Noordman, J., Heijmans, M., Poortvliet, R., Groene, O., Ballester, M., Ninov, L., Niño de Guzmán, E., Alonso-Coello, P., Orrego, C., Suñol, R., Wagner, C. Identifying most important contextual factors for the implementation of self-management interventions: A Delphi study. Patient Education and Counseling: 2023, 114

Postprint version : 1.0
Journal website : https://www.sciencedirect.com/journal/patient-education-and-counseling
Pubmed link : https://pubmed.ncbi.nlm.nih.gov/37352753/
DOI : 10.1016/j.pec.2023.107843

Identifying most important contextual factors for the implementation of self-management interventions: A Delphi study

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ABSTRACT

Objective: To reach consensus amongst stakeholders about the most important contextual factors (CFs) that may influence the successful implementation of (components of) self-management interventions (SMIs) for type 2 diabetes, obesity, COPD and heart failure.
Methods: Building on our literature review that identified 31 CFs on different levels we conducted a Delphi with 44 stakeholders to identify which of these CFs, or additional ones, contribute most to successful implementation of SMIs. The Delphi consisted of three rounds in which the CFs were scored, prioritized and discussed.

Results: The most important CFs overlapped to a great extent across components of SMIs and diseases. Overall, stakeholders identified 'HCP's ability to adapt the advice, communication or intervention to patients' situation and level of knowledge' as most important CF.
Conclusion: CFs need to be taken into account when implementing promising SMIs. According to stakeholders, the most important CFs are patient-, HCP- or interaction related. 'Tailoring' was selected as the most crucial aspect for HCPs.
Practice implications: Stakeholders can make informed decisions on the adoption of the most suitable SMIs in a given context. These CFs are available through a self-management platform. Suggestions to implement selfmanagement behaviour and to close the research-to-practice gap are made.

1. Introduction

Self-management is crucial to decrease the high impact of chronic diseases on individuals, societies and economies [1]. Previous studies show that self-management interventions (SMIs) may improve clinical outcomes as well as patient-reported outcomes. For example, reducing HbA1C levels in patients with type 2 Diabetes (T2DM) [2], reducing weight for patients with obesity [3], improving quality of life in patients with Chronic Obstructive Pulmonary Disease (COPD) [4] and decreasing hospitalization in patients with heart failure (HF) [5]. SMIs are considered 'supportive interventions that healthcare staff, peers, or laypersons systematically provide to increase peoples' skills and confidence in their ability to manage a long-term disease' [6,7]. These interventions aim to enhance people's responsibility and active participation in the daily management of their chronic disease [8]. However, large variation in the success of SMIs has been observed. One of the reasons for this variation may be the difficulty of transferring and implementing effective interventions from randomized controlled trials (RCTs) into real life practice [9–11]. This is especially the case in complex interventions, like self-management interventions (SMIs), which consist of combinations of components. SMIs may include different support techniques (e.g. motivational interviewing, problem solving), types of providers (e.g. physicians and nurses or peers), delivery methods (e.g. face-to-face, remote) and target a range of different behaviours [8].

[Table 1], [Tabel 2]

Understanding why, when and where SMIs work most effectively is crucial for implementation [12,13]. Our previous literature review, using the Tailored Implementation for Chronic Diseases (TICD) framework [12,14], showed that many contextual factors (CFs) on several levels (i.e. intervention, patient, healthcare provider, interaction, organisation or/and system level) can hinder or facilitate the successful implementation of SMIs into practice [15]. Insight into the CFs that are likely to be important for the implementation of SMIs can facilitate more effective development and implementation, as well as the evaluation and reporting of tailored SMIs [12]. However, we do not know which CFs identified in our previous review [15] are considered as the most significant for the successful implementation of SMIs. Therefore, a Delphi study with experts in SMIs, including patients, healthcare providers (HCPs), policy makers and implementation researchers was conducted to identify which CFs contribute most to the successful implementation of SMIs. Delphi techniques are a frequently used method in healthcare to systematically bring together knowledge from experts with a research, policy or practical background, often with the goal of reaching a group consensus [16,17]. For this study, we aimed to reach consensus amongst stakeholders on the most important CFs that may influence the successful implementation of SMIs in general, and for SMIs with specific components, since the importance of contextual factors may vary depending on the type of SMIs.

This study is part of a larger project, called COMPAR-EU: "Comparing the cost-effectiveness of SMIs in four high priority diseases in Europe".COMPAR-EU aims to identify, compare, and rank the most effective and cost-effective SMIs for adults living with T2DM, obesity, COPD and/or HF [6].

2. Methods

2.1. Design

A three-round online Delphi method [17] was used to involve experts on self-management and implementation of healthcare interventions. The Netherlands institute for health services research (Nivel), based in the Netherlands, was responsible for organizing the online Delphi study.

[Table 3]

2.2. Participants

Stakeholders eligible for the Delphi were:

1. Patients, patient representatives and caregivers with experience with SMIs
2. HCPs (e.g. GP's, family physicians, nurses, physiotherapists)
3. Self-management/empowerment researchers, implementation, and e-health experts
4. Policy makers from hospitals, health services centres or, home care institutions

Stakeholders had to be able to: 1) understand and speak English; 2) living with or were experts in one or more of the following diseases: T2DM, obesity, COPD, HF. We did not have exclusion criteria. The aim was to include 30 stakeholders per disease (T2DM, obesity, COPD or/and HF), from various countries, including patients, HCPs, researchers and policymakers. No clear guidelines regarding the optimal sample size for a Delphi study exist [16]. Therefore, in line with two other studies using Delphi techniques [18,19] we aimed for a minimum of 30 experts.

Every effort was made to recruit a heterogeneous sample, with similar numbers of stakeholders recruited from each stakeholder group. Stakeholders were approached through the network of all the COMPAR-EU partners (i.e. Avedis Donabedian Research Institute (FAD); OptiMedis; European Patients' Forum (EPF); Iberoamerican Cochrane Centre, Biomedical Research Institute Sant Pau (IIB Sant Pau); Department of Primary Education, University of Ioannina), and by contacting specific self-management or implementation experts (for example, authors of self-management manuscripts, persons involved in the development of SMIs and practitioners with a special interest in self-management based on our literature review and internet searches). We organised a single Delphi and included stakeholders from all four diseases included in COMPAR-EU and various countries. All stakeholders were invited to be part of all Delphi rounds.

2.3. Contextual factors to prioritize

This study builds on results of our previous literature review about CFs for the successful implementation of SMIs [15]. In the review, results were categorized according to the Tailored Implementation for Chronic Diseases (TICD) framework [12,14]. This led to the identification of a single set of 31 CFs across the four diseases included in COMPAR-EU, related to patients (n = 14), Health Care Providers (HCPs) (n = 10), their interaction (n = 3) or the setting/organization (n = 4) (see Appendix A).

2.4. SMI components under consideration

For the purpose of the Delphi, we highlighted nine SMI components that are often used in SMIs for people with T2DM, obesity, COPD, or HF [7]. These are six support techniques: 1) sharing information and skills training; 2) monitoring techniques; 3) enhancing problem solving skills, goal setting and action planning; 4) coaching, motivational interviewing and stress management; 5) social support; 6) Shared Decision Making (SDM); and three types of deliveries: 7) group intervention; 8) remote delivery; 9) intervention led by peers (see Appendix B for definitions). SMIs can vary in the types and number of components included in each specific intervention. For instance, different support techniques, such as coaching and problem solving, may be employed, different and diverse types of HCPs may be involved, and sessions may be face-to-face, remote, or both. Since certain CFs may only be relevant, or more relevant, for certain intervention components, the purpose of the Delphi was to identify which CFs might be most important to consider when implementing SMIs with certain specific intervention components, as well as for SMIs in general. Therefore, stakeholders were asked to rate the importance of each of the 31 CFs for SMIs in general, and for the nine SMI components separately.

