

Continuity of cardiac care: Cardiac rehabilitation participation and other correlates [☆]

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Abstract

Background: Continuity of care refers to the ongoing management of a patient's care over time and across practitioners, and the patient's experience of this care as coherent and consistent with their medical needs and context. Continuity of cardiac care is integral to secondary prevention and improved health outcomes.

Design: This study examined patient perceptions of continuity, and how they relate to cardiac rehabilitation participation and other correlates.

Methods: Consecutive acute coronary syndrome patients at 3 hospitals were approached, and 661 consented to complete a survey (504 men, 157 women; 75% response rate). Nine months later, 506 participants completed a survey including the Heart Continuity of Care Questionnaire, open-ended continuity perceptions, and self-reported cardiac rehabilitation participation (yes/no).

Results: The mean continuity perceptions were highly positive, and were equivalent to those found in another Canadian province, although open-ended responses revealed discontinuity with regard to outpatient visits and pharmacotherapy prescriptions. In a multivariate model ($p = .003$), the correlates of greater perceptions of continuity of cardiac care 9 months post-discharge were cardiac rehabilitation participation ($p < .05$), greater tangible support ($p < .05$), and less serious perceptions of illness consequences ($p < .001$) at the time of the acute coronary syndrome, after controlling for demographic and clinical factors.

Conclusion: Given the benefits of continuity of care, it is important to promote cardiac rehabilitation participation, a significant correlate of continuity, and to solicit various supports throughout the process of cardiac recovery.

Keywords: Cardiovascular disease; Continuity of patient care; Cardiovascular disease rehabilitation; Perception of care

1. Introduction

Continuity of care refers to the ongoing management of a patient's care over time and across practitioners, and the patient's experience of this care as coherent and consistent

with their medical needs and context [1]. Continuity of care can improve the management of patient care between health care providers [2–4], increase efficiency and cost-effectiveness within the health care system [5–7], and decrease duplication of treatments [8]. Continuity of care has been shown to have beneficial effects on patient satisfaction [4,9], patient self-management, and most importantly on health outcomes [10,11]. When assessing continuity of care, it is important to incorporate patient perceptions [12], as it has been demonstrated that self-reported continuity of care is strongly associated with higher patient satisfaction [9].

Continuity of care may enable ongoing cardiac risk factor reduction. Although continuity of care has been investigated in a variety of patient populations [13,14], the relationship

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between continuity and perceptions of care has received less attention in cardiac patients [15,16]. This study examined patient perceptions of continuity of care, and how they relate to cardiac rehabilitation participation and other potential correlates of continuity. Cardiac rehabilitation is an integral component of the care continuum for cardiac patients, and is supported through clinical practice guideline recommendations [5,17,18]. These disease-specific education and behavior change programs are intended to provide cardiac rehabilitation participants with the necessary information to manage and reduce their risk, improve their health, and potentially ameliorate their continuity of care with specialists and primary care over time. The relationships between social support [19] and illness perceptions [20] and cardiac rehabilitation participation have been investigated. These concepts deserve exploration within a cardiac sample to increase our understanding of their impact on perceptions of continuity of care.

The objectives of this study were: (1) to describe continuity perceptions in a Canadian sample of cardiac patients under universal healthcare, (2) to compare these perceptions to those in another province, and (3) to investigate the correlates of positive continuity perceptions. It was hypothesized that cardiac rehabilitation participation, illness perceptions, and greater social support would have a positive impact on perceptions of continuity. By identifying the correlates of perceptions of continuity of care, secondary prevention may be improved by incorporating these findings into the care continuum for cardiac patients.

2. Materials and methods

2.1. Procedure and design

Ethics approval was obtained from participating institutions. This study constitutes a longitudinal component of a larger prospective study on cardiac rehabilitation referral models [21]. Participants were recruited from three hospitals, namely the Trillium Health Centre (THC) and University Health Network (UHN: Toronto General and Toronto Western Hospitals), all large, urban tertiary care facilities in the Greater Toronto Area, Ontario, Canada, within a universal health coverage system. Inclusion criteria were a confirmed diagnosis of Acute Coronary Syndrome (ACS) and age 18 years or older. Exclusion criteria consisted of being medically unstable, too confused to participate, ineligibility for or previous participation in cardiac rehabilitation, or lack of English language proficiency. Those who met study criteria and agreed to participate signed a consent form and were provided with a self-report questionnaire. Consent was also obtained to link participant's self-report questionnaire data with clinical charts. Nine months from their index cardiac hospitalization, participants completed a questionnaire in person or by mail. Dillman's tailored design method [22] was used to maximize response rate.

