HHS Public Access

Author manuscript

Am J Med. Author manuscript; available in PMC 2016 October 01.

Published in final edited form as:

Am J Med. 2015 October ; 128(10): 1087–1093. doi:10.1016/j.amjmed.2015.05.002.

Characteristics of Contemporary Patients Discharged from the Hospital After an Acute Coronary Syndrome

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Abstract

Background—Limited contemporary data compare the clinical and psychosocial characteristics and acute management of patients hospitalized with an initial versus a recurrent episode of acute coronary disease. We describe these factors in a cohort of patients recruited from six hospitals in Massachusetts and Georgia after an acute coronary syndrome.

Materials and Methods—We performed structured baseline in-person interviews and medical record abstractions for 2,174 eligible and consenting patients surviving hospitalization for an acute coronary syndrome between April, 2011 and May, 2013.

Results—The average patient age was 61 years, 64% were men, and 47% had a high school education or less; 29% had a low general quality of life and 1 in 5 were cognitively impaired. Patients with a recurrent coronary episode had a greater burden of previously diagnosed comorbidities. Overall, psychosocial burden was high, and more so in those with a recurrent versus those with an initial episode. Patients with an initial coronary episode were as likely to have been treated with all 4 effective cardiac medications (51.6%) as patients with a recurrent episode (52.3%), but were significantly more likely to have undergone cardiac catheterization (97.9% vs 92.9%) and a percutaneous coronary intervention (73.7% vs 60.9%) ($p < 0.001$) during their index hospitalization.

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There are no conflicts of interests with any of the authors.

All authors had access to the data and had a role in writing this manuscript.

Conclusions—Patients with a first episode of acute coronary artery disease have a more favorable psychosocial profile, less comorbidity, and receive more invasive procedures, but similar medical management than patients with previously diagnosed coronary disease. Implications of the high psychosocial burden on various patient-related outcomes requires investigation.

Keywords

prospective observational study; acute coronary syndrome; hospital treatment practices; psychosocial characteristics

Introduction

Despite encouraging declines in the short-term death rates of patients hospitalized with an acute coronary syndrome over the past several decades[1–4], this clinical syndrome affects several million American men and women annually[5,6]. Moreover, despite extensive knowledge about the underlying pathophysiology, treatment, and natural history of patients who present with an acute coronary syndrome, relatively little contemporary data are available about possible differences in the descriptive characteristics and management of patients hospitalized with an initial, as compared to those hospitalized with a prior, episode of acute coronary heart disease[7–11]. Even less information is available about the psychosocial profile of these patients at the time of hospitalization for an acute coronary syndrome. Knowledge about these latter factors is particularly important since they can affect health care providers' management practices and patient's long-term outcomes.

We describe the baseline socio-demographic, lifestyle, psychosocial, and clinical characteristics, as well as hospital treatment practices, of patients who survived hospitalization for an initial, as compared to those hospitalized with a prior, acute coronary syndrome episode at 6 hospitals in Massachusetts and Georgia. This descriptive study uses data from the Transitions, Risks, and Actions in Coronary Events Center for Outcomes Research and Education (TRACE-CORE) study[12], one of three Centers for Cardiovascular Outcomes Research funded by the National Heart, Lung and Blood Institute[13].

Methods and Design

Details of the study design, patient recruitment practices, and data collection activities utilized in this longitudinal cohort study have been described previously[12].

In brief, TRACE-CORE used a multi-site prospective cohort design to recruit and follow a cohort of adult men and women hospitalized with an acute coronary syndrome at three tertiary care and community medical centers in Worcester, MA, that capture the vast majority of all hospitalizations for acute coronary syndrome in Central Massachusetts, two hospitals in Atlanta, GA, that contract to admit and treat members of a major health maintenance organization network, and one hospital in Macon, GA, a large teaching hospital that serves all of Central Georgia. Participating study sites served a heterogeneous patient population and were purposely selected for their socio-demographic and socio-economic diversity. All eligible and consenting patients 21 years and older discharged alive from

participating hospitals after an acute coronary syndrome were enrolled between April, 2011 and May, 2013.

