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Eliciting exercise preferences in cardiac rehabilitation: initial evaluation of a new strategy

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Abstract

Cardiac rehabilitation (CR) programs may be more effective in promoting long-term exercise if participants are helped to devise exercise programs that are individually tailored to their exercise preferences. This paper describes an initial evaluation of creating better health orientation by improving communication about exercise experiences (CHOICE), an instrument designed to elicit cardiac patients' exercise preferences. In individual interviews with 16 women, CHOICE was used to help participants select exercise features that were important to them for maintaining long-term exercise. Exercise preferences were then summarized on individual preference forms. Study participants in this pilot study had no problems in selecting exercise features contributing to exercise maintenance and could easily discriminate between their relative importance. Further, there were large variations in the importance participants placed on different exercise features. This suggests the need for eliciting patients' exercise preferences so exercise programs can be individually designed. In conclusion, CHOICE is an applicable instrument for eliciting exercise preferences. © 2000 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Patient preferences; Exercise maintenance; Cardiac rehabilitation

1. Introduction

Exercise following an acute cardiac event (such as myocardial infarction or coronary artery bypass surgery) has been shown to reduce mortality and morbidity, increase cardiovascular functional capacity, decrease myocardial demand and improve blood pressure control, weight control, lipid levels and psychosocial functioning in men and women of all ages [1]. Despite the proven effectiveness of exercise, an increasing drop-out rate from exercise in the first

3–6 months following a cardiac rehabilitation (CR) program has been found [2–4]. Women appear to have even lower rates of participation in CR exercise than men, with women's initiation of CR exercise 10–25% below those of men [5,6]. The downward trajectory of exercise performance during the year following an acute cardiac event results in a large number of cardiac patients who are not exercising at levels needed to achieve the health benefits of exercise. Clearly, evidence of the effectiveness of exercise and fear of another cardiac event in the future is not enough to motivate cardiac patients to maintain long-term exercise.

Exercise maintenance is a complex and demanding health behavior that usually entails complex lifestyle changes. There are few reports of interventions to

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increase exercise maintenance following acute cardiac events. However, studies of the effects of CR programs on exercise maintenance have shown conflicting results; some studies report significant differences in exercise habits up to 1 year following the CR program [7,8], while others indicate no differences in long-term exercise [1]. While interventions to increase exercise in healthy individuals have shown some success [9], efforts to increase exercise maintenance in patients after cardiac events have not been particularly effective [10]. Therefore, better methods to increase exercise maintenance are needed.

Researchers have focused increasingly on the influence of patients' underlying value systems on their health-related decisions. Eliciting patient preferences has been a successful strategy to assist patients to reach health-related decisions that are consistent with their underlying values. For example, interventions to increase patient involvement in health-related decisions have resulted in higher satisfaction with, and more active participation in, decision making [11], better scores on general health perceptions and physical functioning [12,13], higher compliance [14,15], improved knowledge [16] and reduced decisional conflict [17]. If people can exercise in accordance with their preferences and life-styles, it may become easier to maintain exercise over time.

Surprisingly, studies investigating the role of preferences for health promotion *behaviors* are almost absent. Research on behavioral change, such as exercise have primarily built on theoretical frameworks, such as the health belief model, [18] social learning theory, [19] or the social problem solving model, [20] with a focus on self-efficacy, problem-solving skills, coping skills, social support, health beliefs, motivation, or other cognitive-behavioral aspects. Some frameworks acknowledge that preferences are motivators for behavioral change [20]. The six stages of change transtheoretical model [21,22] relates indirectly to patient preferences by incorporating decisional balance as contributing factor to produce change. However, the degree to which patient preferences can explain compliance with health promoting behavior, such as exercise has not been a focus of empirical investigations.

Patient preferences are usually viewed from the perspective of the desirability of outcome states, and little focus has been given to the influence of

the desirability of experiencing the behavior. Individuals may value differently, the desirability of future health benefits from exercise relative to the inconvenience of an exercise regimen that does not fit with their preferences and personal lifestyle. People usually act in accordance with their underlying values. A fruitful route to assist patients in maintaining long-term exercise after cardiac events, therefore, may be to systematically elicit their exercise preferences and individually design exercise regimens based on their preferences. This requires systematic methods for preference elicitation that allow individuals: (1) to select and determine the relative importance of exercise features, they consider important to maintain long-term exercise and (2) use this information for the design of preference-based exercise programs.