2.2. Participants

Thirteen hundred and sixty-two consecutive patients from THC or UHN who were diagnosed with ACS between September 2003 and August 2004 were approached for the study. ACS diagnoses were confirmed based on indication in patient chart of detailed history, focused physical examination, and diagnostic ECG changes (i.e., Q waves, and/or ST-T segment changes), and/or troponin levels above the 99th percentile of normal. Of these patients, 661 consented to participate and 483 were ineligible (response rate=661/879=75%). Reasons for ineligibility were as follows: previous attendance at cardiac rehabilitation ($n=123$; 25.5%), lack of English language proficiency ($n=119$; 24.6%), too ill to participate ($n=98$, 20.3%), condition not indicated for referral to cardiac rehabilitation ($n=70$; 14.5%), patient too confused or experiencing cognitive impairment ($n=42$; 8.7%), comorbid musculoskeletal condition which precludes ambulation ($n=19$; 3.9%), patient already participating in 2 studies ($n=5$, 1.0%) and other ($n=7$, 1.4%) reasons.

Characteristics of participants and non-participants are shown in Table 1. There were no significant differences in participant status based on site of recruitment or marital status. Of the patients approached, participants were significantly younger than those who refused or were ineligible to participate ($F(2)=33.59$, $p<0.001$; post-hoc LSD $ps<.001$). Significantly more males agreed to participate than females ($\chi^2(2)=31.44$, $p<0.001$).

Of the 661 consenting participants, 61 were ineligible and 506 were retained at the 9-month assessment (retention rate=506/600=84.3%). The characteristics of participants at 9 months are shown in Table 2. Reasons for ineligibility were as follows: deceased ($n=8$; 1.2%), too ill to participate ($n=10$; 1.5%), unable to reach patient/incorrect contact information ($n=34$; 5.1%), previous participation in cardiac rehabilitation ($n=4$; 0.6%), change in cardiac condition ($n=3$; 0.5%) and other ($n=2$; 0.3%).

Table 1
Characteristics of participants, refusers, and ineligible at baseline recruitment

Characteristic	Participants ($n=661$)	Refusers ($n=218$)	Ineligibles ($n=483$)
Site (%THC)	331 (50.1)	126 (59.8)	271 (56.1)
Condition/procedure ^a (%PCI)	405 (61.3)	109 (50.2)	184 (38.3) ^b
Sex (%female)	157 (23.8)	77 (35.6)	186 (38.6) ^b
Marital status (%married)	503 (76.1)	160 (76.2)	339 (71.5)
Age (mean \pm S.D.)	61.22 \pm 11.30	65.96 \pm 11.96 ^b	66.48 \pm 11.39 ^b

THC, Trillium Health Center.

PCI, percutaneous coronary intervention.

^a Extracted from medical charts.

^b $P<0.001$.

Table 2
Characteristics of participants, refusers, and ineligible at 9-month assessment

Characteristic	Participants (n=506)	Refusers (n=94)	Ineligibles (n=61)
Site (%THC)	241 (47.6)	57 (60.6)	33 (54.1)
Condition/procedure† (%PCI)	316 (62.5)	55 (58.5)*	31 (50.8)*
Sex (%female)	116 (22.9)	29 (30.9)	12 (19.7)
Marital status (%married or common-law)	397 (78.5)	64(68.1)**	40 (65.6)**
Age (mean±S.D.)	62.38±10.75	55.71±12.35***	60.61± 11.73***
Body mass index (mean±S.D.)	28.31±4.73	29.77±5.36**	29.01± 5.36**
Activity status (mean±S.D.)	34.46±17.18	32.65±18.71	29.79± 16.35
NYHA† (%class 1)	425 (88.7)	76 (84.4)	54 (98.2)
Systolic BP† (mean±SD)	129.2±21.4	125.4±19.4**	134.4± 17.6**
Diabetes† (%yes)	111 (21.9)	26 (27.7)	17 (27.9)
Arthritis† (%yes)	116 (22.9)	22 (23.4)	17 (27.9)
Smoker (%current)	73 (14.6)	24 (25.5)*	17 (28.3)*
Ethnocultural background (%white)	404 (84.0)	62(71.3)**	42 (79.2)**
Education (%some post- secondary or greater)	258 (51.9)	50 (53.8)	31 (50.8)
Family income (%≥\$50 000CAD)	242 (58.3)	39 (48.8)*	17 (33.3)*

† Extracted from medical charts.

THC, Trillium Health Center.

PCI, percutaneous coronary intervention.

BP, blood pressure.

NYHA, New York Heart Association.

* $P < 0.01$.

