

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

A Qualitative Study Exploring Factors That Influence Enrollment in Outpatient Cardiac
Rehabilitation

Codie R. Rouleau¹, M.Sc., Kathryn M. King-Shier², R.N., Ph.D., Lianne M. Tomfohr-Madsen¹,
Ph.D., Sandeep G. Aggarwal^{3,4}, M.D., Ross Arena⁵, Ph.D., & Tavis S. Campbell^{1,*}, Ph.D.

¹Department of Psychology University of Calgary, Calgary, AB, Canada; ²Faculty of Nursing
and Department of Community Health Sciences, University of Calgary, Calgary, AB, Canada;
³TotalCardiology Rehabilitation, Calgary, AB, Canada; ⁴Department of Cardiac Sciences,
University of Calgary, AB, Canada; ⁵Department of Physical Therapy, College of Applied
Health Sciences, University of Illinois at Chicago, Chicago, IL, USA

*Corresponding author. Tel.: +1 (403) 998-0706, Fax: +1 (403) 282-8249

Department of Psychology, University of Calgary
2500 University Dr. N.W. Calgary, AB, T2N 1N4 Canada

Email address: t.s.campbell@ucalgary.ca

**This is an Accepted Manuscript of an article published by Taylor & Francis in Disability
and Rehabilitation in February 2018 available
online: <https://doi.org/10.1080/09638288.2016.1261417>**

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

Abstract

Purpose: This study explored patients' decision-making about whether or not to enroll in cardiac rehabilitation (CR), an underutilized program that is associated with significantly improved health outcomes. *Method:* Face-to-face interviews were conducted with acute coronary syndrome patients ($n = 14$) after referral to a local CR center, but prior to program enrollment. Thematic analysis was used to derive themes from interview transcripts. *Results:* Three themes emerged including anticipated benefit, perceived ability, and contextual influences. Participants believed key benefits of CR would be access to specialist healthcare providers, improved longevity, reduced cardiovascular risk, as well as improved motivation, accountability, learning opportunities, and general fitness. Participants were concerned about their ability to engage in and travel to exercise sessions, pay the program fee, and manage scheduling conflicts. Contextual influences on decision-making included healthcare provider recommendation, first impressions of the CR center, knowledge gaps about what CR entails, input from family and peers, and psychological distress. *Conclusion:* The period following CR referral but prior to enrollment represents an optimal opportunity to promote in-the-moment decisions in favor of CR. Patients report both positive and negative aspects of CR, suggesting individualized efforts to resolve ambivalence may increase program participation.

Keywords: cardiac rehabilitation, qualitative study, enrollment, acute coronary syndrome

1 attendance and reduces cardiac re-admissions [10], indicating the importance of early CR
2 enrollment to optimize risk factor modification.

3 Despite the availability of CR and its documented health benefits, underutilization is
4 widely reported [8]. Underutilization can be attributed to drop-off at multiple points along the
5 continuum of cardiovascular care including lack of referral, non-enrollment after referral, poor
6 adherence to CR components after enrollment, and early dropout [14,15]. In response to CR
7 underutilization, many programs have adopted automatic referral systems [16] and strategies to
8 improve exercise adherence after enrollment [17]. However, the problem of non-enrollment
9 remains relatively understudied, which is problematic given that referral to CR does not
10 guarantee enrollment [18] and that non-enrollers may not receive even basic health coaching
11 related to cardiovascular risk reduction. Estimates of CR non-enrollment vary widely (33-94%)
12 [19–23], at least in part due to inconsistent reporting of whether non-enrollers had received a
13 referral. To fully address CR underutilization, more work is needed to identify and understand
14 the subset of patients who receive a referral and recommendation to attend CR, but who do not
15 enroll.

16 Qualitative methods are used to develop a better understanding of complex, subjective
17 processes such as the decision to participate in CR. Some qualitative research has focused on
18 reasons for not enrolling in CR [24–30]; these reasons include negative interactions with
19 healthcare systems/providers, lack of physician recommendation, poor understanding of
20 cardiovascular disease, physical and practical constraints (e.g., cost, scheduling, distance, poor
21 health), the belief that CR is not beneficial, and the view that cardiovascular disease is not
22 controllable. All but two of these studies [26,27] are limited by retrospective reports about
23 reasons for/against enrollment, collected several weeks or even years after participating in or

1 declining CR. Patients' in-the-moment decision-making about whether to take part in CR needs
2 to be further examined.

3 Thus, the aim of this study was to explore factors that influence *intention* to enroll in a
4 12-week outpatient CR program. In order to capture real-time decision-making, the focus was on
5 understanding patients' experiences shortly after referral but prior to attendance at the first
6 scheduled CR appointment. We used an inductive approach [31] in which the aim was to
7 describe individuals' decision-making about CR enrollment, rather than to test or validate theory.
8 As such, there were no a priori hypotheses about themes that would be identified in the data.

9 **Methods**

10 The current study adhered to RATS guidelines for qualitative research [32] in terms of
11 Relelevance of study question, Appropriateness of method, Transparency of procedures, and
12 Soundness of interpretative approach. Ethical approval was obtained from the Conjoint Health
13 Research Ethics Board at the University of Calgary. All participants included in the study
14 provided written informed consent. Confidentiality was ensured by removing identifying
15 information from questionnaires and interview responses, and by limiting access to individual
16 participant data to the research team.

17 **CR Program Description**

18 This study involved patients referred to the largest outpatient CR center within a large
19 Canadian city. The center adheres to national CR guidelines [3]. An automatic referral system is
20 in place where all patients with an approved indication who are admitted to coronary care units
21 or a cardiology ward within the city are scheduled for a CR orientation appointment. The
22 orientation appointment is held within seven days of hospital discharge, and consists of an
23 exercise stress test, medication consultation, and encouragement to enroll in the 12-week

1 exercise-based CR program. For patients with difficulty attending supervised exercise sessions, a
2 home-based program is available. After completion of the 12-week exercise program, patients
3 are offered cardiac follow-up appointments at one- and two-years. A program fee (\$500
4 Canadian) is fully waived for patients with financial constraints. Previous research at this CR
5 center indicates program completion is associated with improved survival, decreased
6 hospitalizations, and improved physical and mental health outcomes [12,33]. Most ($\approx 85\%$)
7 patients attend an initial orientation appointment and 70% of referred patients enroll in the CR
8 program (i.e., attend at ≥ 1 exercise appointment).

9 **Participants**

10 Patients met inclusion criteria if they were diagnosed with acute coronary syndrome (i.e.,
11 myocardial infarction, unstable angina), referred to and eligible for the CR program, English-
12 speaking (due to lack of an available translator), able to schedule data collection prior to their
13 first scheduled CR exercise appointment, and no documented participation in the CR program
14 within the past two years. Participants were recruited for the study following the orientation
15 session, but prior to enrollment in the 12-week exercise program. Purposive sampling [34] was
16 used to maximize sample diversity in terms of sociodemographic characteristics, with particular
17 attention to recruiting women and individuals across the age spectrum.

