members 5) distribute educational materials Arm 2: 1) promote network weaving 2) use an implementation advisor 3) build a coalition 4) capture and share local knowledge 5) create a learning collaborative 6) conduct ongoing training 7) involve patients/consumers and family members Arm 3: none	Arm 1: interventionist, workers Arm 2: network, management, worksite leader Arm 3:	Changes in work organisation and working conditions	Arm 1: Sustainability + Penetration + Arm 2: Sustainability + Penetration +	Participation in the project was positive in both intervention groups and improvements in systematic work environment management was small with slightly more improvement in the supervised group (arm 1) compared with the network group (arm 2). Impact on daily work (defined as enterprise's knowledge in four areas) at six-months follow-up was increased for both intervention groups. Possible values ranged between 1 (no knowledge) and 5 (full knowledge). Mean knowledge score before implementation in arm 1 and arm 2 were 1.9 and 1.8 before implementation and 3.2 and 2.4 six months after implementation finished respectively.

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Table 4 (continued)

#	Authors, year, country	Design	Occupational sector(s)	Worksite(s), n (employees, n)	Implementation strategies (conform Powell et al., 2015)	Actor(s)	Action target(s)	Effect on implementation outcomes ^a	Authors' main conclusions
#10	Taylor et al., 2010, United States (Taylor et al., 2010)	Intervention (single arm), pre-post measurement, quantitative methods	Administrative and support	1 (8)	1) identify and prepare champions 2) distribute educational materials 3) promote network weaving 4) alter incentive/allowance structures	Interventionist, worksite leader	Training and behavioural changes	Fidelity + Acceptability + Sustainability + Feasibility +	Fidelity in terms of adherence to schedule (i.e. 117 of 120 potential sessions were completed during the six-month study period) and protocol (ranging from 60% to 90% at assessment one, and 100% at assessment four), was high. Overall average attendance was 80.6% at six-months follow-up. In conclusion, the Booster Break programme is feasible and sustainable.
#11	Devine et al., 2012, United States (Devine et al., 2012)	Intervention (single arm), pre-post measurement, mixed methods	Educational services; health care and social assistance	5 (226)	1) provide ongoing consultation 2) recruit, designate and train for leadership 3) conduct local needs assessment 4) use advisory boards and workgroups 5) alter incentive/allowance structures 6) audit and provide feedback	Interventionist, worksite leader, workers	Training and behavioural changes	Sustainability ± ^c	Intervention dose delivered ranged from 40% to 100%. Worksites A, B, C, and E were identified as having high dose delivered; Site D had low dose delivered. Intervention reach ^d ranged from 19% to 96% for walking and 16–96% for healthy food choices, and median reach was respectively 26% and 21% over all sites. On average, sites B and E were high reach sites; these were also the smallest sites overall. Sites A, C and D were low reach sites.
#12	Laing et al., 2012, United States (Laing et al., 2012)	Intervention (single arm), pre-post measurement, quantitative methods	Agriculture, forestry and fishing and hunting; finance and insurance; educational services; public administration	23 (NP)	HealthLinks	Interventionist, management	Training and behavioural changes	Sustainability + Acceptability +	Overall, implementation of best practices increased significantly for all 3 practice types: policy, programme, and communication. On average, workplaces implemented 36% of the best practices at baseline and 59% at six-months follow-up (P < 0.001 ^e). The HealthLinks programme for small workplaces is potentially sustainable over time. Employers appeared to support HealthLinks as they rated the HealthLinks resources and services as useful,

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Table 4 (continued)

