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Facilitating self-management support using the behaviour change wheel (BCW) to address healthcare professionals' behaviour

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ABSTRACT

Background: Supporting self-management in healthcare practice is essential to improve chronic patients' daily life experiences. Primary care professionals play an indispensable role in this. Nevertheless, supporting self-management in practice comes with many challenges. The aim of this study is to identify determinants of professionals' supportive behaviour and develop an intervention that facilitates self-management support in primary care practice, using these determinants as building blocks.

Methods: To develop the intervention, the Behaviour Change Wheel (BCW) was used which involves eight steps in three stages: (1) Understanding the behaviour using the COM-B model, (2) Identifying intervention options, and (3) Identifying content and implementation options. The theoretical underpinnings for stage 1 included data from interviews, focus groups and brainstorm sessions, incorporated beforehand in a self-management support model. Subsequently, literature analysis, empirical research and expertise from the research group guided stages 2 and 3.

Results: We found that changes in "psychological capability", "physical opportunity", "reflective motivation" and "automatic motivation" are required to optimize professionals' behaviour towards self-management support. The two key intervention functions identified were "enablement" and "education". Therefore, a blended learning trajectory that incorporated these interventional building blocks was developed, integrating specific behaviour change techniques (BCTs) including: (1) Information about social and environmental consequences, (2) Information about health consequences, and (3) Social support (practical). The learning design was finalized by applying the Absorb-Do-Connect learning framework developed by Horton.

Conclusions: Application of the BCW framework shaped a self-management support intervention to educate and enable healthcare professionals. Future research will pilot and refine the intervention.

1. Introduction

More than one-third of EU citizens are facing the challenges of a long-term chronic health problem, such as having one or even multiple chronic diseases (Eurostat, 2023). The aging population, along with other factors, will even lead to an increase in this number (Barnett et al., 2012). As a result, our healthcare systems are significantly impacted (Health at a Glance: Europe 2018, 2018,). A variety of interventions have been developed in recent years to support healthcare systems and to empower patients in their own care (Van Der Heide et al., 2015; WHO, 2015; Markwart et al., 2020). With the latter, we refer to the concept of self-management (Jones et al., 2011).

Self-management is defined as "the individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition" (Barlow et al., 2002). This multi-component concept requires different skills from patients, which can be categorised into six groups: action planning, patient–provider partnership development, decision making, problem

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solving, self-tailoring, and resource utilisation (Lorig & Holman, 2003).

When confronted with chronic disease(s), effective self-management leads to better clinical outcomes and improved quality of life by giving patients the skills and confidence to actively manage their health conditions (Dineen-Griffin et al., 2019; Panagioti et al., 2014). Given that primary care is often the initial point of contact in the healthcare system, primary healthcare professionals are in a favourable position to help patients self-manage chronic disease(s) (Alvarez et al., 2016). Their role is to actively collaborate and involve patients in their own care process (van Dongen et al., 2022; Armstrong et al., 2021). Specific support strategies are described in the literature encouraging patients to engage in self-management (Thompson et al., 2018; Mills et al., 2017; O'connell et al., 2018). Most frequently discussed is the 5 A's model (Glasgow et al., 2003). This model is developed to create a personal action plan based on five behavioural strategies (i.e., Assess, Advise, Agree, Assist and Arrange), which are considered essential to facilitate self-management by patients (Glasgow et al., 2003). Our previous research resulted in the development of the SILCQ-model, breaking down the concept of self-management support into five fundamental behaviours in primary care practice: supporting patients, involving patients, listening to patients, coordinating care and asking patients questions (Timmermans et al., 2022). While these frameworks offer valuable insights into the role of healthcare professionals, their practical application faces numerous challenges (Tharani et al., 2021; McGowan, 2013). As a result, successful implementation of self-management support tools and strategies is hindered, even though self-management support interventions incorporating these strategies can yield beneficial results in practice (Timmermans et al., 2023). To identify challenges, most research focusses on external barriers and facilitators of implementation of self-management support (Foo et al., 2020). Beyond this, the patient's capabilities and behaviour are thoroughly examined (Hessler et al., 2019; Araújo-Soares et al., 2019).

