



Exploring how health behaviours are supported and changed in people with severe mental illness: A qualitative study of a cardiovascular risk reducing intervention in Primary Care in England

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Objectives. This study explored how health behaviours were supported and changed in people with severe mental illness by primary health care professionals trained in delivering behaviour change techniques (BCTs) within a cardiovascular disease risk reducing intervention.

Design. Secondary qualitative analysis of 30 staff and patient interviews.

Methods. We mapped coded data to the BCT Taxonomy (version 1) to identify BCT application. Thematic analysis was conducted to explore the barriers and facilitators of supporting and changing health behaviours. Themes were then interpreted using the Capability, Opportunity, Motivation, and Behaviour model to gain greater explanation behind the processes.

Results. Twenty BCTs were identified. Staff and patients perceived that health behaviours were commonly affected by both automatic and reflective motivation, sometimes in turn affected by psychological capability, social, and physical opportunity. Staff and patients suggested that motivation was enhanced by both patient and staff ability to observe health benefits, in some cases patients' health knowledge, mental health status, and social support networks. It was suggested that engaging in/sustaining healthy behaviours was influenced by physical opportunities to engrain behaviours into routine.

Conclusions. According to staff and patients, health behaviour change in this population was driven by complex processes. It was suggested that capability, opportunity, and motivation were in some cases enhanced by BCTs, but variable. Behaviour change may be optimized by individualized behavioural assessments, identifying drivers of behaviour and applying a range of BCTs may help to target individual needs. Patient peer-led approaches, techniques to encourage awareness of visible success, and normalizing health behaviours may increase behaviour change.

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Statement of contribution

What is already known on this subject?

- Poorer health behaviours may contribute to early mortality rates in people with severe mental illness.
- Health care professionals are encouraged to target the uptake of healthy behaviours, but there is limited guidance on how.
- The processes that cause or inhibit health behaviour change within interventions that use behaviour change techniques by health care practitioners are unclear.

What does the study add?

- Staff and patients suggested that behaviour change techniques (BCTs) in some cases increased capability, opportunity, and motivation to engage in healthy behaviours, but in other cases had variable success.
- Staff and patients reported that in some cases, motivation impacted health behaviour change and was in turn affected by psychological capability, social, and physical opportunity.
- Individualized behavioural assessments, flexible approaches to BCT application, involvement from patient peer support and different ways of targeting patient motivation may help to increase healthy behaviour changes in this population.

People with severe mental illness (SMI) are at greater risk of cardiovascular disease (CVD) and early mortality and the mortality gap between the general population and people with SMI continues to widen (Correll *et al.*, 2017; Hayes, Marston, Walters, King, & Osborn, 2017). Although several factors contribute towards this health disparity, many of the main contributors are modifiable. Poorer health behaviours including physical inactivity, smoking, alcohol, and poorer dietary consumption are common in people with SMI (Dipasquale *et al.*, 2013; Stubbs, Firth, *et al.*, 2016; Stubbs, Williams, Gaughran, & Craig, 2016; Vancampfort *et al.*, 2017a, 2017b).

Most interventions targeting health behaviours in people with SMI have reported mixed findings. Lifestyle interventions in some studies have reduced weight gain; however, many studies were reported as poor quality with short follow-up durations (Fernández-San-Martín *et al.*, 2014; Naslund *et al.*, 2017). Another recent study reported negative findings; a lifestyle education programme for people with SMI was not effective at reducing weight gain, and there were no changes to physical activity or dietary intake (Holt *et al.*, 2019). Some earlier studies found sports and exercise-based interventions could reduce body mass index, psychiatric symptoms, and improve cardiorespiratory fitness (Soundy, Roskell, Stubbs, Probst, & Vancampfort, 2015; Vancampfort *et al.*, 2017a, 2017b). However more recently, inconsistencies were identified regarding the effectiveness of interventions to change physical activity and sedentary behaviour and poor-quality evidence with varying follow-up durations (Ashdown-Franks *et al.*, 2018). Varenicline and bupropion increased smoking quit attempts, but smoking cessation programmes were not effective in people with SMI in the medium or long term (Peckham, Brabyn, Cook, Tew, & Gilbody, 2017). In a recent behavioural and pharmacological smoking cessation trial for people with SMI, the intervention was not effective at increasing quitting at 12 months but effective at 6 months (Gilbody *et al.*, 2019).

There is limited evidence regarding how an intervention targeting health behaviours may or may not work to promote healthy behaviours in people with SMI in different settings. Understanding the underlying psychological processes by which interventions bring about health behaviour change could help inform future effective interventions and

explain the mixed evidence behind behaviour change interventions for people with SMI (Moore *et al.*, 2015). Further, although guidelines advocate that health care professionals (HCPs) target health behaviours in people with SMI, there is limited guidance regarding how effective behaviour change strategies can be achieved and minimal detail on the application and value of behaviour change techniques (BCTs) in different health care settings for people with SMI (Department of Health, 2016; Public Health England, 2019).

Understanding the barriers and facilitators of changing health behaviours may help to establish ways of better supporting patients with SMI. Some of the barriers commonly reported include the following: mental health symptoms, social isolation, medication side effects, negative staff attitudes, lack of support, difficulties sustaining health behaviour changes, and unhealthy environments (Aschbrenner *et al.*, 2013; Burton *et al.*, 2015; Jimenez *et al.*, 2015; Roberts & Bailey, 2011; Yarborough, Stumbo, Yarborough, Young, & Green, 2016). Facilitators include the following: staff and patient health knowledge, support from informal social support networks and staff, experiencing benefits to mental and physical health, positive reinforcement, motivation and planning, and cost savings for quitting smoking (Burton *et al.*, 2015; Graham *et al.*, 2014; Jimenez *et al.*, 2015; Roberts & Bailey, 2011; Yarborough *et al.*, 2016).