#	Authors, year, country	Design	Occupational sector(s)	Worksite(s), n (employees, n)	Implementation strategies (conform Powell et al., 2015)	Actor(s)	Action target(s)	Effect on implementation outcomes ^a	Authors' main conclusions
#13 & #14	Edmunds et al., 2013 and Edmunds and Clow, 2016 ^f , United Kingdom (Edmunds et al. (2013); Edmunds and Clow, 2016)	Intervention (single arm)	Health care and social assistance; private sector (not specified); public sector (not specified)	17 (Baseline: 148 [R: 100%], follow-up: 89 [R: 60%])	1) conduct local needs assessment 2) use an implementation advisor 3) distribute educational materials 4) recruit, designate and train for leadership 5) provide ongoing consultation 6) alter incentive/allowance structures 1) identify and prepare champions 2) provide ongoing consultation 3) distribute educational materials 4) promote network weaving 5) build a coalition 6) alter incentive/allowance structures	Interventionist, worksite leader	Training and behavioural changes	Penetration + Sustainability + Feasibility + Acceptability +	relevant, and appealing. Twenty-one of the 23 participating workplaces reported high satisfaction with the intervention. The Workplace Activator (WA) programme was effective and feasible to implement in the 17 included SMEs. The intervention was strongly associated with increased PA and the health and well-being of employees with initially low PA. PA increased significantly at six-months follow-up. The WA programme was described as having a “ripple effect out to other people”, beyond the initial participants to other employees. In another organisation the WA programme had become part of the culture of the organisation. New participants heard about it and wanted to join in with ongoing activities. Acceptability, authors' conclusion: Multilevel PA interventions which incorporate peer physical activity champions were concluded as an acceptable way to promote PA within SMEs with office-based staff.

2013: pre-post measurement, mixed methods

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Table 4 (continued)

#	Authors, year, country	Design	Occupational sector(s)	Worksite(s), n (employees, n)	Implementation strategies (conform Powell et al., 2015)	Actor(s)	Action target(s)	Effect on implementation outcomes ^a	Authors' main conclusions
#15	Parker et al., 2015, United States (Parker et al., 2015)	2016: post measurement, qualitative methods Intervention (single arm), pre-post measurement, quantitative methods	Other services	Baseline: 49, follow-up: 45 (NP)	1) conduct local needs assessment 2) use an implementation advisor 3) distribute educational materials	Interventionist, management	Engineering activities for the modification or installation of plant and equipment	Sustainability +	For 12 months, this intervention was implemented. A business safety assessment survey (comprising 92 questions, each evaluating an item of concern for health and safety) was used to assess safety in health at baseline and follow-up. At 12-months follow-up, overall items increased significantly with 17% ($P < 0.0001$) compared with baseline, resulting in a positive effect on the overall business safety scores.
#16	Wollesen et al., 2017, Germany (Wollesen et al., 2017)	Intervention (single arm), pre-post measurement, mixed methods	Diverse, not specified	14 (342 [R: 19%])	1) conduct local needs assessment 2) promote network weaving 3) use an implementation advisor	Interventionist, worksite leader	Training and behavioural changes	Sustainability + Acceptability +	During the 12 months of implementing the intervention, 55% of the interviewed employees participated in the intervention programme continuously, and 49% of the participants showed high acceptance for the intervention programme. It was widely accepted and sustainable.
#17	Lang et al., 2017, United States (Lang et al., 2017)	Intervention (single arm), pre-post measurement, quantitative methods	Construction; manufacturing; wholesale trade; retail trade; finance and insurance; real estate and rental and leasing; professional, scientific, and technical services; health care and social assistance; public administration; other services	Baseline: 100, follow-up: 41 (Baseline: 5471 [R: 39%], follow-up: 1759 [R: 23.3%]) [§]	1) recruit, designate and train for leadership 2) distribute educational materials 3) use an implementation advisor 4) provide ongoing consultation	Interventionist, management	Training and behavioural changes	Sustainability +	At 18-months follow-up after the implementation of the intervention, the 41 employers who completed the intervention implemented significantly more EBIs and had more comprehensive worksite health promotion programmes compared with baseline. Mean number of interventions employers had in place at baseline was 42.0, compared with 75.4 at 18-months follow-up ($P < 0.001$). Employees made significant improvements in PA and nutritional behaviours, but did not

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Table 4 (continued)

