Illness perceptions among cardiac patients: Relation to depressive symptomatology and sex☆

Sherry L. Grace[a,b,c,*], Suzan Krepostman[c], Dina Brooks[d], Heather Arthur[e], Pat Scholey[f], Neville Suskin[g,h], Susan Jaglal[d,i], Beth L. Abramson[j,k], Donna E. Stewart[d,k]

Abstract

Objective: This study examined cardiovascular disease (CVD) illness perceptions and how they relate to depressive symptomatology among women and men. **Methods:** Acute coronary syndrome (ACS) patients at two hospitals were approached, and 661 consented to participate (504 men, 157 women; 75% response rate). Participants completed a survey including the Hospital Anxiety and Depression Scale (HADS) and Illness Perception Questionnaire (IPQ). **Results:** Women perceived a significantly more chronic course ($P<.001$) and more cyclical episodes ($P<.05$) than men did, while men perceived greater personal control ($P<.001$) and treatability ($P<.05$) than women did. Participants perceived diet, heredity, and stress as the greatest CVD causes. For women ($F=5.49$, $P<.001$), greater depressive symptomatology was significantly related to younger age ($P<.05$), lower activity status ($P<.001$), and perceiving a chronic time course ($P<.01$). For men ($F=7.68$, $P<.001$), greater depressive symptomatology was significantly related to being non-white ($P<.05$), lower activity status ($P<.001$), less exercise behavior ($P=.01$), and three illness perceptions, namely, perceiving a chronic course ($P<.05$), greater consequences ($P<.001$), and lower treatability ($P<.05$). **Conclusion:** Women, compared with men, are more likely to attribute CVD to causes beyond their control and to perceive CVD as a chronic, untreatable condition. Illness perceptions were related to depressive symptomatology, which suggests that interventions to reframe these perceptions may be warranted to improve emotional health in the context of CVD.

Keywords: Cardiovascular diseases; Depression; Illness perceptions; Sex

Introduction

Depression has been implicated in both the onset and outcome of acute coronary syndromes (ACS; [1–3]). A recent review suggests that depression in patients with existing cardiovascular disease (CVD) confers a relative risk

☆ Department where work was conducted: Women's Health Program, Behavioral Sciences and Health Division, Toronto General Research Institute, University Health Network.

* Corresponding author. School of Kinesiology and Health Science, York University, 368 Norman Bethune College, 4700 Keele Street, Toronto, Ontario, Canada M3J 1P3. Tel.: +1 416 736 2100 x22364; fax: +1 416 736 5774.

E-mail address: sgrace@yorku.ca (S.L. Grace).

between 1.5 and 2.5 for cardiac morbidity and mortality [2]. Regrettably, depressive symptomatology and major depressive disorders are common in patients with ACS [4]. The prevalence of major depression ranges from 15% to 23% [5], which is approximately threefold higher than age-matched, community-based prevalence studies [5,6]. Recovery from depression associated with ACS is extremely poor, with many patients remaining depressed months later [7,8].

Moreover, women generally experience greater depressive symptomatology following ACS than men do [8–10], and this symptomatology may more detrimentally affect their prognosis and quality of life [11,12]. Moreover, results from the M-HART trial of a psychosocial home nursing intervention [13] and recent post hoc subgroup analyses from the ENRICHD trial of cognitive behavioral therapy [14] both revealed that interventions to address depression may be more effective in male cardiac patients than in female patients. Much recent research attention has focused on the correlates of depression in ACS, how they may differ between the sexes, and how to mitigate its effect on cardiac outcome [7,15–18].

Previous research has highlighted the importance of personal models of illness to ACS recovery [19–21]. Patients' illness perceptions have been shown to relate not only to adherence behaviors and functional status [19,20,22–25], but also to emotional distress [26–28], including depressive symptomatology [26,29] across numerous health conditions. The construct of illness perceptions stems from Leventhal's Self-Regulation Model [30,31]. This theory proposes that patients make sense of their health experience through personal cognitions, termed illness perceptions, which form the basis for their coping responses. Illness perceptions influence people's views about the *causes* of health conditions, perceptions of (a) an acute, chronic, or episodic *course*, (b) personal *control*, (c) *consequences* (e.g., financial, relational), and (d) the extent to which the condition is amenable to *treatment control or cure*.