2.5. Process of the Delphi

The Delphi consisted of two online survey rounds and an online consensus meeting. Following the completion of round one, responses were summarised and fed back to the stakeholders, producing a refined version for round two. Descriptive statistics (Mean, SD) were used to analyse the data. After agreeing to participate, stakeholders received an email containing a personal weblink to the Delphi survey. All participants received detailed instructions in lay language on how to complete each round of the survey, including definitions and the timescale for completion. The information sheet also emphasised the importance of scoring all the CFs listed for each of the nine intervention components and SMIs in general, and completing all rounds. For those participants who required help completing the survey (both technical and content-related) we provided support by email. Participants had two weeks to complete each round. At the start of each week, those participants who had not completed their round received a reminder by email.

2.6. Delphi rounds

2.6.1. Round 1: rating of CFs

In survey round 1, participants were asked to rate the listed 31 CFs, using a 5-point Likert scale, in which scores of 1–2 represent a CF of no or limited importance, 3 a neutral score, and 4–5 one of intermediate and critical importance respectively. CFs were scored separately per intervention component, meaning that each participant scored each CF for each of the nine intervention components, and for SMIs in general. Participants could also suggest CFs that in their opinion should be added to the list of CFs, and again score them using the 5-point Likert scale. Furthermore, participants could add disease-specific comments (for T2DM, obesity, HF and COPD) per intervention component, related to one or more of the mentioned CFs.

Additional CFs that were proposed by participants were reviewed and added to the conceptual list of CFs when appropriate, or added as an example to the already listed CFs (e.g. after checking that there was no overlap with already listed CFs). For each CF in the final list, we noted whether it originated from the literature or from participants' suggestion. Disease-specific comments were forwarded to the online consensus meeting.

Before Round 2, per intervention component, CFs assessed as very low were eliminated before moving on to round 2. Consensus on low importance was defined as 80% or more participants scoring it as 1–3.

2.6.2. Round 2: prioritization of CFs

In survey round 2, the participants were presented with the average score (mean) per CF across all participants of round 1. They were then asked to score each of the remaining CFs again, considering this average score. In addition, to work towards consensus, for Round 2 we used a 4-point Likert scale; the neutral option (3) was not included. Therefore, scores 1 and 2 represented a CF of no and limited importance respectively, while scores 3 and 4 represented one of intermediate and critical importance respectively. Consensus regarding that a CF should be included in the list of CFs taken forward to the consensus meeting was defined as 70% or more of the respondents scoring the CF between 3 and 4. Based on the mean scores of the participants, we created a Top 5 (or Top 6 or 7 in case of similar mean scores) of the most important CFs for every component, and for SMIs in general.

2.6.3. Round 3: consensus building

Following the completion of the Delphi survey, all stakeholders were asked to take part in a consensus meeting. Given COVID-19 circumstances, this meeting was held online and took 1.5 h. The aim of the meeting was to explore why the CFs identified by the Delphi survey were considered important, to address any gaps in the generated list of CFs, and ultimately to select the CFs that would be included in the recommendations that the COMPAR-EU panels would be formulating for the platform. Specific attention was paid to disease-specific comments (from Round 1 and additional ones). Two experienced researchers (JN & MH) facilitated the meeting. The meeting was audio-recorded, relevant segments were transcribed to support the consensus process (i.e. discussion between stakeholders). It included two main activities. The first activity involved asking the participants to discuss and agree on (by majority vote) the Top 5–7 CFs for every SMI component (and SMIs in general). The second activity involved a discussion on disease-specific comments for the four diseases. We presented the disease-related comments from Round 1 and asked the participants to add additional disease-related CFs. This could involve CFs that are more important for one or more of the four diseases or specifically important for one disease. After the meeting participants received the main results of the consensus meeting and compensation for their participation.

3. Results

3.1. Participants

A total of 44 stakeholders (response 56%) participated in the first Delphi Round, 24 stakeholders in the second Round and 11 stakeholders participated in the online consensus meeting (see Table 1).

3.2. Delphi rounds

3.2.1. Round 1

Stakeholders evaluated the following CFs as of ‘ low importance’ for the implementation of SMIs: HCPs age (for: SMIs in general; sharing information and skills training; monitoring techniques; problem solving; coaching, motivational interviewing and stress management; SDM; group; remote delivery), HCPs sex/gender (for: sharing information and skills training; monitoring techniques; problem solving; coaching, motivational interviewing and stress management; social support; SDM; group; remote delivery), patients sex/gender (for: monitoring techniques; remote delivery), type of HCP (for: social support). Therefore, these CFs were removed (for that particular component) and not included in the next round. Between 28 and 31 CFs per component remained to be scored again in the second Round. The CFs that were added to the survey in round 1 based on participants’ suggestions and scored in round 2 are presented in Table 2.

3.2.2. Round 2

3.2.3.1. Top 5 CFs for SMI components

For each of the nine components of SMI, and for SMs in general, stakeholders reached consensus on a Top-5 of most important CFs (Box 1). For the Top 5's of all SMI components see Appendix C.

Two CFs were added during the survey: "Provider's skills at monitoring group interactions" (for the component Group) and "Education and continuous professional support of peer providers" (for the component Peers). The other CFs are part of the 31 CFs presented at the start of the survey. For four components, 1. monitoring techniques; 2. problem solving, goal setting and action planning; 3. remote delivery, and 4. peers, the Top 5 was already constructed based on the mean scores of round 2. For the other 5 components, and for SMIs in general, consensus still had to be reached, since six or seven CFs were found equally important by participants. Two of the presented CFs were combined into one (i.e. HCPs' ability to adapt the advice, communication or intervention to the patients' situation and level of knowledge). For the eliminated CFs from the Top 5's per component, see Appendix C. Overall, the most important CF identified by stakeholders was the HCPs' ability to adapt the advice, communication or intervention to the patients' situation and level of knowledge. This CF was present in each Top 5, except for the component 'intervention led by peers'. Other CFs that were included in multiple Top 5 selections' were: patient's attitude towards and motivation to engage in self-management; providers' communication skills and patient's preference regarding their own role in treatment. Most CFs in the Top 5's are HCP-related or patient-related CFs. For specific components, two interaction-related CFs and one system-related CF are included.

Box 1

Top 5 contextual factors for self-management interventions in general.

1. Provider-related: ability to adapt the advice, communication or intervention to the patient's personal situation and level of knowledge (merged CFs)
2. Patient-related: attitude towards self-management
3. Patient-related: motivation to engage in self-management
4. Provider-related: communication skills
5. Interaction-related: patient's preference regarding their own role in treatment

Box 2

Top 5 contextualactors for Sharing information and skills training.

1. Provider-related: ability to adapt the advice and communication to the patient's level of knowledge
2. Provider-related: communication skills
3. Provider-related: ability to adapt the advice or intervention to the patient's personal situation
4. Patient-related: motivation to engage in self-management
5. Patient-related: cognitive and behavioural skills to self-management

Box 3

Top 5 contextual factors for Monitoring techniques.