18 **Recruitment Process**

19 During an initial phone call to confirm the orientation appointment, administrative staff at
20 the CR center asked patients' permission to be contacted about this research study. The
21 researcher (C.R.R.) then contacted consenting patients by phone to explain the study and
22 determine interest and eligibility. If the patient was interested, a meeting was scheduled during
23 which the patient provided written informed consent, completed baseline questionnaires, and

1 took part in a semi-structured interview. Patients were given the option to meet with the
2 researcher at one of three sites including the CR center venue, the researcher's office, or a home
3 visit. Recruitment was terminated when theoretical saturation was achieved, defined as lack of
4 new or relevant themes or sub-themes emerging with additional interviews [31]. Saturation was
5 determined by consensus between C.R.R. and K.M.K.

6 **Data Collection**

7 **Sample characteristics.** Information about age, sex, and medical characteristics (e.g.,
8 diagnosis, cardiac procedures, date of cardiac event, Hospital Anxiety and Depression Scale
9 score [35]) was acquired via chart review. Additional baseline data were collected using a self-
10 report questionnaire that assessed education, racial identity, family income, self-reported travel
11 time to CR, and perceived strength of the referring physician's endorsement of CR (five-point
12 scale with 1 = physician did not recommend CR, 5 = strong recommendation; [36]). Enrollment
13 was determined by chart review 60 days after the initial orientation appointment.

14 **Semi-structured interviews.** In-depth interviews were selected over other methods of
15 data collection (e.g., focus groups) in order to understand individual decision processes, while
16 providing a private space to discuss potentially sensitive topics. A template of open-ended
17 questions (adapted from [29]) aimed at understanding decision-making about enrollment in CR
18 was used as a starting point for each interview. Interview questions addressed patients' decision-
19 making process about CR; perceptions about their disease, its causes, course, and treatment;
20 experience of the referral process; beliefs about CR and benefits/drawbacks of taking part; and
21 perceptions about what would make it easier/more difficult to attend. As the individual
22 interviews progressed, additional probing questions were added. Interview duration ranged from
23 39-90 minutes (median 59 minutes). A clinical psychology doctoral candidate (researcher,

1 C.R.R.) with clinical and research experience with cardiac patients conducted all interviews. The
2 researcher had no clinical relationship with the study participants. The interviews were
3 audiotaped, then transcribed verbatim by a research assistant. The researcher then checked all
4 interview transcripts against the original audio files for accuracy.

5 **Data Analysis**

6 Interview transcripts were analyzed using thematic analysis [37], facilitated by NVivo
7 software (QSR International Pty Ltd. Version 11, 2015). Thematic analysis is a qualitative
8 descriptive approach used to identify, organize, and report patterns within a dataset [37].
9 Consistent with recommendations by Braun and Clarke [37], analysis began with two of the
10 researchers (C.R.R. and K.M.K.) independently reading transcripts and making notes about
11 patterns within the data. Both researchers then generated a systematic list of codes to describe the
12 content of each relevant data extract. This was followed by an iterative process of sorting codes
13 into potential themes and sub-themes in order to ensure inclusion of new or contradictory
14 patterns. Trustworthiness of data interpretation was ensured by holding routine team meetings to
15 build consensus. An audit trail consisted of recording personal reflections, methodological
16 decisions, and interview transcriptions throughout the research process. Finally, themes and sub-
17 themes were named, clearly defined, and examined in terms of their relationships to one another.
18 Quotes reported here represent data extracts selected as highly representative of each theme.

19 **Results**

20 **Descriptive Statistics**

21 During a four-month recruitment period, 164 patients with acute coronary syndrome were
22 referred to the CR program. Of these, 17 were not eligible for the study due to limited English (n
23 = 9) or participation in the CR program within the past two years ($n = 8$). An additional 19

1 declined to be contacted by the researcher to discuss the study. Of the remaining 128 patients
2 who provided consent to be contacted about the study, the researcher attempted to reach 37
3 patients based on purposive sampling. Twelve could not be contacted, 11 were interested in the
4 study but unable to schedule the qualitative interview prior to their first scheduled CR exercise
5 appointment, and the remaining 14 patients provided informed consent and comprise the study
6 sample.

7 [INSERT TABLE 1 ABOUT HERE]

8 Aggregate sample characteristics are presented in table 1. Participants ranged from 42 to
9 85 years old (median 61 years), were predominately White ($n = 13$, 92.9%), and came from a
10 range of socioeconomic and educational backgrounds. Over one-third were foreign-born. On
11 average, symptoms of anxiety and depression fell within the normal range. Primary CR referral
12 reasons included myocardial infarction ($n = 9$, 64.3%) and unstable angina ($n = 5$, 35.7%), for
13 which all patients in the study had undergone percutaneous coronary intervention with either
14 drug-eluting or bare metal stenting. Data collection occurred a median of 15 days after the
15 cardiac event. Participants tended to report that their in-hospital physician had given a moderate
16 to strong recommendation to attend CR (median 4 on a 1-5 scale). Only 8 (57.1%) of the patients
17 ultimately enrolled in CR, defined as attendance at ≥ 1 exercise appointment. When asked about
18 their intention to enroll in CR during the qualitative interview, 2 patients (14.3%) reported they
19 had decided against attending the CR program, 6 (42.9%) said they were still undecided, and 6
20 (42.9%) intended to enroll.

21 **Qualitative Findings**

22 Three main themes were identified relating to participants' decision-making about CR
23 enrollment: anticipated benefit, perceived ability, and contextual influences (table 2). Each of

1 these themes is described along with illustrative quotations below (ID numbers reported after
2 each quotation correspond to the individual participants listed in table 3).

3 [INSERT TABLE 2 ABOUT HERE]

4 [INSERT TABLE 3 ABOUT HERE]

5 **Anticipated benefit.** The first dominant theme concerned patients' assessment of what
6 outcomes CR could produce, and whether those outcomes were personally relevant. Several sub-
7 themes were identified that characterize common benefits anticipated from CR participation.

8 *Access to specialist healthcare providers.* Receiving care from providers who specialize
9 in cardiovascular recovery was perceived as a key benefit of CR. Close monitoring by a
10 cardiologist, for example, was seen as advantageous: "*There's the cardiologist there that I can*
11 *make appointments with and they're going to monitor my medication . . . which I think is good,*
12 *that a cardiologist is monitoring it . . . because I feel like my family doctor is not really qualified,*
13 *you know, to tweak my medications and that"* (ID #10).

14 Of the specialized healthcare services provided in CR, supervised exercise tended to be
15 seen as the most valuable. Participants expected the program would provide a safe venue for
16 exercise initiation, and would teach them the optimal amount/type of exercise for cardiovascular
17 health: "*I think what really interested me in the program was, was that there were trainers that*
18 *knew, that were familiar with cardiac problems, someone that would know . . . what level is*
19 *appropriate and how I might increase it"* (ID #02). Similarly, one participant noted, "*That's*
20 *what I need clarification on from the people at [the CR program], is when can I start doing more*
21 *strenuous household activities for instance. I don't want to do it too soon, 'cause I don't want to*
22 *damage the surgery that I had"* (ID #11).