While previous work has explored the effect of these illness perceptions on health behaviors in cardiac populations [19,20,23,25,27,32,33], the relationship between illness perceptions and depressive symptomatology has yet to be explored [25]. Such an examination may shed light on possible gender differences in depression and the gender differential in psychosocial treatment outcomes as outlined above. The objectives of this study were to [1] describe sex differences in ACS illness perceptions and [2] to examine the differential illness perceptions that are related to depressive symptomatology among women versus men with ACS, after controlling for other known correlates of depression, including age [34], marital status [35], socioeconomic status [36,37], ethnocultural background [38], and physical activity and functional status [39].

Methods

Procedure and design

Ethics approval was obtained from participating institutions. This study constitutes a cross-sectional component of a larger prospective study on cardiac rehabilitation referral models. Participants were recruited by a research assistant on relevant cardiology floors from two hospitals, namely, the Trillium Health Center (THC) and University Health Network (UHN), both large, urban tertiary care facilities in the Greater Toronto Area, Ontario, Canada. Inclusion criteria were diagnosis of a confirmed myocardial infarction (MI), unstable angina (UA), congestive heart failure (CHF), percutaneous coronary intervention (PCI), or coronary artery bypass graft surgery (CABG) and age of 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 their clinical data.

Participants

Thirteen hundred and sixty-two consecutive patients from THC or UHN who were diagnosed with an MI, UA, or CHF or who had undergone PCI or CABG between September 2003 and August 2004 were approached for the study. ACS diagnoses were confirmed based on indication in the patient chart of detailed history, focused physical examination, 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 CR (n=138; 28.6%), lack of English language proficiency (n=106; 21.9%), too ill to participate (n=95, 19.7%), condition not indicated for referral to CR (n=67; 13.9%), comorbid musculoskeletal condition that precluded participation in cardiac rehabilitation (n=19; 3.9%), and patient too confused or experiencing cognitive impairment (n=18; 3.7%). Reasons for refusal were as follows: not interested (n=162; 74.3%), patient did not feel well enough (n=23; 10.6%), patient being discharged and was preparing to go home (n=15; 16.9%), patient took survey home to complete and failed to mail back (n=12; 5.5%), participation in another study (n=5; 2.3%), and did not have reading glasses (n=1; .05%).

The characteristics of the participants and nonparticipants 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

Table 1
Characteristics of participants, refusers, and ineligibles 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 (% PCI)	405 (61.3%)	109 (50.2%)	184 (38.3%)*
Sex (% female)	157 (23.8%)	77 (35.6%)	186 (38.6%)*
Marital status (% married)	503 (76.1%)	160 (76.2%)	339 (71.5%)
Age (mean±S.D.)	61.22±11.30	65.96±11.96*	66.48±11.39*

THC=Trillium Health Center with automatic referral.
PCI=percutaneous coronary intervention.
* P<.001.

ineligible to participate [$F(2)$=33.59, P<.001; post hoc LSD Ps<.001]. Significantly more males agreed to participate than females [$\chi^2(2)$=31.44, P<.001]. Participant status also varied by cardiac condition or procedure. For approximately 60% (n=399) of participants, this was not their first cardiac event or procedure.

Measures

Independent variables

Self-reported sociodemographic data included age, sex, ethnocultural background, marital status, work status, level of education, and gross annual family income. Body mass index (BMI) was computed based on self-reported height and weight (kg/m^2). One "yes/no" response item was created to assess the participants' past exercise habits ["Did you exercise to the point of getting short of breath on a regular basis (as an adult) prior to your cardiac event?"]. Clinical data including cardiac condition/procedure, systolic and diastolic blood pressure, New York Heart Association class (NYHA; [40]), and presence of selected comorbid conditions were extracted from patients' medical charts.

