The King's Fund

Ideas that change health care

Motivation and Confidence:

WHAT DOES IT TAKE TO CHANGE BEHAVIOUR?

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kicking bad habits

Kicking Bad Habits: How can the NHS help us become healthier?

Individual responsibility for health and self-care are key themes in recent health policy documents in England. The Wanless review of health care funding (2002) showed that public engagement with health could help to reduce health care costs. *Choosing Health* (2004) looked at how information, services, retailers and marketers could make healthy lifestyles 'an easier option' for people. *Our Health, Our Care, Our Say* (2006) explored the future of health and social care based on an assumption of individuals managing their health and health care. These policies are based on a number of ideas:

- individuals should take greater responsibility for their health care
- individuals should adopt healthier behaviours to avoid ill-health in later life
- if individuals do change their behaviours, the hope is that better health will reduce future health costs.

For the NHS and health practitioners working within it the challenge is how to support people to adopt healthier behaviours and avoid risky ones. Much of the published material on models of individual behaviour and change is based on theory rather than practice, and there is little consensus on the elements of successful interventions.

This programme explores both the theory and practice of behaviour change interventions and tries to answer the questions:

- what interventions are effective in encouraging healthy behaviour?
- how can the NHS help people become healthier?

During 2007 and 2008 the King's Fund will publish a series of papers on:

- the impact of financial incentives
- the effectiveness of targeting low socio-economic groups
- the role of information-led strategies
- the impact of personal skills, capabilities and confidence to change
- strategies for identifying and targeting interventions.

These papers will be of interest to policy-makers, academics, commissioners and practitioners concerned with supporting behaviour change and securing future health improvements.

We will be inviting comments on these papers on our website, and will be holding a series of seminars to discuss our findings. These will feed in to a final report to be published in late 2008.

To get updates on the Kicking Bad Habits programme of work, email your name, job title and organisation to: kickingbadhabits@kingsfund.org.uk

For more information, contact Ruth Robertson at: r.robertson@kingsfund.org.uk

This paper, *Motivation and Confidence: What does it take to change behaviour?*, is the fourth in this series. The paper considers the influence of an individual's motivation and confidence in modifying their health behaviours and summarises the evidence of effectiveness from reviews of behavioural interventions. The paper focuses on interventions that are designed to promote people's motivation and confidence to quit smoking, to become more physically active and to eat a healthier diet. The paper finds there is good reason to believe, at least from theory, that motivation and confidence are key determinants of behaviour change. So while it seems important that an individual is both motivated to change and confident about making a particular change if they are to be successful, there remains little clarity about what behavioural techniques and interventions work and for whom. Most of the interventions that are implemented are not explicit about how they work nor do they assess or report measures of motivation or confidence.

Introduction

A significant proportion of the disease burden faced by the NHS is caused by smoking, poor diet and lack of exercise. For example, in 2005/6 1.7 million hospital episodes in England were related to smoking (Information Centre 2007). The health consequences of smoking have long been recognised (Doll and Hill 1954). Smokers are more likely to suffer from coronary heart disease, lung cancer and respiratory diseases such as chronic obstructive pulmonary disease (COPD). Smoking remains the greatest single cause of illness and premature death (17 per cent of all deaths of adults aged 35 and over in 2005) with more than 106,000 premature deaths every year attributable to smoking (Department of Health 2008b). While overall smoking prevalence is falling in England (from 39 per cent in 1980 to 24 per cent in 2005), inequalities in smoking behaviour persist (Information Centre 2007). Nearly three-quarters of current smokers aged 16 and over reported that they wanted to give up smoking, with health being the most common reason (Information Centre 2007).

Obesity increases the risk of developing type 2 diabetes (by up to 80 times compared to the non-obese) and coronary heart disease (by 2–3 times) and is associated with hypertension and other debilitating conditions (McPherson *et al* 2007). Despite government targets to halt the growth in obesity, rates of obesity in both adults and children have continued to rise rapidly (Wanless *et al* 2007) and are projected to continue to rise (Butland *et al* 2007). In 2006 24 per cent of adults aged 16 or over in England and 16 per cent of children aged 2 to 15 were classified as obese, an increase from 15 per cent in 1993 for adults and 11 per cent in 1995 among children (Information Centre 2008).

Poor diet and a sedentary lifestyle both contribute to the problem of obesity. These are in turn influenced by a range of factors including appetite control in the brain, force of dietary habits, and psychological ambivalence experienced by individuals in making lifestyle choices (Butland *et al* 2007). The Chief Medical Officer has recommended that adults take at least 30 minutes of moderate-intensity activity at least five times a week. For children the recommended level is 60 minutes or more of physical activity every day. In 2006 40 per cent of men and 28 per cent of women, 70 per cent of boys and 59 per cent of girls met the recommended levels (Information Centre 2008). The government recommends that everyone should consume at least five portions of fruit and vegetables a day; 28 per cent of men and 32 per cent of women, 19 per cent of boys and 22 per cent of girls consumed recommended levels in 2006 (Information Centre 2008). Again there are socioeconomic inequalities in both the level of physical activity and consumption of fruit and vegetables (Information Centre 2008).

