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Young adults' motivation and engagement in digital lifestyle change interventions: a systematic review

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Abstract

Despite increased awareness and understanding of healthy lifestyles, interventions typically have only short-term effects on behavior. Limitations of traditional behavior change theories and the lack of theory integration hinder theory-driven behavior change applications. The aim of this systematic review is to synthesize existing evidence on strategies for enhancing motivation and engagement in lifestyle change within digital health promotion interventions.

This review was conducted according to the guidelines of the Joanna Briggs Institute (JBI) and a Preferred Reporting Items for Systematic Reviews (PRISMA) statement. All studies were searched in online databases PubMed, ProQuest, ScienceDirect, and CINAHL. The search period was from inception to May 17th, 2025. The selection of the studies was carried out jointly by two independent reviewers. The research quality was evaluated using the JBI critical appraisal tools.

1404 studies were screened, and 19 were included. The interventions included mobile-based, web-based, and multi-component interventions. Population ranged from 47 to 4591 participants. Interventions targeted diet quality, calcium intake, physical activity, weight gain prevention and weight-related behaviors, metabolic syndrome (MetS) prevention, substance use, gambling, digital media use, sexual health, preconception care, and self-selected health behaviors. Many interventions were developed using health behavior change techniques and theoretical frameworks. Interventions used multiple different methods supporting motivation and engagement.

To achieve behavior change through lifestyle interventions, it is essential to design interventions that foster motivation and sustain user engagement. Modern digital solutions could help improve the usability and engaging elements in interventions. Future studies should aim to investigate post intervention effects on behavior change to determine the long-term effects of digital lifestyle change interventions.

Keywords: motivation, engagement, digital health, young adult

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Introduction

There is a growing interest in the prevention of lifestyle-related chronic diseases among policymakers, healthcare professionals, scientists, and patients [1]. The association between behavioral risk factors and increased morbidity and mortality from chronic diseases is significant [2,3]. Healthcare costs are rising worldwide because of chronic diseases resulting from health behaviors such as smoking, excessive alcohol, poor diet, and physical inactivity [4]. Considering the importance of health behavior for well-being, health, and disease, improving these behaviors is critical for improving quality of life and extending lifespan [5].

Interventions aimed at behavior change can be based on a variety of underlying assumptions. Different theories emphasize different aspects and include partly different strategies for achieving change [6]. Despite increased awareness and understanding of healthy lifestyles, interventions typically have only short-term effects on behavior. To achieve behavior change, interventions must establish new habits that can be repeated with minimal cognitive effort [7].

Digital health should be an integral part of health priorities and must benefit people ethically, safely, reliably, equitably, and sustainably [8]. Technology, digitalization, and versatile data use provide solutions to global challenges and drive major changes in the health sector as well [9]. Many digital health solutions are still in their early stages and will need time to evolve [10].

Limitations of traditional behavior change theories and the lack of theory integration hinders the theory-driven behavior change applications [11]. User engagement, application design, and integration into existing healthcare systems can influence the effectiveness and outcomes of digital health applications. Continued research on these themes and the development of innovations remain necessary in the future [12].

In this review, motivation (in digital health promotion) means internal and external psychological drivers that influence a person's direction, intensity, and persistence of effort toward health-related behaviors mediated by a digital intervention. It explains why someone starts, increases, or maintains engagement with behavior-change activities delivered via apps, websites, wearables, or messaging. Engagement (in digital health promotion) means the quality and quantity of a person's interaction with a digital health intervention and the extent to which that interaction produces intended cognitive, emotional, and behavioral responses that support health outcomes.

This study focuses on digital lifestyle change interventions targeting young adults (aged 18–29) from the perspective of motivation and engagement. The purpose of this systematic review is to examine how young adults' motivation and engagement in lifestyle change can be supported in digital health promotion interventions and what solutions have been implemented to strengthen motivation and engagement.

The examination of healthy lifestyles across the transition to adulthood is important because adolescence and early adulthood are a particularly important time for establishing patterns of health-related behavior and trajectories of adult health [13]. Young people start to exercise more control over the selection of their social environments and make behavioral choices regarding their health [14]. There are no previous studies about young adults' motivation and engagement in digital lifestyle interventions that we know of. There are some studies concerning motivation and engagement in digital health and on the impacts of different digital

approaches in health promotion, such as Peters et al. [15] and Chatterjee et al. [16].