To our knowledge, none of these studies (1) explore the views and experiences of HCPs trained in delivering theoretically driven BCTs to facilitate health behaviour changes and how this worked in practice or (2) offer deeper insight explaining the process of health behaviour change and how the barriers and facilitators occurred. One model that may help to explain the process of supporting or changing health behaviours in people with SMI is the Capability, Opportunity, Motivation, and Behaviour (COM-B) model of behaviour (Michie, Atkins, & West, 2014; Michie, van Stralen, & West, 2011). Although this model has been widely applied to explain different types of behaviour in different populations, to our knowledge it has not been applied to explain the process of supporting and/or changing health behaviours in people with SMI. We aimed to explore how health behaviours were supported and changed during a primary care led intervention specifically designed to include BCTs in the intervention to reduce CVD risk for people with SMI (Osborn *et al.*, 2016; Osborn *et al.*, 2018). We explored how BCTs were applied, the barriers and facilitators of supporting and changing health behaviours and used the COM-B model to explain underlying processes.

Methods

Context and design

We conducted a secondary analysis of interview data originally collected to explore perspectives on the implementation of a CVD risk reducing intervention delivered by primary care HCPs who had received training in delivering BCTs to people with SMI (Osborn *et al.*, 2016; Osborn *et al.*, 2018). Training covered delivering eight strategies as part of the intervention: goal setting, setting an action plan, recording progress, reviewing progress, involving supportive others, providing positive feedback, coping with setbacks, and habit formation. The intervention aimed to improve the following health behaviours in people with SMI: physical activity, diet, smoking, and alcohol use as secondary outcomes. The findings showed that the secondary outcomes did not differ between those that received the intervention and those that did not at 12-month follow-up (Osborn *et al.*, 2018). The primary qualitative findings suggested that though staff attempted to make the intervention accessible to people with SMI, patients were not always willing to engage with the intervention. This secondary analysis explores through a

theoretical behavioural lens how an intervention aimed at reducing CVD risk supported health behaviour change. This was not explored in the original analysis and addresses important gaps and limitations in the field.

Sample and data collection

Thirty patients and thirty-one staff were approached to take part in semi-structured interviews. All the original transcripts were analysed in the present study. Fifteen patients and fifteen staff took part. Staff were health care assistants ($n = 6$) and practice nurses ($n = 9$) working in primary care, all of which were female and White British. Staff were between 25 and 65 years of age, with 1–30 years' experience. Patients ranged from 30 to 70 years of age and were mostly male ($n = 9$). Patients were White ($n = 13$) and Asian ($n = 2$) with a diagnosis of schizophrenia ($n = 6$), bipolar affective disorder ($n = 7$), and other psychosis ($n = 2$).

Interview topic guides were developed around the Theoretical Domains Framework and the COM-B model of behaviour of participants (Atkins *et al.*, 2017; Michie *et al.*, 2011). The interviews were conducted by two researchers (A.B. & S.He), audio-recorded, transcribed, and checked for accuracy. All identifiable content was removed. The study was ethically approved by City Road & Hampstead Research Ethics Committee (01.03.2016; 12/LO/1934).

Data analysis

NVivo (version 11) was used to store and assist data analysis. The data were previously coded inductively by researchers involved in the trial for the original qualitative study and were used in the current study. Researchers had a background in qualitative research, health psychology, psychiatry, and mental health research. A researcher with a background in psychology (S.H.) with no prior involvement in the qualitative interviews led on the current analysis. S.H. coded the data inductively in relation to the current study aims. These codes were compared to the original coded data, and new codes specifically related to the current study were derived and merged with the previous coded data. This process was iterative, and codes were continuously adapted and discussed with the team (K.W. & J.R.) to ensure they reflected the data. In a second stage, S.H. mapped these inductively derived codes regarding how BCTs were applied using a deductive approach to the BCT Taxonomy (v1); this is a comprehensive list of methods, techniques, and tools applied to help facilitate behaviour change in behavioural science (Michie *et al.*, 2013). In the analysis of barriers and facilitators to supporting and changing health behaviours, the coded data were analysed thematically using an inductive approach, discussed, and revised among the team (S.H., A.B., J.R., D.O. & K.W.) (Braun & Clarke, 2006). The themes were further analysed by mapping and interpreting them deductively in relation to the constructs of the COM-B model. Where possible, we attempted to gain more explanation regarding the process of behaviour change including why and how barriers and facilitators occurred in the data, through exploring links between components of the COM-B model. Descriptions of each of the components of the model are reported in Table 1. The process of mapping and interpreting data in relation to the BCT Taxonomy and COM-B model was iterative and conducted and adapted through discussion with the research team (K.W. & J.R.). Thus, data analysis was initially inductive during the stages of coding data and thematic analysis. This was then followed by a deductive approach, mapping the coded data and/or themes to the BCT Taxonomy and COM-B model.

Table 1. COM-B model components

Sources of behaviour	Description ^a
Capability	
Physical capability	Physical skills, strength, or stamina
Psychological capability	Psychological skills, knowledge, strength, or stamina
Opportunity	
Physical opportunity	Opportunity afforded by the environment including time, resource, location, and physical barriers
Social opportunity	Opportunity afforded by interpersonal influences, social cues, cultural norms, etc.
Motivation	
Reflective motivation	Self-conscious planning and evaluations, forming beliefs about what is 'good' or 'bad'
Automatic motivation	Emotional reactions, wants and needs, desires, impulses, and reflex responses

^aThese descriptions are taken from Michie et al (2014).

Results

Exploring how BCTs were applied

We identified the use of 20 BCTs in the staff and patients' reports of delivering and receiving the intervention (Table 2). Under broader BCT Taxonomy groupings, these BCTs fell within goals and planning, feedback and monitoring, social support, shaping knowledge, natural consequences, repetition and substitution, reward and threat, antecedents, and self-belief.

Exploring barriers, facilitators, and processes of supporting and changing health behaviours

We identified five themes and eleven sub-themes in relation to barriers, facilitators, and processes of supporting and changing health behaviours (Table 3). When reporting themes, we also referred to both the individual constructs of the COM-B model and interlinking components (Table 1) where possible.

