Stimulating health behaviour change to reduce cardiovascular risk in primary care

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Abstract

Lifestyle importantly contributes to preventable morbidity and mortality. An unhealthy diet, inactive lifestyle, excessive alcohol consumption and/or smoking put individuals at risk of developing diabetes type 2 and/or cardiovascular disease. Health behaviour changes are necessary to lower an individual's risk of disease, and to lower the associated costs for society. Primary care professionals are in a good position to observe which lifestyle interventions might benefit an individual, but they may not always know how they can stimulate health behaviour change in their patients.

During two annual meetings of the European Primary Care Cardiovascular Society (EPCCS), the evidence-base on the effectiveness of different methods to stimulate health behaviour modifications was reviewed, and lessons on effective strategies were distilled. This document outlines the presented evidence on ingredients of successful behaviour change strategies and motivational interviewing, as well as which CV risk behaviours and clinical outcomes may be improved with various types of strategies. This document aims to provide practical guidance to general practitioners (GPs) and other primary care health workers on empowering patients to improve their lifestyle behaviour. During the EPCCS meetings, gaps in the knowledge base were identified, which have been formulated in this document as recommendations for future research. Moreover, the potential contribution or responsibility of GPs to stimulate societal or policy measures is discussed.

Table of contents

Introduction

Lifestyle importantly contributes to preventable morbidity and mortality. For instance, unhealthy diet, inactive lifestyle, excessive alcohol consumption or smoking put individuals at risk of developing diabetes type 2 (T2DM) and/or cardiovascular disease (CVD). Ill health related to poor health behaviours brings high costs to society. Hence, it is obvious that health behaviour changes are necessary to lower an individual's risk of disease, but it is not always known how these changes may be achieved. Primary care (PC) professionals are in a good position to observe which lifestyle interventions might benefit an individual. Time may, however, be limited to discuss health behaviour and its consequences during consultation. Moreover, general practitioners (GPs) may hesitate to raise the subject, for fear of interfering too much with the patients' life.

During the 8th annual European Primary Care Cardiovascular Society (EPCCS) Clinical Masterclass, held in Prague, Czech Republic in late 2015, and during the EPCCS Annual Cardiovascular Summit for Primary Care in Dublin, Ireland in 2017, the evidence-base on the effectiveness of different methods to stimulate health behaviour modifications was discussed, and lessons on effective strategies were distilled. In addition, gaps in the knowledge base were identified, which have been formulated in this document as recommendations for future research. This document outlines the presented evidence on what can be achieved in the consultation room, and summarises the discussion and conclusions at the EPCCS meetings, in an attempt to guide European PC physicians towards improved support for patients to achieve healthier behaviour.

Guideline recommendations on stimulating health behaviour changes

The 2016 European Society of Cardiology (ESC) Guidelines on CVD prevention in clinical practice (1) define CVD prevention as a coordinated set of actions, at the population level or targeted at an individual, aimed at eliminating or minimising the impact of CVD and related disabilities. Mostly high-income regions have shown a stark decline in mortality rates since the 1980s, which may be largely attributed to preventive measures. Some risk factors, particularly obesity and T2DM, have, however, been on the increase. The remaining CVD morbidity and mortality is not only the result of prevailing risk factors; poor implementation of preventive measures is also of concern (1). It is estimated that if health risk behaviours were eliminated, it would be possible to prevent at least 80% of CVD (2).

Screening methods
Most guidelines recommend a combination of opportunistic and systematic screening. It is most cost-effective to focus on individuals at higher CV risk or with established CVD. GPs are at a particularly important position to identify individuals without a history of CVD but who are at risk of CVD. Although the evidence on its effectiveness is limited, the 2016 ESC guidelines on prevention recommend a systematic approach to CV risk assessment targeting populations that are likely to be at higher risk, for instance in those with a family history of CVD. CV risk assessment in men younger than 40 years and women under the age of 50 years old is not recommended (1).

Risk assessment
According to the 2016 ESC Guidelines, risk assessment should be repeated, for example every five years. Risk can be assessed with the SCORE system that estimates the 10-year risk of fatal CVD, or a validated local risk estimation system. Short-term risk is mostly determined by age. Young persons, particularly women, therefore rarely reach treatment thresholds. In fact, in young persons, a low absolute 10-year risk may conceal a very high relative risk that requires lifestyle advice.
Means to communicate this risk include using a relative risk chart, or talking about lifetime risk or risk age. Lifetime CV risk prediction models identify high-risk individuals both in the short and long term. Adequate evidence on the use of lifetime risk in treatment decisions and meaningful risk categories is currently lacking. Therefore, no recommendations are formulated about its use, but the ESC Guidelines acknowledge that it may serve as a communication tool in conversations with those with high relative but low absolute risk (1). In this population, speaking about risk age can also be helpful, as it illustrates the likely reduction in life expectancy if preventive measures are not adopted (3).

The role of the GP in CVD prevention
The 2016 ESC guidelines (1) specify that CVD prevention should be delivered in all health care settings, including in PC, and emphasise the importance of the GP in delivering >90% of patient consultations in most countries. Thus, PC has a vital role in ensuring that appropriate preventive measures are implemented. The GP is the key person to initiate, coordinate and provide long-term follow-up for CVD prevention. Primary health care workers, which includes GPs and coworkers like practice nurses, are well positioned to identify patients who might be at risk and to assess their eligibility for intervention based on their risk profile.
These guidelines are unique in advocating both individual approaches (targeting high-risk individuals) and evidence-based population-level interventions. The guidelines emphasize that prevention of CVD should be valued and implemented at all levels of society and in all health care settings. This should include increased spending on prevention in health care and on actions that make communities healthier. All clinicians should consider prevention and promotion of healthy lifestyles a professional responsibility and should support policies that promote healthier lifestyles. Patients should be empowered and have the knowledge and support to make informed decisions and to demand robust prevention efforts from health care groups and society. Patient's awareness of their health situation and the options to improve it, hopefully strengthens the realisation that they themselves have a responsibility to live a healthy lifestyle.