There is a notable gap in the literature on internal factors related to professionals' behaviour with regard to self-management support. Therefore, this article aims to strengthen existing research by conducting a Behaviour Change Wheel (BCW) analysis, identifying fundamental components underlying self-management supportive behaviour in practice. Complementing previous valuable insights offered by the Self-Determination Theory (SDT) on challenges and within-person factors affecting self-management support (Wuyts et al., 2021; Duprez et al., 2020), the BCW has the potential to provide a more comprehensive framework to delve deeper into all components of behaviour and suggests practical interventional strategies. More specifically, the BCW presents a structured approach to developing and implementing behavioural interventions by identifying three fundamental components necessary to enable a specific behaviour: Capability, Opportunity and Motivation (COM-B model). Each component is further divided into two subcomponents: physical and psychological capability, physical and social opportunity, reflective and automatic motivation. The BCW's strength to assess both capability, opportunity, and motivational components that influence behaviour has the potential to enable a detailed examination of the challenges faced by healthcare professionals when engaging in self-management support. Moreover, the analysis promises to result in an intervention to increase the effectiveness of self-management support strategies.

The research questions addressed in this study are, "What are the key components necessary to enable self-management supportive behaviour among healthcare professionals? How can these components be translated into building blocks of an intervention to create behaviour change among healthcare professionals, to achieve more sustainable self-management support in primary care practice?"

2. Methods

2.1. Global BCW approach and intervention development

The BCW was applied to analyse behaviours related to self-management support by primary care professionals in Flanders, Belgium. The BCW analysis involves eight sequential steps in three stages: (1) Understanding the behaviour, (2) Identifying intervention options, and (3) Identifying content and implementation options (Fig. 1). It is an evidence-based theory-driven step-by-step approach to systematically design a behavioural intervention and it has previously been successfully applied in healthcare. Our data for this behavioural analysis came from input collected in studies of primary care patients and professionals, using the principle of maximum variation purposeful sampling.

The overall process of the BCW analysis was guided by a team consisting of researchers and care professionals, within the PCA network (see Acknowledgements). On a quarterly basis, gatherings were organised to share research findings and receive input. Moreover, an annual meeting with members of the PCA's external advisory board provided additional feedback and strengthened the BCW analysis. The latter group included behavioural experts and was set up when the PCA was established, under the supervision of the King Baudouin Foundation, to ensure that a body with expertise and experience in primary care would critically evaluate and monitor the PCA's work.

The findings of the BCW analysis shaped an intervention for professionals in primary care practice. Therefore, we aimed at maximum variation of participants across disciplines in health and well-being during the full process of the BCW analysis.

2.2. Steps and stages of the BCW process

The BCW analysis was conducted in accordance with the guidelines outlined in the book of Michie (2014) (Michie et al., 2014). The three stages and eight steps described in this book shaped the development of our self-management support intervention (Fig. 1). In the following paragraph, we describe in detail the methodology that was followed for each phase. In subsequent sections, the use of 'we' refers to the collective efforts and actions of the core research team, consisting of LT, PD, VF, AVH, MV and BS.

2.2.1. First stage: understanding the behaviour

2.2.1.1. Define the problem in behavioural terms. To gain insights into the implementation of self-management support in Flemish primary care practice, we conducted an extensive exploration of the existing literature (Paulus D & Van den Heede, 2012; Overheidsdienst, 2013; Academie Voor De Eerste Lijn, 2021; A.Z. & Gezondheid, 2017). Additionally, we collected input by an online survey to explore the concept across academic programs and courses in higher educational institutions in Flanders (Academie Voor De Eerste Lijn, 2021). By combining the literature insights with the survey results ($n = 95$ training programs), we identified evidence-practice gaps and formulated our problem statement related to the support of self-management. We then referred to the literature on the concept of self-management support to delineate this statement into specific behavioural components (Timmermans et al., 2022).