Proactive approaches and perceived benefits of health behaviours. Motivation had both a positive and negative impact on patient proactivity in taking ownership and responsibility for their health goals. Some examples of health goals included becoming more active, consuming a healthy diet, reducing cigarette use, and/or alcohol consumption. Patient motivation to continue engaging with healthy behaviour changes and staff motivation to support behaviour change were both influenced by the degree to which benefits of making behaviour changes were apparent.

The impact of motivation on proactivity – Staff commonly reported that patients, who took ownership/realized the need for ownership and responsibility for their goals and to be proactive, were more motivated.

... they had to take responsibility for their own health, we could point them in the right direction, we could meet with them regularly, but it was really up to them. Some were more motivated to make that change, based on... "it is up to me". (Staff 4, HCA, 50's)

This was also reflected in patient accounts. Patients who were committed to and took responsibility for achieving their goals were more motivated. In some cases, this commitment was based on believing that this was the right action to take (i.e., reflective motivation).

I just felt it was the right thing to do really yeah. If I commit myself to something, I do like to follow it through. (Patient 16, male, 60's, Schizophrenia)

The reverse was also observed among some patients. Some staff reported that those that were less motivated were less proactive to action advice. Staff often suggested that some patients lacked an awareness that achieving health goals was self-dependent.

...had a mixed half and half, of people that were very, very invested and people who were hoping that they're miraculously lose some weight just by turning up every so often (Staff 6, HCA, 50's)

In a few cases, staff also reported a lack of proactivity and motivation when patients were required to self-monitor behaviours using health plans to monitor health goals. Staff suggested that patients who completed these were more likely to seem motivated and to progress with their health goals.

...the people that tracked definitely were the most successful. However, not everybody tracks. Some people, I didn't see that book again, after the very first time I gave it to them, or I saw it once or twice throughout the process. ... with those people, there was no particular evidence that they'd been thinking about their goals in the meantime (Staff 6, HCA, 50's)

Some patients held similar views, reporting that they did not utilize the tools they were provided with. Patients blamed their lack of productivity on their lack of desire (i.e., automatic motivation) rather than on staff and demonstrated an awareness for the need to be proactive to achieve health goals. This contrasted with staff perceptions that patients lacked awareness for the need to be proactive.

Other people can just give you advice, but at the end of the day, if you are not going to do anything about it, then it's not going to get anywhere. ... but that was nothing to do with [Anonymous] or [Anonymous, nurse 2]. ... I was supposed to do exercises and things. ... It's just the way I was feeling. ... I just couldn't be bothered. (Patient 112, Female, 50's, Other Psychosis)

The impact of visible benefits on motivation - Most staff suggested that patients who were able to observe the benefits of changing their health behaviours, such as improvements to physical appearance and health markers such as cholesterol, were motivated to continue to engage with healthy behaviours. It is possible that decisions to continue with health goals were informed by beliefs in the positive effects (i.e., reflective motivation) of engaging with healthy behaviours. Alternatively, succeeding with goals may have evoked a sense of pleasure and therefore increased patient motivation (i.e., automatic motivation).

... the couple that were motivated to come back was because... they were losing weight... their cholesterol level was going down, they were more active, they could see the improvements in their bodies because they were saying about their clothes... were a bit baggy and things... with all these, this was encouraging them to come back. (Staff 1, HCA, 40's)

Patients frequently commented on the positive effects of changing their health behaviours including better overall physical health, greater mobility, and improved financial status.

Although I was skinny... I couldn't breathe very well when I was going up and down the stairs. That improved. My clothes were not smelly anymore. My purse... my finances improved (Patient 112, Female, 50's, Other Psychosis)

Staff reported that in some cases, patients stopped engaging with healthy behaviours when they were unable to see the benefits. Disengagement may have arisen from automatic motivation, whereby patients experienced disappointment because of lack of visible success or forming the belief that engaging in healthy behaviours did not result in any positive changes (i.e., reflective motivation).

Particularly with X, it was a weight loss thing, and she lost interest when she realised she wasn't actually losing any weight. Do you know what I mean? She disengaged a bit there. (Staff 14, Practice Nurse, 50's)

Similarly, staff reported that their motivation to support patients to achieve healthy behaviours was influenced by their ability to observe patients' progress. Staff commonly reported feeling achievement when patients succeeded with health goals, that is, automatic motivation.

I knew that she'd made progress which is good for me. That was a bit of a sense of achievement for me to know that I've helped her achieve what she set out to do. (Staff 15, Practice Nurse, 60's)

However, some staff reported feeling frustrated and therefore not motivated to support patients when patients experienced failure, that is, automatic motivation.

She hasn't lost this vast amount of weight that she wanted to do... because she was disengaged so much I think you start to lose her, disengage yourself a little as well, so I'm guilty of that (Staff 14, Practice Nurse, 50's)

Health knowledge and perceptions. A common finding was that healthy behaviour changes were affected by patients' understanding of health (i.e., knowledge) and wanting/the need (i.e., perceptions) to change health behaviours which both related to psychological capability. In some cases, patients' understanding of the negative impact of their unhealthy behaviours (i.e., psychological capability) affected reflective motivation (i.e., the belief that certain behaviours were 'good' and 'bad'). However, in other cases despite understanding the negative impact of unhealthy behaviours (i.e., psychological capability), behaviour was driven by automatic habitual processes. Further, health knowledge assisted staff in supporting patients with health goals.

The impact of knowledge - A minority of staff reported that one of the factors preventing some patients from modifying their health behaviours was their lack of knowledge about what was 'healthy'. In some cases, staff found it difficult to change this understanding and challenge it.

...everyone would be, like... so I had a healthy day today, and then go through what their healthy day was, and it was so unhealthy it was unbelievable, and then you'd kind of realise you have to take, stepped right back and you'd start from the very beginning, baby steps, and that everyone's understanding of health and health needs and what it is and what it will mean is so varied... It was challenging... a lack of knowledge and education of what we were doing. (Staff 2, HCA, 40's)

In contrast, patients frequently described the knowledge they had gained within consultations, particularly in reference to the impact of food groups on weight gain (i.e., psychological capability). This understanding influenced patients' reflective motivation to engage with healthy behaviours. Patients reflected and evaluated their behaviour through monitoring with staff, and consequently formed beliefs about 'wrong' behaviours based on their health knowledge.