To address risk in individual patients, the ESC guidelines recommend cognitive behavioural methods to support persons in adopting a healthy lifestyle. Established cognitive-behavioural strategies such as motivational interviewing (4) and involving multidisciplinary health care professionals (e.g. nurses, dieticians, psychologists)(5, 6), both received a class I level A recommendation, indicating that good quality evidence of multiple randomised controlled trials (RCTs) or meta-analyses have shown that the intervention is beneficial, useful or effective. Moreover, another class I level A recommendation states that in very high risk individuals, multimodal interventions integrating medical resources with education on healthy lifestyle, physical activity, stress management and counselling on psychosocial risk factors is advised (6, 7). Indeed, if a person is depressed or lives in deprived social circumstances, he or she may not feel ready to change behaviour. While it is not easy to tackle all these issues, it should be emphasised that efforts to empower patients to improve their lifestyle for better health are never wasted. Small changes in behaviour can have an important positive effect in the long run and multiple small steps can accumulate to larger benefits.

Effective communication styles

Many individuals are aware that it would be good if they change aspects of their lifestyle, and they want to change. They may be motivated to improve their habits. But practice shows that wanting something, and even being motivated, is often not enough. Oftentimes, multiple individual and environmental factors stand in the way of adopting a healthy lifestyle and breaking with behavioural patterns. Friendly and constructive interaction between a primary health care worker and a patient can empower the patient to cope with illness and to adhere to the recommended lifestyle. Individualised counselling forms a basis for motivation and commitment to behaviour changes.

The ESC guidelines formulate a list of principles of effective communication, among which are spending enough time to create a therapeutic relationship and the importance of acknowledging the patient's view of his/her disease and their worries and concerns. Make sure that the patient understands the advice and talk to them in their own language. It is important to acknowledge that changing life-long habits can be difficult and that sustained gradual change is often more permanent than a rapid behaviour change (1).
In addition, ten strategic steps to facilitate behaviour change are listed (7). The primary health care worker should develop a

therapeutic alliance, and counsel all individuals at risk of or with manifest CV disease. Individuals should be assisted to understand the relationship between their behaviour and their health. Help individuals assess potential barriers to behaviour change, and address, for instance, psychosocial risk factors such as stress or social isolation in tailored individual or group sessions. It is good to ask patients what they would like to focus on first and to gain commitments from the individual to own their behaviour change. Use a combination of strategies including reinforcement of the individual's capacity for change. A lifestyle-modification plan should be developed, combining realistic goals with self-monitoring of the chosen behaviour (5). Other healthcare staff such as dieticians, physiotherapists, mental health workers, social workers, and psychologists, should be involved whenever possible, and progress should be monitored through follow-up contact (7).
Several current individual (motivation, habits, resources) and contextual (cues, opportunities and costs) factors affect the likelihood that a person behaves a certain way. The behavioural potential, namely the likelihood of enacting a certain response in a given context, following an initial behavioural change varies over time and context. Adopting new behaviour may involve a few lapses, followed again by improvement of the behaviour, before it becomes sustainable behaviour (8). It is useful to prepare the individual for potential future lapses. A good physician-patient relationship with long-term follow-up can help the person return to the new behaviour if a lapse occurs.

How to start the conversation?

Should there be a medical reason to give advice on lifestyle?
Many physicians believe that the best moment to give advice on for instance smoking cessation is when a patient presents with a smoking-related health issue (9, 10). This belief is, however, not supported by evidence on predictors of smoking cessation following physician's counselling (11). Some evidence suggests that patients may actually be more likely to be irritated when advice is linked to a current medical problem, as it might be interpreted as blaming for the illness (12).

Not having a medical reason to start the conversation may not need to be a barrier. A systematic review and meta-analysis (13) evaluated both brief advice on smoking cessation and offering nicotine replacement therapy (NRT) in smokers not selected by motivation to quit. Data of 13 studies showed giving behavioural support yielder a larger effect on number of patients trying to quit (RR: 2.17, 95%CI: 1.52-3.11) than giving advice to quit on medical grounds (RR: 1.24, 95%CI: 1.16-1.33) and offering NRT (RR: 1.68, 95%CI: 1.48-1.89), all as compared with giving no advice. Increasing attempts to stop smoking did not always translate into higher abstinence rates. The included studies that showed increased attempts to quit after offering behavioural support or NRT did not assess willingness to quit prior to offering assistance. The authors therefore concluded that support for cessation should be offered more commonly, as prior assessment of willingness to quit may miss some who would have taken up a direct offer of assistance (13).

Patient's perspective
A trial evaluated the effectiveness of opportunistically offering participation in a weight management group to obese patients, as well as their perception of appropriateness of this intervention (14). Out of 2728 potentially eligible patients, 1882 were eligible and randomised to one of two 30-second interventions. In the active intervention, patients were referred to a weight management group. If this offer was accepted, the physician ensured that an appointment was made and offered follow-up. In the control intervention, the physician advised the patient that their health would benefit from weight loss. 722 (77%) Individuals assigned to the active intervention agreed to it, and 379 (40%) of these attended the weight management group, compared with 82 (9%) individuals who were randomised to the control intervention. On average 2.43 kg weight change was seen at 12 months in the support intervention group and 1.04 kg with the advice intervention (adjusted difference: 1.43, 95%CI: 0.89-1.97). The proportions of participants that lost at least 5% or 10% of body weight at 12 months were roughly twice as high with the support vs. the advice intervention (5% bodyweight: 25 vs. 14%, 10% bodyweight: 12 vs. 6%).
When asked what they thought of the doctor tackling their weight while they came to consultation for another reason, 1530 (81%) participants thought it was appropriate and helpful. Four (<1%) patients considered their intervention inappropriate and unhelpful. Participants' ratings of appropriateness and helpfulness of brief interventions did not significantly differ between the two intervention groups. While GPs may be concerned to offend patients by discussing weight, this study shows that, when addressed in a helpful, constructive way, it is mostly perceived as a positive intervention and it is effective (14).