2.2.1.2. Select the target behaviour. In a second step, we prioritized the behaviours underpinning self-management support to get a clear focus for the behavioural analysis. We selected the target behaviour based on the criteria proposed by the BCW framework of Michie (i.e.; effect size, likelihood of changing, behavioural spillover score, measurability). This prioritisation was supported by a literature review examining existing self-management support interventions and their impact (Timmermans

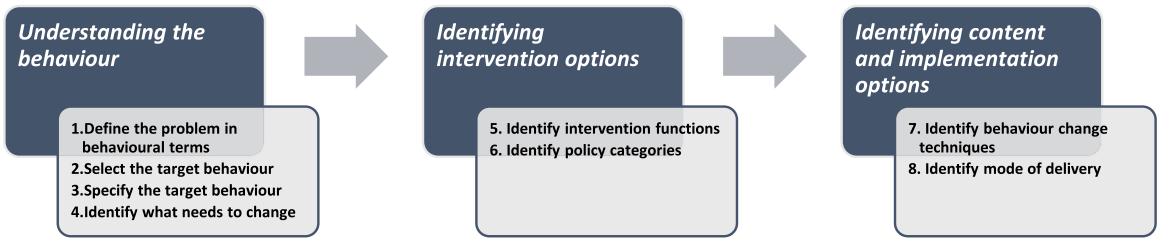

Fig. 1. Flowchart to design behavioural interventions according to the Behaviour Change Wheel of Michie (2014).

et al., 2023).

2.2.1.3. Specify the target behaviour. We continued the behavioural analysis by breaking down the target behaviour. This process was guided by six questions: (1) "Who needs to perform the behaviour?"; (2) "What do they need to do differently to achieve the desired change?"; (3) "When do they need to perform it?"; (4) "Where do they need to perform it?"; (5) "How often do they need to perform it?"; (6) "With whom do they need to perform it?". We discussed these questions thoroughly with all members of the research team. To complement, we used data from qualitative interviews with patients and their informal network ($n = 16$) and from focus groups with care professionals ($n = 5$) (Timmermans et al., 2022; Timmermans et al., 2023). Additionally, we enriched the analysis with data from brainstorming sessions ($n = 3$) in which different stakeholders (patients, informal and formal care providers) discussed interventional strategies to strengthen self-management support in primary care practice (Timmermans et al., 2022a).

2.2.1.4. Identify what needs to change. Following the BCW guidelines (Michie et al., 2014), we applied the COM-B questionnaire to structure data from our self-management support studies. By integrating this questionnaire into our BCW analysis, we gained a comprehensive holistic understanding of the factors influencing self-management supportive behaviour among healthcare professionals. In addition, we explored to what extent there is a need to change these factors referring to the most relevant barriers to self-management support, using data from literature review, interviews, focus groups and brainstorm sessions (Timmermans et al., 2022a; Timmermans et al., 2023a; Timmermans et al., 2023b; Timmermans et al., 2022b). We categorized these relevant barriers under the COM-B (sub-)components (i.e., Capability, Opportunity, Motivation). As a result, combining qualitative approaches with literature analysis informed the 'behavioural diagnosis'.

2.2.2. Second stage: identifying intervention options

2.2.2.1. Identify intervention functions. To identify possible intervention strategies, we followed the BCW guidelines (Michie et al., 2014). We used the matrix proposed by Michie to link the relevant COM-B (sub-) components to nine possible intervention functions (i.e.; Education, Persuasion, Incentivisation, Coercion, Training, Restriction, Environmental restructuring, Modelling and Enablement). Additionally, we applied criteria (i.e.; APEASE criteria) to select the most appropriate functions. This selection was based on literature analysis, findings from our studies on self-management support (Timmermans et al., 2022a; Timmermans et al., 2023a; Timmermans et al., 2023b; Timmermans et al., 2022b) and input from expert researchers (both external and internal).

2.2.2.2. Identify policy categories. In addition to the intervention functions, we identified several policy categories. We questioned which policies would support the implementation of the identified intervention functions. We used Michie's matrix to link the relevant intervention functions to seven candidate policy categories (i.e.; Communication/Marketing, Guidelines, Fiscal, Regulation, Legislation, Environmental/Social planning and Service provision). In addition, we used the APEASE-criteria to select the most appropriate categories. The same supportive sources (literature, own studies, experts) were used for selection as in the previous step.