The aim of this systematic review is to synthesize existing evidence on strategies for enhancing motivation and engagement in lifestyle change within digital health promotion interventions. The specific research questions for this review were "What types of lifestyle change interventions have been developed and used to motivate and engage young adults (aged 18–29)?" and "How do digital health promotion interventions support and enhance young adults' motivation and commitment to sustainable lifestyle changes?"

Methods

Review methodology

This review was conducted according to the guidelines of the Joanna Briggs Institute (JBI) [17] and a Preferred Reporting Items for Systematic Reviews (PRISMA) statement. The selection process for the included articles was reported according to the PRISMA guidelines [18]. The review protocol was registered in PROSPERO (registration number: CRD420251056642).

Search methods

Data searches were conducted on three electronic databases: PubMed, ProQuest Central and CINAHL and on full text platform ScienceDirect. Search terms were defined according to the objectives of the study and using PICO-model (Population, Intervention, Comparator, and Outcomes). In this study population is young adults, intervention is digital lifestyle intervention, there is no comparator, and outcomes are changes in motivation or/and engagement/commitment.

Finnish databases were not used because in preliminary searches no results were found in the Finnish language. The search query was reviewed by an information specialist from Metropolia University of Applied Sciences to ensure its suitability for the selected databases. Search was performed on May 17th, 2025, and included all items up to that date.

Key search terms "motivation", "commitment", "digital health intervention", "eHealth", "mHealth", "digital lifestyle intervention", "young adults", and "18–29-year-olds" were used in all databases. Where applicable, relevant studies were identified using key Medical Subject Headings (MeSH) and CINAHL subject headings. Keywords and subject headings were combined using the Boolean operators AND and OR. More detailed search terms are shown in Supplementary Material A. The selection criteria were defined according to the inclusion criteria, which followed PICO-model. Inclusion and exclusion criteria are described in Supplementary Material B. Grey literature was not searched in this study. Reference lists of included original articles were screened manually, and no articles were found that met the selection criteria.

Study selection

The selection of the studies was carried out jointly by two independent reviewers (TS, MV). Each step, from title and abstract screening to full-text screening, was independently performed by both parties in accordance with the inclusion and exclusion criteria defined in the study. In cases where disagreements arose regarding inclusion or exclusion, the original study was re-examined together, and a joint decision was made on whether to include or exclude the study. Study selection is described according to PRISMA guidelines in the flow chart of the selection process (Fig. 1).