#	Authors, year, country	Design	Occupational sector(s)	Worksite(s), n (employees, n)	Implementation strategies (conform Powell et al., 2015)	Actor(s)	Action target(s)	Effect on implementation outcomes ^a	Authors' main conclusions
#18	Goode et al., 2019, Australia (Goode et al., 2019)	Intervention (single arm), post measurement, qualitative methods	Construction; transportation and warehousing; professional, scientific and technical activities; public administration	7 (603)	1) identify and prepare champions 2) distribute educational materials 3) build a coalition	Worksite leader, worker committee	Training and behavioural changes	Acceptability + Feasibility + Sustainability + Penetration + Appropriateness +	significantly improve employee weight. The intervention was acceptable to champions and staff and sustainable over the period of 12 months, especially for strategies related to environmental and policy changes. All champions reported that the toolkit was a valuable resource. A participatory approach was used, which enabled teams of employees to choose the strategies appropriate to their workplace. Moreover, most champions mentioned that the intervention easily fitted within existing programmes or complemented other workplace health initiatives. The intervention positively impacted the organisational climate, and it integrated within existing practise. Champions reported that the online format, step-by-step guide and the multimedia resources were easy to use, making it feasible for champions to deliver the programme without input of researchers.
#19	Harris et al., 2021, United States (Harris et al., 2021)	Intervention (single arm), pre-post measurement, quantitative methods	Health care and social assistance	35 (NP; mean of 195 per worksite)	HealthLinks 1) conduct local needs assessment 2) use an implementation advisor 3) distribute educational materials 4) recruit, designate and train for leadership 5) provide ongoing consultation 6) involve patients/ consumers and family members	Interventionist, management, worker committee	Training and behavioural changes	Sustainability ± ^h	The HealthLinks intervention aimed to increase worksites' implementation of 14 EBIs, classified as communication, policy, or programme approaches. The aim was to increase four behaviours: cancer screening, healthy eating, physical activity, and tobacco cessation. Total mean implementation scores ⁱ showed a

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Table 4 (continued)

#	Authors, year, country	Design	Occupational sector(s)	Worksite(s), n (employees, n)	Implementation strategies (conform Powell et al., 2015)	Actor(s)	Action target(s)	Effect on implementation outcomes ^a	Authors' main conclusions
									significant increase from 33% at baseline to 47% at six-months follow-up ($P < 0.001^e$). However, total mean implementation scores at 12-months follow-up (38%) showed little change from baseline ($P = 0.14$). Implementation of communications, policy, healthy eating, and tobacco EBIs were significantly increased at six-months follow-up and maintained at 12-months follow-up.

Abbreviations: EBI; evidence-based intervention, PA; physical activity, NP; not provided, R; response rate, SME; small and medium-sized enterprises.

^a The effect on implementation outcomes is graded as + (positive effect) or - (negative effect). The effect in studies with quantitative methods was determined by extracting these data. An increase or decrease in implementation outcome after implementing an intervention was considered as a positive and negative effect respectively. Studies with qualitative methods naturally did not provide quantitative outcome data, hence the effect in these studies was determined according to the authors' statements about this.

^b P value was calculated using t-tests, and it represents significance of the differences between intervention and comparison group.

^c Mixed implementation effect; there are worksites with positive effects, and worksites with no or very little effect.

^d Intervention reach was defined as the number of employees who participated in the intervention as a proportion of the total number of employees at each site.

^e Wilcoxon matched pairs test used to analyse significant differences from baseline to follow-up.

^f Studies are combined since they were identical studies; the only differences were implementation outcomes and follow-up. Edmunds et al., 2013 (2013) analysed the implementation outcomes penetration, sustainability, and feasibility, with six-months follow-up. Edmunds et al. (Edmunds and Clow, 2016) (2016) analysed acceptability with seven-months follow-up.

^g Data was based on 825 employees who participated in both baseline and follow-up.

^h Significantly increased at six-months follow-up, but sustainability at 12-months follow-up was not significantly different from baseline.

ⁱ Implementation score ranged from 0 to 100 (0 = no implementation, 100 = full implementation).

Table 5

Overview of different implementation strategies and number of articles studying the effect of these strategies.

Implementation strategy ^a	Frequency (n = 19), n (%)
1. Distribute educational materials	15 (79)
2. Provide ongoing consultation	11 (58)
3. Recruit, designate and train for leadership	10 (53)
4. Use an implementation advisor	9 (47)
5. Conduct local needs assessment	7 (37)
6. Involve patients/consumers and family members	6 (32)
7. Alter incentive/allowance structures	6 (32)
8. Identify and prepare champions	5 (26)
9. Promote network weaving	5 (26)
10. Build a coalition	4 (21)
11. Use advisory boards and workgroups	3 (16)
12. Audit and provide feedback	2 (11)
13. Change physical structure and equipment	2 (11)
14. Conduct ongoing training	2 (11)
15. Create a learning collaborative	1 (5)
16. Capture and share local knowledge	1 (5)
17. Develop a formal implementation blueprint	1 (5)
18. Increase demand	1 (5)

^a Conform the compilation of Powell et al.¹⁶.