6. Patient-related: motivation to engage in self-management
7. Provider-related: awareness and attitude towards the patients knowledge and personal beliefs
8. Interaction-related: patients’ preference regarding their own role in treatment
9. Patient-related: attitude towards self-management
5. Provider-related: ability to adapt the advice or intervention to the patient’s personal situation

Box 4

Top 5 contextual factors for Problem solving, goal setting and action planning

1. Provider-related: ability to adapt the advice and communication to the patient’s level of knowledge
2. Provider-related: ability to adapt the advice or intervention to the patient’s personal situation
3. Patient-related: motivation to engage in self-management
4. Patient-related: attitude towards self-management
5. Interaction-related: patients’ preference regarding their own role in treatment

Box 5

Top 5 contextual factors for Coaching, motivational interviewing and stress management.

6. Provider-related: ability to adapt the advice and communication to the patient’s level of knowledge
7. Provider-related: ability to adapt the advice or intervention to the patient’s personal situation
8. Patient-related: motivation to engage in self-management
9. Provider-related: communication skills
10. Interaction-related: quality of the relationship between patient and provider

Box 6

Top 5 contextual factors for Social support.

1. Provider-related: ability to adapt the advice and communication to the patient's level of knowledge
2. Patient-related: (perceived) available support from family and friends
3. Patient-related: peer support and interaction
4. Provider-related: ability to adapt the advice or intervention to the patient's personal situation
5. Provider-related: expertise in supporting self-management for chronic disease

Box 7

Top 5 contextual factors for Shared Decision Making.

1. Provider-related: communication skills
2. Patient-related: motivation to engage in self-management
3. Interaction-related: patient's preference regarding their own role in treatment
4. Patient-related: knowledge and personal beliefs about the disease and its treatment
5. Provider-related: ability to adapt the advice, communication or intervention to the patient's personal situation and level of knowledge (merged CFs)

Box 8

Top 5 contextual factors for Group

1. Provider-related: communication skills
2. Provider-related: ability to adapt the advice and communication to the patient's level of knowledge
3. Provider-related: ability to adapt the advice or intervention to the patient's personal situation
4. Patient-related: cultural background and/or language
5. Provider's skills at monitoring group interactions (suggested by stakeholders)

3.2.3.2. Discussion between stakeholders

Stakeholders mentioned that some categories were not mutually exclusive and the chosen HCP-related CFs could also be categorized as interaction-related CFs (e.g. communication skills). For example, a stakeholder (HCP) said: “That to me says that the HCP is interested in having a good relationship with the patient. (.) So I think that are sort of interaction factors, they are sort of an outcome of an attitude that they want to partner with the patient” (S-1). In addition, stakeholders mentioned that the patient- and HCP-related CFs are easier to change than the organization- or setting-related CFs. A stakeholder said: “It is easier to change the relationship with the patient, than with the system. Improve the relationship with the patient (.) The system might be too big to change” (S-4). Another stakeholder (implementation scientist) said that the HCP- and patient-related CFs are more actionable (e.g. changing HCPs' attitude) than the system- or interaction-related CFs (e.g. changing the quality of the relationship or the infrastructure). Another stakeholder (a HCP) mentioned that it is important for people to be aware that they are responsible for their own health and that self-management is forever, not only in case of symptoms. One stakeholder emphasized the shared responsibility between HCP and patient concerning self-management. It was also discussed that good information at diagnosis is crucial for self-management. Moreover, according to stakeholders it is important for patient's self-management to involve their social network, especially the informal caregiver. As one stakeholder mentioned: "*Clinicians very often ignore family caregivers, even if they are present, and they make it very obvious that they are ignoring them. They look only at the patient and if the caregiver tries to contribute they don't even acknowledge the comment. (.) Yet they are the ones supporting the patient predominantly, seven days a week"* (S-2). Another stakeholder mentioned: *"I think the next piece that hasn't been captured yet is how short the amount of time between the patient and the HCP is"* (S-8). This led to the discussion that the type of HCP is also important: "*Who is the healthcare provider? It is not the same being a physician as being a nurse (.). Nurses tend to involve also the informal caregivers. That is also because they have more time than we (physicians) have"* (S-7). According to another participant (HCP), education needs to be improved for physicians: *"I am very worried about the education of younger doctors especially, because nurses tend to have a more balanced education. (.) In our curriculum there are not many addressing these issues (about SMIs and CFs)"* (S-10).

Box 9

Top 5 contextual factors for Remote delivery.

1. Provider-related: motivation to engage in self-management
2. Provider-related: ability to adapt the advice and communication to the patient's level of knowledge
3. Provider-related: communication skills
4. Provider-related: ability to adapt the advice or intervention to the patient's personal situation
5. System-related: availability of suitable infrastructure for self-management support

Box 10

Top 5 contextual factors for Peers

1. Education and continuous professional support of peer providers (suggested by stakeholders)
2. Provider-related: motivation to engage in self-management
3. Patient-related: cultural background and/or language
4. Patient-related: attitude towards self-management
5. Interaction-related: patient's preference regarding their own role in treatment

3.2.3.3. Disease-specific CFs

For all four diseases, comments were made about stigmatization by HCPs, for example because of patients' age and the severity of the disease. For T2DM, several comments of stakeholders were related to monitoring devices; i.e. availability, access, usability, lack of trust, unreliability and inadequate reminders of devices. For patients with T2DM, stakeholders also mentioned the importance of plain advice and information, as well as skills training at the moment of diagnosis. According to stakeholders, social and peer support is important for patients with obesity. In addition, the psychological status of obese patients is important to take into account. Similar comments were made by stakeholders for the diseases COPD and heart failure. For both diseases it was mentioned that severity of the disease and patients' age may limit the possibilities for self-management, the difficulty of establishing objective control measures, and the importance of the social network. For COPD, stakeholders specifically mentioned the peer pressure to stop smoking. For HF, self-management could be seen as less important by patients due to the up and down nature of the disease (i.e. symptomatic treatment) and due to the role of technology (for example, pacemakers make self-management less important for patients as technology is doing the work). Co-morbidity with mental illness in HF patients was also mentioned by stakeholders as making self-management more challenging.

4. Discussion and conclusion

4.1. Discussion

This Delphi study, supported by the evidence from the previous literature review, provided substantial consensus about the most important CFs for the implementation of SMIs. The CFs that were most strongly endorsed by stakeholders, for SMIs in general and several component of SMIs, overlapped to a great extent. Overall, the most important CF identified by stakeholders was: "HCPs' ability to adapt the advice, communication or intervention to patients' situation and level of knowledge". This CF was present for almost all components of SMIs. It implies that 'tailoring' is an important asset for HCPs. Previous studies into SMIs also found that tailored or personalized care interventions can improve the quality of health and healthcare [12,14,20–22]. For example, a Cochrane review found that personalized care planning (i.e. support from health professionals that is tailored to the needs of individual patients) is a promising approach for adults with chronic health conditions that offers potential effective help to patients leading to better health outcomes. Also, they concluded that the effects are greater when the intervention is more intensive, comprehensive and better integrated into routine practice [22]. However, tailoring or personalizing is a broad and also somewhat vague concept. Which factors are particularly important when it comes to tailoring or personalizing for specific patient groups is not quite clear. Although, a recent study suggest that patients with low health literacy mostly prefer to work on their competences for self-management, next to health related outcomes (e.g. symptom control). For health care professionals, acting on these patient preferences and building a solid relationship will enhance successful self-management [20]. Other CFs that were included by the stakeholders in our study as most important for multiple components of SMIs were: patient's attitude towards and motivation to engage in self-management; providers' communication skills and patient's preference regarding their own role in treatment. This is not surprising, since patients' attitude and motivation are prerequisites for effective self-management. While communication between providers and patients is crucial for patients to have an active role in the management of their chronic disease as well as in decision making. This is consistent with a previous study that also mentioned the crucial role of excellent communication and negation skills of providers for tailored self-management support [23].