Ingredients of successful behaviour change techniques

In all effective cognitive behavioural techniques, also called psychoeducational interventions or behaviour change techniques (BCTs), the focus lies on changing how an individual thinks about themselves, their behaviours and circumstances, and how they can modify their lifestyle.

Research efforts evaluate the effectiveness of BCTs, but reporting of such complex processes is generally poor, with large variation in used terminology, making replication difficult. Efforts to improve this and to strengthen the evidence synthesis and intervention development include establishment of a taxonomy of BCTs (15, 16). Taxonomies can serve as a useful methodological tool in research, aimed at characterising active components of interventions with precision and specificity (16).

Goal setting
Cognitive behavioural strategies should fit into the daily life of the patient. The physician can help the patient to set goals and to think of how the goals can be translated into meaningful action. Best is to formulate a set of small, realistic goals, since people gain confidence if they meet a goal. The patient should be prepared for lapses, by formulating how they should react (if … happens, then I will ….) if they do not stick to their plans; this will help to keep realistic expectations. Forward thinking will help to identify barriers and strategies to overcome them.
The patient should define his/her own goals and formulate lifestyle rules. Better, more effective, rules have clear boundaries and they link to a sense of identity, for instance if a patient identifies him/herself as a non-smoker. If a rule involves values, it is easier to follow. If rules are repeated applied, they finally become a habit. A habit works similar to the 'if .. then'-scenarios, except that it is no longer a cognitive process, but rather instinctive.

In light of setting realistic goals towards a healthy lifestyle, it is interesting to consider the concept of "positive health". As opposed to the World Health Organisation's definition of health as formulated in 1948, in which health is 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity', a broader view on health is proposed (17). Considering the current prevalence of chronic and lifestyle diseases, seeing health as 'the dynamic ability to adopt and to manage one's own well-being, in the face of social, physical and emotional challenges', may be more appropriate. Research by the developers of the "positive health" initiative has shown that patients consider these abilities very relevant (17, 18). Shifting the focus from ill health to resilience and well-being may help communication with patients, shared decision-making and goal setting.

Self-monitoring
External tools such as smartphone apps or logs are useful for self-monitoring. The GP can give feedback on the process and positive reinforcement. Not only asking the patient whether they are doing what they planned to do is helpful, but also looking at data on HbA1c, or data from pedometers/accelerometers or health apps together can be motivating.

Involving others
Some evidence exists that involving a partner or the family can facilitate effectiveness of an intervention, as opposed to a 1-on-1 relationship with the doctor. Also, buddy-approaches have been found effective, in which two people make each other responsible, for instance by calling each other to check on behaviour, and by making bets, which the other person needs to pay if he or she fails.

Targeting automatic behaviour
Knowledge about an advantage of certain behaviour does not automatically lead to that behaviour. In this context, it is relevant to consider that two broad categories of behaviour are described: reflective and automatic behaviour. Reflective behaviour is goal-directed, rational, flexible but also slow, and cumbersome, while automatic behaviour can be seen as environmentally responsive, not flexible, and it frees cognitive processes. Most interventions target reflective behaviour, but it is possible to target automatic behaviour and the latter is thought to be more effective (19). Approaches to achieve this require reflection on how the environment needs to be restructured, such that environmental cues that induced the automatic behaviour are replaced by cues that help engage more in healthy behaviour. Making use of an elevator less appealing by slowing down the speed of the doors closing, has been shown to increase stair use (20). Putting healthy food closer, by as little as 10 inches, to a salad bar in the cafeteria can increase selection of easier-to-reach healthy food options (21). Similarly, reducing the density and proximity of outlets for unhealthy choices can diminish consumption (22).
Alternatively, targeting automatic associative processes can alter behaviour. An important example is to restrict marketing of snacks, tobacco and alcohol. Children watching cartoons interspersed with snack advertisements or adults watching film clips in which alcohol is featured prominently, will consume more of the items they were exposed to. Moreover, the fact that humans are generally predisposed to approach positive stimuli can be employed by putting fun terms on healthy foods and cartoon characters on vegetables to increase chances that children will eat them. Along with that, branded packaging should be removed from junk food and tobacco to diminish their attractiveness. Developing positive associations with healthy behaviours is key as well as inhibiting behavioural impulses. While there is little an individual physician can do about this, increasing awareness of these mechanisms may help patients to resist automatic unhealthy behaviour. Moreover, physicians involved in initiatives aimed at creating healthy behaviour-stimulating environments, can benefit from this evidence.

Attitude of the PC professional
The GP should establish a plan with the patient for frequency and duration of follow-up sessions, to assess and reinforce progress towards goal achievement. Long-term support and follow-up can also be provided in a peer-based setting in community-based programmes. Obviously, it is important to know which behaviour programmes or resources are available in the community. Tailor the options to the individual needs and possibilities of the patient.
Although weight loss is often followed by weight regain, it should be noted that also a temporarily reduced risk marker or surrogate marker yields a health gain. The duration of hypertension or insulin resistance is important. Similar to the legacy effect on outcomes seen after 5 years of statin therapy (23), the benefit of weight loss on diabetes lasts longer than the period of the weight loss, so any reduction should be appreciated. Also, small improvements can make the patient feel that he/she is in control, which can improve both motivation and quality of life. Interventions that focus on single health behaviours can be effective at inducing change of this behaviour (24, 25). Lifestyle patterns are, however, often interrelated and multiple habits may need addressing. A more holistic approach focussing on multiple behaviours may be indicated.