The Duke Activity Status Index (DASI; [42]) is a brief 12-item, self-administered survey to determine functional capacity. This measure was incorporated in the model as an indicator of disease severity and as a potential correlate of depression. Participants are asked about their ability to perform common activities of daily living, such as personal care, ambulation, household tasks, sexual function, and recreational activities, which are each associated with specific metabolic equivalents (METs). This valid and common tool correlates highly with peak oxygen uptake [43].

Exercise behavior was also included in the model as a correlate of depression. It was assessed by the subscale of the Health-Promoting Lifestyle Profile II (HPLP; [44,45]). The HPLPII exercise subscale measures the frequency of exercise-related behaviors such as stretching, monitoring pulse rate, incorporating physical activity into daily routines, and leisure time activity. It consists of eight items rated on a four-point Likert scale from 1 "*never*" to 4 "*routinely*". The validity and reliability of the scale are well established [45]. The internal reliability of the scale was α=.85.

Illness perceptions

The Illness Perception Questionnaire (IPQ-R; [41]) was administered to assess cognitive representations of CVD. All items were scored on a five-point Likert-type scale, which ranged from '*strongly disagree*' to '*strongly agree*'. The following five 4- to 6-item subscales were administered: time course (acute/chronic; e.g., "My heart condition is likely to be permanent rather than temporary"), cyclical or episodic course (e.g., "The symptoms of my heart condition change a great deal from day to day"), consequences (e.g., "My heart condition has major consequences on my life"), personal control (e.g., "The course of my heart condition depends on me"), and treatment cure/controllability (e.g., "My treatment can control my heart condition"). A mean subscale score was computed, with higher scores denoting greater endorsement of the given construct. Cronbach's α for the subscales were .82, .84, .80, .71, and .61, respectively, in the current sample.

The 18-item IPQ-R Cause subscale [41] was also administered, where participants were asked to rate the degree to which they agree or disagree (on the same Likert scale as above) that the items represent perceived causes of their heart condition. Participants were then asked to list the three most important causes in an open-ended fashion.

Dependent variable

The Hospital Anxiety and Depression Scale (HADS; [46]), a reliable and well-validated scale [47], was used to assess emotional distress. The HADS is a 14-item self-report questionnaire: Depressive symptomatology was measured through seven items rated on a four-point Likert-type scale. Total scores range from 0 to 21, where a score below 8 indicates the 'normal' range, a score of 9 to 10 represents moderate depressive symptomatology, and a score of 11 or greater represents severe depressive symptomatology [46]. In the current study, the internal reliability of the depression subscale was α=.78.

Statistical analysis

SPSS 12.0 was used for all 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. Post hoc tests for significant differences based on age were conducted with the multiple comparison Least Significant Difference (LSD). Participant characteristics, illness perceptions, and depressive symptomatology were then analyzed by sex, using chi-square and Student's t tests as appropriate. A

Table 2
Descriptive characteristics of the study sample by sex (N=661)

