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Biopsychosocial Health Disparities among Young Women Enrolled in Cardiac Rehabilitation

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Abstract

Purpose—Our aim was to compare the biopsychosocial characteristics of young compared to older women who enrolled in cardiac rehabilitation (CR). We also explored the baseline characteristics of women who prematurely terminated CR participation.

Method—Baseline physiological and psychosocial indices of women 55 years compared to older women eligible for CR were evaluated one week prior to enrolling in either traditional CR or a gender-specific, motivationally enhanced CR.

Results—A greater proportion of young women (n=65) compared to their older counterparts (n=187) were diagnosed with an acute myocardial infarction (AMI) during their index hospitalization. They demonstrated lower high-density lipoprotein cholesterol (HDL-C), higher total/cholesterol/HDL-C ratios and greater body weight compared to older women and were more likely to be active smokers. Young women compared to older women reported significantly worse health perceptions, quality of life (QoL), optimism, hope, social support and stress and significantly more symptoms of depression and anxiety. Women who prematurely terminated CR participation were younger, more obese, with worse QoL and greater symptoms of depression and anxiety compared to women completing CR.

Conclusions—Notable differences in physiological and psychosocial profiles of young compared to older women enrolled in CR were evident, placing them at high risk for nonadherence to secondary prevention interventions as well as increased risk for disease progression and subsequent cardiac adverse events. Continued existence of these health differentials represents an important public health problem and warrants further research to address these age-related and sex-specific health disparities among women with coronary heart disease.

Keywords

Cardiac rehabilitation; Depression; Gender; Psychosocial; Sex; Women

The increased mortality of young women (21-55 years) after acute coronary syndromes (ACS) compared to men or older women is an escalating public health problem.¹⁻⁴ The last decade has witnessed dramatic trends among young women with ACS of increasing complications and mortality, longer hospitalizations, worse risk factor profiles, and more early rehospitalizations after the index event.⁵⁻¹² Coronary heart disease (CHD), the leading killer of women, is deemed premature when diagnosed before 65 years of age.^{13,14} Women 55 years are at especially high-risk for increasing incidence and mortality rates¹⁴⁻¹⁸ and nonfatal acute myocardial infarction (AMI).³ AMI deaths have not fallen in young women in contrast to declining population trends.^{14,19} Young women represent a particularly high risk, understudied phenotype, with troubling health disparities in hospital complications, readmissions and mortality following ACS. CHD diagnosed at a young age translates into extended years living with chronic illness. Effective secondary prevention (SP) interventions are critical for reducing costs incurred by re-hospitalizations in the year after ACS²⁰ and for improving health and quality of life (QoL).

The prevailing paradigm of CHD secondary prevention, based largely on research conducted in men,²¹ is predominantly that of one-size-fits-all. Cardiac rehabilitation (CR), the gold standard of SP,²²⁻²⁸ has reached only 11-20% of eligible women over the last 3 decades.²⁹⁻³³ Women particularly absent from CR include minorities, the uninsured, unmarried, smokers, depressed, obese, sedentary, and those with less education and social support.³⁴⁻³⁸ Shortcomings of current gender-neutral SP interventions point to an imperative to consider innovative paradigms of care that are based on an understanding of the influences of age, sex/gender and biopsychosocial risk factors among young women surviving ACS.

Young women lack awareness that CHD is their leading mortality threat,^{39,40} and risk-awareness often fails to translate to perceived risk.⁴¹ Young women may have unique barriers to executing healthy behaviors encompassing time constraints, family obligations, stress, depression and ambivalence about behavior change.^{40,42} Because so few women attend CR, we have critical knowledge gaps about the biopsychosocial characteristics of young women compared to their older counterparts and how these characteristics might influence CR attendance and health behavior acquisition. A greater understanding of the biopsychosocial characteristics of young compared to older women is essential for developing effective gender-specific SP interventions that are tailored to their health needs. The purpose of this observational study was to examine the baseline biopsychosocial characteristics of women 55 years of age surviving an ACS compared to their older counterparts prior to enrollment in a 12-week center-based CR program. We sought to answer the following questions: (1) what are the baseline biopsychosocial characteristics of women 55 years of age compared to women older than 55 years prior to enrolling in CR?; and (2) what are the baseline biopsychosocial characteristics of women who complete CR compared to those who terminate participation prematurely?

