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Simon Memmer, Raphael Kunisch, Marco Roos, Zekeriya Aktürk

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Individualized lifestyle interventions in primary care: A scoping review of intervention characteristics and cardiovascular risk outcomes

Simon Memmer, Raphael Kunisch, Marco Roos , Zekeriya Aktürk*

General Practice, Institute of General Practice and Health Services Research, University Hospital of Augsburg, Stenglinstrasse 2, 86156, Augsburg, Germany

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ABSTRACT

Background: Cardiovascular diseases remain the leading cause of death. Although primary care plays a key role in modifying behavioral risk factors through lifestyle interventions, the available evidence is heterogeneous.

Objective: This scoping review aimed to map the international evidence on individualized lifestyle interventions delivered in primary care, including intervention characteristics, delivery approaches, target populations, cardiovascular risk outcomes, and reported effects.

Methods: PubMed was searched for interventional studies published up to May 2025. Studies including adults who received individualized lifestyle interventions in a primary care context were eligible. Outcomes included blood pressure, BMI, weight, waist-to-hip ratio, physical activity, smoking, alcohol, diet, and stress. Pharmacological interventions, meal-replacement programs, group-based interventions, and supervised exercise programs were excluded.

Results: Of 822 abstracts identified, 27 studies met the inclusion criteria. Most were randomized controlled trials ($n = 21$). Study durations ranged from 6 to 36 months. The most frequently assessed outcomes were BMI, blood pressure, physical activity, waist circumference, and body weight. Reported effects were heterogeneous, with no consistent pattern according to intervention type, provider, or intensity.

Conclusions: Individualized lifestyle interventions in primary care exhibit substantial heterogeneity in delivery, populations, and outcome assessment. Reported cardiovascular risk-factor effects were variable. Further studies are needed to clarify these ambiguous findings and to establish the role of individualized lifestyle interventions in cardiovascular prevention within primary care.

Introduction

Cardiovascular diseases remain the leading cause of death worldwide, accounting for an estimated one-third of all global deaths each year [1]. Primary care plays an important role in cardiovascular prevention because many modifiable risk factors, including hypertension, obesity, physical inactivity, smoking, and unhealthy dietary patterns, are routinely encountered and managed in this setting [2]. However, implementing preventive lifestyle interventions in routine primary care remains challenging, particularly because of limited consultation time, competing clinical demands, and resource constraints [3–5].

Several studies have demonstrated potential benefits of lifestyle interventions in primary care, whereas others have reported only modest or inconsistent effects on cardiovascular risk factors. For example, the large multicenter Look AHEAD randomized trial showed substantial improvements in weight and cardiovascular risk factors following an

intensive lifestyle intervention but no reduction in major cardiovascular events compared with the control group [6]. Earlier evidence syntheses of primary-care lifestyle counseling similarly found relatively small average effects and considerable heterogeneity across interventions [7]. Current guideline evidence likewise suggests that behavioral counseling provides moderate benefits among adults with cardiovascular risk factors and smaller benefits among adults without established risk factors [2].

Promoting health and well-being is a core competency of general practitioners, yet the implementation of preventive care in routine practice remains variable across settings [4,8].

Fleming and Godwin's 2008 systematic review included seven randomized trials published before 2007 [7]. Since then, preventive strategies in primary care have expanded considerably, with increasing diversity in intervention formats, delivery personnel, intensity, and target populations. Current guidelines provide recommendations on

* Corresponding author.

E-mail address: zekeriya.aktuerk@med.uni-augsburg.de (Z. Aktürk).

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behavioral counseling but do not map the breadth and characteristics of the primary-care intervention literature. A scoping review was therefore considered appropriate to characterize this broader and more diverse evidence base, identify patterns in intervention delivery and outcome assessment, and highlight areas in which evidence remains limited or inconsistent.

This scoping review aimed to map the international evidence on individualized lifestyle interventions delivered in primary care by describing their characteristics, delivery approaches, target populations, cardiovascular risk outcomes assessed, and reported effects.

Methods

The review was conducted according to Arksey and O'Malley's methodological framework [9], which outlines five core stages: (1) identifying the research question, (2) identifying relevant studies, (3) selecting studies, (4) charting the data, and (5) collating, summarizing, and reporting the results. The optional sixth stage—consultation with stakeholders—was not undertaken. The reporting of this review followed the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) checklist, which was developed to operationalize and enhance the transparency of scoping reviews conducted according to Arksey and O'Malley's framework and its subsequent refinements by Levac et al. [10]. No review protocol was prospectively registered or published.

