Published in final edited form as:

Patient Educ Couns. 2016 March ; 99(3): 455–461. doi:10.1016/j.pec.2015.10.007.

Perceiving one's heart condition to be cured following hospitalization for acute coronary syndromes: implications for patient-provider communication

Molly E. Waring, PhD^a, David D. McManus, MD MS^{a,b,c}, Stephenie C. Lemon, PhD^d, Joel M. Gore, MD^b, Milena D. Anatchkova, PhD^{a,e}, Richard H. McManus, MPP MSW^a, Arlene S. Ash, PhD^a, Robert J. Goldberg, PhD^a, Catarina I. Kiefe, PhD MD^a, and Jane S. Saczynski, PhD^{a,f}

Molly E. Waring: molly.waring@umassmed.edu; David D. McManus: david.mcmanus@umassmed.edu; Stephenie C. Lemon: stephenie.lemon@umassmed.edu; Joel M. Gore: joel.gore@umassmemorial.org; Milena D. Anatchkova: milena.anatchkova@umassmed.edu; Richard H. McManus: richard.mcmanus@umassmed.edu; Arlene S. Ash: arlene.ash@umassmed.edu; Robert J. Goldberg: robert.goldberg@umassmed.edu; Catarina I. Kiefe: catarina.kiefe@umassmed.edu; Jane S. Saczynski: jane.saczynski@umassmed.edu

^aDepartment of Quantitative Health Sciences, University of Massachusetts Medical School, 368 Plantation Street, Worcester, MA, 01605, USA

^bDivision of Cardiovascular Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA, 01605, USA

^cMeyers Primary Care Institute, 425 Lake Avenue North, Worcester, MA, 01605, USA

^dDivision of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA, 01605, USA

^eEvidera, 430 Bedford Street, Suite 300, Lexington Office Park, Lexington, MA, 02420, USA

^fSchool of Pharmacy, Northeastern University, 360 Huntington Avenue, R218 TF, Boston, MA 02115

Abstract

Objective—We examined the proportion of patients perceiving their heart condition to be cured following hospitalization for ACS and identified characteristics associated with these perceptions.

Methods—We conducted a prospective cohort study of adults hospitalized with ACS (N=396). Patient interviews during hospitalization and one week post-discharge provided demographic and psychosocial characteristics. Medical records provided clinical characteristics. At one week,

Corresponding author at: Molly E. Waring, PhD, Department of Quantitative Health Sciences, University of Massachusetts Medical School, 368 Plantation Street, AS8-1077, Worcester, MA 01605 USA, Phone: +1 (508) 856-3504, Fax: +1 (508) 856-8993, molly.waring@umassmed.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Informed Consent and Patient Details

I confirm that all patient/personal identifiers have been removed or disguised so that the patient/person(s) described are not identifiable and cannot be identified through the details of the story.

Conflicts of Interest

None.

patients who rated “My heart condition is cured” as “definitely true” or “mostly true” were considered to perceive their heart condition cured.

Results—Participants were aged 60.7 (SD:11.0) years, 26.5% female, and 89.0% non-Hispanic white; 16.7% had unstable angina, 59.6% NSTEMI, and 23.7% STEMI. One week post-discharge, 30.3% perceived their heart condition to be cured. Characteristics associated with cure perceptions were older age (OR=2.2; 95% CI: 1.2–4.0 for ≥65 years vs <55 years), male sex (OR=2.4; 95% CI: 1.3–4.2), history of hypertension (OR=1.8; 95% CI: 1.1–3.1), history of stroke (OR=4.2; 95% CI: 1.1–16.7), no history of CHD (OR=2.8; 95% CI: 1.6–4.9), and receipt of CABG during hospitalization (OR=4.8, 95% CI: 1.9–12.0 vs medical management).

Conclusion—One week post-discharge, 3 in 10 patients perceived their heart condition to be cured.

Practice Implications—Conversations with patients should frame ACS as a chronic disease and dispel cure perceptions.

Keywords

acute coronary syndromes; cure perceptions

1. Introduction

Half of men and a third of women in the United States develop coronary heart disease (CHD) in their lifetime, and CHD is an underlying cause in one in six deaths in the United States[1]. Despite improvements in hospital survival following acute coronary syndromes (ACS), the acute form of CHD, mortality remains elevated for years following hospitalization[1, 2]. One-quarter to one-third of patients hospitalized with ACS experience a recurrent event, and repeat hospitalization is common[3]. Evidence-based interventions for ACS – such as smoking cessation, management of blood pressure and lipids, weight control, and taking heart-related medications – are often not adopted by patients post-discharge[4]. Low engagement in these secondary prevention strategies may be due to unrealistic patient perceptions about the severity of their condition and their prognosis. Short hospital stays and receipt of coronary revascularization during hospitalization may leave patients with the perception that their heart condition has been “cured” or “fixed”[5–7]. Little is known about these cure perceptions and which patients hold them. The purpose of this study was to describe the proportion of patients who perceived their heart condition to be cured one week following hospitalization for ACS and to examine participant characteristics associated with these perceptions.