Methods

This study focuses on baseline data from a randomized controlled trial comparing the outcomes of a traditional CR program to a gender-specific, motivationally enhanced CR

program. After obtaining written informed consent and prior to random assignment, baseline data **were** obtained from eligible women **during face-to-face interviews**. Adherence to CR (completion of all 36 sessions measured as a continuous variable) was analyzed without regard to intervention allocation because baseline characteristics were not different in the randomized groups. The study protocol was approved by the institutional review board of the university and the participating hospital. The study methodology, interventions, recruitment, retention, verification of the effectiveness of randomization according to baseline characteristics, and selected outcomes have been described previously.^{36,43-50}

Participants

A total of 252 participants referred to an outpatient CR program in Florida from 2004 to 2008 comprised the cohort who subsequently enrolled in CR. English speaking women 21 years of age, eligible for CR, and who were willing to participate were included in the study.

Psychosocial and Physiological Measures

The SF-36 Health Survey (SF-36_{v2})⁵¹ comprises 36 questions measuring health perceptions on 8 subscales. Subscales were totaled and transformed to a 0-100 scale with higher scores representing better perceived health. Anxiety was measured with the 20-item State Anxiety Inventory⁵² with higher scores reflecting more anxiety. The 20-item Center for Epidemiological Studies Depression Scale (CES-D) measured depressive symptoms.⁵³ Scores can range from 0 to 60, with higher scores reflecting greater symptom severity. Quality of life was assessed with the Self-Anchoring Striving Scale depicted as a 10-step ladder⁵⁴ and with the 8-item Multiple Discrepancies Theory (MDT) Questionnaire that evaluates perceived discrepancies between one's current QoL compared to a set of internal standards (e.g., wants, needs, best previous).⁵⁵ Social support was measured with the ENRICH Social Support instrument that evaluates emotional, instrumental, informational, and appraisal support.⁵⁶ The Herth Hope Index assessed the level of hope with scores ranging from 12 to 48⁵⁷ and the 10-item Life Orientation Test measured dispositional optimism.⁵⁸

Blood pressure was measured with one automated monitor (Datascope, Mahwah, NJ) according to established guidelines.⁵⁹ Body mass index was calculated as weight (kg)/height (m²). Body fat composition was determined using skinfold measurement taken at 3 sites (suprailium, triceps, and thigh).⁶⁰ Waist circumference was measured by trained staff and reported in centimeters. Lipid profiles and serum glucose were measured after a 12-hour fast using the Cholestech LDX System (Haywood, CA). Urine specimens were screened for exposure to nicotine by immunoassay at a threshold cotinine level of 25 ng/mL; positive samples were confirmed by gas chromatography (MedTox Laboratories, St. Paul, Minnesota).

Standards for the symptom-limited exercise tolerance test (SL-GXT) were followed^{61,62} and a single cardiologist supervised all tests using the same treadmill. Cardiorespiratory fitness was evaluated using the modified Bruce protocol and expressed in metabolic equivalents (METs) where a MET typically equals 3.5 mL of oxygen consumption per

kilogram per minute; METs were estimated from the final treadmill speed and grade.⁶³ Baseline SL-GXTs were obtained within 3 months of the index ACS and within 1 week before initiating CR.

Data Analysis

Data were analyzed using PAWS 21 for Windows. Univariate and bivariate distributions were examined using frequencies and crosstabulation procedures to check for outliers and assess univariate normality. We use descriptive statistics including means, standard deviations, and percentages to summarize the biopsychosocial characteristics of women 55 and >55 years of age as well as women who completed CR compared to those who did not. Age categories were selected for consistency with prior studies showing increased mortality risk for young patients^{12,64,65} as well as ongoing research focused on the outcomes of young AMI patients.¹⁶ Categorical variables were compared using the χ^2 test and continuous variables were compared using the Student *t* test. All tests were 2-tailed and evaluated for statistical significance using an α criterion of .05.

Results

Participants

Most of the women were white (82%), 16% were Hispanic and 17% were Black, and 92% had attained high school education. More than half of women were married (53%) although a greater proportion of young compared to older women were divorced (33.8% versus 16.6%) or separated (10.7% versus 1.6%). A greater percentage of older women were retired (63.1% versus 1.5%) while more young women were considered disabled (24.6% versus 5.9%). Compared with older women, more young women were employed full time (36.9% vs. 11.8%) and on work leave without pay (12.3% vs. 0.5%). Slightly more young women compared to their older counterparts served in a caregiver role (37% versus 32%).