We also found that most of the CFs derived from our literature study [15]. However, two CFs were added by stakeholders during the Delphi and were chosen as most important for specific components: "Provider's skills at monitoring group interactions" (for the component Group) and "Education and continuous professional support of peer providers" (for the component Peers). This indicates that according to stakeholders these CFs are only relevant for these specific components and need to be taken into account when implementing SMIs with a group or peer component.

Similar to our review study [15] the most important CFs according to stakeholders are HCP-related or patient-related CFs. One can argue that some of the presented HCP- and patient-related CFs are also interaction-related (e.g. communication skills, ability to adapt the advice, communication or intervention to the patient's personal situation and level of knowledge). This was also mentioned by stakeholders. Although, stakeholders did not select organisation or setting CFs as most crucial, this does not mean that they are not important or should not be taken into account when implementing SMIs. A previous study, focusing on implementing shared decision making in routine care, identified a wide range of CFs on organizational- and system level that may play a role in successful implementation [24].

Furthermore, most CFs were common across diseases, although disease-specific CFs were mentioned by stakeholders. Especially for the uptake of SMIs, these disease-specific comments are important for HCPs to take into account. For example for COPD and HF, stigmatization by HCPs about patients' age and the severity of the disease limits the possibility to start a SMI, and HCPs will also provide less information and advice about the option to self-manage. While for T2DM patients, especially monitoring devices can hinder or facilitate self-management. Previous studies also found that many chronic illnesses, though unique in their own demands, share common challenges and CFs associated with their management [25,26].

4.1.1. Strengths and limitations

A major strength of our study is that we have created solid evidence about both facilitators and barriers for the implementation of SMIs across various levels and diseases, by combining a review study [15] with a Delphi study. Also, our Delphi process brought together knowledge and expertise from stakeholders with a different background and perspective, we used plain language materials and equal weighting was given to stakeholder groups' rating. Furthermore, the development of the Delphi study was theoretically underpinned by using the Tailored Implementation for Chronic Diseases (TICD) framework [12,14]. However, this study has some limitations. First, our aim was to organise four Delphi studies, for each disease separately. Due to COVID-19, and a limited response rate (56%) we organised one Delphi across diseases. Also, only stakeholders from medium and high income countries were included. Second, policy makers participated as stakeholders, but only in the survey rounds, not in the online consensus meeting. This could have resulted in an underrepresentation of macro level CFs. Especially since our review study also showed a lack of reported macro level CFs in the literature. However, all stakeholders that participated in the Delphi study could add additional (macro level) CFs. Finally, reaching consensus amongst stakeholders about a Top 5 of most important CFs in a group meeting for (components of) SMIs might be somewhat artificial, since every stakeholder needs to decide for themselves what the most important CFs are given their own circumstances and SMI. Moreover, we have to interpret these results with caution since the final agreement was reached amongst 11 stakeholders (25% of the total stakeholders). Therefore, we also have to acknowledge the results from the first and second Delphi round. Fortunately, the findings from the first two Delphi rounds are in line with the final agreement amongst stakeholders.

4.2. Conclusion

CFs are important to take into account when implementing promising SMIs in real life settings. According to stakeholders, the most important CFs are patient-, HCP- or interaction related. 'Tailoring' or personalized care seems to be the most crucial asset for HCPs. Tailoring SMIs to patients preferences, needs and circumstances increases the successful implementation of SMIs in real-life practice. Specific CFs need to be taken into account when SMIs are provided in groups or by peers.

4.3. Practice implications

The findings of this research could be helpful to guide different into a self-management platform which provides support for policymakers, guideline developers, HCPs and patients to make informed decisions on the adoption of the most suitable SMIs in a given context and on which CFs to take into account for successful implementation. The contextual factor heading on the platform includes definitions of CFs, the different levels of CFs and examples for all included diseases. See: Contextual factors - COMPAR-EU - Liferay (self-management.eu).

Patient-, provider-, interaction- or organization and system-related self-management behaviour does not change by themselves, considerable effort and continuous attention is needed to implement self-management behaviour and to close the research-to-practice gap [11]. First, although CFs are presented on different levels in this study, for successful application and implementation of SMIs it is crucial to take CFs on several levels into account simultaneously. Second, the patients' perspective (i.e. exploring their needs, preferences and circumstances) should be the start for integrating tailored or personalized SMIs into practice [23]. Followed by tailored communication and shared decision making between patients and HCPs about treatment plans and self-management. Fourth, a common ground amongst (trained) healthcare professionals within the organization or setting and healthcare system can help the embedding of tailored SMIs. Finally, future research should not only consider CFs for the implementation of SMIs, but also look into CFs when designing a (self-management) intervention.

Ethical approval

The project coordinator (Avedis Donabedian Research Institute) requested the overall ethical approval for the project to our local Clinical Research Ethics Committee (CEIC) (the University Institute for Primary Care Research—IDIAP Jordi Gol) with the code P18/036. Ethical approval was granted in March 2018.

Funding

This work was supported by European Union's Horizon 2020 research and innovation programme under grant agreement No 754936.

CRediT authorship contribution statement

JN contributed to the design of the study and wrote the first draft of the manuscript. All other authors contributed to the design of the study, reviewed the manuscript and approved the final version of the manuscript.

Declaration of Competing Interest

None.

Acknowledgements

We would like to thank all the stakeholders who participated in the Delphi process. Without their participation this study would not have been possible.

Registration and protocol

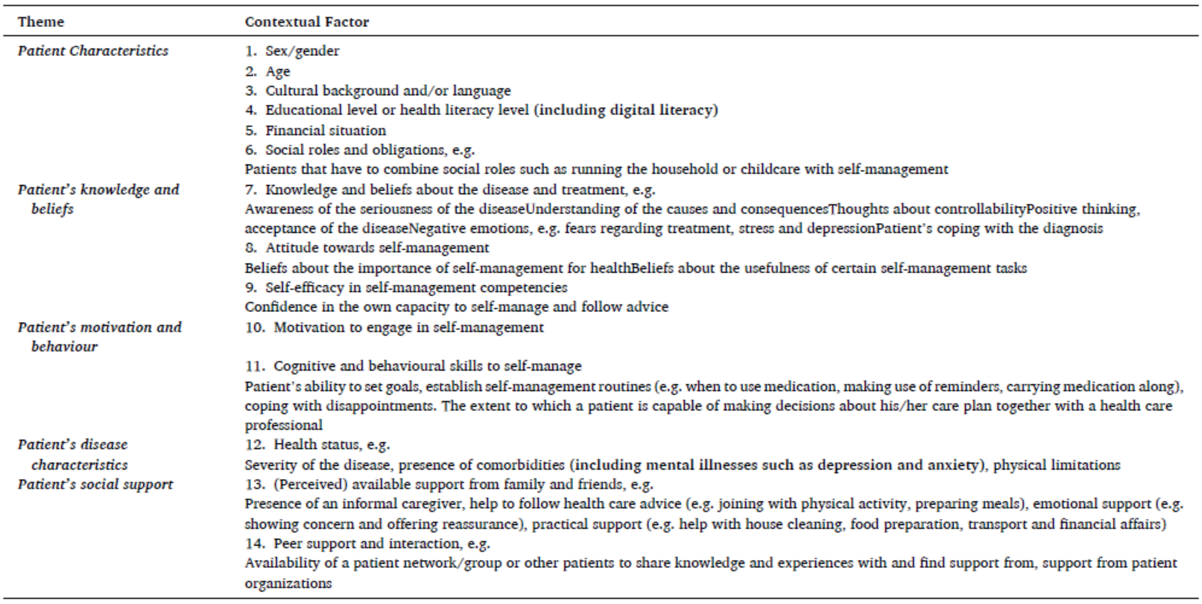
The research protocol is published previously: Ballester M, Orrego C, Heijmans M, et al. Comparing the effectiveness and cost-effectiveness of self-management interventions in four high-priority chronic conditions in Europe (COMPAR-EU): a research protocol. BMJ Open 2020; 10: e034680. 2020/01/22. DOI: 10.1136/bmjopen-2019-034680.