These issues present significant challenges to the government and to the NHS. Effective strategies need to be identified to improve the population's health and to reduce health inequalities. In addition to societal policies (such as the smoking ban and the provision of cycling lanes), the government has committed to supporting individuals to modify these behaviours. *Choosing Health* set out recommendations to create a 'health promoting' NHS. The report focused mostly on giving advice as well as offering access to NHS Stop Smoking services and practical support on healthy eating, exercise, weight gain, and clinical treatment for obesity (Department of Health 2004). More recently the government published a comprehensive strategy (Department of Health 2008a) to tackle obesity in response to the Foresight report on obesity. This strategy commits to take action in a number of areas including investing in a walking campaign and supporting the commissioning of more weight management services. But what evidence is there that these behavioural interventions are effective? This paper seeks to answer that question.

Aims

In the other papers in the Kicking Bad Habits series we have been focused on the response of individuals to external stimuli such as financial incentives (Jochelson 2007) and information (Robertson 2008), and on the impact of interventions on low-income populations (Michie *et al* 2008b). In this paper, the fourth in the series, we are interested in internal psychological factors that influence whether people are able to modify their health behaviours and what interventions are effective in supporting individuals to change their behaviours. The paper focuses on interventions that are designed to promote people's motivation and confidence to quit smoking, to become more physically active and to eat a healthier diet. It does not cover other important health-related behaviours such as sexual behaviours, or alcohol and drug misuse. Nor does the paper focus on interventions targeted at children, though these are much needed to prevent children taking up smoking, and to tackle rising obesity rates among children. As the paper discusses, there is good reason to believe, at least from theory, that motivation and confidence are key determinants of behaviour change.

The paper begins with a general discussion of the role we understand an individual's motivation and confidence plays in their ability to change behaviour and reviews some of the main theories in the psychological literature from which these ideas derive. The paper then attempts to identify the effectiveness of interventions that are designed to enhance motivation and increase confidence. It summarises the findings of a number of reviews of intervention studies to tackle smoking, poor diet and low levels of physical activity. Finally, the paper concludes with a discussion of the main findings and of some of the implications for future research, policy and practice.

What does it take to change?

There is a large body of theoretical work that has sought to explain the determinants of human behaviour. Health behaviour theory has a plethora of theoretical constructs, which are often very similar or indeed identical to each other but use different terminology (Noar and Zimmerman 2005). Attempts have been made to develop an integrated theory and to distil similar concepts from the different theories (Noar and Zimmerman 2005; Michie *et al* 2005). There are many different ideas about what factors affect whether someone will change (and maintain) lifestyle behaviours. Here we focus on those theories (and elements of them) that focus on a person's motivation to change (and the factors that influence motivation) and their self-confidence to make that change as these are understood to be important individual level factors in determining behaviour change.

Most of the main theories include a concept relating to confidence (ie, belief in one's ability to perform the behaviour) and to motivation (ie, one's desire or will to engage in the behaviour). In a review of the psychological literature on behaviour change, Michie *et al* (2005) identified 12 domains including: knowledge; skills; social/professional role and identity; beliefs about capabilities; beliefs about consequences; motivation and goals; memory, attention and decision process; environmental context and resources; social influences; emotion; behavioural regulation; and nature of the behaviours. Table 1 presents two of the domains – beliefs about capabilities and motivation and goals – and includes some related questions that might be posed in investigating the behaviours of interest here – smoking, diet and exercise.

MOTIVATION

The term 'motivation' is used to refer both to our reasons for action (what is your motive?) and to our enthusiasm for doing it (how motivated are you?). It has been defined in the psychology literature as 'the psychological forces or energies that impel a person towards a specific goal' (Sheldon *et al* 2003, p 45). The forces that direct our actions are highly complex and there are many ideas about how motivation operates. Concepts relating to motivation and formation of goals and intentions (Table 1) can be found in a number of theories. Some theories emphasise conscious decision-making others more subconscious urges, impulses and inhibitions. Few have tried to synthesise or integrate the different elements (West 2006).

TABLE 1: THEORETICAL DOMAINS, CONSTRUCTS AND RELATED QUESTIONS ABOUT BEHAVIOUR CHANGE

Domain	Constructs	Questions
Beliefs about capabilites	Self-efficacy	
	Control – of behaviour and material and social environment	How difficult or easy is it for you to give up smoking/eat healthier/take more exercise?
	Perceived competence	What problems have you encountered in trying to do x?
	Self-confidence/professional confidence	How confident are you that you can do x despite the difficulties?
	Empowerment	What would help you?
	Self-esteem	How capable are you of maintaining x?
	Perceived behavioural control	How well equipped/comfortable do you feel to do x?
	Optimism/pessimism	
Motivation and goals	Intention; stability of intention/ certainty of intention	How much do you want to give up smoking/eat healthier/take more exercise?
	Goals (autonomous, controlled)	How much do you feel you need to do x?
	Goal target/setting	Are there are other things you want to do or achieve that might interfere with x?
	Goal priority	Are the goals consistent or do they conflict with other goals?
	Intrinsic motivation	Are there incentives to do x?
	Commitment Distal and proximal goals Transtheoretical model and stages of change	

Source: Michie *et al* 2005 with author's modifications to questions

Some theories focus on the cognitive antecedents of motivation such as knowledge, attitudes and beliefs. For example, the health belief model would suggest that people are motivated to change by their general health values as well as by specific beliefs about their susceptibility to a particular disease and about its likely severity. The Theory of Reasoned Action (TRA) suggests that beliefs about the outcomes of the behaviour and the value they attach to these outcomes are also important. In addition, TRA recognises that subjective norms (that is, perceived social pressure) are also important motivating factors (Ajzen and Fishbein 1975).