Trained study staff abstracted an extensive amount of socio-demographic, clinical, laboratory, physiologic, and treatment related data from the medical records of patients hospitalized with an independently validated acute coronary syndrome. Standard definitions of acute coronary syndrome, including ST-segment elevation myocardial infarction, non-ST segment elevation myocardial infarction, and unstable angina were used[7,12,14,15]; questionable cases of acute coronary syndrome were adjudicated by a team of physicians. Patients were classified as having an initial acute coronary syndrome episode if, based on the careful review of hospital medical records by trained study abstractors, there was no mention of a prior hospitalization for coronary heart disease or receipt of a coronary interventional procedure in the past (e.g., percutaneous coronary intervention and/or coronary artery bypass graft surgery). Patients were classified as having a prior diagnosis of coronary heart disease if there had been either a prior hospitalization for coronary heart disease (e.g., angina or myocardial infarction) or receipt of either a percutaneous coronary intervention and/or coronary artery bypass graft surgery at any time in the past.

Information was collected by trained study staff about patient's general quality of life, behavioral and lifestyle characteristics, including alcohol consumption and cigarette smoking, and a variety of social factors, such as marital and employment status, using standardized instruments during an extensive in-person baseline interview at the time of the patient's index hospitalization for an acute coronary syndrome at participating medical centers[12]. We also collected information directly from patients during their standardized interview about a variety of psychosocial factors which would not be routinely available or collected and recorded in a standardized manner from the review of hospital charts. These factors included cognitive status, depression, anxiety, measures of perceived stress and social support, trust in physicians, and health literacy and numeracy[12,16–18].

Information was also collected from the review of hospital charts about the inhospital use of several evidence-based cardiac medications, cardiac catheterization, percutaneous coronary intervention, and coronary artery bypass graft surgery. Quality control procedures were carried out through double abstraction of a continuing random sample of 5% of study patients at each study site.

IRB approval was obtained from the UMMS Committee for the Protection of Human Subjects in Research and participants provided written informed consent.

Data Analysis

Differences in the baseline socio-demographic, clinical, and treatment characteristics of participating study subjects according to history of acute coronary disease (e.g., initial vs. prior evidence of coronary heart disease) were examined through the use of chi-square and t-tests for discrete and continuous variables, respectively. Analyses were conducted using SAS (Version 9.3).

Results

The average age (±SD) of our 2,174 study participants was 61.3 (±11.3) years, approximately two thirds were men, and 81.2% were non-Hispanic white; for 1,034 patients this was their first documented episode of acute coronary disease. In the overall study population, 28.9% had a low general quality of life (more than 1.5 standard deviation less than the population-based norm for the physical component score of the SF-36 instrument), 20.3% were classified as cognitively impaired, and 23.8% were current smokers.

Baseline Socio-Demographic and Clinical Characteristics

In examining differences in the baseline demographic and clinical characteristics of our 2 primary comparison groups, namely those with an initial episode of acute coronary heart disease (n=1,034) compared to those with previously diagnosed coronary heart disease (1,140), patients with previously documented coronary heart disease were approximately four years older, on average, more likely to be male, and from a minority racial/ethnic group, but were significantly less likely to be married, have graduated from college, and be currently working at the time of their index hospitalization than patients with a first episode of coronary heart disease (Table 1). Patients with pre-existing coronary disease were heavier, on average, and significantly more likely to have been previously diagnosed with each of the comorbid conditions examined than patients with a first episode of acute coronary disease (Table 1).

Patients with an initial as compared to those with previously diagnosed coronary heart disease had higher blood pressure readings, better kidney function, and higher heart rate, serum cholesterol, and peak troponin findings than patients with previously diagnosed coronary heart disease; these patients also had significantly lower serum glucose levels (Table 1). The average ejection fraction findings were similar in the patients with (n=336) and without a history of previously diagnosed coronary heart disease (n=341) who had these values recorded and who underwent ejection fraction testing (mean ejection fraction's = 48.6% and 52.1%, respectively).

Baseline Psychosocial and Lifestyle Characteristics

Important differences in several psychosocial and behavioral characteristics were present in relation to incident versus recurrent coronary disease (Table 2). Patients with previously diagnosed coronary heart disease were more likely to report moderate/severe anxiety and depression, higher rates of perceived stress, to have impaired cognition, to have low health literacy and numeracy, and to have a lower quality of life on the physical and mental health measures on the SF-36 health survey (Table 2). On the other hand, these individuals were less likely to report consuming moderate or heavy amounts of alcohol and be a current smoker at the time of hospital admission than patients with an initial episode of coronary heart disease (Table 2).