The purpose of this pilot study was to evaluate the applicability of the preference elicitation technique of creating better health orientation by improving communication about exercise experiences (CHOICE), an instrument designed to systematically elicit preferences for exercise features. The specific aims were: (1) to assess the applicability of CHOICE for selecting exercise features that are important to individuals for long-term exercise maintenance; (2) to assess CHOICE's ability to discriminate between the relative importance of these features to individuals; (3) to devise a way to display information about exercise preferences in a useful format and (4) to collect information about variations in exercise preferences among individuals. This pilot study is envisioned as a first step in the development of a new strategy to assist CR professionals and patients in eliciting and integrating patient preferences for exercise features into exercise regimens. However, an essential but often overlooked step in building a new intervention is that of refining and testing its applicability before implementing it into clinical practice. Therefore, a goal of this study was to gain experience about the feasibility of the proposed elicitation strategy and to learn about whether eliciting preferences and devising individual exercise programs is a worthwhile route to pursue.

2. Methods

A convenience sample of 16 women was recruited in this study. Eight of the women had attended a Phase

II CR program during recovery from an acute cardiac event during the last year, the other eight women were healthy, University-employed volunteers. The cardiac rehabilitation subjects were randomly selected from a larger ongoing descriptive study of women's patterns of exercise participation after cardiac events. The additional University sample was chosen to obtain a non-clinical sample. It was assumed that the inclusion of these two divergent groups would increase the variance in subjects' response to items on the CHOICE instrument. To select a sample of women was considered appropriate for this pilot study because women have shown lower participation rates in cardiac exercise than men. Women often have multiple and competing responsibilities, such as work, home maintenance, children, grandchildren, or caring for older parents. Thus, women may have even more to gain from eliciting their preferences and individually tailored exercise programs.

2.1. *The preference elicitation technique*

CHOICE consists of an assessment form that contains 20 descriptors of exercise features (see Fig. 2). Each descriptor is considered a unique feature. CHOICE uses a psychometric approach to preference elicitation. Attached to each exercise feature is a rating scale, ranging from 0 (not important) to 10 (very important) used to determine the relative importance of each feature. The CHOICE assessment form is designed to be used during a personal counseling session with a health care or exercise professional. Subjects are walked through each exercise feature and asked to rate their relative importance on the adjacent scale. The CHOICE assessment form also contains five open options that provide individuals with the opportunity to include additional exercise features that are important to their exercise. Thus, they are not restricted only to the predefined exercise features.

2.2. *Selection of exercise features in CHOICE*

Content validity of the CHOICE assessment form is based on previous studies by the authors [23,24]. First, the 20 exercise features were identified through a review of the literature on patients' participation in CR programs and from focus groups with individuals in CR programs [23]. A clinical nurse specialist work-

ing in a CR program and a nurse researcher familiar with the literature on participation in CR exercise programs also assessed content validity. Then, descriptors of exercise features were evaluated in a subsequent study with 65 women and men in which participants indicated the importance of these features in a CR program and the extent to which they had experienced each of these features. Test-retest correlations over a week-long period indicated a correlation coefficient of 0.91 [24]. The descriptors of exercise features used in the CHOICE assessment form were again reviewed for content and clarity by the participants in the pilot study described here.

2.3. *Procedures*

Exercise preference elicitation interviews were conducted individually with each woman by a trained member of the research team. The interviews took place in University offices for the University-employed women and in the homes of the sub-sample of women with a previous cardiac event from the patterns of exercise study. The role of the interviewer was to help the woman to reflect on her preferences and make deliberate choices about the relative importance of different exercise features.

At the beginning of the interview, participants were asked to state two or three features of exercise that they perceived as particularly important to make exercise a good experience for them and that would help them maintain long-term exercise. These additional features were entered into the open spaces at the beginning of the CHOICE assessment form. However, if the participant initially stated features that were already part of the pre-defined features on the CHOICE assessment form, they were entered at the appropriate place on that form. Next, participants were asked to carefully examine each feature on the CHOICE assessment form and to assign importance weights on the rating scales ranging from 0 to 10 adjacent to each feature. The participants' ratings denoted their opinion of the importance of each feature to make exercise a good experience for them. In addition, they were asked to describe how each exercise feature could be more specifically tailored to their preferences. For example, if a woman assigned an importance weight greater than 0 to the "ability to choose among a variety of types of exercise", she was

asked to name a variety of exercise types she particularly liked, so that those various exercise types could be made part of her individual exercise regimen.