Motivation may be internally or externally driven. The concept of intrinsic motivation was developed to explain the desire people have to engage in some activities without external reward – these behaviours are motivated because they satisfy some internal need to feel competent and self-determined (Deci and Ryan 2000).

One of the better-known theories related to motivation is the transtheoretical model. This identifies a series of motivational stages through which people progress and relapse in order to achieve health goals (Prochaska and DiClemente, 1983). It is usually presented as consisting of five stages: pre-contemplation (not thinking about the behaviour), contemplation (deliberating about change in the near future), preparation (preparing to make change), action (initiating behaviour), and maintenance (continuing to perform the behaviour). This theory has been applied widely in health education and promotion, for example, smoking cessation, condom use, weight loss, alcohol abuse, drug abuse and stress management. This model has also been criticised, in particular for drawing arbitrary divisions, assuming that individuals make stable plans, lacking conceptual coherence, and failing to acknowledge the automated nature of some habitual or addictive behaviours (West 2005).

Many psychological theories identify motivation as an important behavioural determinant. However, they identify different factors that influence motivation including conscious and subconscious processes, internal and external drivers, different beliefs about the consequences of their current behaviour, the expected outcomes of the new behaviour, and perceptions of social norms including others attitudes and behavioural approval. We now look at what theory says about the role of confidence in behaviour change.

CONFIDENCE

Self-confidence is usually used to refer to a generalised sense of well-being about one's life (Rollnick *et al* 2000, p 92). Here we are interested in a person's confidence to undertake a particular behaviour – in other words, their belief about their capabilities (Table 1). The concept is variously called self-efficacy in health-belief model and social cognitive theory, and perceived behavioural control in theory of planned behaviour.

People may lack confidence because they fear the consequences ('what if it brings on a heart attack?'), they have had previous experience of failure ('I've tried quitting loads of times before but have never managed it'), or because of their emotional/mental state (ie, depressed, anxious or stressed).

According to Bandura's social cognitive theory self-efficacy is one of three key influences on behaviour. Self-efficacy expectations are defined as beliefs about the individual's ability to perform a particular behaviour regardless of circumstances or contexts. According to this theory the other influences on behaviour are expectations of outcome, that is, beliefs about the effectiveness of the behaviour, and social influences including social norms, social support or pressure, and the behaviours of others (Bandura 1977; 1997). The theory of planned behaviour (an extension of the theory of reasoned action) uses a similar and related concept of perceived

behavioural control to describe the extent to which an individual feels they have control over the particular behaviour or action (Ajzen 1985).

INTERACTION BETWEEN MOTIVATION AND CONFIDENCE

While the concepts of confidence and motivation are distinct, they are also interrelated.

Motivational factors and self-efficacy have both been identified in the literature as being important in intention formation (that is, an individual's commitment to perform a specified behaviour). Intentions express a person's motivation to achieve a specific goal. Intentions in turn are associated with behavioural outcomes, though self-efficacy is believed to have an independent influence on behaviours beyond its role in shaping intentions.

One factor in whether an individual is motivated to change might be whether they have confidence that they can undertake a particular action. Once the individual has decided to take action, self-efficacy is important in order to maintain the effort required in maintaining the behaviour and coping with barriers that arise. It has been suggested that the motivational phase (that is, when a person develops an intention to change) should be considered separately from the volitional phase (that is when the behaviour is planned, initiated and maintained) (Sniehotta *et al* 2005). Self-efficacy may be important at both stages. Therefore, building confidence is important if intentions are to be translated into actual behaviour change.

Other theories such as self-regulation theory, goal theory and control theory attempt to explain how motivation is translated into action. These focus on the mechanisms by which an individual can undertake actions to affect their own behaviour and usually involve self-monitoring together with awareness of the goals or standards they have set.

In summary, there are many theories of behaviour change that include concepts relevant to motivation and confidence. Understanding these theories that underpin human behaviour can help to inform the development of interventions to change behaviour. If empirical evidence supports theoretical predictions that motivation and confidence are important factors in behaviour change then it will enable interventions to be developed that target these determinants more effectively. Do such interventions exist and what evidence is there of their effectiveness? We consider whether there is evidence that certain interventions promote motivation and confidence, *and* change behaviour.

Method

In order to identify empirical studies of interventions designed to change these health behaviours (smoking, diet and exercise) by enhancing motivation and/or confidence, we undertook a non-systematic search of the literature. Searches were conducted in HMC, Psychinfo, Pubmed and Assia databases. Systematic and non-systematic review articles were identified by screening the abstracts, selecting those that focused on adults not children and on the general population rather than on patients. The search was limited to English language papers published since 1989. Additional reviews were suggested by external reviewers. Websites of key organisations such as the National Institute for Health and Clinical Excellence (NICE) and the Cochrane Collaboration were also searched for relevant guidance and reviews.