Hospital Treatment Practices

There were relatively minimal differences with regards to the receipt of effective cardiac medications during the patient's index hospitalization for an acute coronary syndrome

(Figure 1a). Patients with a history of prior coronary heart disease were no more likely to have been prescribed all 4 evidence-based cardiac medications (angiotensin converting enzyme inhibitors/angiotensin receptor blockers, aspirin, beta blockers, statins) during their acute hospital stay (51.6% vs. 52.3%) (p=0.76). Patients with an initial episode of coronary heart disease were significantly more likely to have been treated with anticoagulants during their acute hospital stay than patients with recurrent coronary disease (77.7% vs 66.3%) (p<. 05). On the other hand, patients with a first episode of acute coronary disease were significantly more likely to have undergone cardiac catheterization and a percutaneous coronary intervention than patients with previously diagnosed coronary heart disease (Figure 1b K01AG033643).

Essentially similar differences in patient's baseline sociodemographic, clinical, and psychosocial characteristics and hospital treatment practices were observed between patients with an initial versus recurrent episode of coronary heart disease when we classified patients as having had either an episode of angina or acute myocardial infarction previously diagnosed or had received a prior coronary interventional procedure in separate subgroup analyses (data not shown).

Discussion

The results of the present study provide insights into the descriptive socio-demographic, clinical, and psychosocial characteristics of a contemporary, multi-racial, cohort of patients discharged from the hospital after an acute coronary syndrome and their hospital management practices. Although slightly less than one half of patients hospitalized with an acute coronary syndrome presented with a first episode of acute coronary disease, these patients were significantly younger compared with patients diagnosed with a previous episode of coronary heart disease and, for most factors, had a more favorable socio-demographic, comorbidity, and psychosocial profile.

Baseline Patient Characteristics

Patients in TRACE-CORE were relatively young, on average 61 years old, primarily male, married, had attended college, and a considerable proportion had been previously diagnosed with hyperlipidemia, diabetes, and chronic lung disease. In the population-based study of residents of Olmsted County, MN, patients with an incident (initial) episode of acute coronary syndrome were approximately 7 years older than our study population and had a relatively similar comorbidity profile[1,19]. In the community-based Worcester Heart Attack Study, the average age of central Massachusetts residents hospitalized at all 11 medical centers in this geographic region with independently confirmed acute myocardial infarction in 2003, 2005, and 2007 was 71 years, and the vast majority (87%) of these patients had at least one cardiac comorbid condition, and slightly more than half had at least one noncardiac comorbid condition, previously diagnosed[20]. In a prior analysis of data from the Worcester Heart Attack Study, older individuals, women, nonwhites, and widowed patients were more likely to have multiple cardiovascular comorbidities previously diagnosed than respective comparison groups[21]. In comparing the results of TRACE-CORE with these and other community-based investigations, the younger average may be explained by the fact that we

only included patients who had survived their hospitalization for an acute coronary syndrome and who did not have psychiatric or other conditions which might have precluded their study enrollment and participation.

Baseline Psychosocial and Behavioral Characteristics

Patients with an initial acute coronary syndrome event were more likely to have smoked and consumed moderate/heavy amounts of alcohol compared to patients with previously diagnosed coronary heart disease. On the other hand, patients with a history of previously diagnosed coronary heart disease reported a lower quality of life and higher frequencies of impaired cognition, low health numeracy and literacy, perceived stress, and moderate/severe depression and anxiety as reflected by relevant measures. Some of these differences may have been attributable to patients with prior coronary heart disease being older and having more previously diagnosed comorbidities than patients with an initial episode of acute coronary heart disease.

Few studies have recently examined either the magnitude of, or factors associated with, various psychosocial factors in patients hospitalized with an acute coronary syndrome, with much of the published literature in this area being more than a decade old[22–27]. A review of studies carried out in patients with an acute coronary syndrome showed that the proportion of patients who either expressed symptoms of depression or who had a depressive disorder at the time of baseline enrollment ranged widely[28]. Anxiety is also a highly prevalent disorder in patients with an acute coronary syndrome affecting between 20 to 50% of these individuals[28,29].

Patients with an acute coronary syndrome and symptoms of depression not only experience greater morbidity and mortality, but also report poorer quality of life than patients without symptoms of these underlying psychiatric disturbances. In a recent study of nearly 500 Dutch patients enrolled in the Depression After Myocardial Infarction Study, approximately one quarter of study patients showed signs of depression[28].