2. Materials and Methods

We used data from TRACE-CARE, an ancillary study to the Transitions, Risks, and Actions in Coronary Events: Center for Outcomes Research and Education (TRACE-CORE) study. The design and methods of TRACE-CORE are described in detail elsewhere[8]. Briefly, TRACE-CORE enrolled a prospective cohort of 2,187 adults hospitalized with ACS at six hospitals in Massachusetts and Georgia. Potentially eligible participants admitted to study hospitals were identified by daily screening of ACS-related ICD-9 codes from computerized

admission logs and lists for cardiac catheterization, percutaneous coronary intervention (PCI), and coronary artery bypass graft (CABG) procedures, and lists of patients with elevated troponin levels. Eligibility criteria included diagnosis of ACS consistent with the American College of Cardiology and American Heart Association criteria[9, 10], aged 21 years or older, able to communicate in English or Spanish, and discharged alive from the index hospitalization. Patients were excluded if they developed ACS secondary to another acute condition, screened positive for delirium by the Confusion Assessment Method[11], had documented dementia or severe cognitive impairment that would prevent them from completing an in-person interview, were pregnant, imprisoned, expected to move out of the area within 18 months, or admission for palliative care only. Data were collected through an in-person interview during hospitalization and abstraction of medical records for the index hospitalization. Institutional Review Boards at each study site approved this study. Participants provided written informed consent.

At two of the study hospitals in Worcester, MA, TRACE-CORE participants from September 2011 to May 2013 were invited to participate in an ancillary study, TRACE-CARE, to further examine the role of psychosocial factors and caregiving support on outcomes following hospitalization for ACS. Consecutive TRACE-CORE participants were approached for enrollment in TRACE-CARE (96% enrollment). Exclusion criteria included re-hospitalization in the week following discharge and delirium at the one-week post-discharge contact. Of eligible and consenting patients, 127 could not be reached one week post-discharge, 32 refused to participate, and 3 completed only part of the interview; 72% (423/585) completed a 30-minute follow-up telephone interview one week post-discharge (range: 5–10 days). This structured interview was conducted by trained study staff and focused on psychosocial and physical functioning and caregiving support, and included a question about cure perceptions.

During the interview one week post-discharge, participants were asked, “How true or false is this statement for you: My heart condition is cured. Would you say that this is definitely true, mostly true, neutral/don’t know, mostly false, or definitely false?” Participants responding “definitely true” or “mostly true” were considered to perceive that their heart condition was cured.

We examined the association between several classes of participant characteristics and cure perceptions: demographic, variables related to a participant’s ability to process and understand health information, underlying clinical characteristics, and variables related to the clinical presentation of ACS and receipt of treatment during hospitalization. As little quantitative research has been done examining cure perceptions in adults with coronary heart disease, we focused on categories of variables found to be associated with perceptions of the timeline or permanence of illness among patients with coronary heart disease in previous studies[12, 13].

Participants self-reported demographics, including their race, ethnicity, and marital status. Age and sex were abstracted from medical records. Participants reported their education and other characteristics related to their ability to process and understand health information. Participants were asked, “How confident are you in filling out medical forms by yourself?”

and categorized as having impaired health literacy (“not at all confident”, “a little confident”, and “somewhat confident”) or adequate health literacy (“quite a bit confident” and “extremely confident”)[14]. Participants were categorized as having impaired health numeracy if they did not answer “Which of the following numbers represents the biggest risk of getting a disease?” correctly with both of two response option sets (“1 in 100”, “1 in 1000”, and “1 in 10” and then “1%”, “10%”, and “5%”)[15]. Participants completed a 5-item scale measuring trust in physicians (range: 0–25, with higher scores indicating higher trust)[16] which was categorized as low (0–15), medium (16–20), and high trust (21–25).

Data on the underlying clinical characteristics of participants were derived both from the baseline interview and from medical record abstractions and included both physical and emotion conditions. Participants completed the Telephone Interview for Cognitive Status (TICS; range: 0–41)[17]; cognitive impairment was indicated by a score of ≤ 28 [18, 19]. Participants completed the 9-item Patient Health Questionnaire (PHQ-9; range: 0–27)[20] and the 7-item Generalized Anxiety Disorder (GAD-7; range: 0–21)[21]; scores ≥ 10 indicated probable depression and generalized anxiety disorder, respectively[21]. Participants also reported smoking status. Body mass index (BMI; kg/m^2) was calculated from height and weight recorded in the medical record at admission, and categorized as underweight ($\text{BMI} < 18.5 \text{ kg}/\text{m}^2$), normal weight ($18.5 \leq \text{BMI} < 25 \text{ kg}/\text{m}^2$), overweight ($25 \leq \text{BMI} < 30 \text{ kg}/\text{m}^2$), and obese ($\text{BMI} \geq 30 \text{ kg}/\text{m}^2$)[22]. Documented comorbidities were abstracted. Participants with documentation of CABG, PCI, MI, CHD, stent restenosis, and/or stent thrombosis prior to the index hospitalization were considered to have a history of CHD. History of CHD in a first-degree relative was also abstracted.