1 In deciding whether the specialized services were worth the investment of time, effort,
2 and resources, participants compared CR to less intensive approaches. For example, some
3 participants were unconvinced that CR could provide benefits over and above those offered
4 through a community gym: “*The biggest factor that I’m going to make my judgment or my*
5 *decision on would be how watchful do I have to be, or how careful do I have to be, regarding the*
6 *whole exercise thing . . . is it something that I can easily monitor myself, or is it something that,*
7 *you know, is more something for a professional to be monitoring for?” (ID #03). Some
8 participants also thought they could achieve the same benefit through home exercise: “‘Cause I
9 said . . . you want me in this program, which is great, but I’m suggesting other alternatives . . .
10 [they said] ‘you know, you could do more damage.’ And I’m thinking, doing it at home I could
11 do just as much damage” (ID #12).*

12 ***Longevity and reduced cardiovascular risk.*** Participants also valued the program’s
13 ability to attenuate their risk for future cardiac events: “*You know, your own mortality can*
14 *motivate you to do a lot of things that you probably wouldn’t have done” (ID #05) and “I do not*
15 *want to be stuck in that hospital bed, doing that again, ever, ever . . . that’s motivation enough*
16 *right there” (ID #06). Some participants used more optimistic terms when describing their hope*
17 *that CR would contribute to longevity by indicating the specific activities they wanted to do with*
18 *their extra years of life: “I want to be around and enjoy my grandkids, and enjoy life, and go on*
19 *vacations with my husband, you know.” (ID #11). Some participants, in contrast, doubted*
20 *whether CR could reduce their cardiovascular risk: “To me, it seems like a common-sense*
21 *approach . . . ‘cause you are looking at exercise and diet and other lifestyle choices. Since I*
22 *don’t smoke and I don’t drink alcohol anymore (laughs), and I’m not obese, so I don’t have all of*
23 *the concerns you know?” (ID #14).*

1 **Motivation, accountability, and support.** Several participants anticipated that CR would
2 provide a supportive atmosphere in which to successfully pursue health behavior change. There
3 was a sense that being part of the program would provide accountability to attend exercise
4 sessions: “*If I know somebody is relying on me . . . if it’s a one-on-one thing, I certainly don’t*
5 *want that person to waste their time going there and me not showing up, so I have to be there. I*
6 *would feel the obligation to go*” (ID #03). In a similar line of thought, one participant believed
7 that CR would help him follow through on his intentions for lifestyle change: “*The way I see it*
8 *is, I know what I need to do, it’s just a matter of doing it, and that’s what we’re doing, is working*
9 *on doing*” (ID #11). Participants generally expressed they did not want to go through the
10 recovery process on their own, and valued the support offered by CR: “*At that time [of the*
11 *referral to CR], I was looking for somebody to take care of me so I just don’t care what the*
12 *program . . . looks like*” (ID #01).

13 **Learning opportunities.** Participants tended to describe a general openness to the
14 information that would be provided in the program, as noted by this participant who had
15 previously attended CR: “*I thought, well, you know if I can learn something, or, find some new*
16 *ways of exercising and this type of thing, and find out more about my condition, I would. It’d be*
17 *worthwhile for me*” (ID #09). Similarly, another participant expected the educational component
18 of CR would help her make informed decisions about her heart health: “*The education they give,*
19 *whether it be about the heart and heart events and symptoms and that kind of thing . . . I think*
20 *those are all things that a person who has had a heart event should know about and should be*
21 *aware of*” (ID #11).

22 **Fitness and general functioning.** Participants described wanting additional health
23 benefits over and above those related to cardiovascular disease. For example: “[*The CR*

1 *program] is very much designed to, be very cardiac-specific for improving the health of the heart*
2 *and whatnot, and in turn like that, it leads more to overall health obviously” (ID #05). Some*
3 *participants spoke about generally wanting to “feel better” as a result of CR: “So my attitude is*
4 *just, get through this patch, have the doctor sign me off, get back to work, back into a routine*
5 *again, back into building up the exercise, and feeling better” (ID #12). Others spoke specifically*
6 *about wanting to improve their physical fitness, strength, and energy levels: “I’m just tired . . . I*
7 *really want to get back into shape. I really want to get my strength back” (ID #10).*

8 **Perceived ability.** While considering the potential benefits of CR, participants
9 simultaneously weighed whether they would be *able* to attend. That is, the second major theme
10 relates the perceived ability to attend CR in light of various personal obstacles. This aspect of the
11 decision-making process is well-illustrated by this participant: “*Me sitting in their shoes and*
12 *saying, ‘well this is really important for you.’ And it’s true, it is. But, when you switch chairs, it’s*
13 *‘yeah, I know it’s really important, how do we work all this in?’ That’s where it starts getting*
14 *tricky” (ID #05). There were four sub-themes relating to perceived ability to attend CR,*
15 *described below.*

16 **Concerns about exercise.** Some participants expressed concern about their ability to
17 physically take part in the exercise component of CR, expecting difficulties with endurance,
18 boredom, and physical symptoms. For instance, this participant noted concerns about pain during
19 exercise: “*If it’s going to make my back and my hips sore, I don’t want it, because I’ve had*
20 *enough problems,”* although she also described being open to the program if it was “*geared to*
21 *the things that I can do” (ID #13). A similar point was raised by a participant with comorbid*
22 *cancer, concerned his fatigue might interfere with CR participation: “One thing, that leukemia*
23 *does, is it also, you get tireder and tireder . . . so, it’s sort of the old catch 22 . . . for the*

1 *cardiovascular aspect of the coin, you should be out there exercising, then on the other side of*
2 *the coin is you got your body saying, ‘you don’t have the energy, what are you doing?’” (ID*
3 *#05). Some patients anticipated that their ability to exercise would improve with time and*
4 *practice: “I don’t know how long my endurance will be, but I can build that up hopefully by*
5 *keeping to exercise” (ID #09).*

6 ***Distance and transportation.*** Another factor related to perceived ability was the question
7 of “how will I get there?” This was especially pertinent to participants who had their driver’s
8 license temporarily suspended post-cardiac event: “*Well the fact that I’m not allowed to drive*
9 *right now for a month, it’s obviously is a hindrance . . . I can’t even consider starting until the*
10 *first week of February . . . because I’d have to figure out who’s going to take me there” (ID #03).*
11 Some participants also expressed concerns about winter weather, inconvenient commutes via
12 public transit, and anxiety about driving. One participant said transportation issues represented
13 her primary barrier to attending CR: “*I just don’t care for the drive down there. You know, that’s*
14 *the main reason” (ID #08).* Participants discussed their ongoing problem-solving to overcome
15 transportation-related barriers, which included potential solutions such as delaying CR initiation
16 until able to drive, participating in the home-based program, and asking friends and family for
17 rides. However, participants expressed concern about burdening their loved ones with
18 transportation requests: “*We haven’t really decided about the exercise program yet . . . I think*
19 *it’s a good idea. The thing is I’m gonna inconvenience people to be able to do it, and I just have,*
20 *a little bit of reservation about that right now” (ID #09).*

21 ***Financial considerations.*** Nearly all participants described the program fee as
22 influencing their decision-making about CR. Despite being informed about the availability of a
23 fee waiver, some participants continued to be deterred from joining the program. For example:

1 *“It almost makes you feel like ‘ok come on down here, we’ll fix you. But it’s going to cost you’ . . .*
2 *. nowadays who’s got an extra 500 bucks kicking around?”* (ID #04). Another participant was
3 initially concerned about the fee, but subsequently felt able to attend after receiving a waiver:
4 *“And that there was the cost involved was a lot easier to take than if I had to foot the bill on my*
5 *own . . . I said if there is any costs involved it’s a deal-breaker, so it was waived”* (ID #06). In
6 contrast, some participants were confident in their ability to pay the fee and/or believed the fee
7 was worth it for the benefits they would achieve: *“Considering it’s a two-year program, it’s not*
8 *bad if you break it down per month . . . and, as my husband said, your health is important, and*
9 *that’s quite true”* (ID #11).