	Characteristic	Males (n=504)	Females (n=157)	Total (N=661)
Clinical	Cardiac event/Procedure (% PCI)	314 (62.3)	91 (58.0)	405 (61.3)
	Systolic BP (mean±S.D.)	129.26±20.59	128.34±21.90	129.04±20.89
	Diastolic BP (mean±S.D.)	72.09±11.86	69.20±12.27	71.40±12.01*
	NYHA (% Class 1)	434 (90.4)	122 (84.1)	556 (89.0)*
	Diabetes (% yes)	113 (22.5)	41 (26.5)	154 (23.4)
	Arthritis (% yes)	91 (18.1)	64 (40.8)	155 (23.4)**
	Smoker (% current)	94 (18.8)	21 (13.6)	115 (17.6)**
	Body mass index (mean±S.D.)	28.63±4.76	28.43±5.90	28.59±5.05
	Activity status (mean±S.D.)	35.87±16.97	27.28±17.11	33.81±17.38**
Sociodemographic	Age (mean±S.D.)	60.19±11.07	64.51±11.44	61.22±11.30**
	Ethnocultural background (% white)	375 (79.1)	134 (90.5)	509 (81.8)***
	Marital status (% married)	407 (80.8)	96 (61.1)	503 (76.1)**
	Current daily activity (% full time)	263 (52.3)	39 (25.0)	302 (45.8)**
	Education (% some postgraduate or greater)	274 (54.9)	66 (43.1)	340 (52.1)*
	Family income (% ≥$50 000 CAD)	256 (60.7)	43 (34.4)	299 (54.7)**
	Regular history of exercise to the point of shortness of breath (% no)	339 (69.3)	115 (77.7)	454 (71.3)*
Psychosocial	Exercise behavior (mean±S.D.)	1.95±0.73	1.75±0.67	1.90±0.72***
	IP—time course (mean±S.D.)	17.93±5.19	19.81±5.06	18.37±5.22**
	IP—course cyclical (mean±S.D.)	10.80±3.17	11.55±3.19	10.98±3.19*
	IP—consequences (mean±S.D.)	19.90±4.43	19.83±4.18	19.88±4.37
	IP—personal control (mean±S.D.)	24.48±3.49	23.21±4.00	24.18±3.72**
	IP—treatment cure/controllability (mean±S.D.)	19.82±2.72	19.30±2.44	19.69±2.67*
	Depressive symptomatology	4.50±3.53	5.07±3.39	4.64±3.50

BP=blood pressure.
NYHA=New York Heart Association.
IP=illness perceptions.
* P<.05.
** P<.01.
*** P<.001.

Bonferroni correction was used for the 18 IPQ-R causal items. The three open-ended causal items were coded, and a descriptive analysis was performed. The causal attributions were also explored by the relevant sociodemographic characteristics that they represent (i.e., explore the correlation between participant's age and the strength of their attribution of aging as a causal factor in their CVD). To examine the second study objective, the data were then analyzed separately by sex using the General Linear Model to relate illness perceptions with depressive symptomatology, while controlling for known depression correlates (i.e., age, marital status, income, ethnocultural background, activity status, and exercise behavior).

Results

Respondent characteristics

The characteristics of participants are shown by sex in Table 2. Among the participants, women were significantly older, were more likely to be white, to have comorbid arthritis, and lower income than men do. Men were significantly more likely to have higher activity status, NYHA functional class, and diastolic blood pressure, to work full time, be more educated, married, a smoker, and to exercise regularly than women do.

There were no significant sex differences in depressive symptomatology, although there was a trend that women experienced greater symptomatology than men did (P<.08). Overall, 556 (85.3%) of the participants scored in the

Table 3
Mean and standard deviation of causal attributions for heart disease by sex, in descending order of endorsement

Cause	Males (n=504)	Females (n=157)	Total (N=661)
Diet or eating habits	3.73±1.12	3.38±1.29	3.65±1.17*
Heredity	3.50±1.40	3.85±1.20	3.58±1.36*
Stress or worry	3.56±1.26	3.60±1.26	3.57±1.26
My own behavior	3.56±1.08	3.28±1.18	3.49±1.11
Aging	3.23±1.11	3.16±1.24	3.21±1.14
Smoking	2.81±1.52	2.40±1.49	2.71±1.52
Overwork	2.75±1.23	2.51±1.20	2.69±1.23*
My emotional state	2.62±1.20	2.59±1.24	2.62±1.21
Pollution in the environment	2.63±1.10	2.57±1.08	2.62±1.09
My mental attitude	2.59±1.17	2.49±1.26	2.57±1.20
Family problems or worries	2.50±1.16	2.64±1.27	2.53±1.19
My personality	2.33±1.13	2.11±1.08	2.28±1.12
Poor medical care in the past	2.30±1.14	2.02±1.04	2.23±1.12
Alcohol	2.27±1.19	1.75±0.96	2.15±1.16*
Chance or bad luck	2.11±1.11	2.14±1.19	2.12±1.13
Altered immunity	2.12±0.97	2.07±0.93	2.11±0.961
Accident or injury	1.86±0.96	1.85±0.97	1.86±0.96
A germ or virus	1.86±.90	1.83±.92	1.85±0.91