Finally, medical record abstraction provided variables related to the clinical presentation of ACS and receipt of treatment during hospitalization. ACS type (ST-elevation myocardial infarction [STEMI], non-ST-elevation myocardial infarction [NSTEMI], or unstable angina) was determined by medical record review of ECG readings, Troponin-I or Troponin-T values, and chief complaint on admission. Receipt of coronary revascularization during hospitalization was categorized as CABG, PCI, or neither. Length of stay was categorized as discharged the same or next day, 2–3 days, or hospitalized for ≥ 4 days. We calculated the GRACE risk score for 6-month post-discharge mortality[23, 24], and categorized risk as low, intermediate, or high[25].

2.1 Statistical analysis

We compared the percentage of patients perceiving their heart condition to be cured by participant characteristics using chi-squared tests for categorical variables and tests for trend for ordinal variables (age, education, trust in physicians, weight status, length of stay, and GRACE risk score). We calculated odds ratios (ORs) and 95% confidence intervals (CIs) to estimate multivariable correlates of cure perception using logistic regression models. We added characteristics that were bivariately associated with cure perception with $p < 0.10$ to the adjusted model one at a time, in order of largest crude relationship; variables were retained in the model if the 95% CI for the OR for cure perceptions for at least one level of the variable was statistically significant at the 0.05 level. Analyses were conducted in SAS 9.3 (SAS Institute, Inc., Cary, NC).

3. Results

We excluded participants who did not provide information on cure perceptions (n=17) and those missing covariates (n=10), resulting in an analytic sample of 396 adults. Participants were 26.5% female and 89.0% non-Hispanic white with a mean age of 60.7 (SD: 11.0) years. Seventeen percent were hospitalized with unstable angina, 59.6% with NSTEMI, and 23.7% with STEMI. Other participant characteristics are presented in Tables 1 and 2.

One week post-discharge, 30.3% (n=120) perceived their heart condition to be cured. Tables 1 and 2 present the bivariate associations between patient characteristics and perceiving one's heart condition to be cured. In the multivariable model, older age, male sex, history of hypertension, history of stroke, no history of CHD, and receipt of CABG during the index hospitalization were associated with greater odds of perceiving one's heart condition to be cured (Table 3). Compared to patients younger than 55 years, those aged 65 years or older were more likely to perceive themselves as cured (adjusted OR=2.2; 95% CI: 1.3–4.0). Men were more likely to perceive themselves cured than women (adjusted OR=2.4; 95% CI: 1.3–4.2). History of hypertension, history of stroke, and no history of CHD were each associated with higher odds of cure perceptions (adjusted ORs = 1.8, 4.2, 2.8, respectively). Patients who underwent CABG were more likely to perceive their heart condition to be cured than patients whose ACS was managed medically (adjusted OR=4.8; 95% CI: 1.9–12.0). However, the proportion of patients perceiving their heart condition to be cured did not differ among patients who underwent PCI during hospitalization and patients whose ACS was medically managed (adjusted OR=1.5; 95% CI: 0.8–3.2).

4. Discussion and Conclusion

4.1. Discussion

CHD is a chronic disease[26], and patients are not “cured” following acute hospitalization. However, one week following hospitalization for ACS, we found 3 in 10 patients perceived their heart condition to be cured. This is concerning in light of qualitative research linking such misperceptions to lower engagement in secondary prevention activities[5, 6] including medication adherence[7] and lifestyle behaviors that improve post-ACS outcomes[4, 27]. Even when treatment of the acute event is successful, secondary prevention is needed, such as smoking cessation, management of blood pressure and lipids, weight loss, increased physical activity, adherence to cardiac medications, and participation in cardiac rehabilitation programs[4].

Patients who underwent CABG were more likely to perceive that their heart condition was cured one week post-discharge than patients managed medically. CABG is performed using novel arterial or venous conduits[28], and patients may believe that they have a “clean slate” and not fully appreciate that diseased segments of native coronary circulation persist or that bypass grafts may also be affected by pathophysiological processes. This finding of elevated cure perceptions among patients who underwent CABG is consistent with previous research that found patients undergoing coronary revascularization were more likely to perceive themselves cured. A survey of 234 patients who had undergone an elective percutaneous coronary intervention in Melbourne hospitals revealed that 43% believed that the procedure

had cured their heart disease[5]. Patients in one qualitative study who were unsuccessful making lifestyle changes following angioplasty reported that the “quick and easy” nature of angioplasty led them to believe that their heart disease was cured[6]. A recent systematic review and synthesis of qualitative studies of medication adherence among patients with CHD found that the belief that interventional procedures have cured their heart disease was associated with lower medication adherence[7]. In this study, 29% patients who underwent PCI perceived themselves cured compared to 20% of patients managed medically, which did not differ at a conventional level of statistical significance. However, there may still be an association between PCI and perception of cure that our study did not detect due to lack of statistical power. Although CABG is associated with lower rates of recurrent myocardial infarction, need for repeat revascularization, higher long-term survival rates than PCI and medical treatment, neither CABG nor PCI “cure” coronary disease[29], and clinical care teams should clearly communicate this to patients[30], regardless of receipt of coronary revascularization.