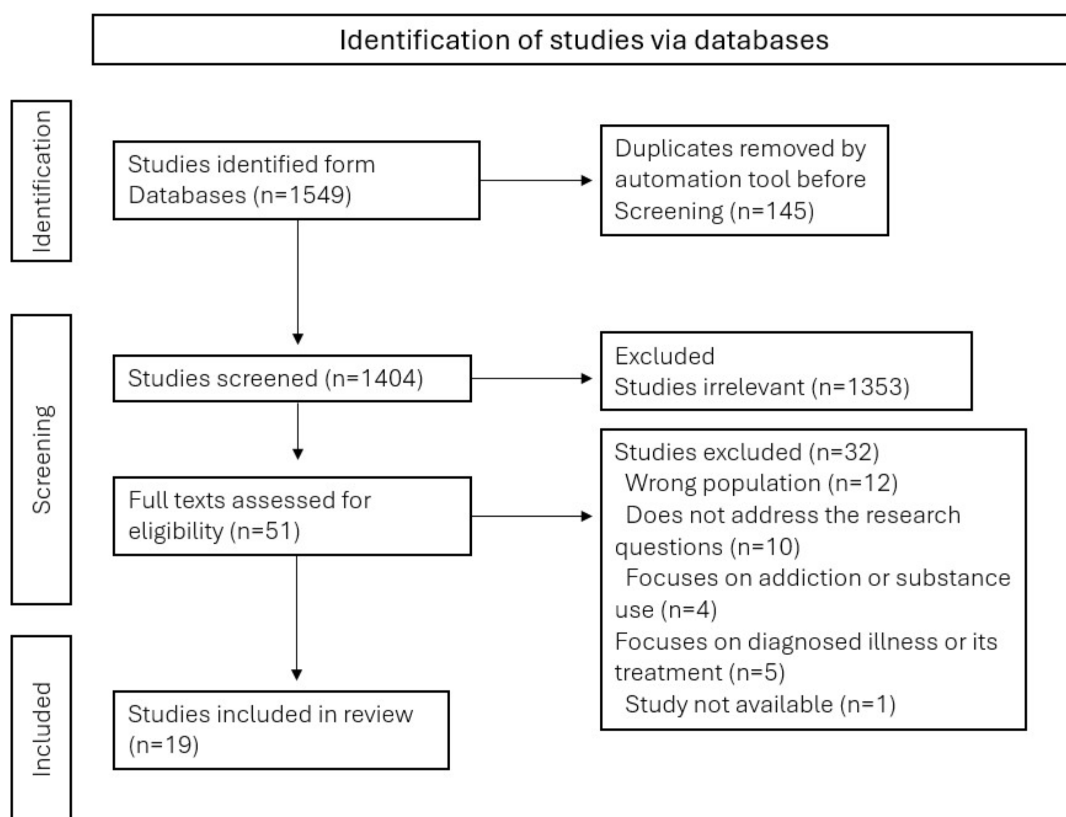

Figure 1. Flowchart of the selection process.

Quality assessment

In this systematic review, JBI critical appraisal tools were used in assessing the trustworthiness, relevance, and results of the studies included. Randomized controlled trials (RCT) were assessed using the JBI critical appraisal tool for the assessment of risk of bias for randomized controlled trial 2023 [19], and the quasi-experimental studies were assessed using the JBI checklist for quasi-experimental studies 2023 [20].

Data extraction and analysis

Data was extracted from the included studies: name of author, year of publication, country, study design and sample, aim of study, intervention components, and key findings and quality assessment points. The author (TS) entered the data into an extraction sheet and validated the entries. The results of the search and selection process were reported using the PRISMA 2020 flow diagram [21]. Because of the disparities in interventions, follow-up duration, and outcome measures, a meta-analysis could not be conducted. Narrative synthesis was used to summarize the findings.

Results

Description of the studies included

Initially, 1549 studies were identified using electronic databases. Duplicates were removed automatically using Zotero tools. After removing

duplicates, 1404 studies were systemically screened manually by two independent reviewers. In cases where disagreements arose regarding inclusion or exclusion, in every part of the selection process, the original study was re-examined together, and a joint decision was made on whether to include or exclude the study. Finally, 19 studies were selected for inclusion using the selection criteria (Fig. 1). A summary of the main characteristics of the 19 studies is shown in Supplementary Material C. Seventeen of the studies included were RCTs and two were quasi-experimental studies.

The sample size of the studies ranged from 47 to 4591 participants. The studies were conducted in different countries, including the USA (n=5), Australia (n=3), New Zealand (n=1), China (n=2), the Republic of Korea (n=2), Ireland (n=1), Belgium (n=1), Spain (n=1), Japan (n=1), the United Kingdom (n=1), and Germany (n=1).

Quality of the studies included

Quality appraisal was carried out independently by one author (TS) following the guidelines of JBI using the critical appraisal tools for RCT and quasi-experimental studies [19,20]. Quality assessment included 17 RCTs and 2 quasi-experimental studies. Quality was quantified by assigning scores of 0-1 points per criterion. All studies were included in the review. For the RCT studies, the average quality score was 9, and for quasi-experimental studies score was 8. Studies and their quality scores are shown in Table 1.

Table 1. Summary of quality appraisal based on JBI checklist for RCT and quasi-experimental studies.

Authors, year, location	Design	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Appleton et al. 2019 [22]	RCT	L	L	L	H	L	L	L	L	L	L	L	L	L	12/13
Bickmore et al. 2020 [23]	RCT	H	U	H	U	U	L	U	L	U	L	L	L	L	6/13
Brookie et al. 2017 [24]	RCT	L	L	L	L	H	L	U	L	L	L	L	L	L	11/13
Haslam et al. 2023 [25]	RCT	L	L	L	L	U	L	U	L	L	L	L	L	L	10/13
LaBrie et al. 2025 [26]	RCT	L	L	L	L	H	L	U	L	L	L	L	L	L	11/13
Lee & Hwang 2025 [27]	RCT	L	L	L	U	L	L	U	L	L	L	L	L	L	11/13
Lee et al. 2020 [28]	non-RCT	L	L	U	L	L	L	L	L	L	N/A	N/A	N/A	N/A	8/9
Lyzwinski et al. 2019 [29]	RCT	L	L	L	H	U	L	U	L	L	L	L	L	L	10/13
Mizuta et al. 2024 [30]	RCT	L	L	L	H	H	L	L	L	L	L	L	L	L	11/13
O'Brien & Palfai 2016 [31]	RCT	H	U	L	U	H	L	U	L	L	H	L	L	L	7/13
Pietch et al. 2023 [32]	RCT	H	U	L	U	U	L	U	L	L	L	L	L	L	8/13
Rouf et al. 2020 [33]	RCT	L	L	L	L	U	L	U	L	L	L	L	L	L	11/13
Sandrick et al. 2017 [34]	RCT	L	L	L	H	H	L	U	L	L	L	L	L	L	10/13
Sañudo et al. 2024 [35]	RCT	L	L	L	H	U	L	U	L	L	L	L	L	L	10/13
Simons et al. 2018 [36]	RCT	L	U	L	U	U	L	U	L	L	L	L	L	L	9/13
Sun et al. 2017 [37]	RCT	L	L	L	U	U	L	U	L	L	L	L	L	L	10/13
Walsh et al. 2016 [38]	RCT	L	U	L	U	U	L	U	L	L	L	L	L	L	9/13
West et al. 2016 [39]	non-RCT	L	L	L	L	L	U	L	U	L	N/A	N/A	N/A	N7A	7/9
Wong et al. 2021 [40]	RCT	L	L	L	H	H	L	U	L	L	L	L	L	L	10/13