In the present study of relatively young patients discharged from 6 hospitals in Massachusetts and Georgia after an acute coronary syndrome, we also showed relatively high rates of psychosocial problems and conditions including impaired cognition, low health literacy and numeracy, and perceived stress, characteristics that may be linked with worse long-term outcomes. This adverse psychosocial and cognitive profile was more pronounced in patients with previously diagnosed coronary heart disease. In addition to these factors, approximately one quarter of study patients admitted to being current cigarette smokers and more than 10% were classified as heavy drinkers.

These psychosocial, cognitive, lifestyle, and other related factors need to be considered in the short and long-term management of patients discharged from the hospital after an acute coronary syndrome, especially in persons with previously diagnosed coronary heart disease. These factors, and their possible treatment and modification, should be discussed with patients to enhance their adherence to prescribed treatment regimens, recommended lifestyle practices, and their long-term prognosis, including quality of life. Often times information on these important psychosocial factors is not collected or acted upon due to time constraints

or other underlying medical issues. Discussions between patients and their providers should incorporate these factors since they may impact prescribed medication, patient self-management activities including lifestyle changes, and patient's long-term prognosis and risk of hospital readmissions.

Hospital Treatment Practices

We observed a relatively high utilization of effective cardiac medications during their index hospitalization in this patient population, irrespective of a history of prior coronary disease, with the exception being ACE inhibitors and angiotensin receptor blockers. We were, however, unable to systematically classify patients in whom these medications may have been contraindicated, and, therefore, may have underestimated the use of currently recommended treatments in this patient population. In addition, the vast majority of patients underwent cardiac catheterization in the present study with some statistically significant, but modest, between group differences noted with regards to the receipt of cardiac catheterization and a percutaneous coronary intervention in patients with an initial versus recurrent episode of coronary heart disease. These findings need to be cautiously, interpreted, however, given the effects of assessing one acute illness episode in an often complex disease management history.

The present results suggest that approaches to optimize the medical management of patients hospitalized with an acute coronary syndrome continue to be needed, which would hopefully pay dividends to improvements in patient's long-term survival and quality of life.

Study Strengths and Limitations

The strengths of the present study include the contemporary and diverse cohort of patients hospitalized with an acute coronary syndrome, use of standardized data collection instruments to ascertain various measures of psychosocial and lifestyle characteristics, and rigorous quality control measures. We collected information from patients about an abundance of psychosocial characteristics that are not usually available in studies of patients discharged from the hospital after an acute coronary syndrome, especially those that are primarily based on the review of information noted in hospital medical records. Nonetheless, our findings need to be interpreted with appropriate reservation due to a lack of broader geographic representation, though our sites were purposely selected to provide diversity in race/ethnicity and socioeconomic status.

Conclusions

The results of this cohort study provide insights into the baseline descriptive socio-demographic, lifestyle, psychosocial, and clinical characteristics of contemporary patients discharged from the hospital with different manifestations of acute coronary disease. Psychosocial vulnerability and burden of comorbidity appear to be high. It will be important to describe changes in factors, such as health-related quality of life and various clinical parameters, over the course of our longitudinal follow-up and examine the relation between baseline levels of these characteristics, and changes over time therein, to various patient-centered measures and clinical outcomes. Our findings also highlight the importance of

considering these factors, especially certain psychosocial conditions, in the acute and long-term management of patients who present with an acute coronary syndrome.

Acknowledgments

We are indebted to the trained study staff at each of our participating study sites in Worcester, MA, Macon, GA, and Atlanta, GA. TRACE-CORE was supported by NIH grant U01HL105268. Support for Dr. Waring was provided by KL2TR000160, for Dr. Saczynski by K01AG033643 from the National Institute of Aging, and by KL2RR031981 for Dr. McManus.

