Self-management interventions: Proposal and validation of a new operational definition


aDepartment of Rehabilitation, Nursing Science and Sports, University Medical Center Utrecht, HP W01.121, Heidelberglaan 100, 3508 GA Utrecht, The Netherlands
bDepartment of Social and Welfare Studies, Linköping University, Linköping, Sweden
cLienhard School of Nursing, College of Health Professions, Pace University, New York, NY, USA
dJulius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, The Netherlands

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Abstract

Objectives: Systematic reviews on complex interventions like self-management interventions often do not explicitly state an operational definition of the intervention studied, which may impact the review’s conclusions. This study aimed to propose an operational definition of self-management interventions and determine its discriminative performance compared with other operational definitions.

Study Design and Setting: Systematic review of definitions of self-management interventions and consensus meetings with self-management research experts and practitioners.

Results: Self-management interventions were defined as interventions that aim to equip patients with skills to actively participate and take responsibility in the management of their chronic condition in order to function optimally through at least knowledge acquisition and a combination of at least two of the following: stimulation of independent sign/symptom monitoring, medication management, enhancing problem-solving and decision-making skills for medical treatment management, and changing their physical activity, dietary, and/or smoking behavior. This definition substantially reduced the number of selected studies (255 of 750). In two preliminary expert meetings (n = 6), the proposed definition was identifiable for self-management research experts and practitioners (80% and 60% agreement, respectively).

Conclusion: Future systematic reviews must carefully consider the operational definition of the intervention studied because the definition influences the selection of studies on which conclusions and recommendations for clinical practice are based. © 2016 Elsevier Inc. All rights reserved.

Keywords: Chronic disease; Complex interventions; Definition; Primary care; Self-management interventions; Systematic review

1. Introduction

There has been increasing attention for the challenges of synthesizing and comparing the evidence on complex interventions [1,2]. Complex interventions are nonpharmacologic interventions and generally consist of several interacting components [3]. Self-management interventions are an example of complex interventions and have evolved over the past decades into a central concept in care for patients with a chronic condition [4]. Patients with a chronic condition have contact with their health care providers only a fraction of their life, whereas nearly all patient outcomes are mediated through their daily behavior [5]. Hence, targeting patients’ self-management behavior is currently considered a promising strategy for improving patient outcomes [6].

With the increasing enthusiasm, questions have emerged about the extent to which interventions to support patients’ self-management are effective. The enormous number of studies conducted in this field [7] is accompanied by a subsequent increase in systematic reviews and meta-analyses that aim to provide an unambiguous answer about the effectiveness of self-management interventions. The meta-analyses repeatedly highlight the issue of the large heterogeneity among interventions included [8–11].

The way self-management interventions are defined determines the ultimate study selection from which conclusions in these systematic reviews and meta-analyses are drawn. Many studies give only a conceptual or general
What is new?

Key findings
• The choice of operational definition of self-management interventions substantially influences the number and case mix of self-management studies being selected.

What this adds to what is known?
• Questions regarding the effectiveness of self-management interventions are partly attributable to a lack of consensus about the definition of self-management interventions.
• This article proposes a new operational definition of self-management interventions and provides an overview of current operational definitions of self-management interventions.

What is the implication and what should change now?
• Future systematic reviews on complex interventions must explicitly specify the operational definition of the studied intervention because this defines the studies on which recommendations for clinical practice are based.

Self-management interventions aim to equip patients with skills to actively participate and take responsibility in the management of their chronic condition in order to function optimally through at least knowledge acquisition and a combination of at least two of the following: stimulation of independent sign/symptom monitoring, medication management, enhancing problem-solving and decision-making skills for medical treatment management, and changing their physical activity, dietary, and/or smoking behavior.

This operational definition is schematically presented in Fig. 1 and evolved from the assumption that management of medication use, independent symptom monitoring, and health behaviors like diet, exercise, and smoking are under the direct control of patients, subsequently those aspects of self-management are often incorporated in self-management interventions [20]. Because current views highlight the multifaceted nature of self-management interventions [6,13], the focus is on interventions with multiple (≥2) components. This differentiates self-management interventions from interventions solely focusing on for instance exercise therapy or psychosocial therapies [11].