Older patients and men were more likely to perceive that their heart condition was cured. Older patients are, in general, more complex with respect to their comorbidity profile and treatment and dialogues between health providers and older patients may differ fundamentally from those with younger individuals[31]. For example, a discussion with a younger, relatively uncomplicated patient may focus on secondary prevention and reduction of risk factors such as smoking, while a discussion with an older patient may focus on a constellation of co-occurring conditions and polypharmacy rather than on the patient’s heart condition. Additionally, non-comprehension of discharge instructions has been reported among elderly patients less than a week post-discharge[32]. Although women hospitalized with ACS tend to be older[33], we found that men were more likely to perceive their heart condition to be cured, independent of age. In previous work, women perceived their cardiovascular risk to be higher than men did, despite similar absolute risk[34]. Another study found that women hospitalized with ACS rated their heart condition as more permanent than did men[35].

Contrary to expectations, neither education, health literacy, or health numeracy were associated with cure perceptions. Higher general education does not necessarily imply greater understanding of medical information[36]. Our brief measures of health literacy and numeracy, while found to identify patients with inadequate health literacy[14] or numeracy[15], may not distinguish among higher – but still suboptimal – levels of understanding of medical information. We did not have information on the content of patient education about their heart disease, which may also contribute to our lack of findings relating to these participant characteristics related to the processing and comprehension of health information.

While it is reassuring that patients with previous clinical manifestations of CHD are less likely to perceive themselves cured than those with incident disease, it is concerning that 20% of these patients with a history of CHD perceive themselves to be cured one week post-discharge. Patients may not appreciate differences in short-term risk and successful in-hospital management of ACS compared with long-term treatment of underlying coronary disease and secondary prevention of recurrent events[37]. Patients with a history of

hypertension or stroke were more likely to perceive their heart condition to be cured. Patients with hypertension may perceive themselves cured because pharmacotherapy for hypertension can lower blood pressure to normal levels[38], thus leading patients to believe that coronary revascularization or medication management may similarly “cure” their heart condition. The observed association with history of stroke may be due to underlying cerebrovascular disease and resultant cognitive impairment not fully accounted for in our multivariable analyses. Although only 12 patients in this sample had a history of stroke, 42% were cognitively impaired during hospitalization compared to 9% of patients without a history of stroke ($p=0.0043$). Patients who are cognitively impaired may not fully understood discussions with their clinical team about their disease process and the importance of secondary prevention. Almost half (46%) of patients with in-hospital cognitive impairment perceived themselves cured versus 29% of cognitively intact patients. While this difference was statistically significant in bivariate comparisons, it was no longer significant in the multivariate model, possibly because of associations with stroke history and non-receipt of coronary revascularization. In this study and other ACS cohorts[39], cognitively impaired patients were less likely to undergo procedures such as CABG and PCI. More invasive procedures may also be associated with developing transient cognitive impairment during hospitalization[40]. In addition, our sample, by design, included only patients with mild or moderate cognitive impairment[17], thus we may underestimate the prevalence of cure perceptions in cognitively impaired ACS survivors, particularly those with severe impairment.

Cure perceptions did not differ by ACS type or GRACE mortality risk score, contrary to expectations. A study of 220 patients hospitalized for PCI in Australia found that actual and perceived cardiovascular risk only weakly correlated.[41] Given the declines in length of ACS hospitalizations over the past few decades[42], we had expected shorter hospital stays to be associated with perceiving oneself cured; we found the opposite, perhaps because length of stay was strongly confounded by receipt of coronary revascularization. All patients who underwent a CABG were hospitalized for four days or longer, versus 16% of patients undergoing PCI and 28% of patients managed medically ($p<0.0001$). Coronary revascularization and subsequent conversations with the clinical care team may affect cure perceptions more than length of hospitalization. Regardless, especially among patients with longer hospital stays, our results suggested a missed opportunity for patient education about ACS.

This study has strengths and limitations. The rich data collected allowed examining both patient-reported demographic and psychosocial characteristics and clinical data from medical records. We developed the measure of cure perception based on the clinical experiences of our cardiologists; its reliability and validity are unknown. Additionally, the construct validity of this measure has not been tested, leaving the possibility that part of the observed differences can be explained by differing interpretations across patients including those of different cultural backgrounds. However, this item is similar to longer measures assessing the timeline, i.e., permanence, of illness[43] which has been associated with older age, comorbidities, and revascularization among patients with CHD[12], suggesting that this measure taps into the same conceptual domain. Reflecting the demographics of Worcester

county[44], the majority of our sample was non-Hispanic white, a limitation considering racial/ethnic disparities in cardiovascular disease risk[45].

4.2. Conclusion

In light of our finding that 30% of ACS patients perceive themselves as cured, research is needed to better understand the consequences of these perceptions on the management and secondary prevention of ACS. A limited body of research suggests that cure perceptions may lead to lower engagement in secondary prevention activities[6]. More work is needed to confirm such associations in prospective, diverse samples. While unanswered questions remain regarding the validity and reliability of the one-item measure of cure perceptions used in the current study, this single item has the potential to provide assessment of cure perceptions in clinical settings with minimal burden on patients and providers.