Maximum score, appropriate appraisal either RCT and non-RCT/ quasi-experimental studies was used. RCT- 13 criteria and non-RCT 9 criteria. L= low risk of bias, H= high risk, U= unclear, NA= not applicable.

Digital interventions

Interventions were categorized as mobile-based, web-based, and multi-component interventions. The same categorization was used in the study by Virtanen et al. [41]. Mobile-based interventions included app-based interventions (n=6) [22,26,27,29,32,38], and SMS-based intervention (n=1) [21]. Web-based interventions used specifically designed websites (n=4) [23,24,30,40] or social media (n=1) [37] to deliver interventions. Websites included metaverse space [30], virtual animated health counsellor [23], and educational websites [25,40]. Many interventions used multi-component approaches (n=7). Those combined apps with wearable devices (n=3) [28,35,36], web-based interventions with motivational and informative text messages (n=2) [31,33], health coaching on a selected health behavior with text messages (n=1) [34], and web-based intervention with an activity tracker and WiFi-scale (n=1) [39].

Intervention targets

The interventions targeted a wide range of health-related behaviors, including fruit and vegetable consumption or overall diet quality (n=4) [22,24,25,31], calcium intake (n=1) [33], physical activity (n=5) [27,30,35,36,38], weight gain prevention and weight-related behaviors (n=2) [29,39], metabolic syndrome (MetS) prevention (n=1) [28], substance use, gambling, and digital media use (n=2) [26,32], sexual health (n=2) [37,40], preconception care (n=1) [23], and self-selected health behaviors (n=1) such as diet, exercise, stress management, and sleep [34].

Behavior change techniques

Many interventions were developed using health behavior change techniques and theoretical frameworks. The Transtheoretical Model of Health Behavior Change was applied in the theoretical background of a preconception care intervention [23], while the Health Action Process Approach guided a fruit and vegetable consumption intervention [24]. The Self-Determination Theory was used in interventions targeting alcohol consumption and physical activity [26,27,30]. Theories of Self-Regulation and Goal Systems guided a healthy eating intervention [31], and the Behavior Change Wheel (COM-B) framework was used in a calcium intake intervention [33]. Intervention Mapping was used in a physical activity intervention [36], whereas the Information-Motivation-Behavioral Skills Model guided a sexual health intervention [37]. The Behavior Change Taxonomy was used in another physical activity intervention [38], and the Social Cognitive Theory informed an intervention targeting weight-related behaviors [39]. Finally, the Health Belief Model was used in a sexual health intervention [40].

Two interventions combined different behavior change techniques or theory-based approaches. For example, social comparison and gamification were applied to reduce alcohol consumption [35], while goal setting and personalized feedback were used to improve diet quality [25]. Mindfulness techniques were incorporated to prevent weight gain [29]. Other guiding frameworks included MoSCoW prioritization [31] and the voluntary abstinence paradigm [32]. Two studies did not employ any theories or frameworks, or these were not described in the publications [28,33].

Behavior change in interventions

There were different outcomes in changing behavior in selected studies. In interventions aiming to increase fruit and vegetable consumption, results were generally positive in terms of behavior change. Fruit and vegetable intake increased during the intervention period [22,26]. The likelihood of

meeting vegetable consumption standards and the frequency of choosing designated healthy food options also improved in the intervention by O'Brian et al. [31].