books, and videos. The strategies ‘provide ongoing consultation’ and ‘recruit, designate and train for leadership’ were also often utilised (n = 11, 58% and n = 10, 53% respectively). An example of the ‘provision of ongoing consultation’ is a supporting expert (i.e. appointed project leader) that arranged ongoing meetings and was available to the enterprise for support between the meetings (Gunnarsson et al., 2010). ‘Recruit, designate and train for leadership’ includes, for instance, the identification, training, and support of staff from local health jurisdictions affiliated with the worksites to disseminate the intervention (Harris et al., 2021). ‘Involve patients/consumers and family members’ (i.e. referring to the employees in SMEs as patients/consumers) and ‘alter incentive/allowance structures’ were less frequently applied (both n = 6, 32%). The strategies ‘create a learning collaborative’, ‘capture and share local knowledge’, ‘develop a formal implementation blueprint’, and ‘increase demand’, were each applied in only one study.

Four studies involved the same intervention “HealthLinks”. However, they varied in occupational sectors, study design, actors, and targeted implementation outcome (Laing et al., 2012; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021). HealthLinks is an intervention that utilised a combination of the following five implementation strategies: ‘conduct local needs assessment’, ‘use an implementation advisor’, ‘distribute educational materials’, ‘recruit, designate and train for leadership’, and ‘provide ongoing consultation’. All included studies applied a combination of implementation strategies. Some strategies were used in combination more frequently than others. The ‘distribution of educational materials’ was often combined with among others, the ‘provision of ongoing consultation’ (n = 10) (Hunt et al., 2007; Laing et al., 2012; Lang et al., 2017; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021; Straker et al., 2004; Edmunds et al., 2013; Edmunds and Clow, 2016; Gunnarsson et al., 2010), ‘recruit, designate and train for leadership’ (n = 8), (Stokols et al., 2001; Hunt et al., 2007; Laing et al., 2012; Lang et al., 2017; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021; Straker et al., 2004) and ‘use an implementation advisor’ (n = 8) (Laing et al., 2012; Parker et al., 2015; Lang et al., 2017; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021; Straker et al., 2004; Gunnarsson et al., 2010). ‘Distribute educational materials’, ‘provide ongoing consultation’, and ‘recruit, designate and train for leadership’ were combined in seven studies (Hunt et al., 2007; Laing et al., 2012; Lang et al., 2017; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021; Straker et al., 2004). Six of these studies also ‘used an implementation advisor’ (Laing et al., 2012; Lang et al., 2017; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021; Straker et al., 2004), which was also combined with other strategies, such as ‘involve patients/consumers and family members’ (n = 6)^{27-30, 34} and ‘conduct

local needs assessment’ (n = 6) (Laing et al., 2012; Parker et al., 2015; Helfrich et al., 2018; Hannon et al., 2019; Harris et al., 2021; Wollesen et al., 2017).

3.4. The actors

Most studies involved an interventionist (n = 15, 79%) as actor, who was a stakeholder from outside the enterprise and helped with the implementation and providing services. Interventionists took on different tasks including assisting in or performing a problem analysis, offering training on implementation or offering interventions directly to employees. Management (the owner or upper management) was involved in 10 studies, and they provided internal support to maintain implementation. Other forms of actors were so-called worksite leaders (n = 9, 47%), being employees who are appointed to take responsibility for the implementation and who encourage other employees, or worker committees (n = 7, 37%) that support the implementation.

3.5. Action targets

The majority of interventions being implemented encompassed training and behavioural changes (n = 15, 79%) as action target. Examples include sitting reduction and increasing physical activity, healthy eating, and walking. Less frequently reported action targets were changes in work organisation and working conditions (n = 4, 21%), for example change in health and safety management, and engineering activities for the modification or installation of plant and equipment (n = 2, 11%).

3.6. Effects on implementation outcomes

Except for the implementation outcome “cost”, all implementation outcomes as defined by Proctor et al. (2011) were addressed in the studies with sustainability being evaluated in nearly all studies (95%), followed by acceptability (42%).