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Figure 1a

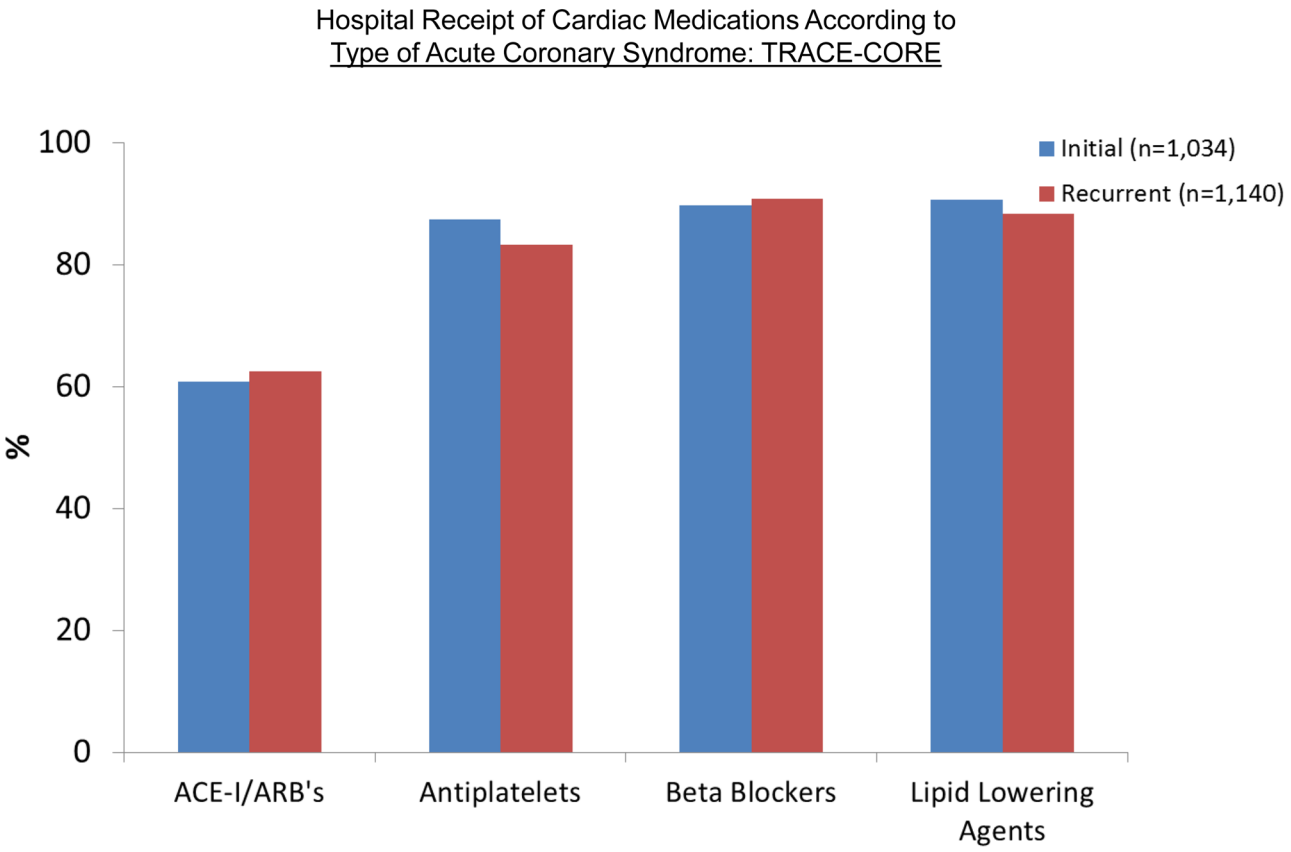

Figure 1b

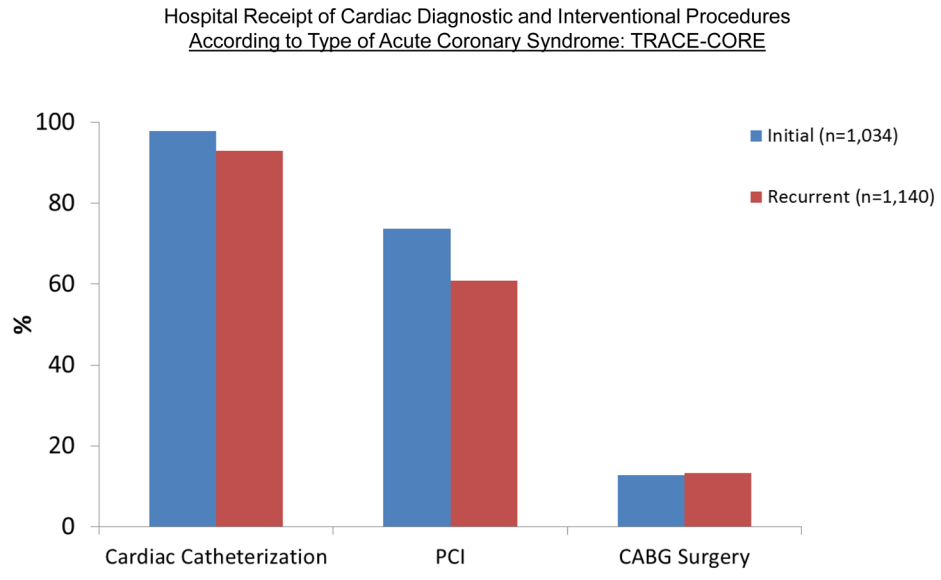

Figure 1.