What is the evidence on effective methods?

Research has been done to evaluate behaviour change strategies. Efforts have been made to assess the quality and the overlapping messages of these studies, as well as to clarify what the active ingredients of the interventions are. Here, we focus on findings of some of the systematic reviews and/or meta-analyses.
Artinian NT et al. reviewed over 70 studies that evaluated BCT interventions, to compose a Scientific Statement from the American Heart Association (5). This revealed that the majority of studies used surrogate endpoints such as lipid levels or blood pressure (BP) and effect sizes are generally modest. Based on the literature review, the document provides evidence-based recommendations on implementing physical activity and dietary interventions among adult individuals, including adults of racial/ethnic minority and/or socioeconomically disadvantaged populations. Class I, level of evidence A cognitive behavioural strategies include goal setting, feedback, self-monitoring, action plan for follow-up contacts, using motivational interviewing strategies, long-term support and follow-up, and a combination of at least two of these strategies is advised. Guidelines are formulated to translate the most efficacious and effective strategies into practice (5).

Another systematic review focussed on BCTs aimed at behaviour change beneficial for coronary heart disease (CHD)(26). In

22 studies that met the criteria for the systematic review, the most commonly included BCTs were providing information on the consequences of behaviour, and on how to perform the behaviour and goal setting. Most studies had follow-up shorter than one year, some up to 2 years, and one assessed mortality after 7-9 years.
Table 1 summarises the effects of interventions on risk factors and clinical outcomes. A small but significant effect was seen on smoking at follow-up, indicating that overall the interventions were more likely to result in smoking cessation compared to the control arms. No significant effects on BMI were seen, but small statistically significant effects were seen on systolic and diastolic BP. The interventions did not significantly impact the risk of CHD events, but a small significant effect on the mortality risk was observed (26).

		Number of studies in analysis	RR/OR	Mean differrence	95% CI	Heterogeneity between studies	P-value	Study
RISK FACTOR	Smoking	15	RR: 0.89		0.81-0.97	Low		(26)
	BMI	8		-0.39 kg/m^2	-1.03 to 0.25	High		(26)
	Systolic BP	10		-3.13 mmHg	-5.11 to -1.15	Intermediate		(26)
	Diastolic BP	10		-1.12 mmHg	-2.10 to -0.13	Intermediate		(26)
CLINICAL OUTCOME	CHD	5	RR: 0.86		0.68-1.09	Moderate		(26)
	Mortality	15	RR: 0.82		0.69-0.97			(26)
	All-cause mortality	6	OR: 1.34		1.10-1.64		P=0.003	(27)
	Cardiac mortality	5	OR: 1.48		1.17-1.88		P=0.001	(27)
	Reinfarction and readmission	8	OR: 1.35		1.17-1.55		P<0.00	(27)

Table 1. Effects of CBTs on CV risk factors and clinical outcomes, as seen in systematic reviews [26, 27]. RR: risk ratio, OR: odd ratio, 95%CI: 95% Confidence Interval, BMI: body mass index, BP: blood pressure, CHD: coronary heart disease.

This study (26) also looked at predictors of effect; which characteristics of the study interventions determine its effect. Although data of 15 studies on mortality suggested that longer interventions may have better outcomes than shorter ones, this effect was not statistically significant. No such pattern was seen for the effect of smoking. Individual interventions appeared more effective than group-delivered interventions with regard to mortality, but again this effect was statistically non-significant, and no difference was seen between approaches for the effect on smoking. It did not matter for mortality or smoking whether the intervention had been developed based upon psychological theory or without a theoretical basis. Finally, the number of BCTs included in an intervention was not associated with mortality either, nor did any of the different categories of BCTs (goal setting/action planning, review of goals/self-monitoring, stress management, social support, providing feedback) significantly predict mortality. The authors speculate that their failure to identify which aspect of these secondary prevention interventions was most effective might be due to the fact that most interventions included a range of techniques and there may be a synergistic effect of combining different techniques (26). It should be noted that this study observed such heterogeneity in the measurement of health behaviours that it was not possible to combine the results across trials in a meta-analysis.

Yet another research group specifically reviewed 38 BCTs (in 26 studies) focussed on reducing sedentary behaviour in adults (28). Categorising interventions as very, quite or non-promising based on the observed behaviour changes revealed that very (39%) or quite (21%) promising BCTs were primarily aimed at reducing sedentary behaviour, rather than also increasing physical activity.

Several functions of a BCT were acknowledged, namely education, persuasion, incentivisation, training, environmental restructuring, modelling and enablement. Intervention promise was linked to the number of functions addressed by the intervention, as very promising (mean: 1.93 functions per intervention, SD=1.28) and quite promising (mean functions: 2.13, SD: 1.13) reported more functions than did non-promising interventions (mean functions: 1.07, SD=0.59, P<0.001). Interventions based on environmental restructuring, persuasion, education or training were most effective, with self-monitoring, problem solving, and restructuring the social or physical environments identified as particularly promising techniques to induce behaviour change. Promising interventions also used more BCTs (very promising: mean number of techniques: 7.27, SD: 5.19, quite promising: mean techniques: 7.00, SD: 2.83) than in the interventions that proved non-promising (mean techniques: 4.87, SD: 2.70, P<0.001) (28). Self-monitoring behaviour, problem solving and restructuring the social environment appeared to contribute most to intervention promise (28).
The authors conclude that to date, insights on the most effective BCTs to reduce sedentary behaviour relies on suboptimal study designs that limit definitive conclusions about intervention effectiveness. Few studies specify sedentary behaviour as an inclusion criterion, and some studies used an inadequate control arm. Thus, the evidence base for 'what works' and 'why' concerning reducing sedentary behaviour is weak (28).