** $P < 0.05$.

*** $P < 0.001$.

2.3. Measures

2.3.1. Dependent variable

The 9 month questionnaire included the Heart Continuity of Care Questionnaire [23], which assesses participants' perceptions of continuity of cardiac care along three dimensions: informational, management and relational continuity [1]. Informational continuity is the use of information on prior events and circumstances to make current care appropriate for the individual. Management continuity refers to the provision of timely and complementary services within a shared management plan. Relational continuity refers to the ongoing relationship between a patient and one or more health care providers. The Heart Continuity of Care Questionnaire is a 36-item self-report questionnaire, with 19 items assessing informational, 10 items assessing relational, and 7 items assessing management continuity. Items were rated on a 5-point Likert-type scale from 'strongly agree' to 'strongly disagree', with a sixth option for 'not applicable'. A mean continuity of care score was computed, with higher scores denoting greater perceptions of continuity. Cronbach's alpha for total continuity of care, and the three subscales of informational, relational, and management continuity

were 0.95, 0.93, 0.78 and 0.88, respectively in the current sample.

The 9-month questionnaire included an open-ended question regarding participants' perceptions of the aftercare received since leaving the hospital. Responses were content analyzed. The 9-month questionnaire also included a list of cardiac medications, such as aspirin, and participants were asked to indicate which medications were incorporated in their current pharmacotherapy regimen. These responses were coded and analyzed. Participants were also asked about their participation in cardiac rehabilitation (yes/no). The kappa coefficient of agreement between self-reported cardiac rehabilitation participation and site-verified enrollment was 81.4%, indicating the validity of the self-reported data.

2.3.2. Independent variables measured at baseline

Self-reported sociodemographic data included age, sex, ethnocultural background, marital status, work status, level of education, gross annual family income, smoking status, height and weight (to compute body mass index; BMI). Clinical data extracted from medical charts included cardiac condition/procedure, blood pressure, New York Heart Association class (NYHA) [24] as an indicator of ACS severity, and presence of selected comorbid conditions, including diabetes and arthritis.

The Duke Activity Status Index (DASI) [25] is a brief 12-item self-administered survey to determine functional capacity. This measure was investigated as an indicator of disease severity and as a potential correlate of perceptions of continuity of care. Participants are asked about their ability to perform common activities of daily living, such as personal care, ambulation, and recreational activities, which are each associated with specific metabolic equivalents (METs).

The Medical Outcome Study Social Support Survey [26] is a brief self-administered 19-item scale survey to assess perceptions of social support. This measure was incorporated in the model as an indicator of the social resources available to patients as a potential correlate of perceptions of continuity of care. Emotional support, informational support, tangible support, positive social interaction and affection are the 5 domains measured on a 5-point Likert-type scale. A total mean score was computed minus the item regarding number of friends, as this data was not normally distributed. Cronbach's alpha for the Medical Outcome Study Social Support Survey domains of tangible, affectionate, positive social interaction, emotional/informational, and total support are .87, .65, .88, .93 and .97, respectively, in the current sample.

The Illness Perception Questionnaire [27] was administered to assess cognitive representations of cardiovascular disease as a potential correlate of continuity perceptions. The following 4–6 item subscales were administered: timeline, cyclical or episodic course, consequences, personal control, and treatment cure/controllability. All items were scored on a 5-point Likert-type scale, which ranged from 'strongly disagree' to 'strongly agree'. A mean subscale score was

computed, with higher scores denoting greater endorsement of the given construct. Cronbach's alpha for the subscales were 0.82, 0.84, 0.80, 0.71, and 0.61, respectively in the current sample.

2.4. Statistical analyses

Following data cleaning and screening, a descriptive examination was performed. Differences between participating, ineligible and refusing patients were tested by Pearson's chi-square and analyses of variance as appropriate. Mean continuity of care scores were computed, and compared to the results obtained by Hadjistavropoulos et al. [23] using equivalency tests [28]. A content analysis of the open-ended comments was performed. Qualitative items were identified as either positive or negative, and were coded in the following categories relating to continuity of care: general, informational, relational and management continuity. For qualitative items that satisfied multiple categorizations, only the first assigned code was included in the analysis. The bivariate relationship among continuity of care perceptions and the hypothesized correlates was performed using Pearson's correlations and t-tests as appropriate. The data was then analyzed using the General Linear Model in SPSS 13.0 to relate mean total continuity of care scores to the correlates outlined above.