Index hospital admission diagnoses did not differ between the age groups with the exception of incident AMI (**Table 1**); far more young women (50.8%) were diagnosed with AMI than older women (30.5%). Consumption of evidence-based cardiovascular medications were generally not different between the age groups although more younger women were prescribed Clopidogrel, antidepressants and anxiolytics whereas more older women were taking hormone replacement therapy. Women, regardless of age, had a high prevalence of multiple traditional risk factors particularly inactivity, dyslipidemia, and hypertension (**Table 2**). A greater proportion of young women lived with a tobacco smoker and had accumulated substantially more pack years of smoking compared to older women. Nearly 14% of women 55 years of age had a previous AMI and 11% had a previous percutaneous coronary intervention.

Physiological characteristics

The first 3 columns of **Table 3** shows the baseline physiological characteristics of women 55 years compared to their older counterparts. Young women had lower high-density lipoprotein cholesterol (HDL-C), higher total cholesterol/HDL-C ratio and greater body

weight compared to older women despite having better exercise capacity. They were also significantly more likely to report active smoking confirmed by urine cotinine levels.

Psychosocial characteristics

The psychosocial profiles of young compared with older women are shown in the first 3 columns of **Table 4**. Young women had significantly worse health perceptions on 7 of the 8 health survey subscales including perceived physical role functioning, general health, vitality, social functioning, mental health, and role functioning related to emotional problems ($P < 0.05$ for all). Young women also demonstrated significantly poorer QoL, and reported significantly less optimism and hope compared with older women. They perceived less social support and more stress related to family, work, finances, and their health. Young women reported significantly greater symptoms of anxiety (41.7 ± 14.1 versus 33.3 ± 11.0 , $P < .001$) and depression (24.5 ± 13.4 versus 15.5 ± 9.9 , $P < .001$) compared to older women just prior to initiating CR.

Biopsychosocial Characteristics Associated with Failure to Complete Cardiac Rehabilitation

We sought to determine the baseline characteristics of women who completed CR, irrespective of intervention assignment, compared to those who dropped out of CR ($n=27$, 10.7%). Of the 27 women not completing 36 sessions of CR, 20% (13/65) were ≥ 55 years of age and 7.5% (14/187) were > 55 years of age ($P=.005$). Racial and ethnic categories were not significantly different among the completers versus those who dropped out. Women not completing CR were significantly younger than completers (55.4 ± 11.4 versus 64.5 ± 11.1 , $P < .001$) with a worse total cholesterol/HDL ratio (4.9 ± 3.1 versus 4.0 ± 1.7 , $P = .020$), higher triglycerides (188.5 ± 144 versus 152 ± 76 , $P = .038$), higher fasting glucose (128 ± 59 versus 107.5 ± 35 , $P < .009$) and a larger waist circumference (107.5 ± 15.5 versus 99.6 ± 15.5 , $P = .014$) (see right hand columns of **Table 3**). Women failing to complete CR also manifested significantly higher urine cotinine levels compared to those who completed (299.7 ± 567 versus 125.3 ± 314.5 , $P = .015$). Significant differences in several psychosocial indices of women who did and did not complete CR are illustrated in the right hand columns of **Table 4**. Women who prematurely dropped out of CR reported more bodily pain, and poor general health perceptions, social functioning and mental health at baseline. They reported a lower QoL, were less hopeful and perceived less social support compared to women who completed CR. They demonstrated significantly worse symptoms of anxiety (45 ± 15.8 versus 34.3 ± 11.4 , $P < .001$) and depression (25.2 ± 12.4 versus 16.9 ± 11.1 , $P < .001$).

Discussion

Among the main findings of this exploratory study is the dramatically higher incidence of AMI during the index hospitalization and the significantly greater prevalence of tobacco consumption and obesity among young women compared with older women prior to enrollment in CR. Compared with older women, young women had significant dyslipidemia despite better functional capacity. Young women manifested dramatically worse psychosocial health disparities compared to their older counterparts with significantly

inferior perceived health, QoL, hope and optimism. They also reported significantly worse symptoms of anxiety, depression and perceived stress. Likewise, more of these young women with poor baseline biopsychosocial characteristics terminated CR participation prematurely.