Without hesitation. Because it made me sit with another person and identify links between food groups that were obviously causing me to gain weight... what that allowed me to do, was to change my pattern of eating, which I've pretty much done 99% of the time since. (Patient 17, Male, 40's, Schizophrenia).

Nurses appeared to have more knowledge regarding health behaviours than health care assistants, subsequently influencing their ability to support patients.

Difficulties changing perceptions - A minority of staff described that they encountered difficulties when encouraging patients to engage with healthy behaviours. Staff suggested that some patients did not perceive the need to change due to a lack of understanding about the need to modify health behaviours (i.e., psychological capability). This was not identified in patient interviews. It was suggested that a lack of understanding may have influenced decisions in weighing up the risks and benefits of unhealthy behaviours (i.e., reflective motivation). Alternatively, it was hypothesized that patients potentially enjoyed unhealthy behaviours and therefore were not motivated to change (i.e., automatic motivation).

When they think they're fine and they don't understand why on earth you want to change anything, that's was always a toughie... In hindsight he didn't see a problem with what was going on, or he enjoyed what we perceive as a bad lifestyle choice too much to want to give it up, and he couldn't see the benefits outweighing any risks (Staff 2, HCA, 50's).

The link between psychological capability and motivation did not always apply. One patient was unwilling to eat healthily despite having the knowledge on how to achieve weight loss (i.e., psychological capability) and understanding the benefits of diet modification to increase weight loss (i.e., reflective motivation). This was due to the patients' perception that she was 'stubborn'. This suggested that she believed her unhealthy behaviour was habitual and therefore driven by automatic motivation.

... if I'm perfectly honest, it's a goal I shouldn't have set because I know myself well enough to know that... I've been on different diets... I've been to [weight reduction group] and had some success with it, but at the end of the day I'm a bit reluctant to change that sort of lifestyle... I'm fairly conscious of a healthy lifestyle... and how I do or don't fit into that... I'm also bloody stubborn... I don't think I really identified anything I wanted to change, if that makes sense... (Patient 18, Female, 60's, Bipolar Affective disorder)

Perceptions of patient capability. Staff commonly held the perception that mental health status prevented patient engagement and concentration (i.e., psychological capability) and subsequently motivation. In some cases, it was also suggested that physical health problems (i.e., physical capability) restricted patient engagement with health behaviours.

Mental health status - Staff suggested that some patients experienced stress and became absorbed by their personal problems due to their mental health. Staff reported that patients' mental status affected their cognitive skills such as concentration. It was suggested that this affected their motivation levels.

Mental health patients... it's so difficult to get them to come off that and sort of engage and concentrate... people with mental health illness do have a tendency to be demotivated. Don't necessarily want to engage on things other than what's occupying their minds and their thought processes at that time. They become quite focused on their problems, understandably. (Staff 14, Practice Nurse, 50's)

However, this rarely arose in patient interviews and only one patient expressed that engaging with healthy behaviours was difficult due to their mental well-being.

... I find it hard to actually concentrate and be able to be, sort of, useful in what I'm supposed to be doing... I get a bit anxious and all the rest of it... It's difficult. (Patient 9, Female, 50's, Bipolar Affective Disorder)

Physical health status - A few patients and staff expressed that poor physical health status affected some patients' physical capability to engage with healthy behaviours such as physical activity.

With one particular patient... She had numerous health problems... it was going to be an uphill struggle to achieve her goal of losing weight, which we did actually adapt to, sort of, maintaining weight... one particular patient, who had not only a problem with obesity, but she had pain, arthritis, and she couldn't really exercise... (Staff 4, HCA, 50's)

Social roles and influences. A common finding was that different social settings and circumstances (i.e., social opportunity) both negatively and positively influenced health behaviours. Social opportunity in the form of staff support increased motivation to engage with healthy behaviours. Informal social networks were also important; patients engaged in similar health behaviours to family and friends.

The role of staff - Patients reported that staff supportiveness including listening to and discussing concerns facilitated their healthy behaviour changes. Some patients felt

pressure to achieve goals because of being monitored by staff. Some suggested that being monitored increased their motivation to engage with healthy behaviours.

... it felt a little bit like I was... I had somebody to answer to, which did, it began, at the beginning of the period of time I was coming in that did motivate me. (Patient 82, Female, 40's, Bipolar Affective Disorder)

In some cases, staff reported that the desire in patients to please staff and prevent their disappointment motivated patients to engage with healthy behaviours. This related to automatic motivation, whereby achieving health goals may have been related to the pleasure of gaining approval from staff.

... I think that person consciously wanted to do well for me... if that was a motivating factor, then it worked. (Staff 4, HCA, 50's)

The role of informal support networks – Patients commonly reported that friends and/or family would encourage and challenge them to engage in healthy behaviours and vice versa (i.e., social opportunity). Patients were establishing healthy social norms, whereby family and/or friends were engaging in similar healthy behaviours, helping them to change their behaviours. This perception was also supported among staff.

My partner also has been eating healthier and exercising more. She was quite overweight, and she's lost 2 stone as well by just supporting me and kind of changing the food that we buy. She's not vegan or anything like that though, but she's changed. We don't ask for any takeaways. (Patient 6, Female, 30's, Bipolar Affective Disorder)

A few staff also suggested that when patients were in social situations where members of their informal network were engaging in unhealthy behaviours, patients would also engage in similar behaviours. However, this perception was not apparent among patients.