3.7. Sustainability

The studies that evaluated sustainability all used a measure of the difference in implementation efforts and activities over time, i.e. between follow-up and baseline. Eighteen studies of which five RCTs evaluated the effect on sustainability, however, the operationalisation differed between the studies. Four out of five RCTs reported a positive effect on sustainability (Hunt et al., 2000, 2007; Helfrich et al., 2018; Hannon et al., 2019), albeit the statistical significance in the studies of Hunt et al., 2000, 2007 was unclear due to no provided p-value or confidence interval. Helfrich et al. (2018) implemented the HealthLinks intervention and sustainability was defined as the difference in implementation related efforts between baseline and 15-months follow-up. Sustainability increased in both intervention conditions (+0.73; P ≤ 0.05) compared with the control condition (+0.05; P < 0.05). Hannon et al. (2019) also implemented HealthLinks and concluded that post-intervention implementation in both intervention conditions was significantly higher compared with the control condition at 15-months follow-up (51%, 51%, and 23% respectively; P < 0.001) and 24-months follow-up (33%, 37%, and 24% respectively; P < 0.001). The participative ergonomics intervention as evaluated by Straker et al. (2004) did not appear to yield an effect on sustainability, defined as the number of tasks for which action was actually taken, between intervention and control condition at nine-months follow-up.

Eleven out of 13 (85%) non-RCTs that assessed the effect of implementation strategies on sustainability reported a positive effect (Tessaro et al., 2000; Taylor et al., 2010; Torp, 2008; Stokols et al., 2001; Gunnarsson et al., 2010; Laing et al., 2012; Parker et al., 2015; Lang et al., 2017; Goode et al., 2019; Edmunds et al., 2013; Wollesen et al., 2017). For instance, Laing et al. (2012) implemented the HealthLinks

intervention for six months in 23 worksites. Sustainability in this study was measured as the implementation of total best practices (i.e. evidence-based workplace health promotion best practices targeting health-related policies, programs, and communications) at six-months follow-up compared with the baseline measurement. They found a significant increase in total best practices implementation of 36% at baseline to 59% at six-months follow-up ($P = 0.001$). To increase walking and healthy eating, Devine et al. (2012) designed an intervention that used a combination of six implementation strategies (see Table 4). They reported mixed findings, namely worksites with positive effects on sustainability, while in other worksites no or small effects were observed. Harris et al. (2021) measured sustainability as total mean implementation, ranging from 0% to 100% (0% = no implementation to 100% = full implementation). They reported significantly increased sustainability from baseline to six-months follow-up of 33%–47% respectively ($P < 0.001$), which did not last at 12-months follow-up (38%; $P = 0.14$).

3.8. Acceptability

The study of Hannon et al. (2019) was the only RCT that assessed the effect on acceptability, which was defined as the employees' perception of overall worksites' support in living a healthier life, based on a five-point Likert-scale. They had two intervention arms and one control arm. The second intervention arm used the same implementation strategies as the first intervention arm, with the addition of the strategy 'involve patients/consumers and family members' (see Table 3). In both intervention arms, acceptability increased significantly and slightly compared with the control group at 15-months follow-up and 24-months follow-up.

All seven non-RCTs that evaluated acceptability reported a positive effect of the implementations strategies on acceptability (Tessaro et al., 2000; Stokols et al., 2001; Taylor et al., 2010; Laing et al., 2012; Goode et al., 2019; Edmunds and Clow, 2016; Wollesen et al., 2017). Laing et al. (2012) reported high acceptability of their intervention as employees appeared to support the intervention and they rated it as useful, relevant, and appealing. The intervention of Wollesen et al. (2017) consisted of four implementation strategies (see Table 4). They provided each worksite with a special proposal of distinct intervention forms, ranging from fitness and different types of sports to dietary change and smoking cessation. They reported that 49% of the participants showed high acceptance for the intervention. Further, another study of Tessaro et al. (2000) used natural helpers to expand the diffusion of health promotion information from close network members to colleagues. Over time these natural helpers were more likely to be approached by their colleagues for information, which indicates high acceptability.

3.9. Feasibility

No RCTs were conducted with feasibility as implementation outcome. All four non-RCTs that evaluated feasibility reported a positive effect of the implementation strategies on feasibility (Tessaro et al., 2000; Taylor et al., 2010; Goode et al., 2019; Edmunds et al., 2013). For example, Edmunds et al. (2013) reported the impact of an intervention which trained employees to stimulate physical activity to their colleagues with poor levels of physical activity. It was concluded that the intervention was feasible to implement and effective. In the single-arm intervention study of Goode et al. (2019), dedicated staff members (i.e. "champions") were trained to coordinate the intervention, and a toolkit provided a step-by-step implementation guide and associated resources to enable the worksite champion to deliver the intervention. Champions reported that the online format, step-by-step guide, and multi-media resources were easy to use without researcher input, implying that this intervention was feasible to deliver.