Eligibility criteria

Inclusion criteria

Studies were included if they were interventional in design and involved adults aged 18 years or older who received individualized lifestyle interventions within a primary care setting. An intervention was considered individualized when it was delivered on a one-to-one basis and tailored to or responsive to the participant's individual characteristics, such as cardiovascular risk factors, lifestyle behavior, goals, readiness to change, needs, preferences, or barriers. Not all of these elements were required to be present. Group-based interventions without an individual counseling component were excluded. Eligible studies had to assess at least one of the following cardiovascular risk factors as an outcome: systolic or diastolic blood pressure, body mass index, body weight, waist circumference, waist-to-hip ratio, physical activity, smoking, alcohol consumption, diet, or stress.

Primary care was defined as general practice, family medicine, primary healthcare centers, and comparable first-contact outpatient healthcare settings. Interventions delivered by physicians, nurses, health coaches, health educators, dietitians, physiotherapists, or other allied health professionals were eligible if delivered within or through a primary care setting.

Exclusion criteria

Studies were excluded if they focused on pharmacological interventions or dietary replacement programs in which meal or formula replacements constituted a central component, if they involved group-based or supervised exercise sessions, or if they included pregnant participants. Dietary counseling, nutritional education, and individualized advice regarding food choices remained eligible. Individualized counseling aimed at increasing physical activity was also eligible, whereas structured or supervised exercise sessions conducted under direct professional supervision were excluded.

Search strategy

A systematic search was conducted in PubMed (last update: 7 May 2025). The search strategy used free-text terms related to primary care,

intervention type, lifestyle modification, and cardiovascular risk factors. No MeSH terms were incorporated. The complete search string is presented in [Box 1](#).

Screening and data extraction

Two reviewers independently screened titles, abstracts, and full texts using Rayyan (www.rayyan.ai). Disagreements were resolved through discussion. Extracted data included study design, sample size, population characteristics, intervention type, intervention duration, contact frequency, delivery personnel, study duration and follow-up, comparator condition where applicable, outcomes assessed, and numerical effect estimates or between-group findings, where reported. Composite cardiovascular risk scores, such as Framingham, QRISK, ASCVD, or SCORE/SCORE2, were not included as outcome measures because the review focused on individual modifiable cardiovascular risk factors. Extracted data were summarized descriptively and narratively synthesized according to study characteristics, intervention delivery, comparator conditions, follow-up, and outcome domains. Reported effects were summarized by direction and magnitude, including between-group findings where available.

Study risk of bias assessment

In accordance with the methodological purpose of a scoping review, no formal risk-of-bias or quality assessment of the included studies was conducted. The objective of this review was to map and summarize the available evidence rather than to evaluate the internal validity of individual studies.

Results

Study selection

Of 822 records identified, 731 were excluded at abstract screening. Ninety-one reports were sought for full-text assessment; two could not be retrieved. Of the 89 full texts assessed, 62 were excluded mainly because they involved group-based interventions, supervised exercise, or otherwise did not meet the eligibility criteria. Twenty-seven studies were included in the review ([Fig. 1](#)).

Study characteristics

Study characteristics are summarized in [Table 1](#). The 27 included studies encompassed a total of 20,916 analyzed participants. Study sample sizes ranged from 45 to 12,472 participants, with a median of 270 participants (IQR 131–496). Most included studies were randomized controlled trials (21/27). The remainder comprised two cluster-randomized, one quasi-experimental, one retrospective cohort, and two pre-post studies.

The mean participant age was reported in 26 of the 27 included studies and ranged from 37 to 66 years. The unweighted mean of the reported study-level mean ages was 54.4 years.

Study populations were heterogeneous and included general primary care populations as well as patients with obesity or overweight, hypertension, type 2 diabetes or impaired glucose regulation, established or increased cardiovascular risk, coronary heart disease, and other cardiometabolic risk factors. Sex distribution was not consistently reported across the included studies and was therefore not summarized quantitatively.

Intervention duration varied between 6 and 36 months. Only 5 studies involved physicians directly in delivering the intervention; most were led by nurses or other healthcare staff.