The scores range from 1, "*strongly disagree*", to 5, "*strongly agree*".
* Bonferroni correction P<.05/18 variables=P<.003.

normal range, 46 (7.1%) reported moderate depressive symptomatology, and 50 (7.7%) reported severe depressive symptomatology, for a total of 96 (14.7%) participants experiencing elevated depressive symptomatology.

Illness perceptions

Potential causes of CVD are presented in Table 3. Participants perceived dietary habits, heredity, and stress as the greatest causes of their CVD. Men were significantly more likely to attribute causation to diet, overwork, and alcohol, and women more likely to blame heredity. Current smokers (mean=4.11, S.D.=0.88) were significantly more likely to endorse smoking as a causal factor than were past smokers (mean=2.93, S.D.=1.47), who were also significantly more likely to endorse smoking as a causal factor than were nonsmokers (mean=1.74, S.D.=1.16; $F=129.46$, $P<.001$; post hoc LSD Ps$<.001$).

Participants who engaged in less exercise behavior were significantly more likely to endorse their own behavior as a causal factor ($r=-.17$, $P<.001$). Participants with a family history of CVD (mean=4.14; S.D.=1.00) were significantly more likely to endorse heredity as a causal factor than were those without such a history (mean=2.46, S.D.=1.30; $t=17.73$, $P<.001$). Older participants were significantly more likely to endorse aging as a causal factor than were younger participants ($r=.24$, $P<.001$). Greater depressive symptomatology was significantly related to greater endorsement of stress or worry, mental attitude, family problems, emotional state, personality, and overwork as causal factors (Bonferroni correction, Ps$<.001$).

The three most important causes listed in open-ended fashion were coded. The results reiterated the Likert-type item means, with the most frequent responses being heredity or genetics ($n=150$, 28.8%), psychosocial factors such as stress ($n=104$, 20.0%), and dietary habits ($n=70$, 13.4%). Aging, overwork, and lifestyle behaviors (including smoking) were also prominent in the top three causes. Spontaneous responses that were not listed in the Likert-type items were generally condition specific, namely, high cholesterol ($n=10$, 1.9%), diabetes ($n=9$, 1.7%), lack of regular physical activity ($n=8$, 1.5%), obesity ($n=4$, 0.8%), hypertension ($n=4$, 0.8%), and blocked arteries ($n=3$, 0.6%). Some participants responded that they did not know or were unsure of the cause of their condition ($n=5$, 1%; results reported from most important cause). "Other" responses included cold weather, West Nile virus, a bomb during World War II, street drug usage, gastrointestinal gas, ignorance, and inevitability.

Table 4
Analysis of variance relating illness perceptions with depressive symptomatology among males, $n=504$

	F	P	η^2
Age	<0.001	.99	<.001
Marital status	2.93	.09	.008
Family income	0.16	.69	<.001
Ethnocultural background	5.26	.02	.013
Activity status	18.17	<.001	.045
Exercise behavior	6.15	.01	.016
IP—time course	3.93	<.05	.010
IP—course cyclical	0.07	.79	<.001
IP—consequences	23.91	<.001	.058
IP—personal control	0.22	.64	.001
IP—treatment cure/controllability	5.80	.02	.015

IP=illness perceptions.

Table 5
Analysis of variance relating illness perceptions with depressive symptomatology among females, $n=157$

	F	P	η^2
Age	4.05	<.05	.037
Marital status	3.53	.06	.033
Family income	0.13	.72	.001
Ethnocultural background	<0.01	.97	<.001
Activity status	27.96	<.001	.212
Exercise behavior	1.90	.17	.018
IP—time course	13.36	<.001	.114
IP—course cyclical	1.87	.18	.018
IP—consequences	0.15	.70	.001
IP—personal control	0.78	.38	.007
IP—treatment cure/controllability	0.97	.33	.009

IP=illness perceptions.