One lady, suddenly her friends had come round, and she'd had a couple glasses of wine at lunch time, so there were things like that, so she would quite often, oh sorry, or she had friends round to stay... (Staff 7, HCA, 40's)

As part of the intervention, staff were encouraged to seek the involvement of informal supportive others in helping patients engage with health behaviours. However, in some cases, patients described having no access to support and being socially isolated. The same patients also reported difficulties in engaging with healthy behaviours. However, there was no indication within the interviews as to why nurses/HCAs did not explore this further and seek alternative forms of support.

I don't go out much, I don't socialise much, so I haven't had much support. I've been mostly on my own. My sister has been quite busy as well. She's got a full-time job and everything. She's tried to provide some support, but the majority of the time, I feel I've been on my own. (Patient 112, Female, 50's, Other Psychosis)

Environmental-level influences. Staff commonly suggested physical opportunity in the context of the general practice (GP) environment, influenced their ability to support patients. Greater access to time increased the level of support (i.e., social opportunity)

Table 2. Staff- and patient-reported descriptions of the methods used to facilitate behaviour change under BCT broader groupings with examples

BCT Taxonomy broader grouping	BCT label from BCT Taxonomy	Methods used to facilitate application	Illustrative quotes
Goals and planning	Goal setting (outcome and behaviour) (1.1. and 1.3)	Reviewing unhealthy habits in initial consultations and enabling patients to set targets to either help modify a behaviour or achieve a specific outcome such-as reduction in cholesterol	<p>'The other patient, his chosen topic was to get off smoking... We had spoken about all the health behaviours and then the patient chose one health behaviour, so we explored that in more depth' (Staff 13, Health care assistant)</p> <p>'The main concern was the weight and the cholesterol, those were the main concerns, because the weight wasn't any... getting any lower, in fact it was getting higher and higher, and I wasn't going out as much, I wasn't active enough to bring the weight down, and diet wasn't good enough. So we had to set goals to improve on that so that the cholesterol could be... helped, to bring the cholesterol down and bring the weight down as well'. (Patient 112)</p>
	Action planning (1.4)	Breaking down goals into smaller manageable plans including what behaviour to carry out, how and when	<p>'It's about, well, we need to make this a bit more manageable, something that will then achieve that goal. So we're talking about food types and, well, we're going to eat more of this and less of this, and which ones are you going to eat when, and this sort of thing, and making those kinds of goals...'. (Staff 6, Health care assistant)</p> <p>'We did just stick to one thing, which was the exercise. And just something simple like going for a walk so many times a week. And sometimes, she was getting there'. (Staff 8, Practice Nurse)</p> <p>'...how easy did you find that goal, was it challenging, do you want to continue with that or try something else... then we'd carry on about how that was going to have an impact on his week, not just, okay, so we're swapping it, but how he was, because he only had one arm, as well, so he had to think about the goals that were easy for him to be doing with one arm... changing to cereal because porridge was an idea but that's really hard to make with one hand, apparently' (Staff 2, Health care assistant)</p>
	Review behavioural goal(s) (1.5)	Using open-ended questions to jointly discuss progress within consultations including whether the persons behaviour aligned with the goals set. Goals were adapted on the basis of feedback provided	

Continued

Table 2. (Continued)

BCT Taxonomy broader grouping	BCT label from BCT Taxonomy	Methods used to facilitate application	Illustrative quotes
Feedback and monitoring	Problem-solving (1.2)	Discussing with patients' factors that may be affecting their behaviour and encouraging ways to overcome problems	<p>'We'd go through the booklet to see what I'd filled in, to see how I'd sort of kept up with the goals, and then we may amend them or we may just do the same thing for the following week. So we might adapt them slightly if something hadn't worked. We'd adapt it, or we'd add something else in'. (Patient 82)</p> <p>'...when they don't perhaps achieve it, look at why. And then get them to see how they can change, turn that around'. (Staff 8, Practice Nurse)</p> <p>'...she would ask me questions: how I'm getting on, any issues I may have, any problems I may have. Sometimes I had problems with my cholesterol and I needed further advice...'. (Patient 112)</p> <p>'... if they didn't fill in their phone, and then they told me about it when they themselves, on their phone, they wrote a note, or something, to come in...so they were tracking... the people that tracked definitely were the most successful...'. (Staff 6, Health care assistant)</p> <p>'I was also given a booklet so I can monitor everyday activities and what changes I've made. So the information was given, a booklet was given so that I can write down what activities I've done, what sorts of changes I've made every day, and they were both helpful... they were both helpful' (Patient ID 112)</p>
Monitoring of behaviour and outcome (2.1 and 2.5)	Self-monitoring of behaviour (2.3)	Encourage use of health planning books to self-monitor behaviour provided as part of the intervention	<p>'...I would ask them how they'd got on, what they'd been up to, have a look in their little health plan book, and to see what they'd eaten'. (Staff 3, Practice Nurse)</p> <p>'...she monitored me on the computer regarding weight and any changes, so that was her role in the study'. (Patient ID 112)</p>

Continued

Table 2. (Continued)

BCT Taxonomy broader grouping	BCT label from BCT Taxonomy	Methods used to facilitate application	Illustrative quotes
Social support	Biofeedback (2.6)	Monitoring through clinical measures including weight, blood pressure and blood tests and communicating results to patients	<p>'... occasionally she'd weigh me, and she would then go through what I was, you know, eating on a daily basis'. (Patient ID 81)</p> <p>'I kind of tried to make it fun for them by doing the blood pressure, the weight. We checked the cholesterol, perhaps once every three months I think I did their cholesterol, and so we got that once every three months and it was a bit like trying to encourage them. Oh, see what your weight is next time and I'll see what you've dieted next time'. (Staff 3, Practice Nurse)</p> <p>'... they take your blood and weigh you and different things like that, you know. And we just have a talk, you know'. (Patient 83)</p>
	Feedback on behaviour (2.2)	When monitoring behaviour, staff would discuss with patients' progress and whether any improvements could be made	<p>'We'd discuss what they'd eaten, what exercise they'd done, how they could do more exercise, how they could improve their diet'. (Staff 3, Practice Nurse)</p>
Social support	Social support (emotional) (3.3)	Staff displayed understanding, listening skills, and encouragement whilst promoting healthy behaviour changes	<p>'Well, I just see her, and she checks up on the sheets I fill in, and she weighs me and sees if I'm progressing, yes'. (Patient ID 83)</p> <p>'I basically just really encouraged her and said well done, kept saying that to her, and I think that was how she came about as well and carried on the whole way through. Because just supporting that one appointment, just getting her through that and listening to what she was saying and how happy she was because she'd done it'. (Staff 15, Practice Nurse)</p> <p>'... we had a good relationship. We had a good dialogue, it was... she supported me, but once... it's very good when somebody actually understands why things are happening. And then doesn't think well... you know you go to some people and they think you're lazy, you're not doing anything about your weight but < practice nurse > understood it'. (Patient ID 12)</p>
	Social support (practical) (3.2)		<p>'She did raise that I think that was obviously part of the project, to make sure that, you know, family and friends were brought into the equation if</p>