When interpreting these data, it should be noted that in all of these studies, interventions were short-term. One exception is formed by the Italian GOSPEL study (29), which evaluated a long-term intervention and which showed the largest beneficial effect of an intervention on CHD events, among the studies

reviewed by Goodwin and colleagues (26). The randomized GOSPEL study compared a 3-year multifactorial continued educational and behavioural programme with usual care (including cardiac rehabilitation [CR] programme) in 3241 patients with a recent myocardial infarction (MI) at relatively low risk (few patients were older than 70 years or with an ejection fraction of less than 40%).
The intervention did not significantly reduce the primary composite CV endpoint (table 2). It did, however, decrease the risk of several secondary endpoints. Kaplan-Meier curves of event-free probability for the primary and secondary efficacy outcomes of the intervention and usual care groups separated over the study period. Moreover, persons in the intervention group showed a marked improvement in lifestyle habits, including exercise, diet, psychosocial stress, less deterioration of body weight control) and in prescription of drugs for secondary prevention. Thus, the GOSPEL study showed that a long-term multifactorial continued reinforced intervention after rehabilitation following MI can lower the risk of important CV outcomes (29).

ENDPOINT	INCIDENCE IN INTERVENTION GROUP	INCIDENCE IN CONTROL GROUP	HAZARD RATIO (95%CI)
Primary composite endpoint	16.1%	18.2%	0.88 (0.74-1.04)
CV mortality plus nonfatal MI and stroke	3.2%	4.8%	0.67 (0.47-0.95)
Cardiac death plus nonfatal MI	2.5%	4.0%,	0.64 (0.43-0.94)
Nonfatal MI	1.4%	2.7%	0.52 (0.31-0.86)

Table 2. Effects of a 3-year multifactorial continued educational and behavioural programme on CV endpoints in the GOSPEL trial [29]. The primary endpoint was a composite of CV mortality, nonfatal myocardial infarction (MI), nonfatal stroke and hospitalisation for angina pectoris, heart failure or urgent revascularisation.

Zooming in on the effect of more specific strategies, what is the evidence on the effect of psychoeducation as a recommended component of CR? A meta-analysis on data of 213 CR participants with coronary artery disease from studies comparing psychoeducational programmes with exercise only, standard CR or medical care, evaluated the effect of psychoeducation on behaviour change and modifiable physiological risk factors (30). Psychoeducational interventions produced a significant positive effect on physical activity levels at 6-12 months, as compared with exercise and risk factor education, but little evidence was found for change in smoking and dietary behaviour. This effect appeared to be attributable to strategies such as goal setting, problem solving, self-monitoring and role modelling. No significant effect was seen on physiological risk factors including BP during rest and exercise, mean body fat, BMI or waist-to-hip ratio (30). Thus, the effect of regular CR programmes may be improved by adding a psychoeducational component.

Another meta-analysis assessed the effect of psycho-educational interventions aimed at smoking cessation in CHD patients (31). Across 14 studies, a significantly increased probability of continuous smoking cessation (RR 1.51, 95%CI: 1.18–1.93) was noted in the intervention group as compared with the control situation. A non-significant decrease in total mortality was seen in the group randomised to a psychoeducational intervention (RR 0.73, 95%CI: 0.46–1.15). The interventions generally targeted motivation and goals, beliefs about capacity, knowledge and skills in all included studies, although this study could not reliably evaluate behavioural determinants retrospectively (31).

Yet another research group aimed to specifically evaluate recent lifestyle modification programmes for CHD patients (published in 1999-2009), in their efficacy to improve risk factors and related health behaviour and mortality, as compared with routine cardiac care. The authors focussed on more recent interventions, since routine cardiac care has improved over time and these advances may off-set the incremental benefit seen in older programmes (27). This meta-analysis of 23 trials, involving over 11000 randomised patients, suggested that lifestyle modification programmes indeed provide benefits beyond those achieved by routine care alone. Effect sizes for all-cause mortality, cardiac mortality and reinfarction and readmission favoured the intervention (table 1). The authors observed that programmes that included all four self-regulation (SR) BCTs, namely goal-setting, planning, self-monitoring and feedback were more successful in improving lifestyle, specifically in changing exercise behaviour and dietary habits (fat intake), than programmes that did not employ these techniques. The observed effects did not persist in the long term. This study also showed that interventions involving partners of patients were associated with greater benefits in smoking cessation rates and dietary behaviour (27).

In the current (mobile) technological age, BCTs can also be applied through for instance text messaging, and providing information on a website. Interventions such as goal setting or giving feedback through text messages did yield positive results for medication adherence short term, for physical activity for 6 months, but no effect on diet or smoking cessation was obtained (32).

Evidence on so-called very brief interventions (VBIs) is being gathered. VBI refers to interventions that take less than 5 minutes, consisting of similar techniques as described above, but that fit into the time-pressured daily practice. VBIs also aim to provide patients with the tools needed to implement changes in their lifestyle. VBIs have been tested for feasibility and acceptability in two practices, with 68 patients. In a randomised trial, 3 VBIs will now be evaluated: a motivational intervention amended to include action planning sheet and physical activity diary for goal setting and self-monitoring; a pedometer intervention amended to include tips and ideas to increase physical activity and step chart for goal-setting and self-monitoring; or a combined motivational and pedometer intervention (33).