In other dietary interventions, the results regarding behavior change varied. Haslam et al. [25] reported no differences in dietary outcomes during the intervention period. Similarly, Rouf et al. [33] found no changes in calcium intake (through milk or calcium-rich foods) during the intervention. Lyzwinski et al. [29] observed reductions in stress levels, emotional eating, and uncontrollable eating, although participants' weight remained unchanged. In the intervention by West et al. [39], the number of appropriate weight control strategies increased.

Physical activity targeting interventions had mixed results regarding behavior change. Mizuta et al. [30] and Sañudo et al. [35] reported increases in physical activity during the intervention period. In contrast, Simons et al. [36] found no significant intervention effects in physical activity or self-reported psychosocial variables. Walsh et al. [38] observed positive changes in step count. The walking intervention had positive effects on stress. Lee & Hwang [27] also found reductions in negative affect during the intervention.

On self-selected health behaviors, some improvements were seen in the study of Pietch et al. [32]. They found improvements in health behaviors such as substance use, gambling, or digital media use during the intervention period. Sandrick et al. [34] found increases in exercise and in health behavior goal attainment. In the study of LaBrie et al. [26], exposure to alcohol feedback led to greater reductions in perceived drinking norms and drinking likelihood. The amount of exposure didn't have a significant effect on behavior.

Bickmore et al. [23] reported that 96,4% of participants had acted on recommendations of the preconception care program or were planning to change their behavior. In metabolic syndrome prevention intervention, Lee et al. [28] found improved scores on health-related lifestyles and self-efficacy. Sexual health interventions had similar outcomes to behavior. Sun et al. [37] reported improvements in condom use attitude. Wong et al. [40] found no improvement in condom use, but attitudes, norms, knowledge, and self-efficacy regarding condom use improved.

Motivation and engagement supporting factors

In the selected studies, there were no specific variables used to measure motivation and engagement. There were many motivation and engagement supporting elements described in selected studies. Many interventions used multiple different methods supporting motivation and engagement.

Personalized feedback was used in many interventions (n=5) [22,28,31,35,39]. In their intervention, LaBrie et al. [26] used feedback, but it was not personalized. O'Brien et al. [31] used motivational enhancement and self-regulating strategies in addition to personalized feedback. Goal setting was a very common way to support motivation and engagement (n=9) [22,23,25,32-34,36,38,39]. Motivational and educational messaging were delivered through email, text messages, newsletter, or notifications (n=7) [24,31,33-36,39]. Self-monitoring was used in five interventions [22,25,33,36,39].

Gamification was used to enhance motivation and commitment (n=3). It included many different elements, for example, social participation, points, rewards, badges, and leaderboards [26,28,35]. Social elements like social support or social interaction were integrated in a few interventions (n=4) [30,33,37,39]. Social interaction was happening in

metaverse space (n=1) [31] or through social media platform (Facebook) (n=3) [33,37,39]. Prompts to interact with the interventions were sent through app, email or text (n=7) [25,29,30,32,33,35,37].

In their intervention, Bickmore et al. [23] used techniques from motivational interviewing, positive reinforcement, and customizable lists of identified risks and recommendations in preconception care. They also used sequential addressing of behaviors to achieve positive changes in behavior. Customized program [28], tailored themes [29], customized texts [34], and personal avatars [30] were also used in supporting motivation and engagement in interventions. Education was used in two interventions [38, 40]. In addition to education, Wong et al. [40] used training and modeling to increase motivation and engagement in their intervention.

Discussion

This study shows the importance of using theory-based approaches in improving health behaviors. Using multiple different behavior change techniques in the same intervention can give more positive results in behavior change and improve motivation and engagement. Mobile health applications significantly contribute to patient engagement by offering individuals tools and resources to proactively manage their health [7]. Goal setting, self-monitoring, personalized feedback, and prompts to interact with the intervention were meaningful in terms of enhancing motivation and engagement. Educational elements and motivational messaging can also be successful in supporting behavior change. Similar findings were made in a systematic review by Zhu et al. [42]. Incorporating health behavior change techniques and theories into digital health and lifestyle interventions could lead to increased motivation and engagement in the intervention.

This study found that gamification was a successful method in supporting motivation and engagement in three interventions [26,27,35]. Gamification emerges as a tool with considerable potential to stimulate motivation, enhance skills, and promote improvements in physical conditioning, including resistance, strength, agility, and flexibility [43]. Gamification shows promising results in enhancing motivation and engagement in digital interventions but still needs more investigation.