Appendix A. Contextual factors

The CFs originate from our review study [11], using the Tailored Implementation for Chronic Diseases (TICD) framework [8,10]. The underlined and bold examples of CFs are added by stakeholders as part of the Delphi study.

Patient related factors

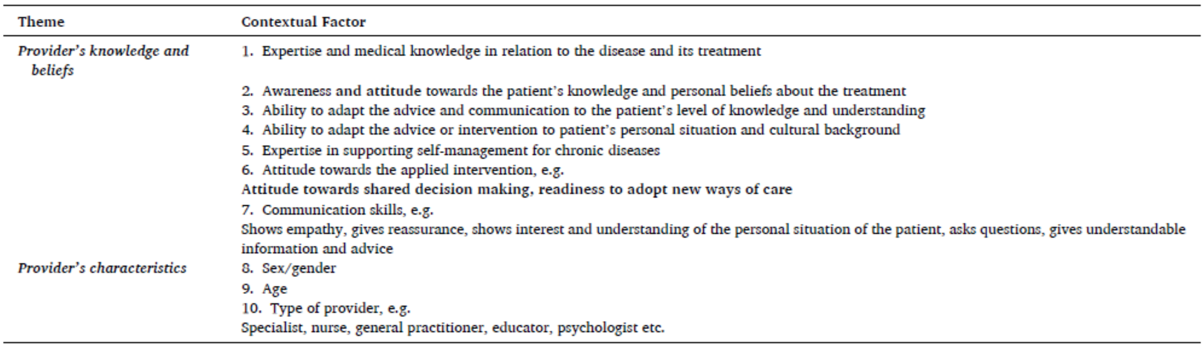
With patients we refer to people with diabetes mellitus type 2, heart failure, obesity and/or COPD.



Theme	Contextual Factor
Patient Characteristics	1. Sex/gender 2. Age 3. Cultural background and/or language 4. Educational level or health literacy level **(including digital literacy)** 5. Financial situation 6. Social roles and obligations, e.g. Patients that have to combine social roles such as running the household or childcare with self-management
Patient's knowledge and beliefs	7. Knowledge and beliefs about the disease and treatment, e.g. Awareness of the seriousness of the diseaseUnderstanding of the causes and consequencesThoughts about controllabilityPositive thinking, acceptance of the diseaseNegative emotions, e.g. fears regarding treatment, stress and depressionPatient's coping with the diagnosis 8. Attitude towards self-management Beliefs about the importance of self-management for healthBeliefs about the usefulness of certain self-management tasks 9. Self-efficacy in self-management competencies Confidence in the own capacity to self-manage and follow advice
Patient's motivation and behaviour	10. Motivation to engage in self-management 11. Cognitive and behavioural skills to self-manage Patient's ability to set goals, establish self-management routines (e.g. when to use medication, making use of reminders, carrying medication along), coping with disappointments. The extent to which a patient is capable of making decisions about his/her care plan together with a health care professional
Patient's disease characteristics	12. Health status, e.g. Severity of the disease, presence of comorbidities **(including mental illnesses such as depression and anxiety)**, physical limitations
Patient's social support	13. (Perceived) available support from family and friends, e.g. Presence of an informal caregiver, help to follow health care advice (e.g. joining with physical activity, preparing meals), emotional support (e.g. showing concern and offering reassurance), practical support (e.g. help with house cleaning, food preparation, transport and financial affairs) 14. Peer support and interaction, e.g. Availability of a patient network/group or other patients to share knowledge and experiences with and find support from, support from patient organizations

Provider related factors

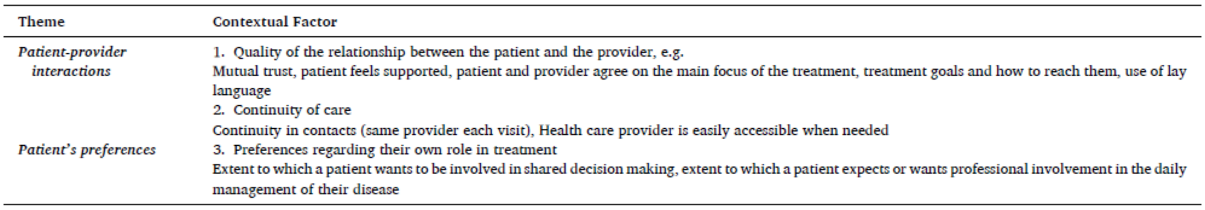
Provider refers to the person or service providing the SMI. Self-management support can be provided by individuals or in the context of multidisciplinary teams. Different practitioners, peers or laypersons can be involved at different stages /levels. Examples of providers are physicians, nurses, physiotherapists, pharmacists, social workers, psychologists, dietician, health care assistants, educators, peers, laypersons, or services.



Theme	Contextual Factor
Provider's knowledge and beliefs	1. Expertise and medical knowledge in relation to the disease and its treatment 2. Awareness and attitude towards the patient's knowledge and personal beliefs about the treatment 3. Ability to adapt the advice and communication to the patient's level of knowledge and understanding 4. Ability to adapt the advice or intervention to patient's personal situation and cultural background 5. Expertise in supporting self-management for chronic diseases 6. Attitude towards the applied intervention, e.g. **Attitude towards shared decision making, readiness to adopt new ways of care** 7. Communication skills, e.g. Shows empathy, gives reassurance, shows interest and understanding of the personal situation of the patient, asks questions, gives understandable information and advice
Provider's characteristics	8. Sex/gender 9. Age 10. Type of provider, e.g. Specialist, nurse, general practitioner, educator, psychologist etc.

Interaction related factors

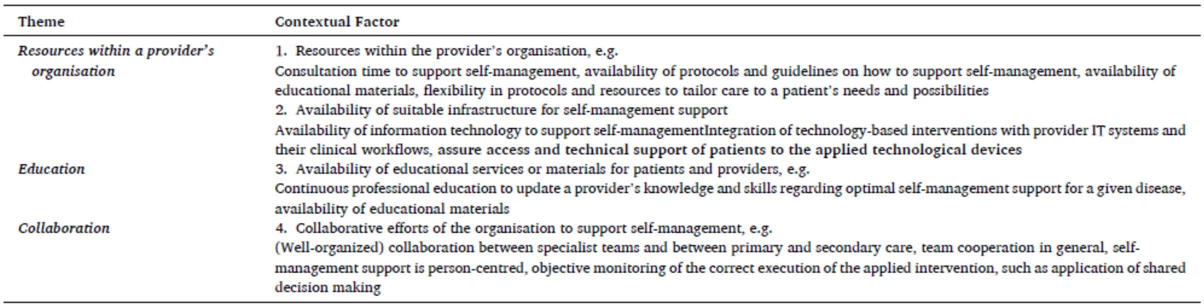
These factors have to do with the quality of the patient-provider relationship and the continuity of care.