Evidence from studies evaluating strategies to improve specific CV risk behaviours

Smoking cessation

A systematic review and meta-analysis examined strategies used in 13 studies on interventions for smoking cessation, to explore which approaches might be most effective at helping patients to quit smoking (13). When compared to no intervention, giving advice to quit smoking on medical grounds increased the frequency of quit attempts by 24% (risk ratio (RR): 1.24, 95%CI: 1.16-1.33). Offering NRT or behavioural support for cessation had a stronger beneficial effect (RR: 1.68, 95%CI: 1.48-1.89 and RR: 2.17, 95%CI: 1.52-3.11 respectively). When offering help was compared directly with giving advice, offering assistance resulted in more quit attempts (RR: 1.69, 95%CI: 1.24-2.31 for behavioural support and RR: 1.39, 95%CI: 1.25-1.54 for offering medication).

One trial in the meta-analysis studied the effect of behavioural support for cessation in comparison to a brief advice to quit. Inconclusive evidence was found that such assistance was more effective than brief advice, in yielding long-term abstinence (RR: 5.25, 95%CI: 0.62-44.14). While the intervention increased attempts to quit smoking, it was inconclusive that this improved the success rates of the attempts (RR: 3.10, 95%CI: 0.38-25.51). Patients receiving the behavioural support intervention rated it more helpful than patients given advice to stop smoking (13).

A systematic review of RCTs evaluating the effectiveness of physicians' advice on smoking cessation on abstinence from smoking after at least 6 months follow-up suggests that counselling has a modest effect on cessation rates (34). Smoking quit rates in control groups in the included trials showed a large variation, ranging from 1 to 14%. Assuming an unassisted quit rate of 2 to 3% at 12 months, pooled data of 17 studies showed that brief advice could increase this rate by about 1-3% (RR: 1.66, 95%CI: 1.42-1.94). 11 Trials that evaluated a more intensive intervention suggested a small additional effect (RR: 1.86, 95%CI: 1.60-2.15) as compared with standard care (no advice given). There was some evidence that providing a follow-up appointment is an important component of the intervention (34).

Evidence also supports the use of NRT or pharmacological support as adjunct to assistance in smoking cessation (35, 36). NRT can be given in various forms, namely chewing gum, transdermal nicotine patches, nasal spray, inhaler or sublingual tables, all of which have been demonstrated to be effective at helping people to quit smoking. A systemic review showed that the RR for abstinence with NRT vs. control was 1.60 (36). Buproprion is an antidepressant that can help with long-term smoking cessation (37). A meta-analysis demonstrated similar quit success rates of bupropion versus placebo as NRT (38).

Varenicline is a partial nicotine receptor agonist that has been shown to more than double the chance of quitting, as compared with placebo (36). The EUROACTION-PLUS (EA+) study showed that offering optional varenicline therapy to a nurse-led preventive cardiology programme substantially increased smoking abstinence over 16 weeks in high CVD risk smokers. 91% Of 350 participants randomised to the EA+ program opted to use varenicline. 177 participants in the EA+ group were abstinent from smoking, as opposed to 63 of the 346 smokers randomised to usual care (OR: 4.52, 95%CI: 3.20-6.39)(39).

Enhancing physical activity

The British NICE guidelines recommend a framework to assess physical activity in a patient (40). Since being inactive is a risk factor for CV disease, this should be seen as reason to set targets. Only suggesting to use a pedometer will have little effect, but using a pedometer and setting incremental targets is helpful. Patients can monitor themselves and progress can be discussed in follow-up consultations. Guidance is needed on appropriate target setting, which involves discussing daily life to find moments when extra physical activity can be incorporated (40).

Reducing alcohol consumption

A strong risk factor for hypertension is high alcohol consumption. A systematic review looked into techniques to change behaviour, in an attempt to identify aspects of interventions that work best to increase motivation to change (41). Within the motivational cluster of BCTs, prompt commitment there and then yielded a large decrease of alcohol consumption (-56 g/week, P=0.025), while providing information on the consequences of drinking (+14 g/week, P=0.5), boosting motivation and confidence (+33 g/week, P=0.11), providing information about other behaviour (-38 g/week, P=0.10) or motivational interviewing (-8 g/week, P=0.73) had no significant effect on alcohol use. In a self-regulatory cluster of techniques, prompting self-recording of goals by means of a drinking diary was most effective (-50 g/week, P=0.002), while action planning and identifying triggers (+15 g/week, P=0.3), goal setting (-22, P=0.26) and prompting reviewing of goals (-29, P=0.19) did not have an effect. When combining all techniques in a meta-regression, self-monitoring showed a larger effect size than did prompt commitment there and then (-36 vs. -8 g/week) (41).

Body weight reduction

In an attempt to learn how to set smarter goals, a study was done in overweight or obese women enrolled in a commercial weight reduction programme (Weight Watchers) to investigate the effect of addition of implementation intention prompts to an established weight-reduction intervention (42). The implementation intentions are a simple document with specifications of what somebody plans to eat where, when and how in for instance the upcoming week. Coping plans were also formulated, which dictate what somebody might do in a given situation, for instance 'If I am hungry, then instead of eating an unhealthy snack I plan to eat …' , or 'if someone offers me my favourite unhealthy food, then in order not to eat it I plan to …'.

Fifty-five overweight or obese women (BMI: 25.28-48.33) were randomly assigned to either an implementation intention prompt or a control condition. After two months, the intention prompt participants had lost on average 4.2 kg (95%CI: 3.19-5.07) as compared with 2.1 kg (95%CI: 1.11-3.09) participants in the control group. The study revealed that planning facilitation was a key mechanism that explained the weight loss generated by implementation intention formation (42).