2.2.3. Third stage: identifying content and implementation options

2.2.3.1. Identify behaviour change techniques (BCTs). As suggested in Michie's book, we used the BCT taxonomy to identify content that could best serve the intervention functions (Michie et al., 2014; Michie et al., 2013). Michie's taxonomy identifies commonly used BCTs that match specific intervention functions and policy categories, facilitating the systematic design of behaviour change interventions. Prior to the analysis, the main researcher (LT) actively participated in behavioural techniques training. Again, we applied the APEASE criteria to reduce the long list of potential BCTs by assessing accuracy of the individual BCTs. The identification process was guided by three short workshops with patients, health- and welfare professionals and representatives of healthcare organisations (Timmermans et al., 2022). The workshops were facilitated by an expert in implementation research and a member of the PCA team. After completing this seventh step, the main researcher drafted and specified the intervention strategy. This strategy was presented to the research team and further refined in discussion.

2.2.3.2. Identify mode of delivery. The final step in the behavioural analysis involved determining an appropriate mode of implementation of the intervention. Therefore, we used the taxonomy from the BCW book to provide us with a wide range of delivery modes (Michie et al., 2014). The selection was reduced by applying the APEASE criteria and deliberation with the research team. In addition, we sought external advice from two experts.

3. Results

3.1. The BCW analysis

3.1.1. First stage: understanding the behaviour

3.1.1.1. Define the problem in behavioural terms. We identified a gap between the level of self-management support provided to chronic patients in practice and the recommended level and strategies in literature. Therefore, self-management support in primary care practice was identified as a problematic behaviour and was used as the starting point for the behavioural analysis. Furthermore, we employed the SILCQ-model, describing five sub-behaviours related to self-management support (i.e., Supporting, Involving, Listening, Coordinating, and Questioning), to guide the analysis.

3.1.1.2. Select the target behaviour. The research team discussed the long list of potential behaviours, as captured in the SILCQ model, associated with the problem (Table 1). Using Michie's predefined questions in the BCW guidance regarding effect size, likelihood of change, behavioural spillover score and measurability, we prioritised the potential behaviours and recorded the target behaviour as *"support*

Table 1
Self-management support behaviours, as captured in the SILCQ-model, to define the problem in behavioural terms.

Self-management support behaviour	Underlying behaviours	Sub-behaviours
	Supporting	Providing practical support
		Providing ADL support
		Providing physical support
		Providing household support
		Providing medical support
		Exchanging information (including the concept of self-management)
		Transferring clinical expertise
		Arranging follow-up
		Transferring skills, tools & motivation
	Involving	Using communication tools
		Making shared decisions
		Ensuring participation
		Ensuring cooperation (including peer organisations)
		Maintaining care continuity
		Creating freedom of choice
		Exchanging information
		Tailoring care to need and wishes
	Listening	Taking time
		Being empathic
		Showing understanding
		Providing a listening ear
		Dealing with help requests
		Providing emotional support
		Listening to questions
		Listening to expectations
		Listening to wishes and goals
		Listening to care barriers & facilitators
		Being without judgement
		Listening to nonverbal cues
		Screening for social and care needs
	Coordinating	Being accessible
		Maintaining care continuity
		Directing and arranging deliberations (sharing concerns/knowledge)
		Creating stability
		Gaining collaboration (with other healthcare professionals)
		Managing time
		Including the support network
		Working in team
		Being the point of contact
		Arranging follow-up
		Arranging contact with peers
	Questions	Engaging in dialogue
		Exchanging Information
		Questioning expectations
		Questioning experiences
		Questioning wishes and goals
		Questioning care barriers & facilitators

patients' self-management by involving patients more and asking more questions to them".

3.1.1.3. Specify the target behaviour. We broke down the target behaviours *"involving patients more"* and *"asking more questions to patients"* into specific details addressing the actors involved, content, setting, timing and frequency. Table 2 presents the detailed analysis, informed by six predefined questions (Michie et al., 2014).

3.1.1.4. Identify what needs to change. We structured our data from interviews, focus groups and brainstorm sessions into the COM-B questionnaire to inform the behavioural diagnosis. Barriers to self-management support (specifically to *involving* and *asking questions* to patients) were identified in all components of the COM-B model. After

Table 2
Selected target behaviours and their characteristics.