What interventions promote motivation and confidence?

Very few reviews were found that focused on specific interventions that target motivation and confidence. There were some that reviewed interventions that were based on particular theoretical models; however, the effectiveness of interventions was often assessed only in terms of impact on behaviours and not on the mediating variables, ie, self-efficacy or motivation.

Here we briefly highlight techniques associated with the main theories and identify the evidence for their effectiveness.

According to Bandura's social cognitive theory, self-efficacy can be increased by:

- enactive mastery experiences – experiencing success by taking small steps to overcome obstacles to behaviour change;
- vicarious learning – seeing other people similar to oneself succeed and learning from their experience;
- verbal persuasion – believing that they have what it takes to succeed; and
- emotive experiences or affective states – reducing stress or negative emotions such as depression through, for example, relaxation techniques (Bandura 1997; Bandura 2000).

Hyde *et al* (forthcoming) review intervention studies that increase self-efficacy to refrain from addictive behaviours. They identified a limited number of studies for the review. The interventions used verbal persuasion and experiential activities to increase self-efficacy. The six randomised control trials reported significant effects of the intervention on self-efficacy, while the non-randomised studies did not report significant intervention effects on self-efficacy. However, as the interventions were so variable the review was unable to conclude anything about the most effective way of achieving increases in self-efficacy.

A number of theories highlight the importance of peer modelling and social norms. Buddying schemes and group programmes (such as weight loss programmes) may provide opportunities for vicarious learning as well as being a source of social support. The Chronic Disease Self Management Program developed by Stanford University and the Expert Patient Programme in England are explicitly modelled on this theory. The Expert Patient Programme (EPP) is designed to enhance the self-efficacy of those with chronic conditions to facilitate their engagement in order that they are more confident to undertake the self-management activities required of them. There is some evidence that participation in EPP alters self-efficacy and participants are generally very satisfied; however, there is as yet little evidence that it leads to behaviour change. Further work is needed to establish the efficacy of these techniques and interventions for use with people with chronic conditions and to assess whether the techniques are transferable for use with groups of at-risk people such as the overweight or obese.

The transtheoretical model is associated with stage-based interventions, whereby an individual's readiness to change is assessed and information and support is tailored to their stage of change. Although stage-based approaches are explicit about how they target people, the interventions used at each stage vary widely, in some cases simply using tailored information in others using techniques such as goal setting or relapse prevention.

Although the stages of change (based on the transtheoretical model) approach is in widespread use, especially for smoking cessation, evidence of its effectiveness is weak.

A review of 87 studies applying the stages of change model across a range of behaviours found little evidence of movement through discrete stages and questioned the validity of the approach (Littell and Girvin 2002).

- In their systematic review of stage-based interventions to promote smoking cessation Riemsma *et al* (2003) found that while there were a considerable number of studies published, the quality of their design was poor, making it difficult to establish evidence of effect. For example, only 11 of the 23 studies compared the stage-based intervention to a non-stage-based intervention. It was not always clear that the studies had used validated tools for assessing participants' stage of change or that the intervention delivered was properly stage based. They concluded that stage-based interventions were no more effective than non-stage-based intervention or no intervention.
- A similar review assessing the effectiveness of applying the transtheoretical model to exercise was identified. Spencer *et al* (2006) identified 15 studies in which stage-matched interventions had been compared to standard interventions. Nine of these demonstrated better outcomes for the stage-based interventions but the evidence was far from conclusive. The review also found that advanced stage membership was associated with higher self-efficacy and a stronger perception of the benefits of exercise.

Another technique that targets motivation and confidence is motivational interviewing or its short form called brief negotiation (Rollnick *et al* 2000; Miller and Rollnick 2002) (see box below). Although there have been a number of trials of motivational interviewing (MI) in smoking cessation they have shown small effects. There have also been several studies of diet, exercise and other lifestyle changes. Burke *et al* (2002) identified four studies of which two had no or short-lived advantages over alternative treatments for diet and exercise, and two found MI to be efficacious as an adjunct to usual medical care or group therapy for improving control of medical illness. The authors suggested that the studies did not test the efficacy of 'pure' MI and that they did not have quality controls to establish the integrity of the intervention. A systematic review of MI interventions found large variation in effect sizes even between studies targeted at the same behaviour, and those effects that were found were small (Hettema *et al* 2005).

MOTIVATIONAL INTERVIEWING AND BRIEF NEGOTIATION

Motivational interviewing has been defined as a 'client centred, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence' (Miller and Rollnick 2002; p 25). It is used both in the United States and to a lesser degree in the United Kingdom to coach individuals with chronic illnesses, those with addictions and people wishing to modify their health behaviours. There are two main phases to MI (1) building motivation for change and (2) strengthening commitment to change. MI draws on multiple concepts of behaviour change (both explicitly and implicitly). The professional engages the client in what is referred to as 'change talk'. This involves the person themselves identifying and communicating the reasons for change and might involve talking about the disadvantages of the status quo, the advantages of change, optimism for change, or their intention to change. Once the professional has established that the person is willing to change – ie, they are sufficiently ambivalent about the status quo that they are motivated to change things – then the professional asks the person what they are going to do about it. They then negotiate a change plan. This involves setting goals, brainstorming change options, arriving at a plan, and then eliciting commitment. This commitment might also be made public or shared with someone close to the person.