Recently, the PC-based, open-label, cluster-randomised DiRECT study evaluated an intensive weight management programme (43). The aim was to assess whether the weight management intervention would achieve remission of T2DM, as compared with best-practice care according to guidelines (n=149 in both arms, from 23 intervention and 26 control practices). Participants had been diagnosed with T2DM within the past 6 years, and had a BMI of 27-45 kg/m2 and did not receive insulin. The intervention consisted of total diet replacement (825-853 kcal/

day formula diet for 3-5 months), stepped food reintroduction (2-8 weeks), and structured support for long-term weight loss maintenance. Participants randomised to the intervention were withdrawn from antidiabetic and antihypertensive drugs. At 12 months, weight loss of at least 15 kg was seen in 36 (24%) participants in the intervention group, as compared with 0 in the control group. 68 (46%) of patients in the intervention group achieved remission of diabetes, and in six (4%) of participants in the control group (OR: 19.7, 95%CI: 7.8-49.8, P<0.0001). Mean bodyweight was 10.0 kg lower in the intervention group and 1.0 kg in controls. Quality of life improved in the intervention group, while a decrease was reported in controls. The cohort will be followed for at least up to 4 years (43).

Motivational interviewing

The philosophy of motivational interviewing has its roots in helping people with addiction. It is a person-centred approach not so much about persuading people and trying to overcome their resistance to change by giving them a lot of information, but more about 'rolling with the resistance'. Key aspects of motivational interviewing include that it should engage the client in talking about issues, concerns and hopes, that it focusses on those habits or patterns the client wants to change, and it should evoke motivation to change by increasing the client's sense of the importance of change, their confidence about change and their readiness to change. It can also be used to develop the practical steps clients want to use to implement the changes they desire.

Motivational interviewing is useful for people who are resistant to making changes, or who are ambivalent about making a change. It helps a health care professional to reach a point at which the individual has their own reason to make a change. Note that patients' motivation may differ from a GP's perspective, as the GP may think in terms of reducing for example mortality risk.

Many of the components of motivational interviewing overlap with those of BCTs (see review by Rubak (4)). In a meta-analysis, Rubak et al. assessed the effectiveness of motivational interviewing on a number of risk factors (4). Significant positive changes in BMI, total blood cholesterol, systolic BP, blood alcohol content and standard ethanol content were observed. Motivational interviewing can be effective in brief encounters of about 15 minutes, but the authors think that using this approach in separate encounters increases the likelihood of achieving an effect (4).

A recent review of 33 studies on motivational interviewing in PC demonstrated that 18 of those studies showed a positive effect on physical activity, diet or alcohol intake. The authors were, however, not very confident of the evidence on its effectiveness in PC. This was because the fidelity to the philosophy of motivational interviewing was unclear in various studies, and or no consistent definition and different components of the approach were used. Moreover, often it was not well reported how PC staff was trained (4). Nevertheless, the motivational interviewing interventions found to be effective, used similar BCTs as were considered effective in other studies, namely goal setting, action planning and problem solving, as well as social support and feedback. This review also concluded that duration of 4-5 hours of motivational interviewing sessions is more likely to be effective than shorter duration (44).
With regard to multidisciplinary approaches, the EUROACTION (45) paired cluster-randomised trial should be mentioned; a nurse-led family-centred programme for coronary patients and their families, conducted in eight European countries. There was a hospital-based arm and a PC-arm. In the latter, there was a nurse-led lifestyle intervention for patients at high risk. Behavioural approaches and motivational interviewing were used. At 1 year, almost 40% more people in the intervention arm were eating fruits and vegetables, about 30% more were physically active. Weight appeared more difficult to change; 10% more people achieved weight loss of at least 5% in those overweight (BMI ≥25 kg/m2) at baseline. Finally, significantly more (16.9%) people had their systolic BP controlled according to guidelines (45).

The Dutch guideline for CV risk management states that the heavy workload of CV management for GPs may be shared with advanced practice nurses. A study in The Netherlands therefore evaluated the effectiveness of practice nurses delivering CV risk prevention and management, as substitutes for GPs (46). 701 High-risk patients were randomised to CV risk management by a GP or a practice nurse. It appeared as though the nurses could achieve somewhat bigger changes in risk factors, but after correcting for confounders, the only change that remained statistically significantly greater in the nurse-groups was lower total cholesterol. Thus, practice nurses can, just like GPs or possibly better, help individuals to improve CV risk factors (46).

Training health professionals in behaviour change counselling

The effect of training PC health professionals in behaviour change counselling on the proportion of patients self-reporting change in risk behaviours (smoking, alcohol consumption, exercise and healthy eating) was evaluated in a cluster-randomised trial (randomised by general practice)(47). 831 Patients with at least one risk behaviour in intervention practices, and 996 in control practices, were eligible to enrol. PC professionals were trained using a blended learning programme, and behaviour change counselling was developed from motivational interviewing.

No effect of the intervention was seen on the primary outcome of self-reported beneficial change in behaviour at three months, as compared with practices where GPs and practice nurses were not trained (362 (43.6%) vs. 404 (40.6%), OR: 1.12, 95%CI: 0.90-1.39). No significant difference was seen in the primary outcome at 12 months (40.6% vs. 39.8%, OR: 1.03, 95%CI: 0.83-1.28). Nor was a difference seen in biochemical (LDL, HDL and total cholesterol) or biometric (waist-to-hip ratio, body mass index) measures (47). While patients' recollection of discussing behaviour change was improved in the intervention practices, and these patients showed more attempts to change behaviour and increased perception of having made a lasting change at three months, this study suggests that a single routine consultation with a trained clinician is unlikely to result in enduring behaviour change and improvements in biometric measures.

Societal strategies to promote healthy behaviour

In addition to aiming for lifestyle improvement at the individual patient level, societal measures can be effective at a population level. Taxing cigarettes or unhealthy food, or restricting their availability may be even more effective, but it is not easy to persuade governments to for instance limit sales of certain consumption goods. Examples of policy measures to stimulate healthy behaviour are the sugar tax raised by the Mexican Government and the boring uniform looks of cigarette packs. These interventions remain exceptions, however, and they may take decades to be implemented. Other effective interventions include implementing smoke-free areas, and reimbursement of smoking cessation programmes.