3. Results

3.1. Perceptions of continuity of care

Mean Heart Continuity of Care Questionnaire subscale scores are shown in Table 3. The mean and standard deviation of the total continuity of care score for the current sample was 3.89 ± 0.57 . Heart Continuity of Care Questionnaire data from the current study were compared with the results obtained by Hadjistavropoulos et al. [23]. Significance tests were used to evaluate the equivalence of subscale scores between the two study populations [28]. The equivalency test statistic for the domains of informational, relational and management continuity were 0.50, 0.48 and 0.50, respectively. All subscale

Table 3

Equivalency test for mean scores on the heart continuity of care questionnaire between current study and Hadjistavropoulos et al. (2004)

Domain	Current study		Hadjistavropoulos et al.		Total <i>N</i>
	Mean \pm S.D. ^a	<i>N</i>	Mean \pm S.D.	<i>N</i>	
Informational	3.89 \pm .63	443	3.89 \pm .99	316	759
Relational	3.72 \pm .56	443	4.36 \pm .73	302	745
Management	3.83 \pm .77	441	3.93 \pm 1.11	324	765

Note. Scores range from 1 to 5 with higher scores denoting more positive continuity perceptions.

^a Assessed at 9 months post-discharge.

Table 4

Distribution of coded open-ended continuity of care responses[‡], *n*=413

Coded item	Participants <i>n</i> =413 (%)
General positive	122 (29.5)
General negative	16 (3.9)
Management positive	143 (34.6)
Management negative	22 (5.3)
Relational positive	21 (5.1)
Relational negative	8 (1.9)
Informational positive	27 (6.5)
Informational negative	9 (2.2)
Other	45 (10.9)

[‡] Assessed at 9 months post-discharge.

scores were determined to be equivalent for the two study populations.

3.2. Analysis of qualitative responses

413 participants (81.6%) provided qualitative comments regarding the continuity of care received. Content analysis of the 413 qualitative comments revealed themes relating to positive and negative perceptions corresponding to each type of continuity. The frequency of coded qualitative items is presented in Table 4, and results are described below. First, comments were coded as 'informational' if the participant made specific references to the use of information regarding prior cardiac events and circumstances to make current care appropriate for the individual and his or her condition.

3.2.1. Informational positive

468: "[Continuity of care has been] excellent-both my cardiologist and family doctor have [carbon copied] any results of tests etc., and [the cardiac rehabilitation program] has also kept both doctors informed".

3.2.2. Informational negative

1071: "No coordination on medication prescription among the doctors".

Comments were coded as 'management' when there was a reference to the provision of timely and complementary services within a shared management plan.

3.2.3. Management positive

53: "The follow-up with my cardiologist and the members of the cardiac rehabilitation team has been excellent and well coordinated".

3.2.4. Management negative

243: "[Follow-up] appointments with doctors were not prearranged. No directions on when to visit cardiologist or family doctor [were provided]. No direction on cardiac rehabilitation classes. After inquiries, and with help from my family doctor, I joined a cardiac rehabilitation class. After leaving hospital I felt I was on my own".

Table 5
Mean total continuity of care score by sample characteristics (N=506)

Characteristic	Total continuity of care score (mean±S.D.) ^a	n
Sex		
Male	3.92±0.55	389
Female	3.81±0.62	116
Ethnocultural background		
White	3.90±0.58	403
Other	3.85±0.58	77
Family income		
Under \$50,000 CAD/year	3.91±0.57	173
Over \$50,000 CAD/year	3.93±0.57	242
Education		
Up to high school	3.90±0.57	239
Some post-secondary	3.88±0.57	257
Marital Status		
Married/common-law	3.91±0.58	397
All others	3.82±0.54	108
Participation in Cardiac Rehabilitation ^a		
Yes	3.97±0.55 ^b	215
No	3.84±0.57	281
Aspirin use ^a		
Yes	3.91±0.56	436
No	3.81±0.56	55
NYHA ^c		
Class I	3.90±0.56	424
Class II–IV	3.93±0.54	54
Condition/procedure ^c		
Percutaneous coronary intervention	3.87±0.57	315
Other	3.93±0.56	190

^a Assessed at 9 months post-discharge.

^b $P < 0.05$.

^c Extracted from medical charts.

05: “My family physician was not aware of my health problem until advised by me after my surgery”.

Comments coded as ‘relational’ included references to the ongoing relationship between a patient and one or more

health care providers, providing a link between past, present and future care.

3.2.5. Relational positive

250: “My cardiac care has been good with contact with my family physician, cardiologist and surgeon. My family doctor has explained anything I wanted to know and has been very supportive”.

3.2.6. Relational negative

351: “I haven’t received any continuity of cardiac care, such as information or interpersonal skills from a healthcare professional.”

Comments were coded as ‘general’ if they did not specifically relate to one of the three domains of continuity of care; ‘positive’ or ‘negative’ modifiers were assigned based on the general tone of the comment.

