Evidence on selection, optimization, and compensation strategies to optimize aging with multiple chronic conditions: a literature review

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Abstract

The self-regulation strategies of selection, optimization, and compensation (SOC) can be effective in optimizing aging with multiple chronic conditions (MCC). Nineteen articles on the use and effects of SOC among older adults with chronic conditions were reviewed. The studies' quality, evaluated by the Mixed Methods Appraisal Tool, ranged from medium to high (Mean = 0.90, SD = 0.10). SOC were found to improve the symptom experience for older adults, resulting in better health outcomes such as increased daily living activities, subjective well-being, life success, fewer falls/sick days, and use of medication for pain control. For those with MCC, higher degree of disabilities, serious health events, and negative self-perceived aging undermined the relationships between SOC and long-term physical functioning, self-rated health, and life satisfaction. Aging can be optimized by identifying and improving older individuals' coping using SOC. Future studies should utilize better MCC measures for comorbidity and chronic disabling symptoms to investigate the influence of SOC on MCC-associated health outcomes.

Keywords: Chronic conditions; Selection; Optimization; Compensation; Older Adults

Introduction

Aging with multiple chronic conditions

Aging with multiple chronic conditions (MCC) is a worldwide problem. In the U.S., from 2006 to 2010, the proportion of people with MCC increased from 27.5% to 31.5%. In 2010, almost half (49.1%) of all people aged 45–64 years, 80% of non-institutionalized older Americans aged 65 years or older, and over two thirds of Medicare beneficiaries (21.4 million) lived with MCC. The most prevalent conditions among MCC are cardiovascular and metabolic diseases (e.g., hypertension, diabetes), musculoskeletal disorders (e.g., arthritis), and mental health related problems. MCC prevalence is higher among older adults, females, racial and ethnic minorities (African and Hispanic Americans), and those with lower socioeconomic status. The health outcomes of older adults with MCC vary with the number of co-morbidities and disease trajectory. MCC have been consistently associated with higher risk of mortality, functional decline, disability, and poor quality of life (QOL). Both the complexities associated with functional decline and poor access to healthcare resources and services act as barriers to achieving desired health outcomes in older adults with MCC. Moreover, the fragmented U.S. healthcare system results in higher risk for inappropriate medication prescriptions, higher healthcare utilization, and heavier economic burden among patients with MCC and their families.

Currently, healthcare systems worldwide and in the U.S. support person-centered comprehensive care to promote the health and well-being of those aging with MCC by advocating the matching of resources and older adults' needs. However, there is insufficient evidence on the effectiveness of comprehensive care programs for MCC that aim to improve health outcomes and QOL. Optimal comprehensive care program structures as well as personal goals of care associated with improved health outcomes of older adults remain to be determined. Understanding the coping and self-management processes of people aging with MCC can inform the refinement of self-management interventions and redesign of comprehensive care programs to attain optimal health outcomes.

Self-management of MCC

Evidence on self-management of MCC is found mostly in qualitative studies and literature reviews that synthesize barriers and facilitators related to MCC self-management. In addition to individuals' functional capacities, the availability of resources and the use of coping strategies have been identified as facilitating self-management of MCC. Resources identified in prior studies include social and family support, support from the healthcare system and healthcare providers, and effective coping strategies for personal mental strength, emotional strength, and control. Self-regulation, purposeful coping to attain personal health and life goals while remaining adaptive to available support, can play a key role...
The self-regulation strategies of selection, optimization, and compensation embedded in a  
an action-theoretical framework.

**Table 1**

<table>
<thead>
<tr>
<th>Selection (goals and preferences)</th>
<th>Optimization (goal-relevant means)</th>
<th>Compensation (means and resources for counteracting and decline in goal-relevant means)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective selection • Specification of goals • Goal system (hierarchy) • Contextualization of goals • Goal commitment Loss-based selection • Focusing on most important goals • Reconstruction of goal hierarchy • Adaptation of standards • Search for new goals</td>
<td>• Attentional focus • Seizing the right moment • Persistence • Acquiring new skills and resources • Practice of skills • Effort and energy • Time allocation • Modeling successful others</td>
<td>• Substitution of means • Use of external aids and help of others • Use of therapeutic intervention • Acquiring new skills/resources • Activation of unused skills and resources • Increased effort and energy • Increased time allocation • Modeling successful others who compensate • Neglect of optimizing other means</td>
</tr>
</tbody>
</table>

in the self-management of MCC by enabling coping with complexities and building competency in self-management.14