Target behaviour	Involving patients more	Asking more questions to patients
Who needs to perform the behaviour?	General practitioners & nurses	General practitioners & nurses
What do they need to do differently to achieve the desired change?	Actively involving patients in the care process, by automatically including them while making care-related decisions. Creating freedom of choice. Accepting that the balance of power is shifting to the patient. Opening up for a more participative approach of delivering care, while ensuring cooperation with peer organisations.	Actively questioning patients' self-management, focussing on both medical, emotional and role management. Informing about the concept of self-management, engaging in dialogue, and asking questions related to patients' care expectations, experiences (i.e., care barriers & facilitators), wishes and goals.
When do they need to do it?	During consultation	During consultation
Where do they need to do it?	Primary care practice or in the home setting	Primary care practice or in the home setting
How often do they need to do it?	Every (home) visit	Every (home) visit
With whom do they need to do it?	Patients, surrounded by their informal caregivers and in team with the other healthcare professionals	Patients, surrounded by their informal caregivers

determining which components required change, we concluded that only *psychological capability, physical opportunity, reflective* and *automatic motivation* were relevant for self-management support to occur in primary care practice.

3.1.1.4.1. Psychological capability. Three barriers related to *psychological capability* emerged from our data: having knowledge, having confidence and having skills. First of all, it appears from our interviewed stakeholders (patients, informal carers, healthcare providers, healthcare organisation representatives) that a prerequisite for supporting self-management is having knowledge of both the concept and the importance (including benefits and outcomes). A lack of knowledge results in several misunderstandings and currently hinder implementation. Knowledge was identified as a barrier not only among healthcare professionals but also among patients themselves. Supporting self-management therefore needs clear guidance.

Secondly, little confidence in both professionals' and patients' capabilities hinder self-management (support). For example, not all interviewed participants believed that the ability to self-manage is something everyone can achieve. Finally, lack of sufficient skills was cited by our participants as a barrier to self-management support.

> "As healthcare professionals, we often say quickly and without much thought, 'Well, that won't work for them…"
>
> (Healthcare professional – focus group)

> "Perfect care? Well, it's about being able to listen and assess. Sometimes it's about unasked questions and understanding what the patient needs, but that requires experience."
>
> (Patient - interview)

3.1.1.4.2. Physical opportunity. When it comes to involving patients as part of self-management support, we identified one central barrier related to *physical opportunity*. According to our participants in the interviews, focus groups and brainstorming sessions, a clear overview of self-management support tools and interventions is missing. In addition, the accessibility and applicability of self-management measurement tools is questioned.

> *"So much money is being allocated towards wonderful, innovative (self-management support) initiatives, yet we are simply not aware of them."*

(Healthcare professional – brainstorming session)

3.1.1.4.3. Reflective motivation. With respect to *reflective motivation*, our data revealed that participants lacked motivation to engage in self-management support. More specifically, the positive impact in the patient care process was questioned. In addition, some focus group participants (i.e.; healthcare professionals) expressed that they did not see the added value of training to strengthen their personal support skills. The issue was mainly about learning to ask questions as a fundamental part of self-management support.

"There are some GPs who have become disengaged from initiatives such as multidisciplinary collaboration (as a tool for stronger self-management support) because they don't immediately see the efficiency or positive outcomes."

(Healthcare professional/healthcare researcher – brainstorming session)

"I assume that anyone who chooses to work in healthcare already possesses competencies in that area." (Referring to self-management support)

(Representative patient organisation – focus group)

3.1.1.4.4. Automatic motivation. According to our participants, future interventions should focus on awareness to target *automatic motivation*. In their opinion, healthcare professionals perceive minimal necessity to pay additional attention towards actions such as actively asking questions to patients and involving them during consultation, although these are defined fundamentals of good self-management support.

A minority emphasized that these self-management supporting actions requires extra effort and thus needs habit formation.

"To empower patients, healthcare professionals must feel empowered. On the one hand psychologically, they need to know what self-management support is and they must have skills to engage in self-management support. But on the other hand, they also need to be structurally empowered"

(Healthcare professional – brainstorming session)

"Healthcare providers also need to be open to this (referring to self-management support initiatives) (…) and be able to communicate the importance of it."

(Healthcare professional – brainstorming session)

3.1.2. Second stage: identifying intervention options

3.1.2.1. Identify intervention functions. According to Michie's matrix (Michie et al., 2014), all nine intervention functions were candidates to target the four components of the COM-B model that were identified as barriers to self-management support and where there was need for change. After applying the APEASE criteria, seven intervention functions were rejected because they were not Effective ($n = 1$), Practicable ($n = 4$) or Acceptable ($n = 2$) in the context of Flemish primary care practice. This resulted in the selected intervention functions of *education* and *enablement* (Table 3).

