



Knowledge and exercise behavior maintenance in cardiac rehabilitation patients receiving educational interventions



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ARTICLE INFO

Article history:

Received 15 June 2015

Received in revised form

11 September 2015

Accepted 14 September 2015

Available online 13 October 2015

Keywords:

Patient education

Health behavior theory

Knowledge

Physical exercise

Cardiovascular disease

ABSTRACT

Objectives: To test whether a theoretically-based education curriculum results in more sustained knowledge, higher scores on Health Action Process Approach (HAPA) constructs, and greater exercise behavior 6 months post-cardiac rehabilitation (CR) when compared to traditional CR education.

Background: Patient education is a core component of CR. No research has examined whether this education results in sustained improvements post-program.

Methods: In this quasi-experimental study, participants exposed to the traditional vs HAPA-based education completed surveys pre, post-CR, and 6 months post-discharge assessing knowledge, HAPA constructs, and exercise.

Results: Ninety-three participants completed the final survey. Knowledge increases post-CR were sustained 6 months post-program, with no differences by curriculum. Many improvements in HAPA constructs observed post-CR were sustained, except for some decay in self-efficacy. Minutes of exercise per week were significantly greater in participants exposed to the HAPA-based curriculum 6 months post-program.

Conclusions: HAPA-based education in CR has sustained effects on exercise.

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Introduction

Cardiac rehabilitation (CR) – a comprehensive outpatient program of secondary prevention and lifestyle counseling¹ – is the standard of care for outpatients with cardiovascular diseases (CVDs).^{2–4} The core components of CR, commonly agreed-upon by the major CR societies internationally,^{5–8} include patient assessment, lifestyle and medical risk factor management, psychosocial management, and patient education to achieve health behavior change and hence long-term control and secondary prevention of CVDs.

Abbreviations: CVDs, Cardiovascular diseases; CADE-Q, Coronary Artery Education Questionnaire; CR, Cardiac rehabilitation; HAPA, Health Action Process Approach; METER, Medical Term Recognition Test; NVS, The Newest Vital Sign.

Funding: This work was supported by the Heart & Stroke/Richard Lewar Centre of Excellence Fellowship Award.

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Patient education is one of the least studied components of CR, but arguably it is one of the most important. Education can be formally defined as “the process by which health professionals and others impart information to patients that will alter their health behaviors or improve their health status.”⁹ Findings from meta-analyses have demonstrated that patient education in CVD patients results in better self-management behaviors,^{10–12} and health-related quality of life, while potentially reducing healthcare costs¹³ and recurrence of acute events.¹² Moreover, a recent systematic review also demonstrated the benefits of educational interventions in CVD patients, with regard to their knowledge and behavior change.¹⁴ There has been scant research on education in the CR setting specifically.

Our group has empirically investigated CR participant information needs,¹⁵ and used this information along with theory, to develop an evidence-based CR education curriculum.¹⁶ Some theoretical orientations considered included adult learning principles,¹⁷ constructivist learning theory,¹⁸ and self-management theory.¹⁹ The theoretical basis of the curriculum is the Health Action Process Approach (HAPA) – a psychological theory of health

behavior change,²⁰ – as it focuses on the elements required to change behavior in a sustained manner. According to the HAPA model, changing health-related behaviors requires two separate processes, involving motivation and volition, respectively. First, the motivational phase is the process in which an individual forms an intention to either adopt a precautionary action or change risk behaviors in favor of others, in part on the basis of self-beliefs. Second, in the volition phase, change must be planned, initiated, and maintained, and relapses must be managed. In addition, self-regulation plays a critical role in these processes.²¹ A recent overview covering seven empirical studies²² has demonstrated the applicability of the HAPA for a number of health behaviors and for diverse samples from various cultures, including exercise adherence after CR.²³

We previously reported our initial evaluation of this curriculum.²⁴ Exposure to the HAPA-based curriculum did not result in greater knowledge post-CR when compared to participation in traditional CR education. However, we hypothesized that this new curriculum would have more sustained effects on knowledge and behavior post-program than traditional education. Accordingly, the objectives of this study were to test whether patient participation in a theoretically and empirically-based CR education curriculum results in more: (1) knowledge and greater endorsement of HAPA constructs, and (2) exercise behavior 6 months post-CR when compared to traditional education.