Expected subtle variations in operational definitions can result in substantial differences in case mix of selected studies. A different case mix of studies in a systematic review may influence the conclusions drawn and application of findings to clinical practice. The present study aimed to provide insight in the discriminative performance of the proposed definition to select self-management studies. Therefore, the operational definition was used to select studies meeting the definition. The resulting case mix of studies was compared with the studies selected by other operational definitions of self-management interventions. In addition, the perceptions of self-management research experts and practitioners on self-management interventions were assessed.
2. Methods

2.1. Identifying operational definitions

The electronic databases of MEDLINE, EMBASE, CENTRAL, PsycINFO, and CINAHL were searched from January 1985 through June 2013 to retrieve publications containing self-management definitions. Search terms were self-management in title/abstract combined with chronic disease as MeSH term or synonyms in title/abstract (Supplementary Material for the search syntax can be found on the journal’s Web site at www.elsevier.com). In addition, all Cochrane systematic reviews with “self-management” in title/abstract were added to the search results, as were relevant references in included publications.

Studies were screened on title/abstract by one researcher (N.H.J.) to select possible relevant publications. Full texts were retrieved for studies that mentioned the term self-management in either the title or the abstract. Full texts were assessed to extract operational definitions of self-management interventions. Eligible studies were published in English and included an explicitly written operational definition of self-management interventions. Definitions were considered operational when self-management interventions were defined in critical components that were needed to be present [12] to distinguish self-management interventions from any other type of educational or behavioral interventions.

2.2. Data extraction operational definitions

From all operational definitions retrieved, we extracted the critical components of self-management interventions. Those were the components that were explicitly specified in the operational definitions and could be grouped according to the following: (1) providing knowledge about the condition and/or treatment, (2) anticipation skills for decisions about self-treatment and/or professional attention, (3) independent monitoring of signs or symptoms, (4) dietary intake, (5) physical activity, (6) role management, (7) emotional coping, (8) medication management, (9) smoking cessation, and (10) miscellaneous. The selected operational definitions were categorized on similarities in critical components. Because the present study focused on self-management interventions across multiple chronic conditions for optimal external validity, from each category, the study defining self-management interventions across multiple chronic conditions was selected for the comparison of definitions. If more definitions were generic, the definition published first was chosen.

2.3. Identifying assumed self-management studies

Published randomized trials on assumed self-management interventions were searched from January 1985 through June 2013 to assess whether the components in the evaluated interventions met the critical components of four operational definitions identified in the first step.
of this study. The randomized trials were acquired through a separate literature search previously conducted for an IPD meta-analysis [18] (Supplementary Material for the search syntax can be found on the journal’s Web site at www.elsevier.com).

Studies were considered eligible if they (1) were reported in English, Dutch, French, German, Italian, Portuguese, or Spanish; (2) were conducted in adult patients with a primary diagnosis of CHF, COPD, and/or T2DM; (3) had a randomized trial design; and (4) consisted of an educational and/or behavioral intervention delivered to patients (i.e., not necessarily labeled self-management).

2.4. Assessing assumed self-management studies

Four operational definitions of self-management interventions were compared. All assumed self-management studies were scored on the presence of any of the critical components of the four operational definitions. Scoring of the intervention components was performed by one researcher (N.H.J.). A 10% random sample was assessed by a second researcher (J.C.A.T.) to judge consistency. With a Cohen kappa of $\kappa = 0.85$ ($P < 0.01$), a decision was made to perform the remaining data extraction for the operational definitions by one researcher (N.H.J.). Results are presented in numbers (%). Because the present study focused on components of interventions without concern of their effectiveness, studies were not assessed on methodologic quality.

2.5. Perceptions of self-management research experts and practitioners

To compare the outcomes of the selection by the different operational definitions with the current perceptions of self-management research experts and practitioners, two meetings were organized after a general methodology of consensus diagnoses. Three self-management research experts (not involved in the conference meeting on developing the operational definition) from different institutes in the Netherlands with demonstrated experience in research regarding self-management in chronic disease attended one meeting (of six invited). Three practitioners who were currently working as general practitioner (one) or practice nurse (two) with chronic disease patients in different practices across the Netherlands attended the second meeting (of five invited). Before the meeting, each participant was asked to independently judge 20 intervention descriptions on whether the intervention was considered a self-management intervention based on his or her professional view. The intervention descriptions were the published texts of a random blind selection of 20 trials from the systematic review. During the consensus meetings, discrepancies and concerns were identified and based on an open discussion, individual judgments were discussed, and as much as possible agreement was generated resulting in final consensus among the participants. An independent facilitator not involved in the present study led the discussions and made sure each individual expert contributed as much as possible to the discussions. Given the low numbers included, results were analyzed descriptively and are presented as percent similarity in judgments made by research experts and/or practitioners.