Theme	Contextual Factor
Patient-provider interactions	1. Quality of the relationship between the patient and the provider, e.g. Mutual trust, patient feels supported, patient and provider agree on the main focus of the treatment, treatment goals and how to reach them, use of lay language
	2. Continuity of care Continuity in contacts (same provider each visit), Health care provider is easily accessible when needed
Patient's preferences	3. Preferences regarding their own role in treatment Extent to which a patient wants to be involved in shared decision making, extent to which a patient expects or wants professional involvement in the daily management of their disease

Organisation or setting related factors

These factors have to do with resources in an organisation to facilitate self-management support, training possibilities and collaboration between providers or services involved.



Theme	Contextual Factor
Resources within a provider's organisation	1. Resources within the provider's organisation, e.g. Consultation time to support self-management, availability of protocols and guidelines on how to support self-management, availability of educational materials, flexibility in protocols and resources to tailor care to a patient's needs and possibilities
	2. Availability of suitable infrastructure for self-management support Availability of information technology to support self-managementIntegration of technology-based interventions with provider IT systems and their clinical workflows, assure access and technical support of patients to the applied technological devices
Education	3. Availability of educational services or materials for patients and providers, e.g. Continuous professional education to update a provider's knowledge and skills regarding optimal self-management support for a given disease, availability of educational materials
Collaboration	4. Collaborative efforts of the organisation to support self-management, e.g. (Well-organized) collaboration between specialist teams and between primary and secondary care, team cooperation in general, self-management support is person-centred, objective monitoring of the correct execution of the applied intervention, such as application of shared decision making

Appendix B. Definitions of the nine self-management intervention (SMI) components

SMI components by type of support strategies, type of interaction, mode of delivery or type of HCP, respectively:

1. Sharing information and skills training. This component consists of providing and exchanging information (e.g. written, verbal, visual) about self-management behaviours and about health consequences of performing those behaviour. For example, information about recommended lifestyles, use of medication, information about the condition and any other relevant aspect to improve self-management. Information can go together with skills training in which patients are taught how to perform a certain self-management behaviour in a correct way. For example using an inhaler or doing exercise on a certain intensity level.
2. Monitoring techniques, including self-monitoring training and feedback and/or use of prompts and reminders. This component refers to training patients techniques and to encourage them to watch, register or keep a record of specified behaviour, symptoms or clinical data. It could include feedback from a HCP or technological equipment on the registered records on a regular basis to encourage the continuation of monitoring. For example: advise a patient on how to register physical activity, pain levels, symptoms and signs of glycaemia etc. To support monitoring, also prompts and reminders can be used to remind a patient to perform the behaviour when needed and considering their preferences (or to avoid or perform an alternative behaviour in the case of behaviours to be reduced). It could be useful to remind about correct techniques or skills each review to maintain high standard of technique. For example: Recommend using electronic reminders in an app to remember medication or teaching to use a "to do list" to perform daily self-management behaviours.
3. Enhancing problem solving skills, goal setting and action planning. Problem solving: techniques to analyse, or prompt the person to analyse, factors influencing the behaviour and generate or select strategies that include overcoming barriers and/or increasing facilitators. E.g.: Identifying and addressing environmental barriers to perform physical activities on a daily basis. Goal setting: the person is encouraged to set one or more goals that can be achieved according to their needs

and preferences. This goal could be formulated as wanted behaviour or a positive outcome. Action planning: Usually an action plan is also developed which involves detailed planning of what the person will do including, as a minimum, when, in which situation and/or where to act. "When" may describe frequency such as how many times a day/week or duration (e.g. for how long).

4. Coaching, motivational interviewing and stress management. Coaching and motivational interviewing facilitate behavioural change in an interpersonal process by identifying individual's values and core strengths and transforming goals into action using targeted and tailored strategies and support. Motivational interviewing and counselling serve as a collaborative conversation between a practitioner and a patient that aim to strengthen the patient's motivation, commitment and minimise resistance and resolve ambivalences to change. Stress management is a wide spectrum of techniques and therapies aimed at controlling a person's level of stress, especially chronic stress, usually for the purpose of and for the motive of improving everyday functioning. For example: Mindfulness, exercising, stretching, listening to music, deep breathing, meditation, etc.
5. Social support. This component consists of helping a person to think through how they might elicit social support from other people to help him/her achieve their targeted behaviour/outcome. This could also include the provision of social support or considerations about available social support networks, depending on patient preferences, needs, burden of the condition(s) and additional life burdens (for example: care-giving roles). Also part of this component is linking the person to relevant community services to enhance the socialisation process and make optimal use of available support in the local community. For example: stimulating involving the family in the condition management, stimulating that the patient participates in physical activity groups, etc.
6. Shared decision making. This component relates to the decision–making process for treatment goals, in which patients are involved as active partners together with a HCP or a multidisciplinary team. In this process, the care or treatment options are fully explored, along with their risks and benefits, and a decision is reached together. Shared decision-making is appropriate in any situation where there is more than one reasonable course of action and where no single option is self-evidently best for everyone. For example: Discuss different treatments, procedures, diagnostics alternatives or modalities of healthy lifestyle behaviours, and decide together which ones best fit the patient's needs, possibilities and preferences.
7. Group intervention. Self-management support is given only in groups, that is to two or more patients at the same time. Usually, interventions are organised in groups to make interventions more efficient or to facilitate the learning and knowledge exchange among peers. For example: a peerled education group to enhance physical activity for patients with obesity.
8. Remote delivery of self-management support by phone, Internet, smart devices or other specific devices. Central to this type of support is that HCP and patient are not in the same room at the moment the support is given. Support by phone allows patients and HCPs to conduct a conversation to support self-management when they are too far apart to be heard directly. Support by smartphone, tablet or internet uses technological communication networks that could be asynchronous (as email, some web-based forums) but also synchronous (as webinars, skype meetings, or other web-site applications). Other specific devices are often designed to facilitate the interaction of the SMIs with the HCP. These devices could involve tele-monitoring or tele-care devices if the technology is focused to improve patients and carers self-management.
9. Interventions led by peers. A peer in the context of self-management support is someone who shares the experience of living with a (long term) condition and participates in the provision of the intervention. Usually they have knowledge and skills to manage and solve problems related with the condition and share this information with other patients to engage and activate other patients with less motivation.

Appendix C

Top 5 's of CF for SMI components

All CFs originate from the literature study [11], except when it is mentioned that the CF is 'suggested by stakeholders' (i.e. originate from the Delphi).

Eliminated CFs from Top 5's

The following CFs were eliminated by stakeholders from the Top 5's (per component): patients' preference regarding their own role in treatment (for: sharing information and skills training), HCPs' expertise in supporting self-management for chronic diseases (for: sharing information and skills training), HCPs' awareness and attitude towards the patients knowledge and personal beliefs (for: coaching, motivational interviewing and stress management), HCPs' communication skills (for social support), patients' attitude towards self-management (for: SDM) and HCPs' attitude towards the applied intervention (for: group).