This variation in study populations, intervention approaches, and comparator conditions contributed to considerable heterogeneity across

Box 1

PubMed Search String

((“primary care” OR “general practice” OR “family medicine” OR “general practitioner” OR “family physician” OR “general physician” OR “primary health*”)
AND (intervention OR experiment*)
AND (“lifestyle intervention” OR “behavioral intervention” OR “lifestyle change” OR “health promotion”)
AND (“blood pressure” OR “BMI” OR “body mass index” OR “body weight” OR “waist hip ratio” OR “physical activity” OR “smoking cessation” OR “alcohol” OR nutrition OR diet))

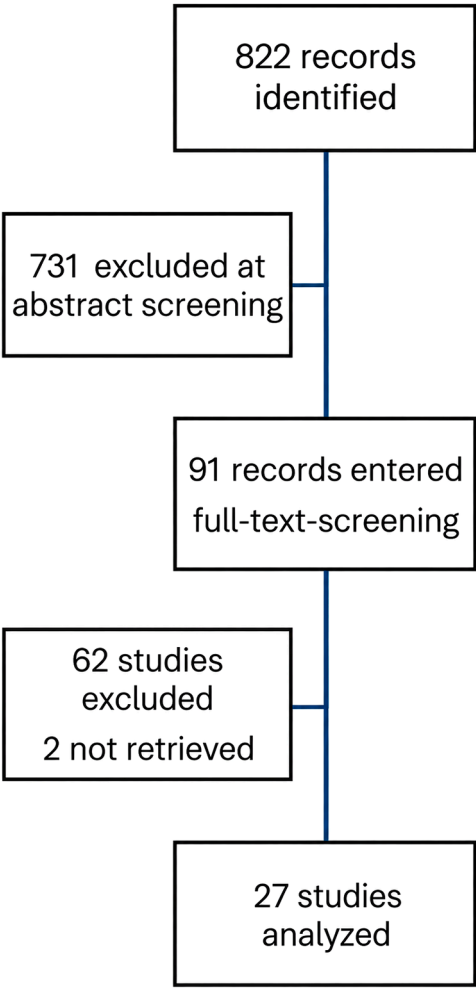


Fig. 1. Study flow chart.

the evidence base.

Considerable heterogeneity was observed in intervention delivery. Where reported, individual contact duration ranged from very brief consultations of approximately 2–5 min to sessions lasting 60–75 min. For descriptive mapping, interventions were grouped as very brief (≤ 10 min), brief/moderate (>10 –30 min), longer (>30 min), variable/mixed, or not reported (Table 1). Contact frequency ranged from a single counseling session to repeated programs comprising up to 40 face-to-face and/or telephone contacts, although frequency was not consistently reported in all studies. Follow-up periods ranged from 6 to 36 months.

Interventions were delivered by a variety of healthcare professionals. Nurses were the most common providers, whereas some studies

Table 1
Summary of intervention characteristics and outcome domains by face-to-face contact duration.

Face-to-face contact duration	Studies, n	Typical providers and delivery formats	Main outcome domains mapped
Very brief (≤ 10 min)	2 [11,12]	General practitioners; brief individualized physical-activity or smoking-cessation counseling	BMI, waist circumference, physical activity, smoking
Brief/moderate (>10 –30 min)	3 [17–19]	Predominantly nurses; structured education, motivational interviewing, problem-solving, and face-to-face counseling with telephone support	BMI, body weight, blood pressure, waist circumference, physical activity, smoking, diet
Longer (>30 min)	5 [14, 20–23]	Nurses, health coaches, counselors, psychologists, and program specialists; motivational interviewing, health coaching, guided self-determination, structured counseling, and hybrid face-to-face/digital or telephone support	BMI, body weight, blood pressure, waist circumference, hip circumference, physical activity, smoking, alcohol, stress
Variable/mixed duration	7 [13,16, 24–28]	Predominantly nurses, with primary-care providers, health educators, and medical assistants; behavioral counseling, motivational interviewing, health coaching, and combinations of face-to-face and telephone contacts	BMI, body weight, blood pressure, waist circumference, waist-to-hip ratio, hip circumference, physical activity, smoking, diet, alcohol
Contact duration not reported	10 [6,15, 29–36]	Nurses, GPs, health visitors, health educators, health coaches, and multidisciplinary teams; structured lifestyle programs, behavioral counseling, education, coaching, and risk-factor counseling	BMI, body weight, blood pressure, waist circumference, physical activity, smoking, diet, alcohol

Interventions were categorized according to the reported typical or initial face-to-face contact duration. Programs with substantially differing face-to-face session durations, multiple intervention arms with different durations, or duration ranges spanning categories were classified as variable/mixed. Telephone or digital contact duration was not used for classification. Studies may contribute to multiple outcome domains. Detailed study-level characteristics and numerical findings are provided under Supplementary Materials.

involved general practitioners, health educators, health coaches, psychologists, or multidisciplinary/allied health teams. Intervention approaches also varied substantially and included motivational

interviewing, behavioral counseling, structured education, health coaching, guided self-determination, individualized risk feedback, and hybrid approaches combining face-to-face counseling with telephone or digital support. This variation in intervention intensity, provider, delivery format, and follow-up contributed substantially to the heterogeneity of the evidence base.