3.2.7. General positive

41: “I have received excellent care since my release from hospital.”

1178: “Happy with continuity of cardiac care with a variety of health care professionals.”

3.2.8. General negative

83: “I received absolutely nothing.”

Finally, comments were coded as ‘other’ if there was no specific reference to continuity of care.

3.3. Correlates of perceptions of continuity of care

A univariate analysis of correlates of continuity of care was performed. Table 5 presents t-tests, and Table 6 presents correlational analyses of mean total continuity of care scores with potential correlates. As shown, cardiac rehabilitation

Table 6
Pearson’s correlations among mean total continuity of care score at 9 months post-acute coronary syndrome discharge with continuous variables, N=506

	Total continuity of care [‡]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Activity status	.083											
(2) Age	-.012	-.140 ^a										
(3) IPQ timeline	-.121 ^a	-.119 ^a	.071									
(4) IPQ consequences	-.122 ^a	-.069	-.219 ^a	.293 ^a								
(5) IPQ cure/control	.155 ^a	.077	.002	-.442 ^a	-.171 ^a							
(6) IPQ timecycle	-.047	-.076	-.030	.163 ^a	.233 ^a	-.126 ^a						
(7) IPQ personal control	.072	.128 ^a	-.087 ^b	-.122 ^a	.059	.437 ^a	-.096 ^b					
(8) MOS total mean support	.220 ^a	.016	.045	-.068	-.037	.152 ^a	-.115 ^a	.152 ^a				
(9) MOS tangible support	.213 ^a	.016	.038	-.055	-.017	.145 ^a	-.115 ^a	.169 ^a	.957 ^a			
(10) MOS affectionate support	.090 ^b	.033	.060	-.122 ^a	-.062	.213 ^a	-.038	.191 ^a	.361 ^a	.321 ^a		
(11) MOS positive social interaction	.210 ^a	.026	.048	-.063	-.058	.134 ^a	-.087 ^b	.192 ^a	.950 ^a	.869 ^a	.354 ^a	
(12) MOS emotional or information support	.201 ^a	.031	.034	-.062	-.033	.127 ^a	-.099 ^b	.186 ^a	.982 ^a	.931 ^a	.355 ^a	.902 ^a

[‡] Assessed at 9 months post-discharge.

IPQ, Illness Perceptions Questionnaire.

MOS, Medical Outcome Study Social Support Survey.

^a $P < 0.01$.

^b $P < 0.05$.

participants reported significantly more positive perceptions of continuity than those who did not participate in cardiac rehabilitation ($t=2.56$). Mean total continuity of care scores were significantly correlated with the timeline, consequences, and cure / controllability subscales of the Illness Perceptions Questionnaire, and all subscales of the Medical Outcomes Social Support Survey. This demonstrated that more positive perceptions of continuity were significantly related to all measures of perceptions of greater support (tangible, affectionate, positive social interaction, and emotional or informational), less grave perceived consequences, a more acute perceived timeline and greater perceived treatment cure/controllability of their heart condition.

The General Linear Model was used to investigate the correlates of perceptions of continuity of cardiac care nine months post-discharge. Sex, age and condition/procedure were entered in the model to control for potential selection biases, as well as significant variables identified in bivariate analyses. Due to the correlations within the Illness Perceptions Questionnaire subscales and the Medical Outcomes Social Support Survey subscales, only the subscales from each measure which were most highly correlated with continuity were included in the model. There was ample power for this analysis. The results are presented in Table 7. Based on this model ($F=1.652$, $p=.003$; adj $R^2=10.9\%$; $\eta^2=27.6\%$), cardiac rehabilitation participation, tangible support, and perceptions of illness consequences were significant correlates of perceptions of total continuity of care after controlling for: sex, age, body mass index, condition/procedure, systolic blood pressure, marital status, ethnocultural background, family income, and smoking status. This suggests that participants who attend cardiac rehabilitation, and perceive greater tangible support

and fewer illness consequences, perceive greater continuity of cardiac care.

4. Discussion

This study prospectively examined patient perceptions of continuity of care in a large multi-site sample of patients hospitalized for an acute coronary event or procedure. Overall, the participant's perceptions of the continuity of care received were quite positive in all domains of informational, management, and relational continuity. The analysis of qualitative, coded items exemplified some of these perceptions of continuity of care in cardiac patients, and despite the high mean scores on the Heart Continuity of Care Questionnaire, there remain participants who hold negative perceptions of care received. For instance, some participants reported a lack of coordination regarding medication prescriptions, and an unmet desire for more follow-up with family physicians within the first nine months post-hospitalization. These are specific areas that could be targeted for enhancing continuity, and to potentially improve care and secondary prevention.