Our data corroborate prior research that over a decade ago reported the dramatically worse risk factor profiles among young compared to older women with AMI.⁶ A population-based study found that from 2000 to 2009 among adults 55 years of age, the AMI hospitalization rates were significantly increased among women while essentially stable in men.¹⁵ Throughout the study period, the odds of premature mortality among these women were 45% higher compared with men. Concordant registry data reveals an increased proportion of young women with ST-elevation AMI from 1995 to 2010.⁶⁶ The mechanisms contributing to excess mortality risk and inferior health and QoL among young women compared to their older counterparts with ACS remain unclear.

Data reveal a significantly higher prevalence of smoking and unhealthy diet among young women compared to older women.⁶⁷ Women who smoke have a 25% excess risk of CHD compared with men⁶⁸ with young women using tobacco at high risk for premature and recurrent CHD events.⁶⁹ A malignant triad of tobacco abuse, dyslipidemia and familial CHD is evident in young individuals with AMI.⁷⁰ Yet traditional risk factors do not fully account for poor health and QoL outcomes in this understudied group.

Few studies have examined the negative health consequences of psychosocial stressors among young women with CHD or their influence on disease self-management. Depressive symptoms, common in young women with CHD^{71,72} are associated with recurrent and longer hospitalizations after AMI^{73,74} and higher mortality after ACS compared with men.⁷⁵ Further, young women with particularly poor self-rated health have a two-fold increase in major cardiovascular events and all-cause mortality.⁷⁶ Single, unemployed, less educated women perceiving limited control over their health manifest co-occurring depression and CHD.⁷⁷ Depression in young women may have pleiotropic effects by increasing healthcare use⁷⁸ through nonadherence to SP therapies such as CR.⁷⁹ Depression among women with CHD endures as a significant, systematic and poorly addressed comorbidity that undermines health, QoL, and adherence to SP behaviors.⁸⁰ Since co-occurring depression and CHD undermines risk factor management, understanding the link between psychosocial risk factors and health outcomes among young women can aid the development of effective interventions that are sensitive to their life circumstances and that address perceived barriers to healthy behaviors.

Young women in our study expressed significant perceived stress and limited social support. Patients with high perceived stress prior to hospitalization for AMI tend to be young, unmarried, female, and obese and express limited social support.⁸¹ They have longer hospitalizations and are more likely to have diabetes, depression and to abuse tobacco. High perceived stress, independent of depressive symptoms, is associated with worse 1-year QoL and increased mortality even though these patients are younger and less likely to have ST-elevation AMI.⁸¹ Inadequate social support is associated with poor QoL and depressive symptoms in women but not men hospitalized with AMI.⁸² The gender-specific influence of

social support and stress implies potential differences in psychological and physiological pathways modulating responses to stress. The negative consequences of poor social support and biopsychosocial risk factors, that are conceivably profoundly gendered, on health outcomes in young women surviving ACS warrants concerted attention in SP interventions.

Our data revealed significant differences in anxiety levels among young women and those who dropped out of CR compared to older women. Anxiety adversely influences premature cardiac events but little research has focused on young women.⁸³ Anxiety and depression appear to act synergistically to increase health care utilization and hospitalizations by 35% compared to either condition alone.⁸⁴ Early identification of women eligible for CR who are particularly anxious or depressed may facilitate appropriate triage for treatment to reduce the risk for nonadherence to CR or to tailor an individualized home program better suited to their particular needs and circumstances. Given the importance of SP for improving health and QoL and for preventing subsequent cardiac events, it is critical to identify women who are at high risk for nonadherence to traditional CR and to offer tailored alternatives to center-based interventions. Given the complex interactions among sex/gender, age, health behaviors and biopsychosocial risk factors, innovative gender-specific paradigms of SP for women are critical for overcoming the limitations of current gender-neutral secondary prevention.