After the exercise preference elicitation interview, information about the woman's preferences was summarized by the interviewer in a preference form. Exercise features with importance weights ranging from 1 to 10 were entered into a portable computer, processed and printed out in the order of the importance women had assigned to these features. Additional features that women had said were important, but were not part of the CHOICE assessment form were included. Only exercise features with importance weights greater than 0 were included on the preference form. Thus, each preference form had a different content that reflected each woman's personal preferences for exercise features with their specifications according to their priority. Fig. 1 shows an example of an individually tailored preference form.

3. Results

3.1. Sample characteristics

The eight women who had attended a Phase II CR program during recovery from an acute cardiac event had a mean age = 69, (range 55–77 years). In this, 12.5% were African-American, 50% were retired, 75% had a myocardial infarction and 60% CABG surgery. The average number of co-morbid conditions were 2.8, the most frequent conditions were high blood pressure and arthritis. Women's mean weight was 153 lb, mean height 62 in. and 50% of them used betablokkers. The mean age of the healthy University-employed volunteers were 39 years (range = 28–49 years). All were Caucasian. The preference elicitation interviews lasted on average 23 min (range 15–39).

3.2. Applicability of CHOICE

Study participants rated a mean of 17 exercise features (S.D. = 2.5, range = 12–21) as having some importance to them for maintaining exercise by assigning them importance weights (IW) greater than 0. Of the 20 features on the CHOICE assessment form, all but three features were rated over the entire scale from 0 to 10, suggesting that an exercise feature that

was very important to some women was not important to others. Ten women selected, one to two additional exercise features that were not part of the CHOICE assessment form. Examples included: being outside, exercising to music, feeling accomplishment and satisfaction, feeling a physical sensation of well being, having a fixed schedule and instructor, having a buddy to report to, or wearing comfortable clothes. Some women also used the open spaces on the CHOICE assessment form to state their motivation for exercising, such as: wanting to lose weight; desiring balance in life; staying healthy or attaining physical fitness.

The exercise features most frequently selected and given the highest importance weights were those that represented personalizing or tailoring the dimensions of an exercise program to their needs. For example, every woman selected the three features "ability to set my own goals", "ability to see progress right way", and "ability to choose among a variety of types of exercise". Features with the highest mean importance weights (IW) were: "flexible hours during which I can exercise" (IW = 8.3, S.D. = 2.6); "exercise does not interfere with other activities in my life" (IW = 7.7, S.D. = 3.4) and "exercise not be boring" (IW = 7.5, S.D. = 2.6). Women reported that the described exercise features on the CHOICE assessment form included aspects of exercise that they considered important for long-term exercise maintenance. Using CHOICE, they had no problems in selecting those features that were important to them, and they could easily discriminate between their relative importance.

3.3. Preference variation

Variations were found in the importance women placed on different exercise features. Fig. 2 displays the frequency of exercise features selected by study participants. Despite the small sample size, there were large differences between participants who had cardiac events and the younger, University employees in both their ratings of the importance they placed on exercise features and the frequency with which the exercise features were selected. Table 1 displays the number of times various exercise features were selected and the mean importance weights assigned by the women who had cardiac events and the healthy, University employees. For example, "support from my physician for exercising" was selected with

PREFERENCE FORM

NAME:

Below Is A Summary Of Your Preferences For Exercise

<i>Exercise Feature</i>	<i>Importance</i>	<i>Specification</i>
Exercise is fun	10	
Exercise does not interfere with other activities in my life	10	My time with my children and work has priority
Flexible hours during which I can exercise	9	
Not getting overly tired while exercising	9	Exercise to the level of getting energized
Length of time to drive to my exercise program	8	Not more than 5-10 minutes driving distance
Not having chest pain while exercising	8	Afraid of chest pain, do not like to experience discouragement due to chest pain
Ability to set own goals	7	My goals are to exercise 30 minutes 4 times a week
Convenience of parking	7	
Ability to choose among a variety of exercise types	7	Walking, dependent on weather, treadmill, basketball, no swimming or climbing stairs
Encouragement for exercise from family and friends	7	Discuss the need for my exercise with my family, exercise together with my husband, make exercise a joint family experience
Cost of participation	6	Should not be too expensive, but some cost is acceptable if exercise is fun
Exercise not be boring	5	
Ability to see progress right away	5	Wish to see progress after 2-3 weeks, the more health benefits with least efforts the better
Being part of a group exercise program	5	Doing group sports once a week, tennis or volleyball, other exercises I prefer to do alone
Discuss my progress in the exercise program with professionals	3	I am able to judge my own progress
Support from my physician for exercising	3	I appreciate acknowledgment of efforts, reinforcement and encouragement by reminding me of health benefits of my exercise
Exercise easy to learn	3	
Exercise with someone rather than alone	1	I like to have quiet time for myself when exercising

Fig. 1. Example of preference form.

importance weights ranging from 1 to 10 by all women with previous cardiac event (mean IW = 9.1), but only by three University employees (mean IW = 4). Particularly large group differences (however, these need to be interpreted with caution because of the small sample size), in importance ratings were found

in the features: “ability to have my heart monitored during exercise”, and “individualized attention from professionals during exercise” to which women with previous cardiac events assigned significantly higher importance weights than the healthy, University-employed group ($P < 0.01$).