Goal setting and action planning are common techniques used as part of behavioural interventions based on self-regulation theory and control theory. Interventions that employ goal setting are likely to be more helpful if they focus on a personally defined goal or one selected by the individual that embodies their personal motivation (as compared to an impersonal goal or one set or defined by someone else) (Locke and Latham 2002). For example 'I want to quit smoking in order to be able to play football with my son this summer'. Specific goals are also generally more effective than general goals. For example, 'I will walk for 20 minutes 3 times a week on the way to work'. Finally, a goal should ideally be proximal (ie, identify an activity to be undertaken in the near future) and positively framed. For example, 'I will start walking on Monday'.

Shilts *et al* (2004) review the use of goal setting as a strategy for changing dietary and physical activity. Of 13 studies that compared goal setting to an intervention without goal setting, they identified five that fully supported goal setting and a further four that provided moderate support for goal setting. Many of these studies involved relatively small samples and were extremely heterogeneous; it is therefore difficult to generalise how effective such an approach would be with the general population.

Self-regulation theory also suggests that individual feedback on one's progress can be helpful to maintain behaviours, such as tools that allow people to track their weight or physical activity (eg, pedometers), or that demonstrates health gains in other ways (eg, lower blood pressure, improved lung function). No reviews were identified of interventions that use feedback based on self-regulation and control theory.

The majority of review-level evidence suggests there is weak support for stage-based interventions. Otherwise there is little systematic evidence of other theory-based interventions. There is some evidence to support self-efficacy enhancing interventions and those that employ techniques such as goal setting. More reviews are needed of studies that explicitly use theory-based techniques.

What interventions work for which behaviours?

Most reviews we identified focus on a specific behaviour and review all intervention studies that target this behaviour. While most reviews include interventions with behavioural components these are often presented alongside other types of interventions. Interventions are often not described in sufficient detail to enable a judgement to be made about the expected causal pathway for changing behaviours, ie, whether they thought the intervention changed behaviour by enhancing motivation or increasing confidence.

For example, we identified several reviews of physical activity that indicate some possible benefit from behavioural support interventions but do not allow any conclusions to be drawn about why these interventions are effective.

- Hillsdon *et al* (2005) found that brief advice from a health professional supported by written materials is likely to produce modest short-term effects on physical activity, while referral to an exercise specialist can lead to long-term changes in physical activity. Despite the diversity of interventions employed in the positive studies the review identified a number of common attributes including: setting goals for behaviour change; encouraging self-monitoring; exploring beliefs about costs and benefits, perceptions of risks and confidence to engage in physical activity; and reviewing progress (Hillsdon *et al* 2005, p 25). Theory would suggest that these sort of approaches can be used to enhance motivation and self-efficacy.

- A systematic review of interventions to promote walking found that brief face-to-face advice to individuals and remote support for individuals had a significant increase in self-reported walking (Ogilvie *et al* 2007). While no single method of promoting walking emerged as being most effective the review identifies two general characteristics of the effective interventions, namely targeting (either at those already motivated to change their behaviours or at sedentary people) and tailoring (so that content was relevant to the individual's circumstances or counselling individualised).
- Another review of schemes to promote walking and cycling as alternatives to car use found six studies that assessed targeted behaviour change programmes. Five of these had a positive effect (two significant) and one was inconclusive or had no effect (Ogilvie *et al* 2004). In general, these interventions were targeted at motivated groups of volunteers and therefore it is not clear how generalisable the findings are.
- A US systematic review of interventions to increase physical activity identified a number of studies that evaluated individually adapted health behaviour change programmes which used constructs from the main health behaviour theories (discussed earlier). All the programmes included: goal setting and self-monitoring of progress; building social support; behavioural reinforcement through self-reward and positive self-talk; structured problem-solving focused on maintenance; and prevention relapse. They concluded that the evidence points to this type of intervention being effective in increasing physical activity as measured by increase in the percentage of people engaging in physical activity, energy expenditure and other measures of physical activity (Kahn *et al* 2002). Due to differences in the metrics used to measure physical activity in the studies they were unable to conduct a quantitative synthesis.
- An evaluation of a series of Local Exercise Action Pilots (LEAP) commissioned by the Department of Health, Sport England and the Countryside Agency was limited by the high level of attrition. The pilots included classes and groups, motivational interviewing, peer mentoring, and training leaders and co-ordinators. There was a positive intervention effect in completers for motivational interviewing; 86 per cent of completers who were sedentary or lightly active at baseline achieved the Chief Medical Officer's recommendation of at least 30 minutes' moderate physical activity on five or more days of the week (Carnegie Research Institute 2007).

NICE guidance on physical activity recommends brief interventions in primary care whereby primary care professionals identify inactive adults and advise them to aim for 30 minutes of moderate activity on five days of the week (or more) (NICE 2006b). They are also advised to provide information on the benefits of activity, local opportunities for activity and to agree goals and put in place regular follow-up and review.

Most of the reviews that focused on diet were interventions targeted at children and young people or at those with existing conditions (such as diabetes).