Continued

Table 2. (Continued)

BCT Taxonomy broader grouping	BCT label from BCT Taxonomy	Methods used to facilitate application	Illustrative quotes
Shaping knowledge	Instruction on how to perform behaviour (4.1)	Staff encouraged the involvement of family and friends in helping encourage healthy behaviours	possible. And she did ask that, you know, does your wife help you, does she support you? That was asked, you know, and when there were discussions about diet, does your wife get involved? Yes, it was mentioned on a regular basis' (Patient ID 81)
		Sharing knowledge on different approaches to target behaviour whilst enabling patients to select their own preferred method	'We'd discuss what they'd eaten, what exercise they'd done, how they could do more exercise, how they could improve their diet'. (Staff 3, Practice Nurse) 'I wanted to lose a bit of weight and she discussed various ways I could do that'. (Patient 16)
	Information about antecedents (4.2)	Encouraging patients to record emotions when undesired behaviour occurred to provide information on emotions that caused unwanted behaviour	'So I came away with lots of ideas, suggestions, not, do this, do that, do that. It was very much suggestions that we had kind of talked about between us'. (Patient 17) 'And so I broke it down and said, just put key words in there [health plan diary]: sad, fed up, fat, heavy, anything, just a word to sum up how they felt, even just one word a day: good, energetic. And then they could look back on that, and perhaps they might see a pattern, or they might see a barrier that perhaps they hadn't identified themselves'. (Staff 4, Health care assistant)
Natural consequences	Information about health consequences (5.1)	Staff communicating health knowledge including benefits/	'Because I was keeping a diary of when did I feel good and when did I not. And so what was I eating and what was happening... And I learnt a lot about me and my relationship to food; my medication's relationship to food. Because I'm... My medications were all... You know, made me crave sugar and I think it was about how I had to... I manage that'. (Patient 17) 'I just said to him, you need to stop but we need to help you to do that because you are going to kill yourself. And at that point he said, okay... You are advising them, but that's what I would said to anybody else that

Continued

Table 2. (Continued)

BCT Taxonomy broader grouping	BCT label from BCT Taxonomy	Methods used to facilitate application	Illustrative quotes
		risks of health behaviours to patients	<p>would come in. You're drinking three or four bottle of wine a day, you are going to give yourself a heart attack. If you want some help I can help you now'. (Staff 5, Practice Nurse)</p> <p>'I would try and always make sure I focussed on giving them a goal and trying to promote what that benefit might be' (Staff 7, Health care assistant)</p> <p>"it made me sit with another person and identify links between food groups that were obviously causing me to gain weight". (Patient 17)</p> <p>... I encouraged her to take her mind off wanting cigarettes by doing something different, and she got back into playing her guitar and keyboard and playing music and making music. So I think that helped and she was a lot more relaxed. When she wanted a cigarette she'd go and play her guitar...'. (Staff 15, Practice Nurse)</p> <p>... there was things I was taking out, I took snacks out, for example. Because she said, look, you had a KitKat, you've had this, why don't you just stop them? So, and also eating late at night. I don't eat late at night, now. I have a meal, I might go and have a drink, but I don't eat late at night, you know' (Patient 81)</p> <p>'And having that, you know, that recognition of, you know, of losing two pound or whatever, that was really positive. But it wasn't done in a fake way or, "well done". It was actually "that's brilliant", it was genuinely meant'. (Patient 17)</p> <p>'I'd praise him on the stuff that went really, really well...'. (Staff 2, Health care assistant)</p>
8. Repetition and substitution	Habit reversal (8.4)	Staff prompted the replacement of unwanted habits with healthier behaviour	
10. Reward and threat	Social reward (10.4)	Staff delivering the intervention displayed praise to patients	
11. Antecedents	Restructuring the physical and social environment (12.1 and 12.2)	Changing physical and social environments with replacement of positive social and healthy contexts	<p>'I think we, we looked at it as a whole, so we were looking at where he was eating, obviously with one arm, convenience food a lot, so instead of always going to KFC let's try something else, and then he found a friend that went to this other café, so then he had someone to go and socialise,</p>

Continued

Table 2. (Continued)

BCT Taxonomy broader grouping	BCT label from BCT Taxonomy	Methods used to facilitate application	Illustrative quotes
15. Self-belief	Verbal persuasion about capability (15.1)	Encouragement displayed by staff delivering intervention	<p>so it wasn't just about going to get food anymore. . . . We've found little things like his friend goes to this café, he found that out, so now he goes there every week and that gets him out of the house for something else'. (Staff 2, Health care assistant)</p> <p>' . . . with the guy that wasn't doing as well as we would've thought, just by saying, don't set yourself targets that are too hard to achieve; just even the smallest of changes can make a difference, and don't be afraid of coming back and saying, I haven't been able to do it, for whatever reason. There's always a next time, as long as you don't give up, and I think that's the main thing, and just giving them that encouragement to feel that you're not being judged by the fact that you haven't been successful in what you're trying to do' (Staff 10, Practice Nurse)</p> <p>' . . . she was really nice and kind and wasn't judgemental or anything like that. And all what I said, I had a week where I hadn't managed to do what I said for a couple of weeks. She was like, Oh, don't worry about it. It's fine we can try this week. So it was really good'. (Patient ID 6)</p>

Table 3. Themes and sub-themes related to barriers, facilitators, and processes of changing and supporting health behaviours

Theme	Sub-themes
Proactive approaches and perceived benefits of health behaviours	The impact of motivation on proactivity The impact of visible benefits on motivation
Health knowledge and perceptions	The impact of knowledge Difficulties changing perceptions
Perceptions of patient capability	Mental health status Physical health status
Social roles and influences	The role of staff The role of informal support networks
Environmental-level influences	Access to time Access to resource Making use of existing tools

staff were able to provide. Access to appropriate resource was also important in helping support behaviour change. However, both time and resource were not always accessible. Patients who made use of existing features of their environment reported that this helped them engage in as well as maintain healthy behaviours.