Implications for Research and Practice

Our study provides insights about the baseline biopsychosocial characteristics and adherence to cardiac rehabilitation among young women with CHD, about which comparatively little is known. From a biopsychosocial perspective, candidates for key determinants of poor outcomes among young women with CHD include unique sex-specific biology and distinctive gendered (socially constructed with identified roles and expectations) psychosocial stressors that interfere with adherence to health behaviors and treatment guidelines. Research to inform the development of expanded SP interventions for improving the negative influences of chronic stress, psychosocial impairments, and unhealthy behaviors that threaten the recovery of this high-risk group of young women is urgently needed. Such research would provide a scientific basis for identifying novel strategies for personalized interventions that address the increasing prevalence of young women disabled by CHD, that improve their biopsychosocial risk factors, and that enhance the education of both women and their health care providers. The health differentials among young women will be reduced through guidance from a scientific evidentiary base of the determinants of these health disparities. The practice of cardiovascular SP will advance by expanding traditional CR to alternative approaches that provide effective real-world, gender-sensitive, and age-appropriate interventions to all women especially those for whom center-based programs are unfeasible.

Limitations

The generalizability of our findings should be applied with caution as the convenience sample comprised predominantly Caucasian women **older than 55 years** from a single south-eastern American city, all of whom had health insurance. The mean age of 63 ± 12 years in our total sample is representative of the typical age distribution in American CR

programs. We recruited relatively few women under the age of 55 years, thus, our findings require replication with a larger more diverse sample of women. In-depth interviews with young women about the facilitators and barriers to CR attendance and lifestyle changes in general would have provided a more comprehensive account of the most salient determinants of premature termination of CR participation.

Conclusions

Despite limitations, our study contributes to the currently very limited scientific evidence of the biological and psychosocial factors uniquely and disproportionately associated with poorer health and QoL among young women with ACS enrolled in CR. Health disparities in this high-risk cohort presents an opportunity to explore novel approaches for optimizing SP through alternative age-appropriate and sex/gender-specific strategies beyond traditional center-based programs that typically reach far too few women in general and young women in particular. Ascertaining the biopsychosocial determinants of health and QoL outcomes among young women will permit translation of this science into novel strategies for improving risk stratification and appropriate triage to age-specific and gender-sensitive interventions that enhance self-management and reduce health differentials among this vulnerable cohort.

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Condensed Abstract

Baseline biopsychosocial characteristics among 252 women enrolled in cardiac rehabilitation (CR) revealed that women 55 years old compared to their older counterparts reported significantly more abnormal physiological and psychosocial profiles. Women who prematurely terminated CR had greater depressive symptoms, anxiety, and perceive stress, inferior quality of life, and less social support.

Table 1Baseline Diagnostic Category and Medications Stratified by Age.¹

	Total Sample N = 252	<55 Years (n = 65)	>55 Years (n = 187)	P ²
Diagnoses Index Admission				
PCI	132 (52.4)	37 (56.9)	95 (50.8)	.395
CABG	74 (29.4)	19 (29.2)	55 (29.4)	.978
CABG + valve replacement	10 (4.0)	1 (1.5)	9 (4.8)	.244
Stable angina	29 (11.5)	5 (7.7)	24 (12.8)	.263
AMI	90 (35.7)	33 (50.8)	57 (30.5)	.003
Medications				
β-blockers	206 (81.7)	52 (80.0)	154 (82.4)	.672
Diuretics	91 (36.1)	19 (29.2)	72 (38.5)	.180
ACEI	94 (37.3)	30 (46.2)	64 (34.2)	.087
Cholesterol-lowering agents	224 (88.9)	62 (95.4)	162 (86.6)	.053
Clopidogrel	160 (63.5)	50 (76.9)	110 (58.8)	.009
Aspirin	214 (84.9)	56 (86.2)	158 (84.5)	.747
Insulin	39 (15.5)	10 (15.4)	29 (15.5)	.981
Oral hypoglycemic agents	72 (28.6)	13 (20.0)	59 (31.6)	.076
Angiotensin receptor blocker	61 (24.2)	5 (7.7)	56 (29.9)	<.001
NSAIDs	62 (24.6)	15 (23.1)	47 (25.1)	.740
Antidepressants	57 (22.6)	25 (38.8)	32 (17.1)	<.001
Anxiolytics	49 (19.4)	23 (35.4)	26 (13.9)	<.001
HRT	19 (7.5)	1 (1.5)	18 (9.6)	.033

Abbreviations: ACEI, angiotensin converting enzyme inhibitors; AMI, acute myocardial infarction; CABGS, coronary artery bypass grafting surgery; HRT, hormone replacement therapy; NSAIDS, non-steroidal anti-inflammatory drugs; PCI, percutaneous coronary intervention.