4.3. Practice Implications

Conversations with patients about their prognosis, severity of disease, and recommendations for secondary prevention should emphasize that their heart condition is not cured, even in absence of symptoms. These discussions should frame CHD as a chronic disease, to dispel patients' perceptions that coronary revascularization "cures" their heart condition[26]. Conversations with patients should frame ACS as a chronic disease and dispel cure perceptions, perhaps by explicitly referring the concept of a "cure", i.e., "you are not cured". Communication with patients who have undergone CABG may be especially critical as we found that 3 in 5 perceive themselves cured. Our results indicate an important gap in clinical practice for which efficacious interventions that can be easily disseminated are needed for broad impact on ACS management and long-term outcomes[46].

Acknowledgements

TRACE-CORE was supported by NIH grant U01HL105268. TRACE-CARE was supported by NIH grant R21HL108187. Additional support provided by NIH grants KL2TR000160 (MEW), KL2RR031981 (DDM), and K01AG33643 (JSS), and by a PhRMA Foundation Starter Grant (MDA).

Role of the Funding Sources

The funding sources had no role in the study design; in the collection, analysis, and interpretation of data; in writing the report; and in the decision to submit the article for publication.

References

1. Go AS, Mozaffarian D, Roger VL, Benjamin EJ, Berry JD, Blaha MJ, et al. Heart disease and stroke statistics--2014 update: a report from the American Heart Association. *Circulation*. 2014; 129:e28–e292. [PubMed: 24352519]
2. McGovern PG, Jacobs DR Jr, Shahar E, Arnett DK, Folsom AR, Blackburn H, et al. Trends in acute coronary heart disease mortality, morbidity, and medical care from 1985 through 1997: the Minnesota heart survey. *Circulation*. 2001; 104:19–24. [PubMed: 11435332]
3. Bernheim SM, Grady JN, Lin Z, Wang Y, Wang Y, Savage SV, et al. National patterns of risk-standardized mortality and readmission for acute myocardial infarction and heart failure. Update on publicly reported outcomes measures based on the 2010 release. *Circulation Cardiovascular quality and outcomes*. 2010; 3:459–467. [PubMed: 20736442]
4. Smith SC Jr, Benjamin EJ, Bonow RO, Braun LT, Creager MA, Franklin BA, et al. AHA/ACC Secondary Prevention and Risk Reduction Therapy for Patients with Coronary and other

Atherosclerotic Vascular Disease: 2011 update: a guideline from the American Heart Association and American College of Cardiology Foundation. *Circulation*. 2011; 124:2458–2473. [PubMed: 22052934]

5. Campbell M, Torrance C. Coronary angioplasty: impact on risk factors and patients' understanding of the severity of their condition. *The Australian journal of advanced nursing : a quarterly publication of the Royal Australian Nursing Federation*. 2005; 22:26–31. [PubMed: 16496833]
6. Peterson JC, Allegrante JP, Pirraglia PA, Robbins L, Lane KP, Boschert KA, et al. Living with heart disease after angioplasty: A qualitative study of patients who have been successful or unsuccessful in multiple behavior change. *Heart & lung : the journal of critical care*. 2010; 39:105–115. [PubMed: 20207270]
7. Rashid MA, Edwards D, Walter FM, Mant J. Medication taking in coronary artery disease: a systematic review and qualitative synthesis. *Annals of family medicine*. 2014; 12:224–232. [PubMed: 24821893]
8. Waring ME, McManus RH, Saczynski JS, Anatchkova MD, McManus DD, Devereaux RS, et al. Transitions, Risks, and Actions in Coronary Events--Center for Outcomes Research and Education (TRACE-CORE): design and rationale. *Circulation Cardiovascular quality and outcomes*. 2012; 5:e44–e50. [PubMed: 22991349]
9. Anderson JL, Adams CD, Antman EM, Bridges CR, Califf RM, Casey DE Jr, et al. 2012 ACCF/AHA focused update incorporated into the ACCF/AHA 2007 guidelines for the management of patients with unstable angina/non-ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2013; 127:e663–e828. [PubMed: 23630129]
10. Kushner FG, Hand M, Smith SC Jr, King SB 3rd, Anderson JL, Antman EM, et al. 2009 Focused Updates: ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction (updating the 2004 Guideline and 2007 Focused Update) and ACC/AHA/SCAI Guidelines on Percutaneous Coronary Intervention (updating the 2005 Guideline and 2007 Focused Update): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2009; 120:2271–2306. [PubMed: 19923169]
11. Inouye SK, van Dyck CH, Alessi CA, Balkin S, Siegel AP, Horwitz RI. Clarifying confusion: the confusion assessment method. A new method for detection of delirium. *Annals of internal medicine*. 1990; 113:941–948. [PubMed: 2240918]
12. Aalto AM, Heijmans M, Weinman J, Aro AR. Illness perceptions in coronary heart disease. Sociodemographic, illness-related, and psychosocial correlates. *Journal of psychosomatic research*. 2005; 58:393–402. [PubMed: 16026654]
13. Alsén P, Brink E, Persson L-O, Brändström Y, Karlson BW. Illness Perceptions After Myocardial Infarction: Relations to Fatigue, Emotional Distress, and Health-Related Quality of Life. *Journal of Cardiovascular Nursing*. 2010; 25:E1–E10. [PubMed: 20168186]
14. Powers BJ, Trinh JV, Bosworth HB. Can this patient read and understand written health information? *JAMA : the journal of the American Medical Association*. 2010; 304:76–84. [PubMed: 20606152]
15. Lipkus IM, Samsa G, Rimer BK. General performance on a numeracy scale among highly educated samples. *Medical decision making : an international journal of the Society for Medical Decision Making*. 2001; 21:37–44. [PubMed: 11206945]
16. Dugan E, Trachtenberg F, Hall MA. Development of abbreviated measures to assess patient trust in a physician, a health insurer, and the medical profession. *BMC health services research*. 2005; 5:64. [PubMed: 16202125]
17. Brandt J, Spencer M, Folstein M. The telephone Interview for Cognitive Status. *Neuropsychiatry, Neuropsychology and Behavioral Neurology*. 1988; 1:111–117.
18. Seo EH, Lee DY, Kim SG, Kim KW, Kim do H, Kim BJ, et al. Validity of the telephone interview for cognitive status (TICS) and modified TICS (TICSm) for mild cognitive impairment (MCI) and dementia screening. *Arch Gerontol Geriatr*. 2011; 52:e26–e30. [PubMed: 20471701]
19. Manly JJ, Schupf N, Stern Y, Brickman AM, Tang MX, Mayeux R. Telephone-based identification of mild cognitive impairment and dementia in a multicultural cohort. *Arch Neurol*. 2011; 68:607–614. [PubMed: 21555635]

20. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*. 2001; 16:606–613. [PubMed: 11556941]
21. Spitzer RL, Kroenke K, Williams JB, Lowe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*. 2006; 166:1092–1097. [PubMed: 16717171]
22. Jensen MD, Ryan DH, Apovian CM, Ard JD, Comuzzie AG, Donato KA, et al. 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *Circulation*. 2014; 129:S102–S138. [PubMed: 24222017]
23. Eagle KA, Lim MJ, Dabbous OH, Pieper KS, Goldberg RJ, Van de Werf F, et al. A validated prediction model for all forms of acute coronary syndrome: estimating the risk of 6-month postdischarge death in an international registry. *JAMA : the journal of the American Medical Association*. 2004; 291:2727–2733. [PubMed: 15187054]
24. Fox KA, Dabbous OH, Goldberg RJ, Pieper KS, Eagle KA, Van de Werf F, et al. Prediction of risk of death and myocardial infarction in the six months after presentation with acute coronary syndrome: prospective multinational observational study (GRACE). *Bmj*. 2006; 333:1091. [PubMed: 17032691]
25. GRACE Risk Table. Worcester: University of Massachusetts Medical School Center for Outcomes Research. MA2014.
26. Rolley JX, Thompson DR. Cardiovascular disease: is it time to finally recognise it as a complex, chronic life-span illness? *European journal of cardiovascular nursing : journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*. 2012; 11:135–137.
27. Ho PM, Spertus JA, Masoudi FA, Reid KJ, Peterson ED, Magid DJ, et al. Impact of medication therapy discontinuation on mortality after myocardial infarction. *Archives of internal medicine*. 2006; 166:1842–1847. [PubMed: 17000940]
28. Deb S, Wijeyesundera HC, Ko DT, Tsubota H, Hill S, Fremes SE. Coronary artery bypass graft surgery vs percutaneous interventions in coronary revascularization: a systematic review. *JAMA : the journal of the American Medical Association*. 2013; 310:2086–2095. [PubMed: 24240936]
29. Kappetein AP, Head SJ, Morice MC, Banning AP, Serruys PW, Mohr FW, et al. Treatment of complex coronary artery disease in patients with diabetes: 5-year results comparing outcomes of bypass surgery and percutaneous coronary intervention in the SYNTAX trial. *European journal of cardio-thoracic surgery : official journal of the European Association for Cardio-thoracic Surgery*. 2013; 43:1006–1013. [PubMed: 23413014]
30. Rothberg MB, Scherer L, Kashef M, et al. The effect of information presentation on beliefs about the benefits of elective percutaneous coronary intervention. *JAMA internal medicine*. 2014; 174:1623. [PubMed: 25156687]
31. Boyd CM, Leff B, Wolff JL, Yu Q, Zhou J, Rand C, et al. Informing clinical practice guideline development and implementation: prevalence of coexisting conditions among adults with coronary heart disease. *Journal of the American Geriatrics Society*. 2011; 59:797–805. [PubMed: 21568950]
32. Albrecht JS, Gruber-Baldini AL, Hirshon JM, Brown CH, Goldberg R, Rosenberg JH, et al. Hospital Discharge Instructions: Comprehension and Compliance Among Older Adults. *Journal of general internal medicine*. 2014; 29:1491–1498. [PubMed: 25015430]
33. Avezum A, Makdisse M, Spencer F, Gore JM, Fox KA, Montalescot G, et al. Impact of age on management and outcome of acute coronary syndrome: observations from the Global Registry of Acute Coronary Events (GRACE). *American heart journal*. 2005; 149:67–73. [PubMed: 15660036]
34. Homko CJ, Zamora L, Santamore WP, Kashem A, McConnell T, Bove AA. Gender differences in cardiovascular risk factors and risk perception among individuals with diabetes. *The Diabetes educator*. 2010; 36:483–488. [PubMed: 20360597]
35. Grace SL, Krepostman S, Brooks D, Arthur H, Scholey P, Suskin N, et al. Illness perceptions among cardiac patients: relation to depressive symptomatology and sex. *Journal of psychosomatic research*. 2005; 59:153–160. [PubMed: 16198188]
36. Hersh L, Salzman B, Snyderman D. Health Literacy in Primary Care Practice. *American family physician*. 2015; 92:118–124. [PubMed: 26176370]