10 ***Scheduling conflicts.*** The time commitment required for CR represents a frequently
11 mentioned barrier to program enrollment. Participants described uncertainty about whether they
12 could attend morning exercise sessions twice per week for 12 weeks due to employment and
13 family-related responsibilities. One participant provided a representative description of this
14 struggle: *“There’s so much other pressures in your life, you know, there’s work, and then I have,*
15 *you know, children and grandchildren, and the house and everything, and pets . . . and then also*
16 *with having my boss on board, you know?”* (ID #10). Similarly, one participant who is primary
17 caregiver to his wife expressed concerns about spending his small amount of leisure time at CR:
18 *“One of the balls in the air . . . is how to incorporate it into our routine because of the fact we*
19 *don’t have a lot of free time as a general rule. Then when you do have free time, quite often you*
20 *just sort of, ‘oh my God, we can actually relax!’ (laughing) You know rather than, ‘oh, come on,*
21 *let’s go get sweaty!’”* (ID #05). Many participants either resolved these scheduling conflicts, or
22 were considering resolving them, by reminding themselves that CR is time-limited, by choosing

1 a different exercise time/location, by speaking with their employer, or by asking their family
2 physician to advocate for their time off from work.

3 **Contextual influences.** The third theme relates to the broader context in which
4 participants engaged in decision-making about CR. There were an array of situational and
5 emotional factors that seemed to influence the benefits patients anticipated from CR and their
6 perceived ability to attend.

7 **Healthcare provider recommendation.** One of the most prominent contextual influences
8 was the physician's suggestion to join CR. Participants remarked that the cardiologist's opinion
9 of CR was weighted heavily in their own decision-making: "*Having a cardiologist, I think that*
10 *was, that was the big, you know, big push. You know? 'Cause then you think, ok that's really*
11 *important for the cardiologist bring it up*" (ID #10). In addition to considering the opinion of
12 their referring cardiologist, some participants indicated the opinions about CR from the nurses in
13 hospital and their family physician were also important. For some participants, the physician's
14 recommendation was so important that they were instantly compelled to join CR: "*Well for me it*
15 *was sort of a no-brainer. I thought, I'm going to do this . . . almost right away, like when the*
16 *doctor first told me about it I said, 'yeah' "* (ID #14).

17 **First impressions.** For some participants, initial interactions with the CR program were
18 identified as an important element in decision-making about enrollment. When participants
19 attended their initial orientation appointment at the CR center, they were acutely aware of their
20 surroundings including the exercise facilities (e.g., locker rooms, equipment), patient
21 demographics, and staff demeanor. Some participants, for example, felt they did not fit in after
22 seeing other patients: "*Oh my God they're all so old! I feel like I'm—do I really belong here?*"
23 (ID #06). Interactions with staff were viewed favorably by most participants, making them feel

1 hopeful about the help available through the program: *“I’ve been impressed with the staff.*
2 *They’re very courteous, very friendly, and if they’re not the one to help you they can always*
3 *point you in the right direction”* (ID #11). Two participants indicated that unpleasant interactions
4 with CR staff were pivotal to their decision against CR enrollment, as described by this
5 participant: *“I personally feel that the doctor looked at me and thought, ‘well she’s overweight*
6 *and that’s her problem,’ because he kept stressing the exercise . . . that made a major decision.*
7 *Bedside manner goes a long way”* (ID #12). Similarly, another participant perceived the initial
8 orientation appointment as disorganized and was uncomfortable discussing the program fee in
9 the waiting area: *“Everybody could hear what you were saying! . . . they’re saying, ‘well if you*
10 *can’t afford it.’ And I’m like, ‘ok, there’s people sitting here”* (ID #04).

11 ***Evolving knowledge about CR.*** Participants’ decision-making was often a moving target,
12 influenced by ongoing changes in their knowledge about what the CR program entails. As they
13 received more information (e.g., cost, schedule, details of program), participants became more
14 informed about their questions of “will I benefit?” and “can I do it?” While some participants
15 said their decision about program enrollment was relatively automatic upon referral, others said
16 they were waiting until they had more information: *“When you’re first going for these type of*
17 *things you’re sort of on information-gathering, not necessarily on decision-making”* (ID #05).
18 Specifically, some participants wanted more information about potential benefits of the program
19 and/or about their ability to participate, as noted by this woman with concerns about her ability
20 to take part in exercise: *“Well I thought probably it would be a good idea, then the more I heard*
21 *of it, the more I wondered, because I didn’t know how . . . it was going to be geared—if it was to*
22 *my level, or to one level and everyone was expected to work up to that, or what? And, as I say, I*
23 *still don’t really know for sure what they program is gonna be”* (ID #13).

1 Although all participants noted that the referring physician had described the basic
2 components of the program, some participants also received information from family members
3 and friends who had previously completed CR. For example, this participant had learned about
4 the benefits of CR via her husband's participation: "*First of all it was the benefits that I saw from*
5 *my husband. Because my husband afterwards, he was like a different person.*" (ID #10). In
6 contrast, another participant whose husband had completed CR said she did not want to attend
7 because she had already knew exactly what the program involves: "*If it hadn't been for what*
8 *transpired last year with my husband, I would be jumping on the bandwagon right away. But*
9 *because I know exactly what, what the program entails . . . it would be so repetitious for me*" (ID
10 #08). Interestingly, most participants knew about the exercise component of the CR program
11 whereas far fewer were aware of the other risk factor modification services such as stress
12 management, smoking cessation, and support from a dietician. Therefore, participants often
13 reported they did not have enough information about CR with which to make a choice and/or
14 were not fully aware of all the services offered.