3.1.2.2. Identify policy categories. All seven policy categories could be linked to the selected intervention functions *education* and *enablement* according to the matrix (Michie et al., 2014). Of these, five policy categories did not meet the APEASE criteria for developing a self-management support intervention in primary care practice. The final selection included *communication/marketing* and *service provision* as policy categories (Table 3).

3.1.3. Third stage: identifying content and implementation options

3.1.3.1. Identify behaviour change techniques (BCTs). A total of 17 commonly used BCTs were reported as potentially active components for the selected intervention functions and policy categories (Michie et al., 2013). Only three techniques met the APEASE criteria and were therefore incorporated for the development of a behavioural self-management support intervention, including *information about social and environmental consequences, information about health consequences* and *social support (practical)* (Table 3).

3.1.3.2. Identify mode of delivery. To determine the mode of delivery, we summarised the behavioural analysis and formulated our intervention strategy. This strategy aims to demonstrate how we can provide healthcare professionals with *'information about social and environmental*

Table 3
Overview of the identified COM-B component and barriers related to self-management support, linked to the selected appropriate intervention functions, policy categories and BCTs.

COM-B components	Identified barriers for involving patients and asking them questions, as essential fundamentals of self-management support	Selected intervention functions	Policy categories through which BCTs can be delivered	BCTs to deliver intervention functions
Psychological capability	Lack of knowledge of the concept of self-management (including the benefits, the importance, etc.) Insufficient skills to ask questions (learn how, when and which questions need to be asked) Limited knowledge of available tools to involve patients (communication techniques, etc.)	Education	Communication/marketing Service provision	Information about social and environmental consequences Information about health consequences
	Lack of confidence in yourself that you can collaborate with patients and have confidence in the patient's abilities Lack of confidence that asking questions results in better healthcare outcomes and benefits the care process Strong urge to follow own judgement/opinion Insufficient skills of empathetic questioning	Enablement	Service provision	Social support (practical)
Physical opportunity	Inadequate access to or non-existence of necessary materials and tools	Enablement	Service provision	Social support (practical)
Reflective motivation	Doubts about the positive impact of involving patients and asking them questions Limited belief in the need for improved skills to involve patients effectively	Education	Communication/marketing Service provision	Information about social and environmental consequences Information about health consequences
Automatic motivation	Lack of established habits for involving patients and asking questions Disregard for the necessity of involving patients and recognizing the importance of questioning	Enablement	Service provision	Social support (practical)

COM-B: Capability, Opportunity, Motivation-Behaviour.
BCT: Behaviour Change Technique.

consequences', 'information about health consequences' and *'social support (practical)'*, achieved by making *changes to communication* and *service provision*. The goal is to *educate* and *enable* healthcare professionals to actively involve patients more and ask them more questions, as essential fundamentals of self-management support.

3.2. Description of the intervention and of the planned pilot study

To translate this strategy into a practical intervention, the development of a blended learning program was chosen. The intervention aims to provide healthcare professionals with *information* about social, environmental consequences and health consequences of self-management support. In addition, it focusses on providing social *support*. By making changes in *communication* and *service provision*, the blended learning program aims to *educate* and *enable* healthcare professionals to deliver more effectively self-management support, fostering patient-centredness and achieving better self-management outcomes for individuals with chronic disease(s). Following Michie's guidance, the internet was chosen as the most suitable primary medium to deliver the intervention at a population level. Therefore, the learning program was hosted on a knowledge and service-oriented self-management platform.

The blended learning program consists of four modules, combining online education (by means of text, audio (i.e., podcasts) and video), real-life reflection and discussion. The duration of the learning trajectory has been estimated to be six hours over an 8-week period. Detailed characteristics of the intervention are presented in the TIDierR-checklist (Supplementary file 1).

Healthcare professionals from different disciplines within primary care will be included for piloting the learning program. These participants will be recruited by contacting community health centres and multidisciplinary health and welfare practices in Flanders, Belgium. The pilot study will enrol at least 5 centres, with a total of no less than 24 healthcare professionals.