Other illness perception scores are presented at the bottom of Table 2. There were no significant differences in illness perception scores based on whether this was a first or subsequent coronary event (data not shown). There were no significant sex differences in perceptions of the consequences of CVD, but women perceived a significantly longer time course (i.e., chronic vs. acute) for CVD and more cyclical episodes than men did, while men perceived significantly greater personal control over their disease and greater treatment effect than women did.

The relation between illness perceptions and depressive symptomatology

The data were analyzed separately by sex. The General Linear Model was used to test the association between illness perceptions and depressive symptomatology, while controlling for known depression correlates such as age, marital status, income, ethnocultural background, activity status, and physical activity. There was ample power for both analyses. Results are shown in Tables 4 and 5. For men (model $F=7.68$, $P<.001$; adjusted $R^2=15.6\%$; $\eta^2=18.0\%$), greater depressive symptomatology was significantly related to being non-white, having lower activity status, engaging in less exercise, and three illness perceptions, namely, perceiving a longer more chronic time course, greater consequences, and perceived lower treatment control or cure (with the greatest contribution made by perceived consequences). For women (model $F=5.49$, $P<.001$; adjusted $R^2=30.0\%$; $\eta^2=36.7\%$), greater depressive symptomatology was significantly related to younger age, having lower activity status, and perceiving a longer, more chronic time course.

Discussion

This study examined differences in illness perceptions between women and men in a large sample of ACS patients hospitalized for a coronary event or procedure. Illness perceptions among patients with the same condition and disease severity are shown to vary widely, conferring important ramifications for adherence behavior and functional recovery [21]. Our results suggest that illness perceptions also account for significant variation in emotional distress, specifically depressive symptomatology, a comorbid condition with detrimental prognostic effects [2]. Approximately one-sixth of the current sample reported elevated depressive symptomatology.

Illness perceptions

Overall, participants perceived dietary habits, heredity, and stress to be the most important causes of their ACS. This suggests that participants have adopted a fairly accurate awareness of the causes, as shown in empirical studies (but some also report grossly erroneous beliefs). For example, the recent INTERHEART case-control study of risk factors for MI in 52 countries revealed that smoking, cholesterol, hypertension, diabetes, abdominal obesity, psychosocial factors (including stress at work and home, control, and depression [3]), daily consumption of fruits and vegetables, regular alcohol consumption, and regular physical activity accounted for over 90% of the population attributable risk across these global regions [48]. First, in the present study, current and past smokers endorsed this behavior as a principal cause. Second, participants also accurately perceived that their dietary behavior can cause their CVD, as empirical data support dietary effects on lipid values, blood pressure, abdominal girth, and diabetes [49]. Third, they were also aware of the large effect of psychosocial stress on their cardiovascular health and endorsed overwork, family problems, and emotions to a lesser extent, all causes corroborated by the INTERHEART study. The fourth leading perceived cause in the current study was their health behavior, which was shown to relate to physical activity, another empirically validated causal factor.

Participants accurately attributed less of a role to alcohol, given the recent curvilinear association found between alcohol and CVD risk, with moderate consumption conferring health benefits [50,51]. They also attributed less of a role to 'altered immunity', although immune function has been implicated in the pathophysiology of CVD in recent years [52–55].

Of interest was the sex difference in the perception of heredity as a cause of ACS. Women were significantly more likely to see family history as a cause, a risk factor which is nonmodifiable. However, the INTERHEART findings reveal that, while family history was an independent risk factor for MI, most of the associated risk burden could be accounted for by the other risk factors identified [48]. Reframing women's causative risk factors to focus on modifiable or controllable behavior changes may be constructive.