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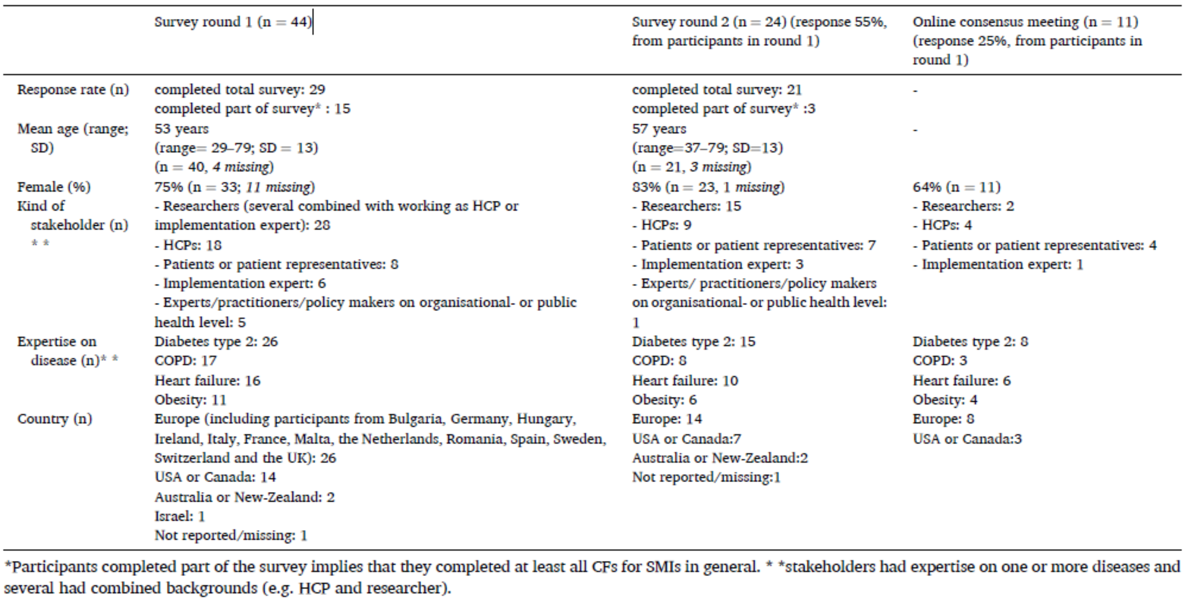
Tables and figures

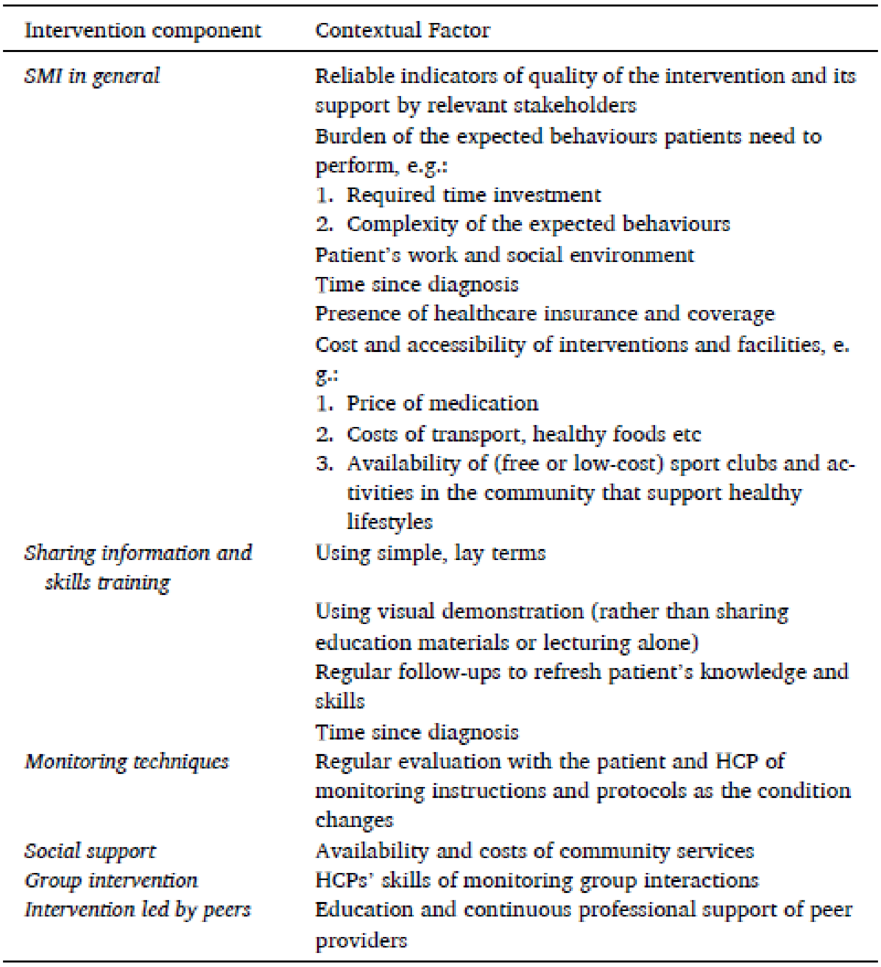
Table 1 Characteristics of Delphi participants.



	Survey round 1 (n = 44)	Survey round 2 (n = 24) (response 55%, from participants in round 1)	Online consensus meeting (n = 11) (response 25%, from participants in round 1)
Response rate (n)	completed total survey: 29 completed part of survey* : 15	completed total survey: 21 completed part of survey* :3	-
Mean age (range; SD)	53 years (range= 29–79; SD = 13) (n = 40, *4 missing*)	57 years (range=37–79; SD=13) (n = 21, *3 missing*)	-
Female (%)	75% (n = 33; *11 missing*)	83% (n = 23, *1 missing*)	64% (n = 11)
Kind of stakeholder (n) * *	- Researchers (several combined with working as HCP or implementation expert): 28 - HCPs: 18 - Patients or patient representatives: 8 - Implementation expert: 6 - Experts/practitioners/policy makers on organisational- or public health level: 5	- Researchers: 15 - HCPs: 9 - Patients or patient representatives: 7 - Implementation expert: 3 - Experts/ practitioners/policy makers on organisational- or public health level: 1	- Researchers: 2 - HCPs: 4 - Patients or patient representatives: 4 - Implementation expert: 1
Expertise on disease (n)* *	Diabetes type 2: 26 COPD: 17 Heart failure: 16 Obesity: 11	Diabetes type 2: 15 COPD: 8 Heart failure: 10 Obesity: 6	Diabetes type 2: 8 COPD: 3 Heart failure: 6 Obesity: 4
Country (n)	Europe (including participants from Bulgaria, Germany, Hungary, Ireland, Italy, France, Malta, the Netherlands, Romania, Spain, Sweden, Switzerland and the UK): 26 USA or Canada: 14 Australia or New-Zealand: 2 Israel: 1 Not reported/missing: 1	Europe: 14 USA or Canada:7 Australia or New-Zealand:2 Not reported/missing:1	Europe: 8 USA or Canada:3