4. Discussion

This paper describes the identification of the necessary building blocks of an intervention to create a behavioural change in healthcare professionals to achieve more sustainable self-management support in primary care practice. The BCW provided a systematic approach to identify these building blocks and translate them into a practical intervention. We found that "psychological capability", "physical opportunity", "reflective motivation" and "automatic motivation" need to change to increase professionals' behaviour towards self-management support. Psychological capability was limited by a lack of knowledge, confidence and skills to support self-management. Physical opportunity was limited by the lack of clear, accessible support tools and interventions. Reflective motivation was affected by doubts about the positive impact and value of self-management support, while automatic motivation was challenged by a minimal perceived need to ask questions and involve patients in consultations as essential components of self-management support, highlighting the need for habit formation. In response, two key intervention functions were identified using Michie's framework: "enablement" and "education". Completing the BCW resulted in the development of a blended four-phase learning intervention that incorporates three behavioural techniques, namely informing healthcare professionals about social and environmental consequences of self-management support, informing about health consequences and providing social support. Our preparatory work underpinned this analysis based upon in-depth literature reviews and multiple qualitative studies (Timmermans et al., 2022; Timmermans et al., 2023; Academie Voor De Eerste Lijn, 2021; Timmermans et al., 2023; Boeykens et al., 2022).

This paper corroborates previous research on behaviour in healthcare practice. Valuable insights on the topic of self-management support were already obtained using the SDT. For example, Duprez et al. (2020) investigated different ways nurses interact with chronic patients while engaging in self-management support (Duprez et al., 2020). The study highlighted the varying profiles of nurses and their associated indicators, and contributed to a better knowledge of professionals' interactions with patients regarding self-management support. Understanding these different profiles can provide a nuanced perspective on how our proposed blended learning trajectory can be adapted and tailored to the specific needs of a healthcare professional, depending on their profile.

Our research introduces the BCW as a valuable addition to the field of Self-Determination by providing a holistic approach that combines the theoretical depth of the SDT with the practical applicability of behaviour analysis. By providing a systematic and comprehensive framework for the development of behaviour change interventions, BCW analysis has the power of enhancing the ability to understand, predict, and effectively influence human behaviour in different contexts. To date, the application of the BCW has not been fully explored to analyse self-management support behaviour in healthcare practice and only a very limited number of studies focus on healthcare professionals' behaviour. Nichols et al. (2017) launched a survey to explore the components of the COM-B model capable of changing behaviour among diabetes care professionals (Nichols et al., 2018). They concluded that particularly capacity and opportunity to engage in self-management support were lacking. This was confirmed by our study data, which additionally highlighted the value of motivation. Similar findings were found in other research in which (controlled) motivation was associated with belief in the importance of self-management support (Chung et al., 2021). In addition, Lee et al. (2021) investigated healthcare professionals' perceptions on barriers to implementing self-management support of asthma patients in primary care, also using the COM-B model (Lee et al., 2021). Again, comparable findings were found in terms of barriers to capability and motivation. Related to capability, the need of training self-management support skills emerged. In addition, lack of awareness about the benefits of self-management was central to motivation-related barriers. Coventry et al. identified barriers to patient engagement in self-management in the context of multimorbidity by exploring the views of both patients and practitioners (Coventry et al., 2014). Although focused on self-management rather than self-management support, similar COM-B related barriers were identified.

A broader analysis of self-management supportive behaviour in practice is found in the review by Tharani et al. (Tharani et al., 2021). More specifically, their systematic mixed studies review provides a summary of factors influencing the provision of self-management support by nurses. Their research findings align with our study's results. However, they look at behaviour from a broader perspective which transcends the COM-B model. In their review, they present a framework of interdependent factors influencing nurses' behaviour regarding self-management support. The emphasis is additionally on patient-provider collaboration, patient-related barriers to self-management and impeding healthcare structures. Our analysis focused more in-depth on the healthcare professional, regardless of which discipline, but examines the concept of self-management support from a narrower perspective.