- Slevin (2004) provides a summary of the findings of a US review of interventions for obesity in adults which found that counselling achieves modest weight loss in obese patients. It identified that better outcomes were achieved from intensive counselling and when combined with behavioural interventions. Neither the interventions nor the type of counselling employed were described, making it difficult to establish how these interventions were operating and what the mediating variables were on behaviour.

A number of reviews were identified that focused on both diet and physical activity as both of these are important in tackling obesity.

- The Health Development Agency published a review of reviews of the management

of obesity and overweight (Mulvihil and Quigley 2003). It included a number of systematic reviews of the effectiveness of behavioural therapy, which suggest that in conjunction with other weight loss approaches it is effective over a one-year period. However, it noted that there are few studies on which to judge the effectiveness of group behavioural therapy, correspondence courses, provision of structured meal plans and grocery lists, cue avoidance (individuals are asked to make changes to their habits in order to reduce exposure to certain foods) or cognitive rehearsal (rehearsing one's thoughts and actions and planning responses to a difficult situation). The review identified the need for more studies that assess the actual effectiveness of interventions and identify what aspects appear to be effective (Mulvihil and Quigley 2003).

- Avenell *et al* (2006) provide a useful summary of the evidence on behaviour change, diet and activity. They suggest that people should be encouraged to reduce inactivity rather than do more exercise, by incorporating activity into their current lifestyle. Techniques such as self-monitoring, identifying triggers and developing coping strategies can be helpful in aiding weight loss and maintenance. They also suggest that prompts and reminders can help to build habits and that individuals must be supported through frequent contact.

NICE guidance on obesity gives relatively little detail about interventions that are known to be effective but suggests that health professionals receive training in the 'health benefits and potential effectiveness of interventions to prevent obesity, increase activity levels and improve diet', in 'best practice approaches' and 'the use of motivational and counselling techniques' (NICE 2006c). It also suggests that primary care and local authorities should recommend or endorse self-help weight management programmes only if they follow best practice.

The majority of reviews identified are in the area of smoking.

- The Health Development Agency in its review of reviews of interventions designed to increase smoking cessation, reduce smoking initiation and prevent further uptake of smoking (Naidoo *et al* 2004) found that there was good evidence that contact with a clinician (both physician and non-physician) is effective in increasing abstinence rates, and that certain counselling and behavioural therapies are effective including problem solving, skills training, relapse prevention or stress management. They also found evidence that 'buddy systems' delivered in smokers' clinics increase smoking cessation and that proactive telephone counselling can help smokers to quit. No evidence is presented to demonstrate whether these interventions increase self-efficacy or motivation, but it is possible, given what we understand about the mechanisms of behaviour change, that these factors may be playing a mediating role in the successful outcomes observed.
- A more recent review by the Cochrane Collaboration shows that both individual counselling and group therapy increase the chances of quitting, but that group therapy was no more effective than other interventions involving personal contact. They note that the interventions used by therapists draw on a variety of psychological techniques rather than one theoretical model and were unable to conclude anything about the relative effectiveness of different psychological approaches (Lancaster *et al* 2000).
- The review of individual behavioural counselling looked at the effectiveness of one-to-one counselling (duration of more than 10 minutes) delivered by a smoking cessation counsellor (usually with a background in social work, psychology, psychiatry or health education). Only one study in the review compared two counselling approaches (relapse prevention model and health belief model). Pooled data from 17 studies gave

an odds ratio for successful smoking cessation of 1.56 (95 per cent CI 1.32 to 1.84). There was no evidence that more intensive counselling was more beneficial than brief counselling. There is still a need to establish the most cost-effective intensity and duration of counselling (Lancaster and Stead 2005).

Many countries have telephone quitlines for smokers but due to the reluctance to deny support to those calling, controlled evaluations are limited.

- A Cochrane review of telephone counselling for smoking cessation identified numerous studies of proactive telephone counselling and found that it helped smokers interested in quitting, with those receiving three or more calls more likely to quit than people receiving standard self-help materials, brief advice or pharmacotherapy. They concluded that telephone quitlines 'provide an important route of access to support for smokers, and call-back counselling enhances their usefulness' (Stead *et al* 2006). Pooled data from eight trials comparing call-back counselling with the control condition gave an odds ratio of 1.41 (95 per cent CI 1.27-1.57) (Stead *et al* 2007). Similar positive results were found in another review of proactive telephone counselling (Pan 2006).

NICE guidance recommends that people who smoke should be asked how interested they are in quitting and that GPs, nurses, and other health professionals should refer them to an intensive support service (such as NHS Stop Smoking services) (NICE 2006a). NHS Stop Smoking services comprise a number of elements including a telephone quitline, proactive counselling and pharmacological therapies on prescription (such as nicotine replacement therapy). Studies included in the Cochrane review of individual smoking cessation counselling noted that the interventions typically included a review of the person's smoking history and motivation to quit, help with identifying high-risk situations, and generation of problem-solving options (Lancaster and Stead 2005). Recent public health guidance from NICE has recommended that PCTs ensure that smoking cessation services are targeted at minority ethnic and socially disadvantaged communities in the local population and that health professionals in contact with pregnant women and their partners do more to target advice and treatment at those who smoke (NICE 2008).

Most reviews identified focus on a specific behaviour. These reviews suggest that behavioural interventions that support individuals have been shown to be effective as compared to other approaches to behaviour change.