Depressive symptomatology

The perceived causes that were related to the degree of depressive symptomatology included stress or worry, mental attitude, family problems, emotions, and personality. Where these participants perceive the causes of their ACS to be psychological in origin, clearly, intervention to reduce psychological distress is warranted to facilitate their mental and, perhaps, physical recovery.

When examining the noncausal illness perceptions, again, sex differences are revealed. Women ACS patients are more likely to view their condition as chronic, and the course as episodic or cyclical. Men are significantly more likely to view their condition as within their personal control and to view treatment as effective in curing or controlling their condition. This may have important ramifications for depressive symptomatology, whereby women, compared with men, overall appear to perceive less control over their condition, its course, and its treatment. Helplessness and external locus of control have been shown to relate to depression [56]. These results may also hold important ramifications for tailoring interventions by sex, given the differential impact of psychosocial treatments in recent trials [13,14].

While there was a trend toward greater depressive symptomatology among women compared with men, this did not reach statistical significance. It is unclear why our sample does not replicate sex differences in depressive symptomatology demonstrated quite consistently in both general [34] and cardiac [18] samples. Our study utilized a self-report assessment tool and did not employ diagnostic criteria or a clinical interview. However, other studies using self-report measures do show sex differences, e.g., the work of Frasure-Smith et al. [10] in a similar population, which administered the Beck Depression Inventory. Alternatively, the lack of sex difference in depression could be an artifact of age. Epidemiological studies show that major depression is more prevalent in midlife and less prevalent in those aged over 64 [34]. Within cardiac populations, younger patients are less likely to remit and more likely to progress from minor to major depression when compared with older patients [18]. Considering that the women in this sample were significantly older than the men, this could explain why there were relatively equivalent levels of depressive symptomatology across sex.

The statistical model accounted for a greater degree of the variability in depression among women with ACS than among men. For women, less depression was associated with greater activity or functional status, perceiving an acute rather than chronic time course for their condition, and older age (in descending order of effect). For men, less depression was associated with fewer perceived consequences of their

ACS, greater activity or functional status, engaging in more physical activity, perceived effectiveness of treatment in the control or cure of their condition, being white, and perceiving an acute rather than chronic time course (in descending order of effect). The common illness perception related to depressive symptomatology among both women and men with ACS was time course. Unfortunately, ACS is a chronic condition, and perceiving it as such is instrumental to engaging in recuperative health behaviors such as medication adherence, fruit and vegetable consumption, and engaging in regular physical activity [19,23]. However, these results suggest that efforts to minimize the perceived course of the condition may be warranted where patients are experiencing elevated depression. Clearly, open and genuine communication about disease course is necessary, therefore, this would only be reasonable where cognitive distortions are at play. In addition, for men, efforts to reduce perceived CVD consequences, be they financial or relational for example, may be warranted. This may include efforts such as vocational counseling, including spouses in cardiac rehabilitation programs or medication education sessions with a pharmacist.

Caution is warranted when interpreting these findings, particularly due to potential sample biases. Participants were more likely to be male and younger than the nonparticipants were. Second, the sample was restricted based on exclusion criteria set for the larger study, namely, cardiac rehabilitation eligibility. The internal reliability of the treatment cure/controllability illness perception subscale was somewhat lower than desired. Finally, the cross-sectional nature of the study precludes drawing conclusions regarding the directionality of reported relationships. Replication in a prospectively designed study to investigate the role that illness perceptions may play in the course of depressive symptomatology is warranted, and ways that intervention to modify maladaptive perceptions may perhaps reduce depressive symptomatology (see the randomized controlled trial of Petrie et al. [17] affecting health behavior and functional status in MI patients) and may potentially mitigate its effects on cardiovascular health.

In conclusion, women, compared with men, are more likely to attribute CVD to causes beyond their control and to perceive CVD as a chronic, uncontrollable condition. Generally, illness perceptions are shown to relate to depressive symptomatology in revealing ways. Considering that illness perceptions have previously been shown to also relate to health behaviors and CVD recovery, intervention to reframe patients' perception of CVD [17] may be warranted pending further study.

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