Outcome mapping and reported effects

The most frequently analyzed outcomes were BMI ($n = 17$), blood pressure ($n = 15$), physical activity ($n = 13$), waist circumference ($n = 12$), and body weight ($n = 10$) (Table 1).

Across outcome domains, findings were heterogeneous. Changes in BMI and body weight were generally modest and inconsistent across studies, whereas waist circumference showed somewhat more consistent improvements. Blood pressure findings were mixed, with only a minority of studies reporting improvements in both systolic and diastolic pressure. Physical activity outcomes also varied considerably, partly because definitions and measurement methods differed across studies. Evidence for smoking cessation and dietary change was limited, and alcohol-related outcomes generally showed little change. Perceived stress and waist-to-hip ratio were rarely assessed, precluding meaningful conclusions for these outcomes.

Considerable heterogeneity was observed in design, duration, personnel, and outcome measurement, which limited comparability.

Statistically significant findings were not interpreted automatically as clinically important. Where available, the magnitude of change was considered alongside statistical significance. For example, some studies reported statistically significant but modest changes in anthropometric outcomes, whereas others showed larger numerical changes that did not reach statistical significance.

Across randomized studies, the magnitude and direction of effects varied considerably according to intervention intensity, provider, comparator, and target population. Several brief or moderate-intensity interventions showed modest between-group effects. For example, Bolognesi et al. [11] reported greater reductions in BMI and abdominal girth following brief physical-activity counseling compared with control, while Pieterse et al. [12] found a higher 12-month smoking cessation rate in the intervention group than in usual care (17.6% vs. 9.0%; OR 1.51, 95% CI 1.1–2.1). In contrast, other brief counseling interventions showed little or no between-group benefit. In Vetter et al. [13], brief lifestyle counseling did not significantly improve weight or blood pressure compared with usual care over 24 months.

More intensive or repeated interventions also produced mixed findings. Hellstrand et al. [14] reported significant between-group improvements after 12 months in systolic blood pressure, diastolic blood pressure, BMI, and waist circumference, whereas Höchsmann et al. [15], despite a high-intensity 24-month lifestyle program with repeated face-to-face and telephone contacts, found no significant between-group differences in systolic or diastolic blood pressure. Similarly, ter Bogt et al. [16] reported no significant between-group differences in weight, BMI, waist circumference, or blood pressure after 36 months.

Interventions were most commonly delivered by nurses, but nurse-led programs showed heterogeneous results. Some studies reported improvements in blood pressure, waist circumference, physical activity, or weight-related outcomes, whereas others found little difference compared with usual care. Programs delivered by general practitioners, health coaches, health educators, psychologists, or multidisciplinary teams showed similarly variable findings. Overall, no consistent pattern emerged, suggesting that one provider type, intervention duration, or contact frequency was uniformly associated with more favorable outcomes.

Comparator conditions also influenced interpretation. Several trials compared the intervention with usual or standard care, whereas others used minimal-intervention controls, written information, or alternative counseling approaches. In some studies, both intervention and

comparison groups improved over time, resulting in small or non-significant between-group differences despite favorable within-group changes. This heterogeneity in comparator conditions, intervention intensity, and target populations limited direct comparison across studies.

Discussion

This scoping review mapped 27 studies evaluating individualized lifestyle interventions delivered face-to-face in primary care settings. Despite the central role of general practitioners (GPs) in cardiovascular prevention, the reported effects on cardiovascular risk factors were heterogeneous and inconsistent across studies. Considerable heterogeneity in intervention content, intensity, delivery personnel, and outcome measurement substantially complicates interpretation and comparison across studies [7].

Across outcomes, the most consistent benefit was observed for waist circumference, suggesting that localized reductions in abdominal adiposity may occur even when changes in overall body weight or BMI are modest. This pattern aligns with previous findings indicating that behavioral interventions may preferentially affect central adiposity, which is itself a clinically relevant cardiovascular risk marker. However, reported between-group effects were often small or inconsistent, including in some intensive or longer-duration interventions. These findings raise questions about the feasibility, scalability, and real-world effectiveness of individualized lifestyle interventions in routine general practice.