A small number of studies employed behavioural analysis to develop an intervention aimed at empowering professionals. Wuyts et al. (2021) adopted the SDT to develop a multifaced need-supportive training program in self-management support for nurses (Wuyts et al., 2021). Although drafted from a different behavioural analysis, the objectives of their training are similar, namely to equip participants with attitudes, knowledge, skills and reflection needed to provide patient-centred self-management support. The similarities between both studies reinforce the value of the blended learning trajectory proposed in our analysis. The added value of the BCW consists in providing specific evidence-based intervention functions, policy categories and implementation approaches to underpin the intervention strategy. Porcheret

et al. (2014) described a case study on the adoption of theory to inform an intervention to enhance self-management support for general practitioners (Porcheret et al., 2014). Their theoretical foundation consisted of four different theoretical models, including the Theoretical Domains Framework (TDF) in order to identify relevant determinants of change. Although our study did not use the TDF, our results are consistent with their findings. Similar behavioural techniques related to information provision were incorporated into the intervention developed to target the domains of knowledge and motivation. This validates our intervention by suggesting that the learning program was well-targeted to the key theoretical domains that influence behaviour of healthcare professionals related to supporting self-management.

Interestingly, there are many other frameworks that can be used for behaviour change interventions. For example, the Theory of Planned Behaviour (TPB) is often used in behavioural research. A study by Anderson et al. (2019) applied TPB to explore views of healthcare professionals on self-management support in long-term conditions and found similar results to our study (Anderson & Ozakinci, 2019). More specifically, weak intentions towards the implementation of self-management support were observed, as there was a lack of belief in their own professional abilities. These findings suggest that, although using more technical frameworks such as the BCW may not be the standard and comes with additional challenges, our analysis was effective in identifying key behavioural factors influencing self-management support.

4.1. Strengths and limitations

This study is not without limitations. Bias in the selection of intervention functions and BCTs may have occurred since they were informed by the judgement and experience of the research team. However, we tried to involve as many experts as possible by intensively collaborating with the network of the PCA and by appealing on an advisory board. In addition, we only focussed on healthcare professionals' behaviours, which may have limited the impact on patient outcomes. However, patients' experiences and input were incorporated in the BCW analysis. Finally, there are some limitations to the use of the BCW framework. This approach does not provide a detailed analysis of the theoretical structures and mechanisms at the foundation of behaviour change, which can make it challenging to identify the precise factors causing behaviour. Nevertheless, the BCW framework has the strength to provide a very comprehensive and systematic approach, by which we were able to develop an evidence-based intervention for a broad target audience. Further insights into the functioning and impact of our blended learning intervention will be gained through a comprehensive evaluation of the pilot study.

5. Conclusion

Application of the BCW framework shaped a holistic self-management support intervention to *educate* and *enable* healthcare professionals in primary care practice. This intervention comprises three central BCTs, delivered via a combination of online education, real-life reflection and discussion. Future research will pilot and refine the intervention.

Abbreviations

APEASE: Acceptability, Practicability, Effectiveness, Affordability, Spill-over effects, and Equity; BCT: Behaviour Change Technique; BCW: Behaviour Change Wheel; COM-B: Capability, Opportunity, Motivation-Behaviour

EU: European Union; MRC: Medical Research Council; PCA: Primary Care Academy; SDT: Self-Determination Theory; TDF: Theoretical Domains Framework; TPB: Theory of Planned Behaviour

Availability of data and materials

NA

Authors' contributions

LT took the lead in conducting the comprehensive BCW analysis, under supervision of BS and in close collaboration with the core research team, additionally consisting of PD, VF, AVH and MV. The analysis process was enriched by the active participation of researchers and healthcare professionals within the PCA network. LT wrote the manuscript. All authors read, reviewed and approved the final manuscript.

Ethics approval and consent to participate

Not applicable for the design aspects of this study.

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CRediT authorship contribution statement

Lotte Timmermans: Writing – review & editing, Writing – original draft, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Peter Decat:** Writing – review & editing, Supervision, Formal analysis, Data curation, Conceptualization. **Veerle Foulon:** Writing – review & editing, Supervision, Formal analysis, Data curation, Conceptualization. **Ann Van Hecke:** Writing – review & editing, Supervision, Formal analysis, Data curation, Conceptualization. **Mieke Vermandere:** Writing – review & editing, Supervision, Formal analysis, Data curation, Conceptualization. **Birgitte Schoenmakers:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ijedro.2024.100370.

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