3.10. Penetration

The impact of implementation strategies on penetration was positive in all four non-RCTs that evaluated this implementation outcome, which they qualitatively evaluated with focus groups or (semi-) structured interviews (Goode et al., 2019; Tessaro et al., 2000; Edmunds et al., 2013; Gunnarsson et al., 2010). To illustrate, Edmunds et al. (2013) mentioned that their intervention was described as having a "ripple effect out to other people", beyond the initial participants to other employees. The intervention had become part of the culture of the organisation in some enterprises of this study. New participants heard about it and wanted to join in with ongoing activities. Goode et al. (2019) reported that their intervention positively impacted the organisational climate and it integrated well within existing practise.

3.11. Fidelity

The effect on fidelity was assessed in one RCT (Hunt et al., 2000). The authors tested the effectiveness of two interventions in increasing employees' fruit and vegetable consumption and overall found fidelity to the intervention protocol in both intervention groups.

As to the non-RCTs, the study of Taylor et al. (2010) also reported a positive effect on fidelity, as defined by adherence to the schedule (i.e. completion rate of the potential intervention sessions) and protocol (measured with a checklist). They concluded that fidelity was high since adherence to the schedule (98% of all potential sessions were completed) and protocol (ranging from 60% to 90% at the start to 100% near the end of the study) were high.

3.12. Adoption

Only one RCT (Helfrich et al., 2018) evaluated the effect on adoption, which appeared to significantly decrease in both intervention groups and the control group with -0.29 ($P \leq 0.05$) and -0.39 ($P \leq 0.05$), respectively between baseline and 15-months follow-up. Adoption in this study (Helfrich et al., 2018) was defined as "change commitment", which refers to the intention of employees to implement a change to the workplace. Thus, no clear conclusion could be drawn.

3.13. Appropriateness

The study of Goode et al. (2019) was the only study that examined the effect on appropriateness. Their set of implementation strategies affected appropriateness positively since they were applied with a participatory approach which enabled teams of employees to choose the strategies appropriate to their workplace. Moreover, most champions reported that the intervention fitted well within existing programmes or complemented other workplace health initiatives. This indicates the compatibility of the intervention with the worksites and thus high appropriateness.

4. Discussion

4.1. Principal findings

This scoping review aimed to summarise and evaluate implementation strategies for the implementation of preventive health measures in SMEs. The most frequently applied strategies include the 'distribution of educational materials', followed by the 'provision of ongoing consultation' and 'recruit, designate and train for leadership'. All studies applied a combination of implementation strategies, which varied widely between the studies. Overall, most studies demonstrated a positive effect of their combined implementation strategies on the particular implementation outcome(s). The 'distribution of educational materials' and 'provide ongoing consultation' combined seem to have a positive effect on sustainability of the intervention, as four out of five RCTs combined

these strategies with three of them demonstrating a positive effect on sustainability. In this context, it may be worthwhile to emphasise that sustainability refers to the concept as defined by Proctor et al. (2011) and refers to the extent to which the newly implemented intervention is maintained or institutionalised within the organization.

4.2. Comparison with existing literature

The current scoping review was not the first review on implementation strategies for preventive health measures in workplaces but was unique in the focus on SMEs. Therefore, it may be that some implementation strategies that were used in other settings were not identified in this scoping review. Still, previous reviews on implementation strategies for preventive health measures in workplaces found similar implementation strategies and/or combinations (Wolfenden et al., 2018; Garne-Dalgaard et al., 2019). The Cochrane review of Wolfenden et al. (2018) included seven studies that all assessed the effects of combined implementation strategies to improve the implementation of workplace-based policies or practices on diet, physical activity, obesity, risky alcohol use and tobacco use. They reported that most studies applied one or more of the following implementation strategies: 'conduct educational meetings', 'conduct local consensus discussions', and/or 'tailor strategies'. In addition, Garne-Dalgaard et al. (2019) conducted a scoping review on implementation strategies for physical activity at work. They included nine studies of which five were conducted in SMEs. As it was unclear how they classified the implementation strategies and their taxonomy differed considerably from the taxonomy used in the current scoping review, their results could not be compared with ours. Another previously published review of Bernard et al. (2022) identified implementation strategies to improve the uptake of occupational eMental health in workplaces. Their implementation strategies differed from the current review as they did not focus on SMEs, and their action target (i.e. the improvement of the uptake of occupational eMental health) required different strategies compared with the action targets of the studies of the current scoping review (i.e. predominantly training and behavioural changes). The most frequently applied strategy of the included studies of Bernard et al. (2022) was 'develop and organise quality monitoring systems', followed by 'assess for readiness and identify barriers and facilitators' and 'use of mass media'. Although these are all implementation strategies in accordance with Powell et al. (2015), they were not identified in the studies of the current scoping review. This may be explained by the difference in action target. To explain, the 'use of mass media' is more useful in improving the uptake of eMental health compared with the action targets of the current review. Consequently, this suggests that the identified implementation strategies of the current review might be less useful or applicable to worksites with different action targets, such as implementing an e-health intervention.