Heart Continuity of Care Questionnaire data from the current study were compared with the results obtained by Hadjistavropoulos et al. [23] to test the psychometric properties of this tool in a different cardiac sample, and using a different format of administration. Both studies were conducted within the Canadian health system of universal coverage. However, a 36-item self-report version of the questionnaire was administered in the current study, while Hadjistavropoulos et al. [23] administered a 41-item interviewer-administered measure. Also, the cardiac population studied by Hadjistavropoulos et al. [23] consisted of patients with congestive heart failure and atrial fibrillation, whereas the current study consisted of acute coronary syndrome patients who could be considered to have better prognosis. Despite these differences, the Heart Continuity of Care Questionnaire maintained its reliability. In the current sample, Cronbach's alpha for the three subscales of informational, relational, and management were 0.93, 0.78 and 0.88, respectively, compared with 0.93, 0.86 and 0.84, respectively, reported by Hadjistavropoulos et al. [23]. These values suggest that this questionnaire is also applicable to an acute coronary syndrome population. Although more psychometric testing is warranted including confirmatory factor analyses and further assessment of construct validity, the Heart Continuity of Care Questionnaire may serve as a psychometrically-valid tool that is applicable to patients with a range of cardiovascular diseases which can be reliably administered in self-report format.

4.1. Correlates of continuity of care

Results supported our postulated positive relationship between continuity perceptions and cardiac rehabilitation participation. Regular interactions with the multi-disciplinary staff for approximately 6 months enables the

Table 7
Analysis of variance of factors affecting perceptions of continuity of cardiac care 9 months post-acute coronary syndrome discharge, $N=506$

	<i>F</i>	<i>p</i>	η^2
Sex	.097	.755	.000
Age	1.108	.300	.163
Body mass index	.006	.937	.000
Condition/procedure ^a (PCI vs. other)	1.589	.208	.006
Systolic blood pressure ^a	1.334	.249	.005
Marital status	.714	.399	.003
Ethnocultural background	1.449	.230	.005
Family income	1.263	.262	.005
Smoking status	1.961	.143	.014
CR participation ^b	3.973	.047	.014
MOS tangible support	5.465	.020	.019
MOS Positive Social Interaction	.008	.930	.000
IPQ cure/controllability	.039	.844	.000
IPQ consequences	11.261	.001	.039
IPQ timeline	.201	.654	.001

PCI, percutaneous coronary intervention.

CR, cardiac rehabilitation.

MOS, Medical Outcome Study Social Support Survey.

IPQ, Illness Perceptions Questionnaire.

^a Extracted from medical charts.

^b assessed at 9 months post-discharge.

establishment of a relationship and ongoing rapport, thus meeting the relational continuity needs of the cardiac rehabilitation participant. Relational continuity is further enhanced by the camaraderie created among cardiac rehabilitation participants [29]. The cardiac rehabilitation staff provides informational continuity by caring for participants in a manner that is appropriate and tailored to the specific needs of the participant based on their previous health issues, since referral forms contain acute care information pertaining to the patient [30]. The information continuum is further facilitated by a cardiac rehabilitation discharge summary, which provides a link between the program and the primary care physician for long-term risk reduction [31,32]. Cardiac rehabilitation participation also facilitates management continuity of care, as participants are provided with timely, complementary services within the program. All of these facets of continuity that are contained within the cardiac rehabilitation program assist the patient with adopting and maintaining health promoting behaviours necessary for secondary prevention [33,34], such as physical activity [35], proper nutrition and adherence to pharmacotherapies [36].

Our results confirm the importance of illness perceptions, specifically perceived illness consequences, as a correlate of perceived continuity of care. Regardless of disease severity assessed via New York Heart Association class in clinical charts or via self-report on the Duke Activity Status Index, perceiving more grave consequences was associated with lower perceptions of continuity of care. Patients who perceive greater consequences of their illness may be less satisfied with their care or desire more intensive coordination of care among providers. This suggests that providers should be attuned to patient's perceptions of the consequences of their disease be they financial, relational, or other.

Perceived tangible support from both healthcare providers and non-healthcare providers can lead to greater perceptions of continuity, considering the continuous relationship that is established provides the patient with stability and consistency as they move through the healthcare system. Empathetic patient-provider communication is an integral component of the care continuum, and this ongoing communication assists in creating the tangible support network of the patient. In a critical review of the medical literature investigating the relationship between relational continuity and patient satisfaction, Saultz and Albedaiwi [37] found that, despite methodological limitations, there is a consistent and significant positive relationship between these two constructs. This tangible support may be especially important during patient transition periods, such as between hospital discharge and subsequent outpatient care, as previous research has shown positive associations between measures of continuity of care and client outcomes in transitional treatment situations [38].