Why do interventions change behaviour?

Very few reviews were found where the focus was on the extent to which the intervention changed the mediating variable (in this case self-efficacy or motivation) and its consequent impact on behaviours.

Most theories about the underlying factors that drive behaviour change have been supported by behaviour prediction studies. These studies generally measure how much of the variance in behaviours among a sample of the population can be explained by, for example, levels of self-efficacy. So while we know that high levels of self-efficacy are associated with the desired health behaviours, and that increasing self-efficacy is an effective means of changing many health-related behaviours, there is still almost no systematically reviewed evidence about the best way to increase self-efficacy. It is expected that a future review of interventions to increase self-efficacy concerning physical activity for adults will begin to address this gap in the research (David French, personal communication).

- Albarracin *et al* (2005) conducted a review of HIV prevention that assessed the influence of the major theoretical constructs on observed behaviour change. They concluded that there was good evidence to support the assumption that control perceptions/self-efficacy, behavioural skills and motivation promote behaviour change. They conclude this on the basis that strategies targeting the causal variable changed behaviour and influenced changes in the measure of the causal variable, that changes in measure of the causal variable influenced behaviour change and that changes in measures of the causal variable mediated the impact of strategies that target behaviour change (Albarracin *et al* 2005).
- Webb and Sheeran (2006) conducted a meta-analysis in order to estimate the impact of changing intentions on behaviour change. The studies mostly provided information regarding the behaviour and outcome, risk awareness material, skill enhancement and goal setting. The evidence suggests that medium- to large-sized change in intention results in only a small to medium change in behaviour (Webb and Sheeran 2006). They also found that intentions have less impact on behaviour when people lack control over the behaviour, when the behaviours were performed frequently (ie, conducive to habit formation) and where a social reaction to the behaviour was more likely. They suggest that interventions that promote intention stability (over time) and help people form implementation intentions (eg, 'I will smoke my last cigarette tonight') not simply behavioural intentions (eg, 'I will quit smoking') are likely to be more effective in changing behaviour.
- Hardeman *et al* (2002) reviewed studies that explicitly applied the theory of planned behaviour. The studies mostly employed persuasion and information techniques, with some use of techniques to increase skill, goal setting and rehearsal. Evidence of the mediation of components of the theory was sparse.

There have been few reviews of studies that systematically measure the impact of interventions and techniques on motivation and self-efficacy and their consequent effect on behaviours. Some studies claim interventions are based on theoretical models but often are not explicit about how techniques map onto theories or their associated constructs.

NICE's recent guidance on behaviour change (NICE 2007) is informed by a review of theoretical and empirical evidence and recommends interventions that motivate and support people to:

- understand the short-, medium- and longer-term consequences of their health-related behaviours, for themselves and others
- feel positive about the benefits of health-enhancing behaviours and changing their behaviour
- plan their changes in easy steps over time
- recognise how their social contexts and relationships may affect their behaviour, and identify and plan for situations that might undermine the changes they are trying to make
- plan explicit 'if–then' coping strategies to prevent relapse
- make a personal commitment to adopt health-enhancing behaviours by setting (and recording) goals to undertake clearly defined behaviours, in particular contexts, over a specified time
- share their behaviour change goals with others (NICE 2007).

Discussion

There are some significant challenges in reviewing and synthesising the evidence in this area. First, most of the existing reviews focus on a behaviour and review intervention studies in order to find out what works for that behaviour. They therefore include a wide range of interventions covering individual behavioural interventions as well as community-based interventions drawing on the full gamut of theoretical models of behaviour change. It would be useful if future reviews looked across or within behaviours at a single intervention or technique to determine its effectiveness. Each of these behaviours has different characteristics, which means that generalising about what works in each case is difficult.

Second, interventions are usually delivered in the context of a face-to face encounter, either on a one-to-one basis or in a group session. Some interventions are delivered by a professional in the course of a routine encounter with a patient; some by a professional trained specifically for that task, such as a smoking cessation counsellor; some by lay people or peers with some training but no professional qualification, for example, NHS health trainers (see box below). The use of lay health trainers to support people in deprived communities to change behaviour has not yet been evaluated in England. The ability to standardise the intervention is challenging and research studies have often not given sufficient attention to assuring the integrity of the intervention. However, increasingly use is being made of the telephone (for example, smoking cessation quitlines) and the internet (eg, NHS Lifecheck) for delivering these interventions. These offer the possibility of delivering interventions more cost effectively to large numbers. The evidence on the relative effectiveness of these is not well established. Reviews were often limited in the conclusions they could draw about the relative effectiveness because of poor reporting of data in the original studies.

Health trainers

The health trainers' programme was introduced following a commitment in the White Paper *Choosing Health* to have 1,200 trainers in post by the end of 2006/7 (Department of Health 2004). Competencies have been defined, and there is a training handbook and job description for health trainers (see www.dh.gov.uk/en/Publichealth/Healthinequalities/HealthTrainersusefullinks/index.htm). One of the main purposes of health trainers is described as, 'Boosting clients' motivation to change and their confidence in their ability to change'. A trainer also helps people to set goals and develop a personal health plan, gives practical support and identifies with individuals the barriers they face, and then helps them to celebrate their achievements (Michie *et al* 2008a).