4.3. Strengths and limitations

There are several strengths of this scoping review that are to be noted. First, the scoping review was reported according to the PRISMA-ScR and such reporting guidelines have been shown to enhance methodological transparency and uptake of research findings (Moher et al., 2010). Despite a systematic and thorough literature search, it cannot be guaranteed that no studies were missed. However, it is believed that this chance is small because of the extensive amount of potentially relevant articles that were screened. Not all potential implementation strategies had been identified in the included studies, as 18 out of the 73 potential implementation strategies of Powell et al. (2015) were identified. This is explained by the focus on SMEs and the specific intervention (i.e. preventive health measures). Lastly, due to the expected scarcity of RCTs there were also non-RCTs (i.e. single-arm intervention studies and quasi-experimental studies) included. RCTs are designed to have high internal validity and low risk of bias. External validity, however, may be

limited (Booth and Tannock, 2014). Contrarily, single-arm intervention studies and quasi-experimental studies are considered to have high external but low internal validity, and higher risk of bias (i.e. selection bias and information bias) (Carlson and Morrison, 2009; Grimes and Schulz, 2002). Including both RCTs and non-RCTs resulted in a synergistical effect by an improved balance of the internal and external validation, and risk of bias.

Some results in this review need to be interpreted with caution due to methodological aspects, such as the measurement of the implementation outcome only at post-test, or the absence of the provision of confidence intervals, p-values, or other effect size measures. Further, it should be noted that no risk of bias assessment was performed, which in fact is in line with the aim of a scoping review to provide an overview of the available evidence of a particular subject (Munn et al., 2018). Still, one of the objectives of this scoping review was to conduct an assessment of the effect of implementation strategies on implementation outcomes. As RCTs are given the highest level of evidence and internal validity, it was decided to separately describe the effect based on RCTs versus non-RCTs (Mulimani, 2017; Burns et al., 2011). In this context, it is also important to consider that due to the lack of statistical analyses performed and resulting effect sizes reported in the non-RCTs, conclusions were based on authors' conclusions, which could be influenced by the researcher's personal biases. This potentially leads to an overestimation of the effect or a more favourable picture of the effect, implying that the results of the non-RCTs should be interpreted with caution. Lastly, it is worthwhile to mention that most implementation strategies were carried out slightly different across the studies, which can impact the effectiveness of the implementation strategies. For instance, both the study of Gunnarson et al. (Gunnarsson et al., 2010) and Parker et al. (2015) used the 'distribution of educational materials', but differed in their way of delivery. In Gunnarson et al. (Gunnarsson et al., 2010), this strategy consisted of a book, CD and a guiding manual, while in the study of Parker et al. (2015) it consisted of free access to a website that provided training, and a plan that described the steps needed to implement the intervention. Hysong (2009) conducted a meta-analysis on different features of an implementation strategy ('audit and feedback') and concluded that certain features increase or decrease its effectiveness.