This study is limited in generalizability, due to differences in characteristics of participants and non-participants. More specifically, participants were younger, were more likely to

be male, and the majority were admitted to hospital for percutaneous coronary intervention. However, these differences were controlled in statistical analyses. There may be further selection bias, such that patients who are more or less satisfied with their care may be more likely to return the survey. However, one study of nonresponse bias in a survey of patient perceptions of hospital care found that increasing response only modestly influenced the final conclusions of the study [39]. Moreover, our response rate and retention rate were both high. Future research is needed to replicate these findings, and further explore correlates of patient's perceptions of continuity.

In conclusion, within the universal healthcare system we observed highly positive patient perceptions of cardiac continuity of care. Nevertheless, significant care gaps remain with regard to medication prescription and follow-up healthcare visits. Given the benefits of continuity, the promotion of cardiac rehabilitation participation, the solicitation of various supports throughout the process of cardiac recovery, and attention to patient's perceptions of their illness consequences deserve emphasis. Considering the current burden of cardiovascular diseases, improvements in the continuity of care perceived by cardiac patients could lead to improved secondary prevention.

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References

- [1] Haggerty JL, Reid RJ, Freeman GK, Starfield BH, Adair CE, McKendry R. Continuity of care: A multidisciplinary review. *BMJ* 2003;327:1219–21.
- [2] Anderson MA, Helms LB. Comparison of continuing care communication. *J Nurs Scholarsh* 1998;30:255–60.
- [3] Smoot SM. Continuity of care prism process applied to the congestive heart failure population. *Nurs Case Manag* 1998;3:79–88.
- [4] Urden LD. Heart failure collaborative care: an integrated partnership to manage quality and outcomes. *Outcomes Manag Nurs Pract* 1998;2:64–70.
- [5] Brown A, Taylor R, Noorani H, Stone J, Skidmore B. Exercise-based Cardiac Rehabilitation Programs for Coronary Artery Disease: a Systematic Clinical and Economic Review. Ottawa, Canada: Canadian Coordinating Office for Health Technology Assessment; 2003.
- [6] Probstfield JL. How cost-effective are new preventive strategies for cardiovascular disease? *Am J Cardiol* 2003;91:22G–7G [Suppl].
- [7] De Maesseneer JM, De Prins L, Gosset C, Heyerick J. Provider continuity in family medicine: does it make a difference for total health care costs? *Ann Fam Med* 2003;1:144–8.
- [8] Bestul MB, McCollum M, Stringer KA, Burchenal J. Impact of a critical pathway on acute myocardial infarction quality indicators. *Pharmacotherapy* 2004;24:173–8.
- [9] Fan SV, Burman M, McDonnell MB, Fihn SD. Continuity of care and other determinants of patient satisfaction with primary care. *J Gen Intern Med* 2005;20:226–33.
- [10] Ahmed A, Allman RM, Kiefe CI, et al. Association of consultation between generalists and cardiologists with quality and outcomes of heart failure care. *Am Heart J* 2003;145:1086–93.