15 ***Input from family and peers.*** Another contextual variable that influenced participants'
16 decisions-making was partners', friends', and family members' opinions about CR. There were
17 some participants whose family members were supportive of their participation in the program,
18 such as this participant's husband, "*He is in favor of it . . . I think he wants to see me healthy, or*
19 *healthier, and uh, you know this is his number 1 priority . . . it's a joint affair, so to speak*" (ID
20 #11), and this participant's wife, "*Truth be known, if I didn't go, she would kill me (laughing)*"
21 (ID #05). Others' family members had expressed concern about the patient completing CR: "*I*
22 *think he [husband] was a little dubious about it, and my daughter was—thought the same. She*
23 *wondered if the program would be too strenuous, I guess*" (ID #13). One participant had even

1 received input about the program from a church minister she met in the hospital: “*Well that*
2 *[conversation with the minister] is what kind of settled me more . . . he said . . . ‘definitely check*
3 *into it, ‘cause it really is a good program.’ And he said, ‘I’ve learned lots.’ And I said ‘well*
4 *that’s good to know’” (ID #04). Despite the influence of others on decision-making about CR,
5 patients generally expressed that, in the end, they wanted to make the decision for the own
6 reasons and not be pressured by others.*

7 ***Psychological distress.*** Participants often described feeling anxious, overwhelmed, and
8 exhausted; these emotions provided an important context in which patients were considering CR.
9 Several participants avoided thinking about CR because they were still in a state of shock about
10 what had happened, such as this participant who had not yet read the CR information booklet: “*I*
11 *think it was just too much in, in—‘cause I mean, she gave me the book, and I thought you know*
12 *I’m taking the book home, and I haven’t even looked at it, cause I just, it was just too much all at*
13 *once . . . I’ll look at it when I feel a little bit more settled here” (ID #04). Another participant*
14 *shared a similar experience: “So really I haven’t even thought about it [CR], ‘cause I was more,*
15 *just glad to be home. Glad to be able to sleep through the night without them coming in and*
16 *taking my blood pressure or drawing blood or whatever” (ID #05). Others described their*
17 *psychological distress as being a driver behind their motivation to join CR: “I had so many*
18 *questions in my mind. My job, my family, my kids, and everything so, whatever they tells me, I*
19 *said ok [to joining CR] because I don’t have a choice . . . I’m really motivated to start doing*
20 *their, whatever they just give me” (ID #01).*

21 **Discussion**

22 These qualitative findings provide insight into patients’ subjective decision-making about
23 whether or not to enroll in CR. The novelty of this study is our exploration of considerations

1 made by patients shortly after referral, in real-time. The data suggest that, regardless of patients’
2 intentions regarding CR participation, they tend to evaluate what they might gain from the
3 program while simultaneously evaluating their ability to address pragmatic and physical barriers
4 to attendance. The context in which this decision-making occurs is also relevant, such that
5 various interpersonal, emotional, and healthcare-related factors influence the extent to which
6 eligible patients see CR as feasible and important to attend.

7 This study complements existing quantitative research on CR adherence by describing
8 the subjective “how” and “why” of program enrollment. To date, efforts to elucidate reasons for
9 non-enrollment have generally involved the comparison of hospital discharge statistics in
10 patients who attended versus those who did not attend CR. This quantitative literature indicates
11 the factors most consistently associated with lower enrollment include female sex, older age,
12 comorbid illness, social deprivation, depressed mood, longer distance to CR, lower socio-
13 economic status, and lack of physician recommendation [15,22,38–40]. Although socio-
14 demographic and medical predictors help characterize underrepresented patient groups, they
15 generally provide little information about how individuals’ perceptions and experiences
16 influence their initial decision about CR participation. Our qualitative design, in contrast,
17 facilitated insight into decision-making processes that might not be uncovered using standard
18 quantitative instruments; these processes include the fluidity of patients’ intentions over time, the
19 importance of healthcare provider communication style (e.g., private, sensitive discussions about
20 the CR program fee), and the reasons why a physician’s recommendation is perceived to be
21 important.

22 Our findings also confirm several themes reported in previous qualitative studies
23 conducted at less optimal time-points—namely, after patients have already chosen to attend or

1 not attend CR. Clark and colleagues [25], for example, conducted focus groups with patients
2 eligible for a 12-week outpatient CR program within the previous year, including those with high
3 attendance (>60% CR sessions), high attrition (<60% attendance), and non-attendance (i.e., non-
4 enrollers; 0% attendance). Participants were asked to recall their first reactions and concerns
5 about CR. Non-enrollers tended to describe a current sense of being fearful and uncertain about
6 the future, described poor relationships with healthcare providers, and viewed CR as something
7 for “old, illness-focused, and generally needy” people (p. 11). Their study design, which is
8 representative of research in the area [24,25,28,41–43], introduces the potential for skewed
9 recall. It could be that patients inadvertently remember their initial impressions about CR in a
10 manner consistent with their decision to not attend (e.g., “I chose not to enroll, therefore it must
11 be a terrible program”) or in a manner consistent with their current negative affect (e.g., “I feel
12 upset now, therefore I am more likely to remember upsetting aspects of the decision-making
13 process”), in accordance with confirmatory and mood-congruent memory biases [44,45].
14 Understanding motivations to attend CR in real-time reduces the potential for retrospective bias
15 to color individuals’ reporting of their experiences.

16 Using a prospective study design, we observed that patients consider the potential
17 benefits of CR during their initial decision-making about program enrollment. Although the
18 purpose of this study was not to develop or validate theory, it is noteworthy that the “anticipated
19 benefit” theme is consistent with well-established theories of health behavior change, which
20 posit that favorable attitudes toward a given behavior (Theory of Planned Behavior [46]), beliefs
21 that a certain course of action will reduce susceptibility to illness (Health Belief Model; [47]),
22 and positive outcome expectancies (Health Action Process Approach; [48]) increase the
23 probability of a target behavior. This finding is also consistent with themes from several other

1 qualitative studies on CR participation, such as “benefits of CR” [26], “CRP [cardiac
2 rehabilitation programme] as beneficial” [30], and “positive value of CR” [29]. The specific
3 benefits anticipated by our participants were also similar to those previously described, including
4 the desire to resume or increase physical activity, to learn how much exercise to do in a safe
5 environment, to bolster motivation and social support, and to generally improve one’s health and
6 “get well” [26,27,41,49]. Interestingly, our observation that some patients did not expect CR to
7 produce any benefit over and above their typical physical activity was also reported as a theme
8 by McCorry and colleagues [43] in their interviews with 14 patients, seven to 22 months post-
9 myocardial infarction, who had decided not to attend CR. Efforts to promote enrollment should
10 highlight the benefits of CR that are valued by patients, while addressing potential
11 misunderstandings regarding the importance of structured aerobic exercise in cardiovascular
12 recovery.

13 Our qualitative investigation adds to this existing literature by drawing attention to
14 patients’ real-time deliberations about whether the anticipated benefits of CR are worth the
15 burden, time, physical pain, money, commute, conflict with employer—and so on—that would
16 need to be overcome in order to attend. Patients’ considerations about “perceived ability” are in
17 line with a wide array of mainstream theories of motivation that imply a central role of self-
18 efficacy, or “the belief in one’s own ability to successfully perform a behavior” (p. 20) in health
19 behavior change [50]. Nearly all patients expressed at least some concern about their ability to
20 attend CR, including those who enrolled in the program, suggesting that patients’ perceived
21 ability exists on a continuum and is not a perfect predictor of CR enrollment. In addition, patients
22 varied considerably in the amount of problem-solving they had done to alleviate their concerns,
23 such as arranging transportation to CR, requesting a fee waiver, and reminding themselves that

1 exercise will become easier with the passage of time. As noted by others [26], the degree to
2 which a patient works to overcome their barriers to CR might relate to their perceived
3 importance of the program. Given the modifiable nature of most barriers identified by patients,
4 these findings underline the importance of assessing self-efficacy in prospective CR patients
5 while collaboratively problem-solving to overcome obstacles to CR participation.