Figure 1a. Hospital Receipt of Cardiac Medications According to Initial Versus Recurrent Episode of Coronary Heart Disease: TRACE-CORE

Figure 1b. Hospital Receipt of Cardiac Diagnostic and Interventional Procedures According to Initial Versus Recurrent Episode of Coronary Heart Disease: TRACE-CORE

Table 1

Socio-Demographic and Clinical Characteristics of Study Patients According to Order of Acute Coronary Syndrome: TRACE-CORE

Characteristic	First Episode* (n=1,034)	Recurrent Episode (n=1,140)	P value
Socio-Demographic			
Age (mean, yrs)	59.3	63.2	<0.001
Male (%)	64.1	68.7	<0.05
Non-Hispanic white (%)	83.3	79.0	<.01
Married (%)	60.8	56.1	<.05
Education (%)			
High school or less	41.7	50.8	
Some college	27.7	29.9	<.001
College graduate	30.6	19.3	
Currently working (%)	54.3	29.0	<0.001
Body mass index (mean)	29.9	30.5	0.06
Hospital length of stay (mean, days)	4.8	5.1	0.83
Comorbidities at admission (%)			
Atrial fibrillation	3.8	12.0	<0.001
Chronic kidney disease	4.6	16.6	<.001
Chronic lung disease	11.9	23.3	<.001
Depression	10.4	14.7	<0.005
Diabetes	22.1	39.9	<0.001
Heart failure	4.3	22.9	<0.001
Hyperlipidemia	53.2	82.8	<0.001
Hypertension	62.7	88.1	<0.001
Stroke	2.6	7.8	<0.001
Physiologic variables (mean, at admission)			
Blood pressure (diastolic, mmHg)	82.7	78.6	<.001
Blood pressure (systolic, mmHg)	142.7	140.7	0.08
Estimated GFR (ml/min/1.73^{m2})	83.1	75.7	<.001
Heart rate (bpm)	78.8	76.9	<.05
Serum cholesterol (mg/dl)	182.4	162.1	<.001
Serum glucose (mg/dl)	146.1	155.4	<.005
Troponin (mg/mL)	21.9	12.5	<0.001

GFR – glomerular filtration rate

* History of angina, myocardial infarction, percutaneous coronary intervention, or coronary artery bypass graft surgery

Table 2

Psychosocial and Behavioral Characteristics of Study Patients According to Type of Acute Coronary Syndrome: TRACE-CORE

Characteristic	First Episode* (n=1,034)	Recurrent Episode (n=1,140)	P Value
Psychosocial			
Anxiety∞			
Mild	24.2	25.9	<0.001
Moderate/Severe	20.6	27.1	
Depression∞∞∞			
Mild	23.3	29.7	<0.001
Moderate/Severe	18.4	26.0	
Impaired cognition∞∞∞∞	15.2	24.4	<0.001
High perceived stress†	34.5	45.3	<0.001
Lives alone	19.9	23.8	<0.10
Low health literacy††	30.6	41.1	<.001
Low health numeracy†††	45.2	51.4	<0.05
Social support (mean)	20.2	20.0	0.16
SF-36 Components°			
MCS (mean)	49.2	45.8	<0.001
PCS (mean)	44.4	38.2	<0.001
Trust in physicians°°	64.4	65.8	0.23
Behavioral			
Alcohol consumption			
Moderate	13.3	10.4	<0.001
Heavy	11.0	8.4	
Current smoking	24.9	21.9	<0.005

∞GAD7 General Anxiety Disorder 7 item score: 5–9 mild, 10–14 moderate, >15 Severe anxiety

∞∞∞PHQ-9 Patient Health Questionnaire 9 item score: 5–9 mild, 10–14 moderate, 15–19 moderately severe, and ≥20 severe depression

∞∞∞∞TICS – telephone interview for cognitive status: ≤28 impaired cognition

†Perceived stress scale: ≥20 high perceived stress

††Somewhat/not at all confident/little confidence in filling out medical forms

†††Unable to answer both health numeracy questions correctly

°SF-36 – mental health and physical health components

°°Trust in Physicians questions (all in all, you trust doctors completely: agree/strongly agree)

MCS – mental component summary measure

PCS – Physical component summary measure