An article that summarises the main messages of the ESC 2016 prevention guidelines notes that a population level approach follows the Geoffrey Rose paradigm, meaning that small shifts in the risk of disease (or risk factor) across a whole population consistently lead to greater reductions in disease burden than a large shift in high-risk individuals only (48). We now commonly consider smoking a risk factor, and that appears to pay off. Regarding smoking, incremental little effects have indeed accumulated to a large effect. Parallels should be sought for instance for weight control. Governments should take specific responsibilities in caring for groups with lower socio-economic status, who appear particularly vulnerable to unhealthy lifestyles. These are conditions a GP can do little about, but policy makers can. For instance, taxing cigarettes or reimbursement of medication to quit smoking can determine whether somebody will try.
It could be argued that GPs have further responsibility in being involved in policy-making, as advocates of the patient community. This should not be left to policy-makers alone. In fact, in England, when the smoking ban in public places was established, initially the plan was to still allow smoking in pubs. This plan was overturned by medical organisations and public pressure. Oftentimes, those active in pushing people to change behaviour have also been the ones pushing governments to change policy.
Talking to patients about the need for adopting a healthy lifestyle can furthermore have an indirect effect on the acceptance rate of societal measures, as this signals the message that it is a problem if health is at risk. Alternatively, if a doctor does not continue to raise the subject of improving lifestyle, patients may think that the situation is now good enough and that no change of behaviour is needed.
A commentary (49) on the main messages for primary care (48) on the 2016 ESC guidelines on CVD prevention (1) also acknowledges the essential role a GP can play in both individual risk assessment and implementation of the guideline in national and regional prevention frameworks. According to the authors, the responsibility of GPs in CVD prevention extends beyond clinical practice and a proactive attitude and leadership is advocated, in order to promote a healthy lifestyle in the whole population (49). All involved parties should establish a plan to better work together in health care and the community; GPs can act to better organise this collaborative effort. Furthermore, since efforts to promote healthy behaviour are time-consuming, reimbursement may need to be organised. Reaching subgroups in society with specific health situations, for instance people in lower socio-economic classes, likely requires extra effort or different approaches. Funding should be made available for the necessary efforts to reach all corners of a community.

Conclusion

Evidence suggests that using BCTs helps patients change their health behaviour. It is generally more effective when more than two strategies are used, and if the focus lies on developing skills. Formulating smart goals is essential to increase chances that these goals will be followed: define implementation intentions that will actually carry through, rather than only speaking out aspirations. It helps to be realistic that lapses may occur, and plans should be formulated on how to behave when motivation drops and the patient lapses. Involving a partner, or member of the household/family member helps most patients. Moreover, self-monitoring can help in achieving goals, and feedback from the PC professional on the efforts and achieved changes can be stimulating.
Studies suggest that people are more open to conversations about health behaviour changes with their physician than health professionals think and give them credit for. Linking the raising the subject to a positive health message can be effective.
Simply offering opportunities is already helpful, especially if the physician helps the patient commit to action during that same consultation. It helps to establish accountability of the patient to you as a doctor.
In conclusion, changing behaviour is not easy, as we are not as rational as we like to think we are. It is important to figure out how GPs can implement these methods in their practices, as it can make a huge difference in a patient's health and life. Importantly, BCTs do not have as many side effects as pharmacotherapy. These interventions can be added to or sometimes be used in place of drugs to make meaningful changes to the lives of patients and to improve risk factor control. Overall, there is no magic bullet. Even if the effect of efforts to change health behaviour is limited, the effort is not wasted, as many small effects can accumulate to a meaningful health benefit.

Recommendations for further research

Compared to usual care or education alone, BCTs can indeed be more effective at changing behaviour in CR and lifestyle changes such as smoking cessation and exercise, at least in the medium term. Sometimes, this is just because studies did not follow patients longer than 6 or 12 months. Also, patients have lapses or they lose motivation. Thus, a booster intervention seems necessary to be able to expect sustained effects. The question remains how we deliver on some of these strategies.

More research is needed regarding what works best for whom in what situation, and on how to tailor approaches to individual needs. Some gaps in the evidence seem to arise from the difficulty to separate motivational interviewing from other cognitive behavioural techniques, as these methods share many similar strategies. It is important therefore, in research, to use the same precision in describing interventions, as we do when talking about pharmacotherapy (e.g. type, dose, frequency). The BCT taxonomy (15, 16) can be helpful to achieve this.
Table 3 lists gaps in the evidence base on use of BCTs in PC that require further research.

REMAINING QUESTIONS ON OPTIMAL BCTS	SUBQUESTIONS
Which interventions work best during a consultation?	How can we make BCTs an effective part of practice (time, how to tailor approaches to an individual patient)?
What is the best form of delivery?	Group vs. individual, face-to-face vs. remote, using (online) technology or not, lecture vs. interactive style?
What is the efficacy of brief interventions as compared with repeated efforts over time?	
How long should follow-up of health behaviour change be? When can a lifestyle modification be considered sustainable?	
Who should instigate the behaviour change?	GP or practice nurse, or e.g. local governmental body. What are the responsibilities of the patient him/herself, the GP and/or other authorities?
When should physicians receive training about how to stimulate health behaviour changes?	undergraduates, young doctors
How can training on communication skills be organised?	How we use them, how we deliver them, and how we can implement them in busy practices
How can the approaches be adapted to different cultural settings?	How to make them culturally sensitive and appropriate
Which smart phone applications can help change behaviour?	

Table 3: Gaps in the evidence base on use of BCTs in PC

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