6 Of the many contextual influences on their decision-making, the one described most
7 frequently by patients was the conversation about CR with their referring healthcare provider.
8 This finding is supported by systematic reviews of qualitative and quantitative studies examining
9 CR participation, representing dozens of heterogeneous CR programs from across the world,
10 which consistently indicate that a stronger recommendation to join CR by the referring physician
11 is associated with higher rates of enrollment and attendance [15,40,51]. In this study, however,
12 only 57% of patients ultimately enrolled in CR despite all patients having received a referral and
13 recommendation to attend. Whether or not patients adhered to their physicians' recommendation
14 might relate to unmeasured nuances of *how* the recommendation was delivered, given strong
15 evidence for the role of provider communication in treatment adherence [52]. There was also
16 considerable variation across participants in terms of how much and what type of CR
17 information was provided by the referring physician, and in terms of how strong the
18 recommendation was perceived to be. Although systematic patient referrals and education about
19 CR are clearly effective for some patients [18], our findings suggest that simply telling patients
20 to enroll in CR is not always sufficient to motivate program utilization.

21 Our findings also highlight the emotional underpinnings of patients' choice to enroll in
22 CR, a theme which has largely gone unreported in retrospective qualitative studies. The present
23 study adds to prior literature on the association between depressed mood and poor CR attendance

1 [53] by demonstrating that other aspects of psychological distress including acute feelings of
2 fear, shock, and anxiety can influence initial decision-making about program uptake. Whether
3 these unpleasant negative emotions facilitate or interfere with CR participation remains unclear.
4 Some patients reported that psychological distress motivated them to join CR, whereas others
5 reported that their psychological distress interfered with the ability to thoughtfully consider
6 whether CR was right for them. These findings, combined with the importance of patients' initial
7 impressions of the CR center and staff, suggest that healthcare providers should attend to the
8 emotional context of prospective CR patients while acknowledging that patients' psychological
9 distress might interfere with the retention of relevant information [54].

10 Rigor of the study was enhanced by transcription of interviews and consensus of themes
11 achieved by two independent researchers. Despite these efforts, several limitations should be
12 considered when interpreting the results. Although there is no consensus about ideal sample size
13 in qualitative research [31], there is the potential that inclusion of a greater number of individuals
14 may have uncovered additional themes in the barriers to attending CR. However, there was
15 evidence of saturation of themes and consistency with other studies in the literature, giving us
16 confidence in the findings. Additionally, the sample was composed of only English speakers and
17 the majority of participants identified as White. Inclusion of a more diverse sample with regard
18 to language and race may have identified additional or differing barriers and/or motivations for
19 attending CR. The sample was embedded within the context of all having been recommended to
20 attend CR and may not be representative of individuals who do not receive an automatic referral
21 and/or heavily subsidized participation costs. Finally, the selection of interview questions and
22 interpretation of qualitative themes may have been influenced by the researchers' social lens.
23 This concern is mitigated by the observation that two interdisciplinary researchers with divergent

1 training backgrounds (nursing, psychology) independently read the transcripts and came to
2 consensus about themes.

3 The present findings indicate that the brief period following referral, but prior to CR
4 participation, represents an optimal opportunity to assist patients in making in-the-moment
5 decisions in favor of this highly effective secondary prevention program. Importantly, this study
6 yields valuable insights that can be used to inform novel strategies to promote CR utilization,
7 consistent with the innovative ORBIT Model [55] which endorses a phased approach to
8 behavioral intervention development. Given that patients report both positive and negative
9 aspects of CR participation following referral, individualized efforts to address knowledge gaps,
10 inform patients about the multifaceted nature of CR services (beyond just exercise),
11 collaboratively problem-solve barriers, and build motivation by resolving ambivalence (e.g.,
12 through motivational interviewing [56]) may represent effective strategies for increasing
13 enrollment. The next logical step in future research is to define and test a behavioral intervention
14 to promote CR enrollment that addresses the patient-identified issues in this study, while
15 incorporating appropriate evidence-based behavior change theory and techniques.

16

17

1
2
3
4
5
6
7
8

Acknowledgements

The authors would like to acknowledge the participants of this study for their time and honesty. The authors also thank C. Maturana and C. Hare for their assistance with data entry and interview transcription, as well as staff members at the cardiac rehabilitation center for their assistance with participant recruitment.

1
2
3
4
5
6
7

Declaration of Interest

The authors report no conflicts of interest. C. Rouleau is supported by an Alberta Innovates Health Solutions (AIHS) Graduate Studentship and a Canadian Institutes of Health Research (CIHR) Doctoral Award. The sources of funding had no role in the study design; in the collection, analysis, or interpretation of data; in writing the manuscript; or in the decision to submit the manuscript for publication.

References

- 1
- 2 1 World Health Organization. Global status report on noncommunicable diseases 2010.
3 Geneva: 2011: http://www.who.int/nmh/publications/ncd_report2010/en/
- 4 2 Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, *et al.* Heart
5 disease and stroke statistics--2016 update: A report from the American Heart Association.
6 *Circulation* 2015; 133:e38–e360.
- 7 3 Stone JA, editor. *Canadian guidelines for cardiac rehabilitation and cardiovascular*
8 *disease prevention: Translating knowledge into action.* 3rd ed. Winnipeg, MB: Canadian
9 Association of Cardiac Rehabilitation; 2009.
- 10 4 Anderson L, Oldridge N, Thompson DR, Zwisler A-D, Rees K, Martin N, *et al.* Exercise-
11 based cardiac rehabilitation for coronary heart disease. *J Am Coll Cardiol* 2016; 67:1–12.
- 12 5 Dugmore LD, Tipson RJ, Phillips MH, Flint EJ, Stentiford NH, Bone MF, *et al.* Changes
13 in cardiorespiratory fitness, psychological wellbeing, quality of life, and vocational status
14 following a 12 month cardiac exercise rehabilitation programme. *Heart* 1999; 81:359–66.
- 15 6 Macchi C, Fattirolli F, Lova RM, Conti AA, Luisi ML, Intini R, *et al.* Early and late
16 rehabilitation and physical training in elderly patients after cardiac surgery. *Am J Phys*
17 *Med Rehabil* 2007; 86:826–834.
- 18 7 Taylor RS, Brown A, Ebrahim S, Jolliffe J, Noorani H, Rees K, *et al.* Exercise-based
19 rehabilitation for patients with coronary heart disease: systematic review and meta-
20 analysis of randomized controlled trials. *Am J Med* 2004; 116:682–92.
- 21 8 Balady GJ, Ades PA, Bittner VA, Franklin BA, Gordon NF, Thomas RJ, *et al.* Referral,

- 1 enrollment, and delivery of cardiac rehabilitation/secondary prevention programs at
2 clinical centers and beyond: A presidential advisory from the American Heart Association.
3 *Circulation* 2011; 124:2951–60.
- 4 9 World Health Organization. Rehabilitation after cardiovascular diseases, with special
5 emphasis on developing countries. In: *WHO Technical Report Series*. Geneva: World
6 Health Organization; 1993. p. 831.
- 7 10 National Institute for Health and Care Excellence. *Secondary prevention in primary and*
8 *secondary care for patients following a myocardial infarction: NICE clinical guideline*
9 *172*; 2013. guidance.nice.org.uk/cg172
- 10 11 Beauchamp A, Worcester M, Ng A, Murphy B, Tatoulis J, Grigg L, *et al.* Attendance at
11 cardiac rehabilitation is associated with lower all-cause mortality after 14 years of follow-
12 up. *Heart* 2013; 99:620–5.
- 13 12 Martin B-J, Hauer T, Arena R, Austford LD, Galbraith PD, Lewin AM, *et al.* Cardiac
14 rehabilitation attendance and outcomes in coronary artery disease patients. *Circulation*
15 2012; 126:677–87.
- 16 13 Doll JA, Hellkamp A, Thomas L, Ho PM, Kontos MC, Whooley MA, *et al.* Effectiveness
17 of cardiac rehabilitation among older patients after acute myocardial infarction. *Am Heart*
18 *J* 2015; 170:855–864.
- 19 14 Grace S, Krepostman S, Brooks D, Jaglal S, Abramson B, Scholey P, *et al.* Referral to and
20 discharge from cardiac rehabilitation: Key informant views on continuity of care. *J Eval*
21 *Clin Pract* 2006; 12:155–163.