3. Results

3.1. Identifying operational definitions

The search strategy and selection yielded 10 publications that contained an operational definition of self-management interventions (Fig. 2 for selection process). The resulting 10 operational definitions and the proposed aforementioned definition are presented in Table 1. Four categories of definitions with similar critical components could be identified in which the operational definitions were classified: (1) Multiple components (defining self-management interventions as requiring multiple components), with two operational definitions [13] including the one proposed in this study; (2) Education plus (defining self-management interventions as more than just education), with one definition [21]; (3) Single component (defining self-management interventions as containing at least one specific component), with four operational definitions [8,22–24]; and (4) Social cognitive behavioral (defining self-management interventions as containing at least medical management, role management, and emotional management, based on the framework of Corbin and Strauss [27] and social cognitive theory [28]), with four definitions [4,15,25,26]. Four operational definitions have explicitly been built on an established theoretical framework [4,15,25,26] or authors referred to previous research to define essential components [8,23], whereas others did not explain how they came to defining which interventions constitute self-management and which do not [13,21,22,24]. From each category, the definition of self-management interventions across multiple chronic conditions was used for the selection of self-management trials (indicated with “a” in Table 1).

3.2. Identifying and assessing assumed self-management studies

We identified 750 randomized trials of behavioral interventions in patients with CHF, COPD, or T2DM, to which the four operational definitions were applied (Fig. 2 for selection process). The impact of each definition on the number of selected studies is presented in Fig. 3, and the mixture of intervention components for each definition is presented in Table 2. Applying the criteria of the definition proposed in this study, the Multiple components definition resulted in a substantial decrease of interventions compatible with the definition ($n = 255$). This selection comprises
interventions with a mixture of components (range, 3–7), with independent monitoring of symptoms and anticipation skills being most often applied (in 68% and 65% on the interventions, respectively). Applying the other definitions showed a gradual narrowing of the number of selected studies with increasing number of critical components. In the selection of Education plus (n = 545), all interventions comprise some form of knowledge provision, which was in half of the interventions accompanied by enhancing anticipation skills and/or independent monitoring of symptoms. The selection of the Single component definition (n = 431) contained interventions that encompassed anticipation skills for decisions about treatment or skills for independent monitoring of symptoms. In 29% of the cases, this was a combination of both.

3.3. Perceptions of self-management research experts and practitioners

In the random selection of the 20 interventions reviewed by self-management research experts and practitioners, the perceptions of what research experts considered to be self-management interventions were most in line with the criteria applied by the more comprehensive definitions of Multiple components (80%) and Social cognitive behavioral (65%) (Table 3). The practitioners’ perceptions corresponded mostly with the broader definitions of Single component (80%) and Education plus (75%). Combining the research experts and practitioners resulted in most agreement with the selection mechanism of the proposed definition (70%).

4. Discussion

The present findings highlight the importance of a clear operational definition of the intervention under study. The Multiple components definition proposed in this article resulted in a substantial reduction of eligible interventions that can be classified as self-management interventions (255 of 750) compared with the broader definitions of self-management interventions (545 of 750 and 431 of 750). The most restrictive definition based on the Social cognitive behavioral resulted in a very small (n = 18) and homogeneous selection of studies. The Multiple components definition best matched with current views of
The perceptions of practitioners about self-management interventions were most in line with definitions of self-management interventions as containing at least one component of behavior change, instead of multiple components (80% vs. 60%).

Lorig and Holman [4] already emphasized the need to look beyond the label of self-management to define if interventions actually address the necessary components. The results of the present study showed that a very strict and comprehensive definition as posited by authors of the Social cognitive behavioral definitions [4,15,25,26] will result in more interventions actually addressing self-management components.
in a homogeneous but restricted selection of interventions. The present findings showed that stricter definitions like the Multiple components or Social cognitive behavioral definitions narrowed down the study selection of broader definitions, with nearly a complete overlap in selected interventions. To avoid a premature exclusion of relevant interventions for clinical practice (99.9% of all interventions were excluded with the strictest definition), one may choose to opt for a broader definition [8]. Yet, the heterogeneity among the included interventions with very broad definitions makes it questionable to what extent combining selected interventions is actually appropriate in a systematic review or meta-analysis and how an overall conclusion about the effectiveness of such diverse interventions can be transferred to practice [29]. This does apply to not only self-management interventions but also other types of complex interventions. These are critical points researchers should consider because a different study selection might lead to different conclusions regarding effectiveness of complex interventions and subsequent recommendations for clinical practice.

Although the numbers of participants in the preliminary consensus meetings were relatively small, the results suggest that current perceptions of research experts regarding self-management interventions differed from those of practitioners. Overall, the research experts tended to judge more comprehensive interventions to be self-management interventions. This is not surprising because current scientific positions of what constitutes a self-management intervention address the multifaceted nature of these types of interventions [6,13], and research experts were likely well informed of this scientific debate. Practitioners viewed interventions addressing only single aspects of behavior change more often as self-management interventions.