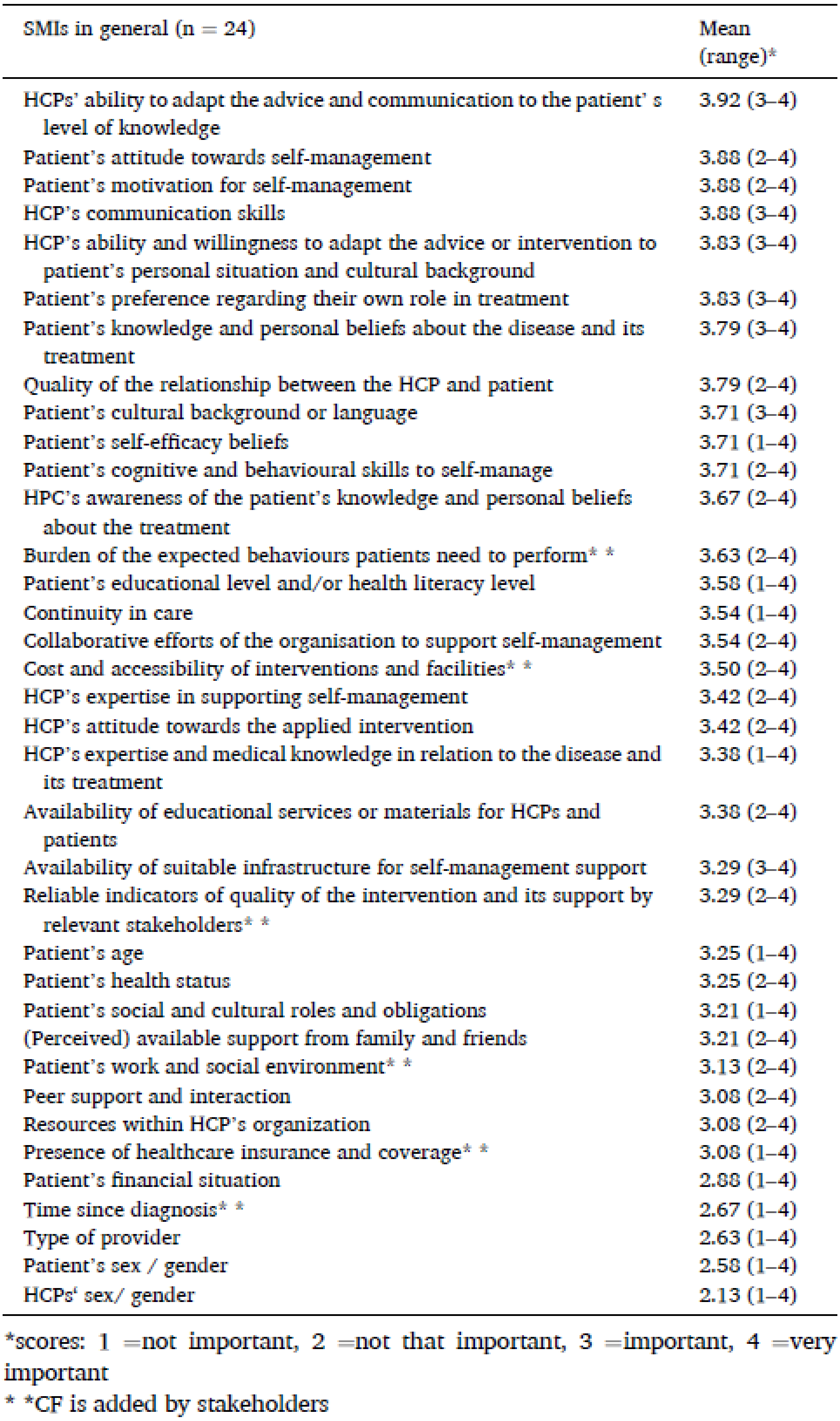
*Participants completed part of the survey implies that they completed at least all CFs for SMIs in general. * *stakeholders had expertise on one or more diseases and several had combined backgrounds (e.g. HCP and researcher).

Table 2 Additional contextual factors.



Intervention component	Contextual Factor
SMI in general	Reliable indicators of quality of the intervention and its support by relevant stakeholders Burden of the expected behaviours patients need to perform, e.g.: 1. Required time investment 2. Complexity of the expected behaviours Patient's work and social environment Time since diagnosis Presence of healthcare insurance and coverage Cost and accessibility of interventions and facilities, e.g.: 1. Price of medication 2. Costs of transport, healthy foods etc 3. Availability of (free or low-cost) sport clubs and activities in the community that support healthy lifestyles
Sharing information and skills training	Using simple, lay terms Using visual demonstration (rather than sharing education materials or lecturing alone) Regular follow-ups to refresh patient's knowledge and skills Time since diagnosis
Monitoring techniques	Regular evaluation with the patient and HCP of monitoring instructions and protocols as the condition changes
Social support	Availability and costs of community services
Group intervention	HCPs' skills of monitoring group interactions
Intervention led by peers	Education and continuous professional support of peer providers

Table 3 Importance score of contextual factors for the implementation of self-management interventions in general, according to stakeholders.



SMIs in general (n = 24)	Mean (range)*
HCPs' ability to adapt the advice and communication to the patient' s level of knowledge	3.92 (3–4)
Patient's attitude towards self-management	3.88 (2–4)
Patient's motivation for self-management	3.88 (2–4)
HCP's communication skills	3.88 (3–4)
HCP's ability and willingness to adapt the advice or intervention to patient's personal situation and cultural background	3.83 (3–4)
Patient's preference regarding their own role in treatment	3.83 (3–4)
Patient's knowledge and personal beliefs about the disease and its treatment	3.79 (3–4)
Quality of the relationship between the HCP and patient	3.79 (2–4)
Patient's cultural background or language	3.71 (3–4)
Patient's self-efficacy beliefs	3.71 (1–4)
Patient's cognitive and behavioural skills to self-manage	3.71 (2–4)
HPC's awareness of the patient's knowledge and personal beliefs about the treatment	3.67 (2–4)
Burden of the expected behaviours patients need to perform* *	3.63 (2–4)
Patient's educational level and/or health literacy level	3.58 (1–4)
Continuity in care	3.54 (1–4)
Collaborative efforts of the organisation to support self-management	3.54 (2–4)
Cost and accessibility of interventions and facilities* *	3.50 (2–4)
HCP's expertise in supporting self-management	3.42 (2–4)
HCP's attitude towards the applied intervention	3.42 (2–4)
HCP's expertise and medical knowledge in relation to the disease and its treatment	3.38 (1–4)
Availability of educational services or materials for HCPs and patients	3.38 (2–4)
Availability of suitable infrastructure for self-management support	3.29 (3–4)
Reliable indicators of quality of the intervention and its support by relevant stakeholders* *	3.29 (2–4)
Patient's age	3.25 (1–4)
Patient's health status	3.25 (2–4)
Patient's social and cultural roles and obligations	3.21 (1–4)
(Perceived) available support from family and friends	3.21 (2–4)
Patient's work and social environment* *	3.13 (2–4)
Peer support and interaction	3.08 (2–4)
Resources within HCP's organization	3.08 (2–4)
Presence of healthcare insurance and coverage* *	3.08 (1–4)
Patient's financial situation	2.88 (1–4)
Time since diagnosis* *	2.67 (1–4)
Type of provider	2.63 (1–4)
Patient's sex / gender	2.58 (1–4)
HCPs' sex/ gender	2.13 (1–4)

*scores: 1 =not important, 2 =not that important, 3 =important, 4 =very important

* *CF is added by stakeholders