37. Battegay E, Gasche A, Zimmerli L, Martina B, Gyr N, Keller U. Risk factor control and perceptions of risk factors in patients with coronary heart disease. *Blood pressure Supplement*. 1997; 1:17–22. [PubMed: 9285103]
38. Borghi C, Tartagni E. The older patient with hypertension: care and cure. *Therapeutic advances in chronic disease*. 2012; 3:231–236. [PubMed: 23342238]
39. Gharacholou SM, Reid KJ, Arnold SV, Spertus J, Rich MW, Pellikka PA, et al. Cognitive impairment and outcomes in older adult survivors of acute myocardial infarction: findings from the translational research investigating underlying disparities in acute myocardial infarction patients' health status registry. *American heart journal*. 2011; 162:860–869. e1. [PubMed: 22093202]
40. Saczynski JS, Marcantonio ER, Quach L, Fong TG, Gross A, Inouye SK, et al. Cognitive trajectories after postoperative delirium. *The New England journal of medicine*. 2012; 367:30–39. [PubMed: 22762316]
41. Davidson PM, Salamonson Y, Rolley J, Everett B, Fernandez R, Andrew S, et al. Perception of cardiovascular risk following a percutaneous coronary intervention: a cross sectional study. *International journal of nursing studies*. 2011; 48:973–978. [PubMed: 21367417]
42. Saczynski JS, Lessard D, Spencer FA, Gurwitz JH, Gore JM, Yarzebski J, et al. Declining length of stay for patients hospitalized with AMI: impact on mortality and readmissions. *The American journal of medicine*. 2010; 123:1007–1015. [PubMed: 21035590]
43. Moss-Morris RW, John, Petrie Keith J, Horne Robert, Cameron Linda D, Buick Deanna. The Revised Illness Perception Questionnaire (IPQ-R). *Psychology and Health*. 2002; 17:1–16.
44. Bureau USC. U.S. Census Bureau; 2012. State and County QuickFacts: Worcester County, Massachusetts, 2011.
45. Karlamangla AS, Merkin SS, Crimmins EM, Seeman TE. Socioeconomic and ethnic disparities in cardiovascular risk in the United States, 2001–2006. *Annals of epidemiology*. 2010; 20:617–628. [PubMed: 20609342]
46. Schoenthaler A, Kalet A, Nicholson J, Lipkin M Jr. Does improving patient-practitioner communication improve clinical outcomes in patients with cardiovascular diseases? A systematic review of the evidence. *Patient education and counseling*. 2014; 96:3–12. [PubMed: 24795073]

Highlights

- One week post-ACS, 30% of patients perceived their heart condition to be cured
- Older patients and men were more likely to perceive themselves cured
- History of stroke and hypertension, incident CHD also linked with cure perceptions
- 58% receiving CABG during hospitalization perceived their heart to be cured
- Patient-provider discussions should frame ACS as chronic to dispel cure perceptions
- Patients need realistic expectations – that CABG/PCI treat but do not ‘cure’

Table 1

Demographic and information-processing characteristics of the sample, and proportion perceiving their heart condition to be cured one week following hospitalization for acute coronary syndromes, TRACE-CARE, 2011–2013

	Overall sample, N (column %)	Proportion of subgroup who perceives heart condition is cured, N (row %)	p-value
Demographics			
Age			
<55 years	121 (30.6)	28 (23.1)	
55–64 years	128 (32.3)	38 (29.7)	0.02
65+ years	147 (37.1)	54 (36.7)	
Sex			
Male	291 (73.5)	98 (33.7)	0.02
Female	105 (26.5)	22 (21.0)	
Race/ethnicity ^a			
Non-Hispanic White	349 (89.0)	102 (29.2)	0.17
Other race/ethnicity	43 (11.0)	17 (39.5)	
Marital status			
Single/never married	52 (13.1)	14 (26.9)	
Married or living as married	246 (62.1)	80 (32.5)	0.50
Separated or divorced	64 (16.2)	15 (23.4)	
Widowed	34 (8.6)	11 (32.4)	
Characteristics related to processing and comprehension of health information			
Education			
High school or GED or less	143 (36.1)	44 (30.8)	
Some college, trade school	122 (30.8)	37 (30.3)	0.86
College/graduate school	131 (33.1)	39 (29.8)	
Health literacy ^a			
Impaired health literacy	106 (26.8)	38 (35.9)	0.15
Adequate health literacy	289 (73.2)	82 (28.4)	
Low health numeracy			
Impaired health numeracy	160 (40.4)	51 (31.9)	0.57
Adequate health numeracy	236 (59.6)	69 (29.2)	
Trust in physicians ^a			
Low trust	81 (20.9)	20 (24.7)	
Medium trust	204 (52.6)	61 (29.9)	0.10
High trust	103 (26.6)	37 (35.9)	