Importantly, limited effectiveness should not be interpreted as evidence that lifestyle interventions are inherently ineffective. Rather, growing evidence suggests that variability in outcomes is largely driven by differences in implementation rather than intervention failure. Brief lifestyle counseling and motivational interviewing (MI) have repeatedly been shown to be effective, even when delivered in sessions lasting <20 min, with meaningful effects on behaviors such as smoking cessation, physical activity, and diet [12,22,37]. This directly challenges the assumption that effective lifestyle counseling is incompatible with short consultation times. Given that the average primary care consultation lasts approximately 7.6 min [38], sustainable prevention strategies must prioritize brief, evidence-based approaches that can be realistically embedded into routine care.

The marked heterogeneity observed across studies is better understood through an implementation science lens. Frameworks such as RE-AIM and the Consolidated Framework for Implementation Research (CFIR) provide structured explanations for why interventions with proven efficacy may fail to demonstrate consistent effects when translated into real-world settings [37,39]. Key factors include insufficient integration into practice workflows, lack of organizational support, and variable provider engagement. Notably, provider training and intervention fidelity were inadequately reported in most included studies, despite strong evidence that behavioral counseling techniques such as MI are highly skill-dependent [40,41]. Without systematic reporting of training intensity, supervision, or adherence to intervention protocols, null findings cannot be confidently attributed to lack of efficacy.

Patient-level factors further contribute to variable outcomes. A substantial proportion of at-risk primary care patients are in the pre-contemplation stage of behavior change and therefore not yet ready to modify lifestyle behaviors [42,43]. Interventions that do not account for readiness to change are unlikely to succeed. Stage-tailored counseling approaches—particularly motivational interviewing—are specifically designed to address ambivalence and facilitate progression toward behavioral change and appear essential for maximizing intervention effectiveness in unselected primary care populations [22,44].

Task-shifting from physicians to trained multidisciplinary teams represents a further evidence-based strategy to overcome time and resource constraints. In this review, the majority of interventions were delivered by nurses, health educators, or health coaches. Randomized trials such as the COACH trial have demonstrated that nurse-led and

team-based lifestyle interventions can achieve significant improvements in cardiovascular risk factors compared with usual care [8]. These findings support models in which GPs focus on risk identification and clinical oversight, while trained non-physician staff provide structured behavioral counseling. Such approaches are increasingly aligned with contemporary primary care delivery models and may be essential for sustainable prevention.

Cost-effectiveness analyses indicate that lifestyle interventions are most economically favorable when targeted at high-risk populations, such as patients with hypertension, diabetes, or obesity, where absolute risk reductions are greatest [45,46]. In low-risk populations, benefits tend to be smaller and cost-effectiveness more marginal, reinforcing the value of risk-stratified prevention strategies consistent with current guideline recommendations [2].

Digital health interventions may further extend the reach of lifestyle counseling by supplementing brief face-to-face encounters with ongoing remote support. Digital and hybrid interventions have shown comparable effectiveness to in-person counseling in several randomized trials, particularly when combined with human coaching elements [37,41]. However, successful implementation requires integration into existing clinical workflows and attention to digital literacy to avoid exacerbating health disparities [47].

Finally, cultural adaptation and health equity considerations remain insufficiently addressed in the current literature. While culturally tailored interventions can improve engagement and outcomes in specific populations [48], social determinants of health—such as income, education, housing, and access to healthy environments—substantially constrain patients' ability to implement lifestyle recommendations. Few studies systematically examined differential effects across socioeconomic or ethnic subgroups, representing a critical gap given the social patterning of cardiovascular risk [1].

An important limitation of this review is that the literature search was restricted to PubMed. Relevant studies indexed exclusively in databases covering nursing, behavioral science, psychology, nutrition, rehabilitation, or allied-health literature may therefore have been missed. The findings should consequently be interpreted as a mapping of the evidence identified through PubMed rather than as a fully comprehensive representation of all available literature. Composite cardiovascular risk scores were not assessed, as the review focused on individual modifiable cardiovascular risk factors. Studies reporting only composite risk estimates may therefore not have been captured in the outcome mapping.

Conclusion

The available literature on individualized lifestyle interventions in primary care shows heterogeneous and inconsistent changes in cardiovascular risk factors across diverse interventions and study populations. However, the available evidence suggests that effectiveness is strongly influenced by implementation quality, provider training, patient readiness to change, and contextual factors rather than by the inherent inefficacy of the interventions themselves. Brief, stage-tailored counseling approaches, task-shifting to trained multidisciplinary teams, and digital supplementation appear particularly promising. Future research should prioritize standardized reporting, integrate implementation science frameworks such as RE-AIM and CFIR, and explicitly address health equity to support the development of scalable, sustainable lifestyle intervention models suitable for routine primary care.

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Declaration of competing interest

The authors declare that they have no known competing financial

interests or personal relationships that could have influenced the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.hsr.2026.100285.

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