- 1 15 Jackson L, Leclerc J, Erskine Y, Linden W. Getting the most out of cardiac rehabilitation:
2 A review of referral and adherence predictors. *Heart* 2005; 91:10–14.
- 3 16 Beswick AD, Rees K, West RR, Taylor FC, Burke M, Griebisch I, *et al.* Improving uptake
4 and adherence in cardiac rehabilitation: Literature review. *J Adv Nurs* 2005; 49:538–55.
- 5 17 Karmali KN, Davies P, Taylor F, Beswick A, Martin N, Ebrahim S. Promoting patient
6 uptake and adherence in cardiac rehabilitation. *Cochrane database Syst Rev* 2014;
7 6:CD007131.
- 8 18 Gravely-Witte S, Leung YW, Nariani R, Tamim H, Oh P, Chan VM, *et al.* Effects of
9 cardiac rehabilitation referral strategies on referral and enrollment rates. *Nat Rev Cardiol*
10 2010; 7:87–96.
- 11 19 Bethell HJ, Turner SC, Evans JA, Rose L. Cardiac rehabilitation in the United Kingdom:
12 How complete is the provision? *J Cardiopulm Rehabil Prev* 2001; 21:111–115.
- 13 20 Suaya JA, Shepard DS, Normand SLT, Ades PA, Prottas J, Stason WB. Use of cardiac
14 rehabilitation by Medicare beneficiaries after myocardial infarction or coronary bypass
15 surgery. *Circulation* 2007; 116:1653–1662.
- 16 21 Grace SL, Bennett S, Ardern CI, Clark AM. Cardiac rehabilitation series: Canada. *Prog*
17 *Cardiovasc Dis* 2014; 56:530–535.
- 18 22 Turk-Adawi KI, Oldridge NB, Tarima SS, Stason WB, Shepard DS. Cardiac rehabilitation
19 enrollment among referred patients: Patient and organizational factors. *J Cardiopulm*
20 *Rehabil Prev* 2014; 34:114–122.
- 21 23 British Heart Foundation. The national audit of cardiac rehabilitation- annual statistical

- 1 report 2015. London: 2015: <http://www.cardiacrehabilitation.org.uk/docs/2007.pdf>
- 2 24 Chauhan U, Baker D, Lester H, Edwards R. Exploring uptake of cardiac rehabilitation in a
3 minority ethnic population in England: A qualitative study. *Eur J Cardiovasc Nurs* 2010;
4 9:68–74.
- 5 25 Clark AM, Barbour RS, White M, MacIntyre PD. Promoting participation in cardiac
6 rehabilitation: Patient choices and experiences. *J Adv Nurs* 2004; 47:5–14.
- 7 26 Cooper A, Jackson G, Weinman J, Horne R. A qualitative study investigating patients’
8 beliefs about cardiac rehabilitation. *Clin Rehabil* 2005; 19:87–96.
- 9 27 Hird C, Upton C, Chesson RA. “Getting back to normal”: Patients’ expectations of cardiac
10 rehabilitation. *Physiotherapy* 2004; 90:125–131.
- 11 28 Jones LW, Farrell JM, Jamieson J, Dorsch KD. Factors influencing enrollment in a
12 cardiac rehabilitation exercise program. *Can J Cardiovasc Nurs* 2003; 13:11–15.
- 13 29 Pullen S, Povey R, Grogen S. Deciding to attend cardiac rehabilitation: A female
14 perspective. *Int J Ther Rehabil* 2009; 16:207–218.
- 15 30 Wyer SJ, Earll L, Joseph S, Harrison J. Deciding whether to attend a cardiac rehabilitation
16 programme: an interpretative phenomenological analysis. *Coron Heal Care* 2001; 5:178–
17 188.
- 18 31 Tracy SJ. *Qualitative Research Methods: Collecting Evidence, Crafting Analysis,*
19 *Communicating Impact*. Somerset, GB: Wiley-Blackwell; 2012.
- 20 32 Clark JP. How to peer review a qualitative manuscript. In: *Peer Review in Health*

- 1 *Sciences*. Godlee F, Jefferson T (editors). London: BMJ Books; 2003. pp. 219–235.
- 2 33 Campbell TS, Stevenson A, Arena R, Hauer T, Bacon SL, Rouleau CR, *et al*. An
3 investigation of the benefits of stress management within a cardiac rehabilitation
4 population. *J Cardiopulm Rehabil Prev* 2012; 32:296–304.
- 5 34 Emmel N. Purposeful Sampling. In: *Sampling and Choosing Cases in Qualitative*
6 *Research: A Realist Approach*. London: Sage Publications; 2013. pp. 164–173.
- 7 35 Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr*
8 *Scand* 1983; 67:361–370.
- 9 36 Ades PA, Waldmann ML, Polk DM, Coflesky JT. Referral patterns and exercise response
10 in the rehabilitation of female coronary patients aged >62 years. *Am J Cardiol* 1992;
11 69:1422–1425.
- 12 37 Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006; 3:77–
13 101.
- 14 38 Cooper A, Jackson G, Weinman J, Horne R. Factors associated with cardiac rehabilitation
15 attendance: A systematic review of the literature. *Clin Rehabil* 2002; 16:541–552.
- 16 39 Sharp J, Freeman C. Patterns and predictors of uptake and adherence to cardiac
17 rehabilitation. *J Cardiopulm Rehabil Prev* 2009; 29:241–7.
- 18 40 Daly J, Sindone AP, Thompson DR, Hancock K, Chang E, Davidson P. Barriers to
19 participation in and adherence to cardiac rehabilitation programs: A critical literature
20 review. *Prog Cardiovasc Nurs* 2002; 17:8–17.