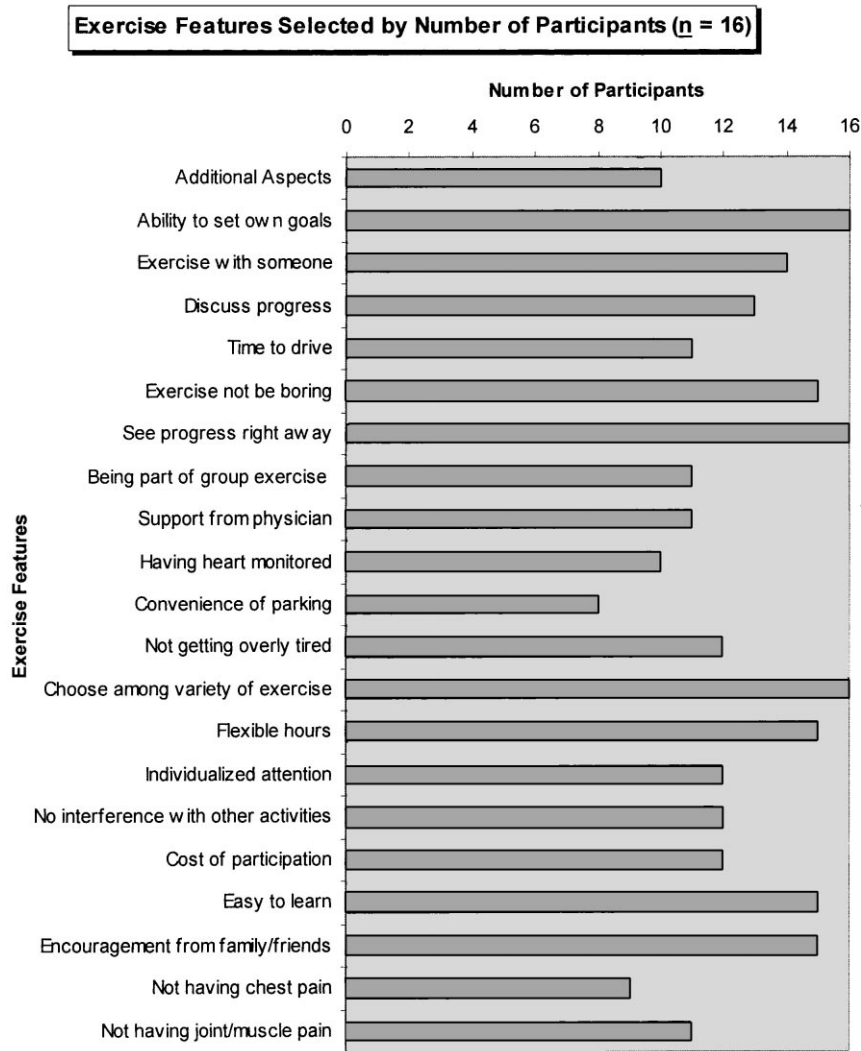


Fig. 2. Selected exercise features.

3.4. Additional results

One week after the initial preference assessment, test–retest reliability was assessed in five individuals and showed an overall consistency score of 0.95 for importance weights assigned to exercise features. While this again needs to be interpreted with caution because of the small sample size, ratings of exercise features identified on the CHOICE assessment form appeared to reflect individuals' preferences in a consistent fashion.