Social elements and various forms of social support in digital settings were found to be acceptable motivation and engagement-supporting factors [26,27,30,33,35,37,39]. Studies, such as Yeo et al. [44], have shown that social elements integrated in digital health interventions may result in more positive outcomes. Peer-to-peer support can enhance engagement in digital health interventions through reciprocal accountability, where peers motivate each other to pursue individual goals [45].

Our study found that digital interventions, including educational elements, can effectively influence attitudes toward sexual health topics and healthy eating behaviors, as well as promote physical activity while supporting motivation and engagement in lifestyle change [24,31,33,34,37-40]. Vahedian-Shahroodi et al. [46] stated that education and being aware of the benefits of having a healthy diet have been found to have positive effects on sticking to a healthy diet.

Other aspects affecting the success of interventions were usability and design of digital intervention. Low interaction with the intervention was linked to low motivation of participants or design issues of the digital interventions [25].

Persuasive elements in mHealth applications appear to significantly influence users' intention to continue using these services. The aesthetic appeal

of a system contributes substantially to its overall usability and attractiveness, positively affecting perceived usefulness and trust in persuasive systems. Tailoring app features and interactions to individual user needs can significantly enhance engagement and satisfaction [47]. Digital lifestyle change interventions often compete with users' attention with other entertaining and appealing apps. That is why it is important to acknowledge the importance of design, appeal, and usability of apps and other digital interventions.

The length of the included digital interventions varied from two weeks to one year. In many of the reviewed studies, there were no true postintervention follow-up measures to see whether the users maintained behavior change, or the follow-up period was relatively short (1-month postintervention). Future studies should aim to investigate postintervention effects in behavior change to determine long-term effects of digital lifestyle change interventions.

Generative artificial intelligence (AI) should be considered in designing future interventions. Possibilities are significant, but it is important to note the limitations, ethics and safety concerning use of AI. Early studies have indicated that AI models can improve efficiency, reduce administrative burdens, and enhance patient engagement, although most findings are preliminary and require rigorous validation [48,49]. Future studies should implement AI in interventions and examine its effectiveness in sustainable lifestyle change.

Some studies included in this review may be considered outdated. Text message (SMS) interventions were developed and implemented before the widespread adoption of mobile applications and artificial intelligence. It is debatable whether SMS-based interventions remain relevant in today's rapidly evolving digital landscape. However, these interventions employed methods to support motivation and engagement, and their principles can be adapted and integrated into more modern approaches.

Strengths and limitations

The review has notable strengths, particularly its transparent systematic protocol, detailed methodology, and use of multiple databases, which enhance validity. To ensure thorough review and avoid publication bias, all studies that demonstrated good methodological quality were included in the review. In this study, using the revised JBI critical appraisal tools helped to recognize that excluding studies with a high risk of bias could limit meaningful evidence synthesis and understanding. Following PRISMA guidelines supports the reliability of this review.

There are some limitations in this study. Critical appraisal and data extraction of the studies was made by one author (TS). This may result in higher risk of bias or errors in the appraisal, although critical appraisal was done carefully and responsibly. Search strategy and exclusion of grey literature may limit the search results and increase the risk of bias.

Conclusion

Digital interventions can effectively promote healthier lifestyles and improve overall health outcomes. To achieve these benefits, it is essential to design interventions that foster motivation and sustain user engagement. Since habit formation requires time, digital interventions should be implemented over a sufficiently long period to enable meaningful behavioral change. Furthermore, the design and usability of these interventions must not be overlooked, as they play a critical role in maintaining user engagement and adherence. Modern

digital solutions could help improve the usability and engaging elements in interventions. For example, Generative AI could be a useful tool in designing and being part of the interventions. Future studies should aim to investigate post-intervention effects in behavior change to determine the long-term effects of digital lifestyle change interventions.

Declaration of generative AI

While preparing the manuscript, the author (TS) used generative AI to enhance language and reporting in English. Following the use of the OpenAI tool, the author carefully reviewed and revised the content as necessary.

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Conflicts of interest

There are no conflicts of interest regarding the publication of this paper. There are no financial or personal relationships with other people or organizations that could inappropriately influence the authors' work in this manuscript.

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Contribution statement

The study was planned by a researchers TS and MV. In addition, they were responsible for ensuring the quality of the study. The manuscript was drafted and written by TS in consultation with MV. All the authors contributed to the research, analysis and manuscript by providing critical feedback and suggestions. MV was responsible for ensuring the integrity of the entire work.

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