Access to time – Some staff suggested consultations requiring discussion of health behaviour change required time. Given the lack of access to time, staff felt they were unable to support some patients adequately.

Following up, probably if I had more time to follow-up it probably would have been more successful here. But it is like running a race when you are here (Staff 10, Practice Nurse, 40's).

Access to resource – As part of the intervention, staff were required to signpost patients to specialist services to help facilitate behaviour change. However, as the study was conducted in different geographical regions in England, the availability of services in different areas varied (i.e., physical opportunity). This potentially indicated differences between deprived and affluent areas. Staff with access to services were better able to support patients to engage with health behaviours as compared to staff with limited access.

Well, that lady joined a weight loss group and gave up smoking. She was seeing her GP regularly, so I think that clinical care and guidance helped. Another person was referred to a dietician. As I said, that was in regard to his cholesterol, and he was referred to a specialist. . . (Staff 4, HCA, 50's)

Making use of existing 'tools' – Patients made use of their physical environment (i.e., physical opportunity) including making use of stairs rather than lifts, walking more between bus stops and using the bus less, open spaces for walking, shopping, and cycling. Patients were embedding behaviours into their routine and therefore normalized their health behaviours (i.e., automatic motivation).

I think the main goals were kind of like exercising, it was just kind of like getting off the bus a couple of stops early before uni and walking the rest of the way in. . . Because I'd been doing it for such a long time, I kind of managed to maintain it. (Patient 6, Bipolar disorder, 30's)

Discussion

Patients and staff (nurses/HCAs) reported using a range of BCTs within a CVD risk reducing intervention for people with SMI delivered in primary care. These related to goals and planning, feedback and monitoring, social support, shaping knowledge, natural consequences, repetition and substitution, reward and threat, antecedents, and self-belief. Numerous factors affected the process of supporting and changing health behaviours. Patient proactivity to action staff advice varied depending on their motivation to engage in healthy behaviours. Motivation was influenced by the ability to perceive the visible benefits of engaging with health behaviours and patients' health knowledge, but health perceptions were sometimes difficult to change. It was also suggested by staff that mental health symptoms negatively impacted patient motivation. Social factors including involvement from staff and informal support networks both motivated and prevented health behaviour change. Patients, who made use of existing opportunities in their environment to exercise, engaged in and sustained healthy behaviours. Access to time and resources in the context of primary care was important for supporting patients and discussed in greater detail in our primary qualitative paper.

Our findings are partly consistent with previous research that health knowledge including understanding healthy behaviours and how they are achieved facilitates patient engagement in healthy behaviours (Roberts & Bailey, 2011). We found patients reported healthy changes in some cases where staff discussed information about health consequences, and reviewed health behaviours and health plans. However, despite having health knowledge and awareness, some patients were still not motivated, and in some cases, health perceptions were difficult to change. This is consistent with quantitative work reporting that although people with SMI had health behaviour knowledge, this was not associated with their self-reported health behaviours (Happell, Stanton, Hoey, & Scott, 2014). Although health knowledge may facilitate behaviour change in some people with SMI, for others, more work and/or skills may be needed to uncover and implement techniques that generate strong enough desires and impulses to drive behaviour.

Emotional support and practical support from informal social networks were reported as both barriers and facilitators to health behaviour change in people with SMI in previous work (Aschbrenner *et al.*, 2013; Burton *et al.*, 2015; Jimenez *et al.*, 2015; Roberts & Bailey, 2011; Yarborough *et al.*, 2016). This was also mirrored in our findings; involving supportive others as part of the intervention facilitated health behaviour change, but lack of access to informal support and unhealthy social environments may have prevented change. This may support the value of peer-support interventions in this area, particularly where patients lack access to healthy social environments. A peer-led intervention to increase chronic disease self-management in people with SMI was associated with improvements in mental and physical health scores (Druss *et al.*, 2010). The value of HCPs in supporting patients should also be recognized. Previous work reported that staff holding patients accountable for their actions facilitated behaviour change (Jimenez *et al.*, 2015). We also found in some cases patients were motivated to achieve health goals because of the anticipated pleasure of gaining staff approval, possibly arising from the positive and trusting relationships formed. The importance of such relationships is further supported in other work reporting that negative staff attitudes prevented behaviour change in patients (Burton *et al.*, 2015; Roberts & Bailey, 2011).

Positive reinforcement in the form of being able to identify progress with goals through health indicators or physical appearance has also been reported as a motivating factor

(Burton *et al.*, 2015; Jimenez *et al.*, 2015). We found similar findings when staff provided feedback to patients in terms of progress and biofeedback. However, we also found that not experiencing visible positive results decreased motivation in both staff and patients, suggesting that care should be taken when applying these techniques. Our earlier analysis of factors affecting implementation found that staff skill-set workability to support patients varied, and knowledge and experience in mental health, physical health training additional peer support, were perceived as important. Other work has also shown the knowledge and personal attributes of staff influenced health behaviour change in people with SMI (Burton *et al.*, 2015; Roberts & Bailey, 2011).