4. Discussion

4.1. Practical implications

The ease and feasibility of the interviews demonstrated in this study suggest that the preference elicitation technique of CHOICE may be used in CR programs. Since participation in a CR program is often the first step in making lifestyle changes following an acute cardiac event, CHOICE may be applied during an initial interview when patients enter a CR

Table 1
Number of women who selected exercise features and mean importance weights for selected features

Exercise feature	Healthy University employees (<i>n</i> = 8)		Recovering from cardiac event (<i>n</i> = 8)	
	Mean importance weight	Feature selected by # of persons	Mean importance weight	Feature selected by # of persons
Additional features	8.8	5	5.4	5
Ability to set own goals	6.4	8	8.0	8
Exercise with someone	6.1	8	7.2	6
Discuss progress	5.5	6	7.4	7
Time to drive	8.3	7	5.8	4
Exercise not be boring	7.3	7	7.6	8
See progress right away	5.7	8	7.0	8
Being part of group exercise	4.6	5	7.7	6
Support from physician	4.0	3	9.1	8
Having heart monitored	2.3	3	8.9	7
Convenience of parking	6.5	4	6.0	4
Not getting overly tired	5.6	5	6.6	7
Choose among variety of exercise	7.6	8	6.0	8
Flexible hours	8.1	8	9.6	7
Individualized attention from professionals	3.2	5	8.9	7
No interference with other activities	8.5	6	6.8	6
Cost of participation	6.0	7	7.4	5
Easy to learn	5.9	7	5.3	8
Encouragement from family/friends	6.0	8	9.4	7
Not having chest pain	9.3	3	8.7	6
Not having joint/muscle pain	7.2	5	8.0	6

program. Although this study's sample was exclusively women, CHOICE could be used with both men and women. Using the CHOICE technique, information about individual preferences for exercise features is elicited and displayed in an easily interpretable format that encourages further reflection and communication between patients and their health professionals. With a glance, individuals and health care professionals can find concise information about a person's opinion of the important features to maintain long-term exercise on the preference form.

Although the purpose of this study was to evaluate the applicability of CHOICE for selecting features important for exercising and the instrument's ability to discriminate between the relative importance of these features, the rationale behind CHOICE is to be able to devise preference-based exercise programs. For example, if the preference elicitation interview identified that it is important to a participant to be able to choose among a variety of types of exercises, then the health care professional may help him or her select a program that varies among those exercise types that she or he

likes to do. Or if driving distance is important, an exercise regimen suitable for the home environment or, alternatively an exercise facility near home may be identified. Also, conflicting preferences may need to be discussed and resolved. For example, a participant may not want to be overly tired and sweaty during exercise, but want to see progress right away. Discussing exercise features important to participants as part of the elicitation interview and finding solutions to accomplish them, it becomes easier to devise an individually tailored exercise program that includes the exercise type, frequency, intensity, location, and time commitment that the participant has agreed to do.

4.2. Conclusions

While generalizations from this study's findings are limited by the small sample size and convenience sampling, notable points are demonstrated. Our data suggest that we have developed a feasible technique for eliciting women's preferences for exercise features. Study participants were able to select exercise

features that they thought were essential to make exercise a good experience for them; they easily discriminated importance among various exercise features. We found that there were large variations in the number and types of exercise features that were selected and in the importance individuals placed on these features. Also, differences in preferences between healthy, University-employed volunteers and women recovering from cardiac events suggests that preferences for exercise features do vary among women by characteristics of women's health or life situations. This highlights the need to elicit preferences for exercise features on an individual basis and to tailor individual exercise programs.

Applying techniques, such as CHOICE could help health care professionals to gain a better understanding of aspects of exercise that are important from the patients' perspective. Unfortunately, a large part of the adult population is sedentary or inactive. Current CR programs have not been particularly effective in increasing women's exercise maintenance and the typical drop-out curve in cardiac exercise is a negatively accelerating one [2,3,10]. Patient preferences may be an important variable to include in interventions designed to influence behavioral change, such as exercise.

Continued assessment of the feasibility, validity and reliability of the preference elicitation technique described here is, however, necessary. To substantiate the usefulness of this technique, a larger study of women and men in cardiac rehabilitation is needed. Also, the ultimate value of individual preference-based exercise regimen counseling is its ability to design exercise programs that are easier for patients to implement and that changes patients' long-term exercise behavior. Given the feasibility of the preference elicitation technique of CHOICE found in this study, an important next step would be to test the effect of eliciting and tailoring preference-based exercise regimens in a randomized clinical trial with enough statistical power to detect whether this intervention would produce significant improvement in long-term exercise maintenance. A larger sample size would also be needed to analyze which of the exercise features are more or less important in reducing drop-out rates, for example in a factor analysis.

In conclusion, the preference elicitation technique described here provides an initial, but important step

to include patient preferences in decisions about their health promotion behavior. This pilot study demonstrated that the elicitation of exercise preferences with CHOICE was applicable and acceptable to study participants. CHOICE may be a potentially promising method to improve long-term exercise in cardiac patients.

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