¹ All data reported as number (%).

² Bold values indicate significant difference (χ^2 with df = 1; $P < .05$).

Table 2Baseline Clinical Characteristics and Co-morbidities Stratified By Age.^a

	Total (N = 252)	<55 Years (n = 65)	>55 Years (n = 187)	<i>P</i> ^b
Risk Factors				
Familial heart disease	115 (45.6)	34 (52.3)	81 (43.3)	.210
Overweight	152 (60.3)	43 (66.2)	109 (58.3)	.264
Physical inactivity	215 (85.3)	57 (87.7)	158 (84.5)	.530
Dyslipidemia	206 (81.7)	53 (81.5)	153 (81.8)	.960
Pack-years smoked, y	16.8 (23.6)	22.1 (24.2)	15.0 (23.1)	.038
Lives with a smoker	73 (28.9)	26 (40.0)	47 (25.1)	.023
Diabetes	99 (39.3)	18 (27.7)	81 (43.3)	.026
Hypertension	196 (77.8)	44 (67.7)	152 (81.3)	.023
Metabolic syndrome	115 (45.6)	26 (40.0)	89 (47.6)	.290
Post-menopause	217 (86.1)	36 (55.4)	183 (98)	<.001
Co-Morbidities				
Previous AMI	47 (18.6)	9 (13.8)	38 (20.3)	.248
Previous CABG	20 (7.9)	3 (4.6)	17 (9.1)	.250
Previous PCI	37 (14.7)	7 (10.8)	30 (16.0)	.301
Previous CHF	21 (8.3)	4 (6.2)	17 (9.1)	.460
Previous stroke	17 (6.7)	2 (3.1)	15 (8.0)	.171

Abbreviations: AMI, acute myocardial infarction; CABG, coronary artery bypass graft; CHF, congestive heart failure; PCI, percutaneous coronary intervention.

^aContinuous data are reported as mean ± standard deviation; proportions are reported as n (%).

^bBold values indicate significant differences between age groups ($P < .05$).

Table 3Baseline Physiological Characteristics Stratified by Age and Cardiac Rehabilitation Adherence.^a

	Age		<i>P</i> ^b	Adherence		<i>P</i> ^c
	55 years (n = 65)	> 55 years (n = 187)		Dropout (n = 27)	Completer (n = 225)	
Age, y	47.2 ± 5.2	68 ± 7.27	<.001	55.4 ± 11.4	63.5 ± 11.1	<.001
Total cholesterol, mg/dL	167.5 ± 54	165.5 ± 37	.745	179.3 ± 61.3	164.4 ± 38.9	.081
HDL-C, mg/dL	40.1 ± 12.8	46.1 ± 14	.003	41.7 ± 15.2	45 ± 13.7	.265
LDL-C, mg/dL	88 ± 35.6	89.1 ± 31	.824	89.2 ± 30	88.8 ± 32.4	.954
Total cholesterol/HDL-C	4.6 ± 2.6	3.9 ± 1.6	.013	4.9 ± 3.1	4 ± 1.7	.020
Triglycerides, mg/dL	165 ± 107	153 ± 78	.344	188.5 ± 144	152.2 ± 76	.038
Fasting glucose, mg/dL	110.8 ± 51	109.3 ± 33	.789	128 ± 59	107.5 ± 35	.009
Body mass index, kg/m ²	32.8 ± 7.8	30.9 ± 6.6	.052	33.8 ± 7.4	31.1 ± 6.9	.060
Waist circumference, cm	102.2 ± 18.5	99.9 ± 14.6	.304	107.5 ± 15.6	99.6 ± 15.5	.014
Body weight, lb	191.3 ± 49	177.5 ± 40	.024	195.1 ± 46.2	179.4 ± 42	.070
Body fat, %	37.3 ± 6.4	36.6 ± 5.5	.383	38 ± 5.2	36.6 ± 5.8	.246
Resting SBP	118.4 ± 18.5	130.1 ± 18	<.001	124.4 ± 21.6	127.4 ± 18	.431
Resting DBP	71.8 ± 10.6	71.6 ± 10.4	.855	69.6 ± 9.3	71.9 ± 10.5	.280
Resting HR, beats/min	73.6 ± 11.8	70.3 ± 10.5	.033	71.5 ± 12.9	71.1 ± 10.7	.844
Peak exercise capacity, METs	7 ± 2.9	5.3 ± 2.2	<.001	5.6 ± 2.7	5.8 ± 2.5	.795
Total treadmill test time, min	9.8 ± 3.6	7.5 ± 3.3	<.001	7.7 ± 3.7	8.1 ± 3.5	.575
Pack-years smoked, y	22.1 ± 24.2	15 ± 23.1	.038	15.1 ± 22.1	17.1 ± 23.8	.683
Urine cotinine, ng/mL	330.2 ± 570	79.2 ± 200	.001	299.7 ± 567	125.3 ± 315	.015