It is commonly reported that mental health symptoms prevent patients engaging with healthy behaviours (Roberts & Bailey, 2011; Yarborough *et al.*, 2016). Though this was not identified in patient interviews, staff suggested this as a barrier to behaviour change. The reason for these opposing views may be due to negative staff attitudes and stigma (Burton *et al.*, 2015). However, people with SMI commonly experience a lack of motivation as part of their symptoms (Albrecht, Waltz, Frank, & Gold, 2018). Having a good understanding of mental health symptoms and BCTs when delivering behaviour change interventions could help patients to overcome the potential impact of mental health symptoms on their ability to change behaviours. Access to interdisciplinary teams with behavioural psychologists and mental health practitioners may also help to overcome such challenges, and the lack of motivation staff experienced when patients did not achieve their goals as discussed earlier. Further, it could be that patients did not perceive their health behaviours as a priority compared to mental health. This may provide reasoning why in some cases patients reported a lack of proactivity to action staff advice, staff reported difficulties changing some health perceptions and may be supported where staff reported problems of poor physical health, the time, and resource required to support health behaviour change in this population.

We found that participants who made use of existing opportunities to exercise within their environments perceived this as helpful for continuing and normalizing their behaviours. However, it is important to acknowledge that such opportunities may vary based on environmental factors such as area-level deprivation, access to green space, the costs associated with eating healthily, and the availability of fast food. This was supported in our findings where staff reported that the availability of resource across different areas of England limited the extent to which they were able to refer patients to receive specialist services. Although this was not apparent in patient interviews, it is possible that researchers had not prompted further discussion of the impact of socio-economic factors on health behaviours as this was not the original aim of the study.

Habit formation was one of the eight key intervention strategies. However, we were unable to identify any instances where patients and/or staff reported that staff were prompting patients to rehearse or repeat behaviours in the same context continuously. Although we identified that patients reported making use of their environment such as getting off the bus early and walking more which helped normalize behaviour, there was no suggestion that rehearsal or repetition in such contexts was prompted by staff. This may be that habit formation was not specifically explored in interviews or that this BCT was not explored by staff.

Strengths and limitations

To our knowledge, this is the first study to explore the perspectives of primary care nurses and HCAs delivering BCTs to change health behaviours in people with SMI and how these

worked in practice using theoretical reasoning. We also compared both staff and patient experiences therefore capturing a broad range of perspectives and gaining a comprehensive understanding of staff and patient experiences of behaviour change. Using the COM-B model and acknowledging the links between the different sources of behaviour facilitated a deeper understanding behind the processes affecting health behaviour change.

This was an analysis of data from a sub-sample of those receiving/delivering a CVD risk-reducing intervention as part of the PRIMROSE trial, and participants may not therefore be representative of all people with SMI (e.g., there was limited ethnic diversity) or primary care nurses/HCAs. It may be that people with SMI who took part were more motivated to change their unhealthy behaviours than those who did not, and that HCPs had more interest and/or confidence in this topic than those not participating. The samples were, however, generally representative of staff and patients who took part in the trial. The trial was pragmatic in design, with the intervention delivered in a clinical setting (primary care) by existing staff who were trained in behaviour change. Those responsible for data collection were also involved in the trial. Prior contact with staff may have influenced staff responses in terms of social desirability and/or how researchers collected the data. However, the data were analysed with other members in the research group and a third researcher with no involvement in the trial or data collection led the current secondary analysis. As this was a secondary analysis of qualitative data, it was not always possible to distinguish BCTs and barriers and facilitators for different health behaviours as the data were not always available, particularly when staff discussed various patients and patients discussed various health goals. It may not be ideal to explore the range of health behaviours together as it is possible that different BCTs were applied for different health behaviours and there may have been different barriers and facilitators associated with each health behaviour. Nevertheless, when staff and patients discussed specific health behaviours, there were similarities in terms of the BCTs, barriers, and facilitators reported across the range of health behaviours.

Implications for practice

We identified from our findings a range of strategies to optimize healthy behavioural changes in people with SMI. Future interventions should consider the following: (1) conducting individualized behavioural assessments (including what may be causing a lack of change), applying flexible approaches and a range of BCTs to suit individual requirements, (2) peer-led approaches or providing practical social support, in particular for those who lack social support or are influenced by unhealthy social environments, (3) strategies that increase patient motivation, whilst considering individual drivers of motivation based on behavioural assessments, (4) the use of techniques designed to encourage awareness of visible success (e.g., biofeedback, feedback on behaviour, and/or outcome), but with care in their application, in line with this, setting achievable goals so that success is experienced early and can reinforce behaviours, and (5) embedding changes into patient routines to maintain behaviours.

Conclusions

Overall, our findings suggest that health behaviour change in people with SMI was variable. Patients and staff suggested that that in some cases, BCTs helped facilitate behaviour change through increasing capability, opportunity, and motivation, but in

other cases did not. The perception that BCTs helped improve health behaviours for some suggests that some people with SMI may be able to change their health behaviours with support from primary health care professionals. This may be important in terms of the role primary health care professionals might have in helping to reduce CVD risk in this population. However, given staff and patient perceptions that health behaviour change in some cases is difficult, more work should be conducted to optimize the effectiveness of interventions for people with SMI in different health care settings. Future interventions should consider individual needs, the role of social support, strategies to target motivation, and ways of normalizing healthy behaviours.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Suzan Hassan (Data curation; Formal analysis; Investigation; Methodology; Project administration; Validation; Writing – original draft; Writing – review & editing) Jamie Ross (Conceptualization; Data curation; Formal analysis; Methodology; Supervision; Writing – review & editing) Louise Marston (Conceptualization; Methodology; Supervision; Writing – review & editing) Alexandra Burton (Data curation; Formal analysis; Investigation; Supervision; Writing – review & editing) David Osborn (Formal analysis; Investigation; Methodology; Supervision; Writing – review & editing) Kate Walters (Conceptualization; Formal analysis; Investigation; Methodology; Supervision; Writing – review & editing)

Data availability statement

The research data are not shared. The data are not publicly available due to privacy and ethical restrictions.

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