- 1 41 Heid HG, Schmelzer M. Influences on women's participation in cardiac rehabilitation.
2 *Rehabil Nurs* 2004; 29:116–121.
- 3 42 Jolly K, Greenfield SM, Hare R. Attendance of ethnic minority patients in cardiac
4 rehabilitation. *J Cardiopulm Rehabil* 2004; 24:308–312.
- 5 43 McCorry NK, Corrigan M, Tully MA, Dempster M, Downey B, Cupples ME. Perceptions
6 of exercise among people who have not attended cardiac rehabilitation following
7 myocardial infarction. *J Health Psychol* 2009; 14:924–32.
- 8 44 Nickerson RS. Confirmation bias: A ubiquitous phenomenon in many guises. *Rev Gen
9 Psychol* 1998; 2:175–220.
- 10 45 Mayer JD, McCormick LJ, Strong SE. Mood-congruent memory and natural mood: New
11 evidence. *Personal Soc Psychol Bull* 1995; 21:736–746.
- 12 46 Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Mak* 1991; 50:179–
13 211.
- 14 47 Janz NK, Becker MH. The health belief model: A decade later. *Heal Educ Behav* 1984;
15 11:1–47.
- 16 48 Schwarzer R, Lippke S, Luszczynska A. Mechanisms of health behavior change in
17 persons with chronic illness or disability: The Health Action Process Approach (HAPA).
18 *Rehabil Psychol* 2011; 56:161–70.
- 19 49 McSweeney JC, Crane PB. An act of courage: Women's decision-making processes
20 regarding outpatient cardiac rehabilitation attendance. *Rehabil Nurs* 2001; 26:132–140.

- 1 50 Nutbeam D, Harris E, Wise M. *Theory in a Nutshell: A practical guide to health*
2 *promotion theories*. 3rd ed. North Ryde, New South Wales: McGraw-Hill; 2010.
- 3 51 Neubeck L, Freedman B, Clark AM, Briffa T, Bauman A, Redfern J. Participating in
4 cardiac rehabilitation: A systematic review and meta-synthesis of qualitative data. *Eur J*
5 *Cardiovasc Prev Rehabil* 2011; 19:494–503.
- 6 52 Alexander SC, Sleath B, Golin CE, Kalinowski CT. Provider-patient communication and
7 treatment adherence. In: *Patient Treatment Adherence: Concepts, Interventions, and*
8 *Measurement*. Bosworth HB, Oddone EZ, Weinberger M (editors). Mahwah, NJ:
9 Lawrence Erlbaum Associates; 2006. pp. 329–372.
- 10 53 Glazer KM, Emery CF, Frid DJ, Banyasz RE. Psychological predictors of adherence and
11 outcomes among patients in cardiac rehabilitation. *J Cardiopulm Rehabil* 2002; 22:40–6.
- 12 54 Mitoff PR, Wesolowski M, Abramson BL, Grace SL. Patient-provider communication
13 regarding referral to cardiac rehabilitation. *Rehabil Nurs* 2005; 30:140–6.
- 14 55 Czajkowski SM, Powell LH, Adler N, Naar-King S, Reynolds KD, Hunter CM, *et al*.
15 From ideas to efficacy: The ORBIT model for developing behavioral treatments for
16 chronic diseases. *Heal Psychol* 2015; 34:971–82.
- 17 56 Miller WR, Rollnick S. *Motivational Interviewing: Helping People Change*. 3rd ed. New
18 York, NY: The Guilford Press; 2013.

19

20

1 Table 1

2 *Aggregate Sample Characteristics (n = 14)*

| Variable | Median | Range |
|--|----------|-------|
| Age (years) | 61.0 | 42-85 |
| Education (years) | 13.0 | 8-18 |
| Time since event (days) | 14.5 | 10-40 |
| Strength of physician endorsement (1-5) | 4.0 | 2-5 |
| Distance to CR (minutes) | 30.0 | 8-150 |
| Hospital Anxiety and Depression Scale ^a | | |
| Symptoms of depression | 3.0 | 0-6 |
| Symptoms of anxiety | 3.0 | 2-15 |
| | <i>n</i> | % |
| Male | 8 | 57.1 |
| Enrolled in CR | 8 | 57.1 |
| Primary diagnosis | | |
| STEMI | 4 | 28.6 |
| NSTEMI | 5 | 35.7 |
| Unstable angina | 5 | 35.7 |
| Marital status | | |
| Married or common-law | 12 | 85.7 |
| Single or divorced | 2 | 14.3 |
| Employment | | |
| Full-time | 6 | 42.9 |
| Retired | 6 | 42.9 |
| Disability leave | 2 | 14.3 |
| Highest education | | |
| High school diploma or less | 9 | 64.2 |
| Trade school/community college | 4 | 28.6 |
| Bachelor's degree | 1 | 7.1 |
| Racial identity | | |
| White | 13 | 92.9 |
| Black | 1 | 7.1 |
| Foreign-born | 5 | 35.7 |
| Family income (CAD\$) | | |
| \$20,000-\$40,000 | 1 | 7.1 |
| \$40,001-60,000 | 3 | 21.4 |
| \$60,001-80,000 | 4 | 28.6 |
| \$100,000+ | 4 | 28.6 |

3 *Note.* CR = cardiac rehabilitation, STEMI = ST-segment elevation myocardial infarction,

4 NSTEMI Non-ST-segment elevation myocardial infarction, CAD\$ = Canadian dollars.

5 ^aCut-off scores indicate symptoms in the normal (0-7), mild (8-10), moderate (11-14), and severe
6 (15-21) ranges.

7

1 Table 2

2 *Themes and sub-themes identified in qualitative interviews*

| Theme | Sub-Themes |
|-----------------------|---|
| Anticipated Benefit | <i>Access to specialist healthcare providers</i> <i>Longevity and reduced cardiovascular risk</i> <i>Motivation, accountability, and support</i> <i>Learning opportunities</i> <i>Fitness and general functioning</i> |
| Perceived Ability | <i>Concerns about exercise</i> <i>Distance and transportation</i> <i>Financial considerations</i> <i>Scheduling conflicts</i> |
| Contextual Influences | <i>Healthcare provider recommendation</i> <i>First impressions</i> <i>Evolving knowledge about cardiac rehabilitation</i> <i>Input from family and peers</i> <i>Psychological distress</i> |

1 Table 3

2 *Characteristics of Individual Respondents (n = 14)*

| ID # | Age (Years) | Sex | Strength of Physician Recommendation (1-5) | Travel Time to CR (Minutes) | Marital Status | Enrolled in CR |
|------|-------------|-----|--|-----------------------------|--------------------|----------------|
| 01 | ≤60 | M | 5 | ≤30 | Married/Common-Law | Y |
| 02 | >60 | M | 3 | >30 | Married/Common-Law | Y |
| 03 | ≤60 | M | 4 | ≤30 | Married/Common-Law | Y |
| 04 | >60 | F | 5 | ≤30 | Married/Common-Law | N |
| 05 | ≤60 | M | 5 | >30 | Married/Common-Law | Y |
| 06 | ≤60 | M | 4 | >30 | Single/Divorced | N |
| 07 | ≤60 | M | 5 | ≤30 | Single/Divorced | N |
| 08 | >60 | F | 2 | ≤30 | Married/Common-Law | N |
| 09 | >60 | M | 3 | >30 | Married/Common-Law | Y |
| 10 | ≤60 | F | 5 | ≤30 | Married/Common-Law | Y |
| 11 | >60 | F | | >30 | Married/Common-Law | Y |
| 12 | ≤60 | F | 3 | ≤30 | Married/Common-Law | N |
| 13 | >60 | F | 3 | >30 | Married/Common-Law | N |
| 14 | >60 | M | 4 | ≤30 | Married/Common-Law | Y |

3

4 *Note.* CR = cardiac rehabilitation.

5