Fig. 3. Comparison of study selections by different operational definitions for self-management interventions. *N = 9 studies were selected by the Single component definition but were not selected by the Education plus definition. N = 37 studies were selected by the Multiple components definition but were not selected by the Single component intervention.

Table 2. Case mix of studies selected by different operational definitions

<table>
<thead>
<tr>
<th>Components</th>
<th>Multiple components (n = 255)</th>
<th>Education plus (n = 545)</th>
<th>Single component (n = 431)</th>
<th>Social cognitive behavioral (n = 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing knowledge about condition/treatment</td>
<td>255 (100.0)</td>
<td>545 (100.0)</td>
<td>422 (97.9)</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>Anticipation skills for decisions (about self-treatment/ professional attention)</td>
<td>167 (65.2)</td>
<td>273 (50.1)</td>
<td>280 (65.0)</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>Independent monitoring of signs or symptoms</td>
<td>174 (68.2)</td>
<td>271 (49.7)</td>
<td>274 (63.6)</td>
<td>8 (44.4)</td>
</tr>
<tr>
<td>Enhancing dietary intake</td>
<td>136 (52.3)</td>
<td>175 (32.1)</td>
<td>100 (23.2)</td>
<td>13 (72.2)</td>
</tr>
<tr>
<td>Stimulation of physical activity</td>
<td>103 (40.2)</td>
<td>135 (24.8)</td>
<td>66 (15.3)</td>
<td>8 (44.4)</td>
</tr>
<tr>
<td>Role management</td>
<td>37 (14.5)</td>
<td>44 (8.1)</td>
<td>42 (9.7)</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>Emotional coping with condition</td>
<td>28 (10.9)</td>
<td>42 (7.7)</td>
<td>39 (9.0)</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>Medication management</td>
<td>31 (12.1)</td>
<td>39 (7.2)</td>
<td>25 (5.8)</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>8 (3.1)</td>
<td>16 (2.9)</td>
<td>7 (1.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Miscellaneous (e.g., meditation skills)</td>
<td>0 (0.0)</td>
<td>7 (1.3)</td>
<td>8 (1.9)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

Values are number (%).
Previous research has shown that practitioners consider provision of information as the principal component in their strategies for stimulating patients’ self-management [30]. Their experience in providing self-management support to patients might have influenced with this less strict judgment. This discrepancy in perceptions highlights the need for a clear operational definition of self-management interventions to enhance communication with practice, particularly because health care providers continue to question the value of self-management support [31]. However, future research should assess if this difference between research experts and practitioners observed in the present study can be confirmed.

All the operational definitions proposed and identified by the present study focused on the content of interventions to set boundaries for what distinguishes self-management from any other form of education or behavioral intervention; none defined any criteria with regard to the intensity, duration, or mode of delivery of the interventions. This is not surprising as there is a continuum of strategies to apply self-management interventions in practice [16]. Trying to restrict to a specific mode of delivery or intensity of a program would be counterproductive. Different types of patients might even respond better to or simply prefer specific modes of delivery.

This study has some limitations. First, study selection was based on the full-text description in publications of the interventions. In general, educational and behavioral interventions are inconsistently and incompletely described [32]. This might have led to more false-negative results (i.e., not selecting interventions because of incomplete description), particularly for the more comprehensive definitions. Second, although 5 to 10 experts are considered adequate for content validation [33], and we included six experts, the proposed operational definition should be validated in a larger sample to confirm our findings. In addition, this study has used an operational approach to define self-management interventions by scoring the separate components of the definitions. For the purposes of evaluating interventions, defining unambiguous criteria is highly important to be able to distinguish self-management interventions from other types of interventions [34]. Yet, self-management interventions are implemented in a dynamic setting involving a wide variety of patients and providers, making the actual intervention more than the sum of its separate components [35]. Third, this study has used the case of self-management interventions to illustrate the importance of clearly defining the criteria for the complex intervention under study. However, the issues addressed in our study also apply to other types of complex interventions.

5. Conclusion

The present study proposed a new operational definition of self-management interventions, which can be used to make a distinct selection of self-management interventions without being too restrictive. In two preliminary expert meetings, the selection mechanism of the proposed definition was in line with current views of self-management research experts. Self-management practitioners judged less comprehensive interventions (i.e., those consisting of at least one behavioral component) to be self-management interventions. In view of the number of experts we included in our study, further validation of the proposed definition in all larger samples of scientific and clinical experts is needed. This study further highlights the need for future systematic reviews to carefully consider the operational definition of the intervention under study because we showed that the operational definition substantially influences the selection of studies on which conclusions and recommendations for clinical practice are based.

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Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jclinepi.2016.08.001.
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