**Self-regulation strategies of selection, optimization, and compensation**

Self-regulation consists of the “individual processes of developmental regulation via various levels of analysis and across different domains of functioning” to “influence, modify or control own behavior according to the goals or standards.”15–17 The self-regulation strategies of selection, optimization, and compensation (SOC) are strategies for coping and life management with which individuals adapt to stresses by deliberately seeking and utilizing resources.17 These strategies are generally applied by older adults to cope with aging-related cognitive functioning and disabilities in order to age with health and success.17 Table 1 illustrates the concepts and strategies involved in SOC.18

**Selection**, which refers to individuals’ goal-setting, includes both elective selection of goals that are important for health and well-being and loss-based selection of goals so that one can cope with aging-related loss.17 **Optimization** is based on individuals’ capabilities; it is the means with which one manages and optimizes relevant skills to achieve selected goals.17,19 **Compensation** is the use of alternative means to compensate for aging-related losses and deficits and maintain performance using technical aids and the wisdom accumulated with age.17,19 SOC have been measured with questionnaires, such as the one developed by P.B. Baltes and his team.17–19 Examples for each concept are as follows. (1) Elective selection: “I concentrate my energy on a few things.” (2) Loss-based selection: “When things don’t go as well as before, I choose one or two important goals.” (3) Optimization: “I keep working on what I have planned until I succeed.” (4) Compensation: “When things don’t go as well as they used to, I keep trying other ways of doing it until I can achieve the same result I used to.”18

In 2009, an overview of SOC studies on older adults suggested potential for the use of SOC in health programs to enable older adults to maintain independent functioning, autonomy, and QOL.20 SOC were recommended to health professionals as an action-theoretical framework to support and guide patients in identifying adaptive goals and behaviors,21 especially to facilitate older adults’ adaptation after stroke.22 However, most studies had focused on the healthy aging population. Because major differences exist among normal, optimal, and sick (pathological) aging individuals, the use and effects of SOC in older adults with chronic conditions require further detailed exploration, especially because MCC contribute additional complexity.19,21,22

Since MCC build from single chronic conditions and their comorbidities, the purpose of this literature review was to: (1) review the use of SOC by older adults with chronic conditions, (2) synthesize findings of the effects of SOC on health outcomes such as disease outcomes, self-management, and QOL among older adults with chronic conditions, and (3) discuss the available evidence and potential implications of SOC for nursing research and practice for MCC.

**Material and methods**

**Literature search**

The PubMed, CINAHL, PsycINFO, Cochrane Library, and Web of Science databases were searched for articles in English on SOC and older adults with chronic conditions. The terms “selecti*” AND optimization AND compensation AND (older adult” OR senior” OR elder”) were used to retrieve articles published before August 11, 2017. Studies were included if they explored the use and/or effects of SOC among older adults with chronic conditions (including chronic diseases, visual impairment, and disabilities).

Articles were excluded if (1) they did not include older adult age groups (50 or older) in subgroup analyses and results22; (2) they focused on general healthy older adults without subgroup analyses and results on those with chronic conditions21; (3) they were literature reviews or theory-based model development papers (e.g., integrating self-efficacy and aging theories to promote behavioral change and reduce stroke risk);24 (4) SOC did not form the focus of the study but rather was mentioned as a potential explanation for the intervention’s effects25; or (5) they were conference abstracts.23–26

All studies that met the inclusion criteria after title/abstract and full-text screens were finally included in the review.  

**Data abstraction**

From the final included articles, the following data were extracted: (1) author; (2) study purpose and design; (3) sample characteristics, including inclusion/exclusion criteria and attri- butions, chronic conditions, demographic profile,27 and other sociodemographic and clinical characteristics; (4) measures; (5) main findings; (6) limitations; (7) implications and suggestions for future studies; and (8) study quality. For the studies on adults with subgroup analyses based on age, only the data on older adults were extracted. These data were entered into Microsoft Excel tables for further analysis and synthesis.

**Data analysis**

Descriptive statistics were used to examine the characteristics of the included articles and their samples. Aggregate frequencies, means, and proportions of data related to the main findings from the included studies were identified whenever appropriate.
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