4.4. Practical application and future research

A large variety of combinations of implementation strategies was found, leading to the conclusion that there is no one-size-fits-all combination of implementation strategies for SMEs. Besides, occupational sectors varied widely between the studies. If certain implementation strategies exert positive effects on implementation outcomes in a particular occupational sector, this might not be the case in another sector. It is thus recommended that implementation strategies need to be tailored to the context (i.e. type of enterprise and tasks, its needs, and characteristics of employees) and targeted implementation outcome, to achieve optimal results of the intervention. From the included studies, however, no clear conclusion can be drawn on the potential of tailored strategies, as most did not study or provide information about specific tailored strategies. Taylor et al. (2010) did and tailored the implementation strategies to the context and targeted implementation outcome. They studied the implementation of peer-led group sessions in which the participants performed the intervention during each workday. The intervention consisted of 14 activities in four phases: warming up exercises, toning exercises, cool down activities, and relaxation. They selected a small work site with a strong wellness mission and management support, providing an ideal corporate culture to implement the intervention. Although no comparison in effect between tailored versus non-tailored implementation strategies can be made, based on the current review, the tailored strategy as implemented by Taylor et al. overall resulted in a positive effect on the outcomes under study (Taylor et al., 2010). Based on current literature, it is advisable to apply a combined set of implementation strategies when implementing a

preventive health measure in SMEs. For an implementation strategy to be successful it requires some facilitators. Examples of facilitators reported in the studies include online training, adapting the offered interventions to the needs of the employees and requirements of the enterprise, and interventions that are geographically close to the enterprise and compatible with working hours (Parker et al., 2015; Wollesen et al., 2017).

Further research of high methodological quality, preferably RCTs, is needed to identify what (combinations of) implementation strategies in SMEs have most potential to improve implementation outcomes and subsequently the effect of the preventive health measures. Researchers can accomplish this by systematically plan or select implementation strategies, for instance by using Implementation Mapping. Implementation Mapping is a systematic, multi-step method for developing implementation strategies that incorporates theory, evidence, and stakeholder perspectives (Fernandez et al., 2019). Further research on the effect of improved implementation of preventive health measures on the actual prevention of health complaints of employees is also needed. Furthermore, it is important that researchers periodically evaluate the implementation of an intervention and make adjustments to the intervention if necessary to increase its potential effect. To enable comparison of the implementation strategies, it is recommended that future research on this topic utilises consistent and valid terminology of implementation strategies and outcomes according to existing classification systems, e.g. Powell et al. (2015) and Proctor et al. (2011) respectively. Poorly labelled implementation strategies and outcomes might cause misinterpretation, and application of these taxonomies can improve the availability and usability of future implementation research. There were no studies that evaluated the implementation outcome “cost”, hence it is unclear whether the combined implementation strategies are cost-effective. It is thus important that future research also takes into account the cost-effectiveness of implementing preventive health measures in SMEs, given the lack of financial resources in SMEs (Fan et al., 2020). Lastly, it is important to conduct further research on the effectiveness of different ways of delivering particular implementation strategies to provide more insight in what features of the strategy increase or decrease its effectiveness.

5. Conclusions

This scoping review has provided an overview of (combinations of) implementation strategies used in SMEs to improve the implementation of preventive health measures. The main finding of this study is that different combinations of implementation strategies are used in SMEs to improve the implementation of preventive health measures. There were strategies that were combined more frequently than others. Overall, a positive effect of the implementation strategies on the implementation outcome(s) was found, particularly on the implementation outcome sustainability. The other implementation outcomes also seem to be positively affected, except for adoption of which no clear conclusion could be drawn. The ‘distribution of educational materials’ and ‘provide ongoing consultation’ combined seem to have a positive effect on sustainability of the intervention. Due to a scarcity of RCTs and heterogeneity of the included studies, further research of high methodological quality is needed on the effect of implementation strategies on implementation outcomes and whether this subsequently leads to improved health and employability.

Funding

This study was funded by the Institute GAK foundation, grant number 2020-128. The funders had no role in the study design; collection, analysis, and interpretation of data; writing of the manuscript; or the decision to submit the manuscript for publication.

Ethics approval and consent to participate

Not applicable.

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study. The data from the studies used in this review are available from the corresponding author on reasonable request.

Conflicts of interest

The authors declare that they have no competing interests.

Financial interests

The authors declare that they have no financial interests.

CRediT authorship contribution statement

Thomas Röben: Writing – review & editing, Writing – original draft, Investigation, Formal analysis. **Sandra van Oostrom:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Friederike Benning:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Denise Smit:** Writing – review & editing, Formal analysis, Data curation. **Karin Proper:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Abbreviation

ERIC	Expert recommendations for implementing change
ESENER	European survey of enterprises on new and emerging risks
EU	European Union
IBSS	international bibliography of the social sciences
PRISMA-ScR	Preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews
RCT	Randomised controlled trial
SME	small and medium-sized enterprises

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.apergo.2024.104303>.

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