Methods

Participants

Participants included CR enrollees (with CVD or multiple cardiovascular risk factors) recruited from the largest CR program in Toronto, Canada. The exclusion criteria were: lack of English-language proficiency, and any visual, cognitive or psychiatric condition that would preclude the participant from completing the surveys.

As reported elsewhere,²⁴ 306 patients consented to participate in this evaluation, of which 146 (47.7%) were exposed to the HAPA-based curriculum. One hundred and seventy-three (56.6%) completed the post-CR survey. This paper includes these participants that also completed the 6 month post-CR survey. The sample size calculations for the primary study were based on the rule of thumb of a minimum of 100 participants to run structural equation modeling and anticipating a retention rate of 70% (so a minimum of 145 participants per group were required).²⁵ Patients were approached consecutively until the required sample size was achieved.

Design and procedure

Ethics approval was obtained from the review board at the hospital where the CR program was located. Patients were informed about the study during their first cardiopulmonary exercise stress test by a technician. Consenting patients were then invited to complete a self-administered confidential survey in paper format (pre-CR survey). Clinical data were extracted from patient charts using a standardized Case Report Form. Data collection for this quasi-experimental longitudinal study was conducted between April 2013 and December 2014. Allocation of patients to educational curriculum was based on their choice of class time.

CR participants are offered weekly-supervised exercise classes for 24 weeks (i.e., 6 months), and provided a home exercise prescription for the other days of the week. Between the 22nd and 24th weeks of CR, patients were approached during their CR class to complete the post-CR survey. Finally, 6 months after graduation patients were contacted by phone and a third and final survey

(6 month post-CR survey) was mailed to them. This study presents findings from the final assessment 6 months post-CR. Findings from the pre and post-CR assessment are reported elsewhere.²⁴

Education curricula

The traditional education curriculum focused on educating patients and the HAPA-based education curriculum was based on promoting behavior change, aiming to enable patients to take charge of their medical condition and respond appropriately to changes in their health, developing strategies to improve their risk factors. Topics covered in both curricula were similar, but the ones from the HAPA-based education curriculum were strategically sequenced in accordance with the CR program learning outcomes (Table 1). For both groups, education was delivered in large and small group sessions, lectures, a workbook, and online videos; however, topics for the HAPA-based education curriculum contained learning activities, learning assessments, behavioral-based action planning, and assessment of patients' motivation and confidence to incorporate change into their lifestyle. Both education curricula were provided by an interdisciplinary team of on-site exercise leaders, nurses, dietitians, a psychologist, and physicians.^{16,24}

Measures

Clinical characteristics extracted from CR charts included CR referral indication and cardiac risk factors. The initial pre-CR survey assessed sociodemographic characteristics and included 2 health literacy scales, namely the medical term recognition test (METER)²⁶ and the newest vital sign (NVS).²⁷ METER is a brief and practical measure of health literacy for use in clinical settings. It consists of a list of health-items and patients are simply asked to check off those they recognize as actual words.²⁶ The NVS tests literacy skills for both numbers and words. Respondents are presented with a food label and asked to respond to 6 questions.²⁷

All 3 surveys included scales to assess patients' CVD knowledge, HAPA constructs, and exercise behavior. Knowledge was assessed via the Coronary Artery Disease Education Questionnaire-II (CADE-Q II), which assesses patients' knowledge about CAD in 5 domains: medical condition, risk factors, exercise, nutrition, and psychosocial risk. Each of the 31 items has 4 alternative response options, of which one is most correct (scored 3), one is somewhat accurate (scored 1), and two are incorrect (scored 0). These scores are summed, with a maximum score of 93.²⁸ The CADE-Q II was demonstrated to have good reliability and validity, with a Cronbach's alpha of 0.91, criterion validity supported by significant differences in mean scores by educational level ($p < .001$), and factor analysis with four factors, which were all internally-consistent (0.65–0.77) and well-defined by items.²⁸

All constructs from the HAPA model were assessed via psychometrically-validated scales, namely risk awareness,²¹

Table 1
Program learning outcomes for HAPA-based educational curriculum.

By the end of their 6 month CR program, patients will be able to:
1. Take charge of their medical condition and respond appropriately to changes in their health status;
2. Maintain an exercise program to improve their health and well-being;
3. Identify and develop strategies to improve their risk factors for heart disease;
4. Incorporate healthy food choices and practices to manage their health and well-being; and,
5. Identify and develop strategies to manage their psychosocial risks for heart disease and improve their well-being.

CR indicates cardiac rehabilitation.

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