^aInformation missing for race/ethnicity (n=4), health literacy (n=1), and trust in physicians (n=8)

Table 2

Clinical characteristics of the sample, and proportion perceiving one's heart condition to be cured one week following hospitalization for acute coronary syndromes, TRACE-CARE, 2011–2013

	Overall sample, N (column %)	Proportion of subgroup who perceives heart condition is cured, N (row %)	p-value
Underlying clinical characteristics			
Smoking status			
Never smoker	122 (30.8)	38 (31.2)	
Former smoker	193 (48.7)	66 (34.2)	0.06
Current smoker	81 (20.5)	16 (19.8)	
Weight status			
Underweight	2 (0.5)	0 (0.0)	
Normal weight	69 (17.4)	21 (30.4)	0.92
Overweight	154 (38.9)	49 (31.8)	
Obese	171 (43.2)	50 (29.2)	
Cognitive impairment			
No	355 (89.7)	101 (28.5)	0.02
Yes	41 (10.4)	19 (46.3)	
Depression ^d			
Not likely	336 (86.4)	103 (30.7)	0.36
Probable	53 (13.6)	13 (24.5)	
Generalized anxiety disorder ^d			
Not likely	317 (80.9)	95 (30.0)	0.73
Probable	75 (19.1)	24 (32.0)	
History of Type II diabetes			
No	299 (75.5)	89 (29.8)	0.68
Yes	97 (24.5)	31 (32.0)	
History of hypertension			
No	125 (31.6)	29 (23.2)	0.04
Yes	271 (68.4)	91 (33.6)	
History of lipidemia			
No	142 (35.9)	49 (34.5)	0.17
Yes	254 (64.1)	71 (28.0)	
History of CHD			
No	273 (68.9)	95 (34.8)	0.004
Yes	123 (31.1)	25 (20.3)	
History of stroke			
No	384 (97.0)	113 (29.4)	0.03

	Overall sample, N (column %)	Proportion of subgroup who perceives heart condition is cured, N (row %)	p-value
Yes	12 (3.0)	7 (58.3)	
History of heart failure			
No	371 (93.7)	112 (30.2)	0.85
Yes	25 (6.3)	8 (32.0)	
History of cancer			
No	356 (89.9)	106 (29.8)	0.50
Yes	40 (10.1)	14 (35.0)	
Family history of CHD			
No	202 (51.0)	70 (34.7)	0.05
Yes	194 (49.0)	50 (25.8)	
Clinical presentation of ACS and in-hospital treatment			
Type of ACS			
Unstable angina	66 (16.7)	27 (40.9)	
NSTEMI	236 (59.6)	64 (27.1)	0.10
STEMI	94 (23.7)	29 (30.9)	
In-hospital procedures			
CABG	43 (10.9)	25 (58.1)	
PCI	288 (72.7)	82 (28.5)	<0.0001
Neither	65 (16.4)	13 (20.0)	
Length of stay			
Discharged same or next day	75 (18.9)	16 (21.3)	
2–3 days	214 (54.0)	64 (29.9)	0.02
4+ days	107 (27.0)	40 (37.4)	
GRACE 6-month mortality risk score ^a			
Low	196 (49.8)	54 (27.6)	
Intermediate	133 (33.8)	44 (33.1)	0.33
High	65 (16.5)	21 (32.3)	

^aInformation missing for depression (n=7), anxiety (n=4), and GRACE risk score (n=2).

Table 3

Participant characteristics associated with perceiving one's heart condition to be cured one week following hospitalization for acute coronary syndromes, TRACE-CARE, 2011–2013

	Crude OR (95% CI)	Adjusted^a OR (95% CI)
Age		
<55 years	(Referent)	(Referent)
55–64 years	1.4 (0.8–2.5)	1.3 (0.7–2.4)
65+ years	1.9 (1.1–3.3)	2.2 (1.2–4.0)
Male sex	1.9 (1.1–3.3)	2.4 (1.3–4.2)
Trust in physicians		
Low trust	(Referent)	
Medium trust	1.3 (0.7–2.3)	
High trust	1.7 (0.9–3.3)	
Smoking status		
Never smoker	1.8 (0.9–3.6)	
Former smoker	2.1 (1.1–3.9)	
Current smoker	(Referent)	
Cognitive impairment	2.2 (1.1–4.2)	
History of hypertension	1.7 (1.0–2.7)	1.8 (1.1–3.1)
History of stroke	3.4 (1.0–10.8)	4.2 (1.1–16.7)
No history of CHD	2.1 (1.3–3.5)	2.8 (1.6–4.9)
No family history of CHD	1.5 (1.0–2.4)	
Type of ACS		
Unstable angina	1.6 (0.8–3.0)	
NSTEMI	0.8 (0.5–1.4)	
STEMI	(Referent)	
In-hospital procedures		
CABG	5.6 (2.4–13.1)	4.8 (1.9–12.0)
PCI	1.6 (0.8–3.1)	1.5 (0.8–3.2)
Neither	(Referent)	(Referent)
Length of stay		
Discharged same or next day	(Referent)	
2–3 days	1.6 (0.8–2.9)	
4+ days	2.2 (1.1–4.3)	

^a Adjusted for other variables in the column.