The trainer is intended to help at a number of stages of the process: thinking about behaviour changes; planning the behaviour change; recording and reviewing behaviour change and maintaining behaviour change.

There has not yet been a published evaluation of their impact.

Third, meta-analysis of these interventions requires standardised reporting of outcomes. Srudies often use a variety of outcome measures, making comparison and synthesis difficult. In particular it is difficult to establish the comparative effectiveness of individually targeted behaviour change interventions against other community-based interventions, where the measures may differ and the population 'treated' is much larger. For example, there are a variety of self-report and objective measures of physical activity including use of a pedometer,

oxygen uptake, electrocardiogram readings, physical activity diaries, including or excluding lifestyle activities (see Spencer *et al* 2006; Ogilvie *et al* 2007). In addition, the measures used for assessing the mediators of behaviour such as self-efficacy are not always well validated. These measures, usually in the form of short self-complete questionnaires, are also not always standardised, making comparison between studies difficult.

Fourth, behavioural interventions are often delivered as part of a multi-component strategy. It is often not possible to isolate the effect of the behavioural component from other aspects of the intervention. In many reviews (as well as the original studies) the interventions are often poorly described making them difficult to replicate in practice and for researchers to compare results across studies. Abraham and Michie (in press) have developed a taxonomy of behaviour change techniques used in interventions; if used in future studies this will facilitate synthesis and comparison. Michie *et al* (in press) conducted a similar exercise mapping behaviour change techniques and linking these to behavioural constructs. This preliminary work demonstrates that it may be possible to develop a taxonomy of techniques linked to theory to enable future intervention studies to be more explicit about the components used and the extent to which they are testing theory or targeting particular behavioural determinants.

Finally, it was often difficult to locate interventions that were specifically designed to impact on the mediating variables of interest, namely motivation and self-efficacy. Many interventions are informed either implicitly or explicitly by theories of behaviour change. Yet many studies mention the underlying theory only in the introduction and discussion sections and do not include measures of the mechanism by which it expects to change behaviour in the data collection or analysis. Abraham and Michie (in press) identified multiple and overlapping constructs associated with each of the theories that are understood to be causal mechanisms for behaviour change. Unfortunately, not all evaluations have been designed to test the impact on the psychological variable they were designed to affect – eg, attitude, self-efficacy, intention – as well as on the behaviour itself. Studies measure the impact of the intervention either on the psychological variable or on behaviours but not always both. This means it is difficult to attribute the changes in behaviour to changes in the mediating variable and consequently to understand why the intervention is effective. The lack of reported mediation analysis is a major reason why we are still not clear whether these theories are correct and which of the main constructs derived from the theories are responsible for behaviour change.

Interventions and techniques also vary in their effectiveness depending on the population targeted. Most of these individual behavioural interventions are targeted at people who may be at higher risk of poor health due to their lifestyle behaviours, for example, those who are overweight or obese, sedentary or smokers. Variations in effectiveness have also been noted by gender, age, ethnicity and educational level. At least a couple of the reviews suggest that interventions are more effective when targeted at motivated individuals. Indeed by their very nature many of the studies look at what works in people who already have a certain level of motivation as they have enrolled in or made contact with a service. This suggests that while motivation is an important antecedent of behaviour change we still know very little about how to increase motivation in those who are not motivated.

There is also likely to be a range of different support needed for people in different social circumstances, at different stages in their disease, with different skill levels (eg, literacy). The theories reviewed here suggest that interventions to support people in taking action to improve their health might need to adopt a range of strategies depending on a person's level of knowledge, his/her illness and health beliefs, his/her attitudes towards the behaviour, the level of confidence, strength of social networks and the level of motivation. Understanding

who interventions work for is important if the NHS is to target more intensive support both on those who need it most and on those who stand to benefit most.

So while it seems important that an individual is both motivated to change and confident about making a particular change if they are to be successful, there remains little clarity about what behavioural techniques and interventions work and for whom. There is evidence that 'counselling' delivered in clinical settings either by health care professionals or specifically trained counsellors even if brief can be effective. However, training health care professionals in these techniques and persuading them that this is an important part of their routine care of patients will be more difficult. Perhaps models of referral, similar to that used for smoking cessation, need to be developed for other health behaviours to ensure that individuals who are most at risk are able to benefit from appropriate and effective support to make changes in behaviour. It is likely that some people will benefit from more intensive support to change, especially if they already recognise the need to change, and that there are some techniques and approaches that are more effective than simply informing and advising people to 'kick the habit'.

In summary, based on the body of theoretical work there is good reason to believe that motivation and confidence are key determinants of behaviour change. However, there are few known effective interventions for each of the behaviours examined here– smoking, exercise and diet. Most of the interventions that are implemented are not explicit about how they work nor do they assess or report measures of motivation or self-efficacy. Finally, there are very few studies that attempt to answer the question of why interventions change behaviour by measuring both behaviours and the mediating variables. So it is impossible to conclude whether the theories are in fact right. None of the reviews identified measured cost-effectiveness so it is not possible to conclude whether any of these interventions are worth the NHS investing in. This points to a need for research to be much more focused on the questions that commissioners and those implementing public health interventions have, namely what works, for whom and is it cost effective.

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