- [11] Cabana MD, Jee SH. Does continuity of care improve patient outcomes? *J Fam Pract* 2004;53:974–80.
- [12] Reid R, Haggerty J, McKendry R. Defusing the confusion: concepts and measures of continuity of healthcare. Final report. Vancouver, Canada: Centre for Health Services and Policy Research, University of British Columbia; 2002.
- [13] Adair CE, McDougall GM, Mitton CR, et al. Continuity of care and health outcomes among persons with severe mental illness. *Psych Serv* 2005;56:1061–76.
- [14] Love MM, Mainous III AG, Talbert JC, Hager GL. Continuity of care and the physician-patient relationship: the importance of continuity for adult patients with asthma. *J Fam Prac* 2000;49:998–1004.
- [15] Young W, Rewa G, Goodman SG, et al. Evaluation of a community-based inner-city disease management program for postmyocardial infarction patients: a randomized controlled trial. *CMAJ* 2003;169:905–9.
- [16] Jolly K, Bradley F, Sharp S, et al. Randomised controlled trial of follow up care in general practice of patients with myocardial infarction and angina: final results of the Southampton heart integrated care project (SHIP). *BMJ* 1999;318:706–11.
- [17] Stone JA, Arthur HM, editors. Canadian Guidelines for Cardiac Rehabilitation and Cardiovascular Disease Prevention: Enhancing the Science, Refining the Art. Winnipeg, Canada: Canadian Association of Cardiac Rehabilitation; 2004.
- [18] Suskin N, MacDonald S, Swabey T, Arthur H, Vimr MA, Tihaliani R. Cardiac rehabilitation and secondary prevention services in Ontario: recommendations from a consensus panel. *Can J Cardiol* 2003;19:833–8.
- [19] Husak L, Krumholz HM, Lin ZQ, et al. Social support as a predictor of participation in cardiac rehabilitation after coronary artery bypass graft surgery. *J Cardiopulm Rehabil* 2004;24:19–26.
- [20] French DP, Lewin RJP, Watson N, Thompson DR. Do illness perceptions predict attendance at cardiac rehabilitation and quality of life following myocardial infarction? *J Psychosom Res* 2005;59:315–22.
- [21] Grace SL, Scholey P, Suskin N, Arthur H, Brooks D, Jaglal S, Abramson BL, Stewart DE. Automatic referral can double verified cardiac rehabilitation enrolment and reduce utilization delays. *J Rehabil Med* submitted for publication.
- [22] Dillman DA. *Mail and Internet Surveys: The Tailored Design Method*. 2nd ed. New York: John Wiley & Sons, Inc.; 2000.
- [23] Hadjistavropoulos HD, Biem HJ, Kowalyk KM. Measurement of continuity of care in cardiac patients: reliability and validity of an in-person questionnaire. *Can J Cardiol* 2004;20:883–91.
- [24] The Criteria Committee of the New York Heart Association, editor. *Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels*. Boston: Little, Brown & Co.; 1994.
- [25] Hlatky MA, Boineau RE, Higginbotham MB, et al. A brief self-administered questionnaire to determine functional capacity (the Duke Activity Status Index). *Am J Cardiol* 1989;64:651–4.
- [26] Sherbourne CD, Stewart AL. The MOS social support survey. *Soc Sci Med* 1991;32:705–14.
- [27] Moss-Morris R, Weinman J, Petrie KJ, Horne R, Cameron LD, Buick D. The revised illness perception questionnaire (IPQ-R). *Psychol Health* 2002;17:1–16.
- [28] Rogers JL, Howard KI, Vessey JT. Using significance tests to evaluate equivalence between two experimental groups. *Psychol Bull* 1993;113(3):553–65.
- [29] Grace SL, McDonald J, Fishman D, Caruso V. Patient preferences for home-based versus hospital-based cardiac rehabilitation. *J Cardiopulm Rehabil* 2005;25:24–9.
- [30] Stewart DE, Abbey S, Irvine J, Shnek Z, Grace SL. Gender differences in health information needs and decisional preferences in patients recovering from an acute ischemic coronary event. *Psychosom Med* 2004;66:42–8.
- [31] Riley DL, Krepostman S, Stewart DE, Grace SL. Continuity of care in cardiac patients: from cardiac rehabilitation to primary care physicians. Presented at the 6th International Conference on the Scientific Basis of Health Services. Canada: Montreal; 2005.
- [32] Grace SL, Krepostman S, Abramson BL, et al. Referral to and discharge from cardiac rehabilitation: Key informant views on continuity of care. *J Eval Clin Pract* 2006;12(2):155–63.
- [33] Cannistra LB, Balady GJ, O'Malley CJ, Weiner DA, Ryan TJ. Comparison of the clinical profile and outcome of women and men in cardiac rehabilitation. *Am J Cardiol* 1992;69:1274–9.
- [34] Lavie CJ, Milani RV. Effects of cardiac rehabilitation and exercise training on exercise capacity, coronary risk factors, behavioral characteristics, and quality of life in women. *Am J Cardiol* 1995;75:340–3.
- [35] Marchionni N, Fattiroli F, Fumagalli S, et al. Improved exercise tolerance and quality of life with cardiac rehabilitation of older patients after myocardial infarction: results of a randomized, controlled trial. *Circulation* 2003;107:2201–6.
- [36] Stewart KJ, Badenhop D, Brubaker PH, Keteyian SJ, King M. Cardiac rehabilitation following percutaneous revascularization, transplant, heart valve surgery, and for chronic heart failure. *Chest* 2004;123:2104–11.
- [37] Saultz JW, Albedaiwi W. Interpersonal continuity of care and patient satisfaction: a critical review. *Ann Fam Med* 2004;2:445–51.
- [38] Greenberg GA, Rosenheck RA. Continuity of care and clinical outcomes in a national health system. *Psych Serv* 2005;56:427–33.
- [39] Perneger TV, Chamot E, Bovier PA. Nonresponse bias in a survey of patient perceptions of hospital care. *Med Care* 2005;43:374–80.