Abbreviations: DBP, diastolic blood pressure; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; METs, metabolic equivalents; SBP, systolic blood pressure

^a All data are reported as mean ± standard deviation.

^b Bold values indicate significant difference between age groups (*P* < .05)

^c Bold values indicate significant difference between completers vs. dropouts (*P* < .05)

Table 4**Baseline Psychosocial Characteristics Stratified by Age and Cardiac Rehabilitation Adherence^a**

	Age		<i>P</i> ^b	Adherence		<i>P</i> ^c
	55 Years (n=65)	> 55 Years (n=187)		Dropout (n=27)	Completer (n=225)	
SF-36 Health Survey Subscales						
Physical Functioning	48.2 (26.8)	48.3 (23.9)	.993	42.4 (26.9)	48.9 (24.3)	.193
Role Functioning - Physical	34.0 (24.1)	46.1 (23.6)	<.001	36.6 (25.1)	43.8 (24.1)	.146
Bodily Pain	44.6 (24.7)	54.6 (23.1)	.003	41.5 (27.7)	53.3 (23.0)	.015
General Health Perceptions	47.2 (21.9)	60.6 (18.2)	<.001	45.4 (20.0)	58.6 (19.7)	.001
Vitality	35.8 (18.4)	49.3 (20.6)	<.001	38.4 (24.7)	46.7 (20.2)	.052
Social Functioning	51.5 (28.4)	69.0 (25.3)	<.001	50.5 (32.0)	66.2 (26.1)	.004
Role functioning - emotional	49.0 (28.8)	68.4 (26.8)	<.001	55.2 (28.6)	64.3 (28.5)	.119
Mental Health	50.9 (24.5)	70.7 (18.7)	<.001	52.4 (26.6)	67.2 (21.0)	.001
Quality of Life Measures						
Self-Anchoring Striving Scale	5.7 (2.2)	7.4 (1.8)	<.001	5.9 (2.1)	7.1 (2.0)	.005
MDT Questionnaire	30.6 (8.3)	36.2 (6.2)	<.001	30.4 (7.7)	35.3 (7.1)	.001
Optimism (Life Orientation Test)	12.9 (4.4)	16.4 (4.2)	<.001	14.0 (4.0)	15.7 (4.5)	.076
CES-D Depression Scale	24.5 (13.4)	15.5 (9.9)	.001	25.2 (12.4)	16.9 (11.1)	<.001
State Anxiety Inventory	41.7 (14.1)	33.3 (11.0)	<.001	45.0 (15.8)	34.3 (11.4)	<.001
Herth Hope Index	37.2 (5.9)	40.1 (5.4)	<.001	37.1 (7.3)	39.6 (5.4)	.028
ENRICH Social Support Scale	22.1 (6.5)	24.0 (5.2)	.019	21.5 (6.2)	23.7 (5.5)	.046
Self-Reported Stress, n (%)						
Family-related	47 (72.3)	76 (40.6)	<.001	17 (63)	106 (47)	.119
Work-related	34 (52.3)	28 (14.9)	<.001	9 (33)	53 (24)	.265
Finance-related	40 (61.5)	39 (20.9)	<.001	13 (48)	66 (29.3)	.046
Health-related	39 (60.0)	43 (23.0)	<.001	11 (41)	71 (31.5)	.336

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; MDT Questionnaire, Multiple Discrepancies Theory Questionnaire

^aN=252. Data are described as means (standard deviation) unless otherwise specified.^bBold values indicate significant difference between age groups ($P < .05$).^cBold values indicate significant difference between completers versus dropouts ($P < .05$).