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Self-Management of Heart Disease in Older Adults

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Abstract

The American Heart Association estimates that 81% of people who die of coronary heart disease are 65 years old or older. The leading risk health behaviors include physical inactivity, poor diet, smoking and binge drinking. Using the 2011–2012 California Health Interview Survey (CHIS), this study looked at how self-management, which includes a plan developed by a medical professional and the confidence to manage one's disease, may decrease negative risk behaviors in older adults. The presence of a plan and increased self-efficacy decreased engagement in negative dietary behaviors and low physical activity. Implications for strategies that address heart disease and self-management are discussed.

Keywords

heart disease; older adult; self-efficacy; self-management plan

Introduction

The Centers for Disease Control and Prevention (2015) cite heart disease as the leading cause of death for both men and women, with 610,000 Americans dying from heart disease each year. Heart failure is the most common cause of hospitalization for adults over the age of 65 (Heidenreich et al., 2011) and costs the nation an estimated 32 billion a year (Young, 1992). Moreover, one in five people die within a year of diagnosis (Graven & Grant, 2014). Fortunately, heart disease is highly sensitive to self-management interventions (CDC, 2015). Patients who modify their behavior can reduce hospitalizations. As a team, a physician and patient should decide on an individualized treatment plan that considers a patient's unique

factors, such as overall health, life-style and patient's expectations (Young, 1992). The treatment plan for heart disease will often include increasing physical activity, restricting the intake of fatty foods, and limiting smoking and binge drinking.

With chronic diseases, patients need to manage their disease on their own, often for a lifetime. Disease self-management, or patients' ability to apply disease knowledge and engage in activities that help maintain their own health, has been effective in reducing death and hospitalization rates (Jovicic, Holroyd-Leduc, & Straus, 2006). Recent studies show that the impact of self-management plans may be greater than new advances in medical treatment (Haynes, McDonald, Garg, & Montague, 2002; Haynes, McDonald, & Garg, 2002) and reduce hospitalizations (Kasper et al., 2002; McAlister, Lawson, Teo, & Armstrong, 2001; Rich et al., 1995; Stewart, Marley, & Horowitz, 1999). Conversely, lack of adherence to a self-management plan has been found to be risk factor for hospital readmission (Chin & Goldman, 1997; He et al., 1999; Ofili et al., 1999; Vinson, Rich, Sperry, Shah, & McNamara, 1990). Studies have shown that patients with a disease management plan displayed better behavioral health. For example, Rosenberg et al. (2014) found that coronary heart disease patients who were engaged with nurses in working towards behavioral changes were more likely to eat better and engage in more physical activity. The effectiveness of self-management plans, where health professionals provide written guidelines to assist patients with decision-making, has also been demonstrated in other chronic disease, such as asthma (Town et al., 1995) and chronic obstructive pulmonary disease (Lorig & Holman, 2003; Watson et al., 1997).

Current guidelines on treatment of heart disease recommend that patients receive education on self-management plans (Glassman, Booss, Ciraulo, & Cusack, 1997; Hunt et al., 2001). The presence of a self-management plan is only the first step in patients' ability to manage their disease. Another important aspect that has recently gained research interest is a patient's self-efficacy in regards to disease management. Bandura defined self-efficacy as an individual's optimistic belief in his or her ability to achieve a goal. Self-efficacy for managing chronic disease is related to a patient's confidence in managing various aspects of the disease, which includes communicating with physicians and symptom control (Lorig, Sobel, Ritter, Hobbs, & Laurent, 2001). Self-efficacy theory holds that the successful achievement of the action plan is more important than the plan itself (Bandura, 2004). For example, nursing studies have found that patients who actively participate in their own care can benefit from self-management plans (Farrell, Wicks, & Martin, 2004; Hiltunen et al., 2005). Furthermore, the confidence individuals have in managing their heart disease can also empower them, which in turn leads to greater self-management and behavioral changes. Conversely, low levels of self-efficacy were associated with greater symptom burden and worse overall health (Bodenheimer, Lorig, Holman, & Grumbach, 2002; Sarkar, Ali, & Whooley, 2007).

Negative health behaviors that increase the risk of heart disease include smoking, negative dietary behaviors, binge drinking, and physical inactivity (CDC, 2015). These are also the most modifiable risk factors. Negative dietary behaviors include eating fatty foods and those high in cholesterol, which increase the likelihood of obesity and put an individual at risk for cardiovascular failure (Nakamura, Fuster, & Walsh, 2014). Negative dietary behaviors

create excess weight, adding strain on the heart and a life-style lacking in physical activity is a risk for heart disease (Lloyd-Jones et al., 2010). Brown, Pavey, and Baumen (2014) found that in women between the ages of 31-90, physical inactivity outweighed all other heart disease risk factors, including smoking. Smoking can affect the heart muscles' ability to bring-in oxygen from the bloodstream. Pooling data from five contemporary cohort studies of individuals over 55, where participants were followed from 2000 to 2011, smokers were 2.4 times more likely to develop heart disease than non smokers (Carter et al., 2015). While light drinking may not be a risk factor, high levels of alcohol consumption and binge drinking are related to poor cardiovascular health (O'Keefe, Bhatti, Bajwa, DiNicolantonio, & Lavie, 2014; Waszkiewicz, Szulc, & Zwierz, 2013).

Other factors such as age, gender, socioeconomic status, race and health insurance are also related to heart disease incidence. Older adults, women in particular, are at an increased level of risk for heart disease incidence and mortality. Many older adults who have low socioeconomic status are under-insured; those living below the federal poverty level and have inadequate health insurance have also been found to have worse outcomes (Anand et al., 2008; Jousilahti, Vartiainen, Tuomilehto, & Puska, 1999). Similar findings were found in a national study looking at ethnic differences in heart disease prevalence in older adults. The study found that after accounting for age and SES, both black and Mexican-American women had significantly higher prevalence of heart disease than white women. Older women and men, black and Mexican American women, and black men were at the greatest risk for heart disease (Sundquist, Winkleby, & Pudaric, 2001).

As noted earlier, one aspect of successful heart disease management is the patient's ability to manage the disease outside of the physician's office. This study investigates the relationship between self-management plans, specifically having a plan made by a health care professional and the confidence one has in managing one's one disease, on decreasing negative health behaviors in older adults with heart disease. Negative health behaviors related to heart disease include low physical activity, negative dietary behaviors, smoking, and binge drinking.

Methods

Data

This study uses public use data from the 2011-2012 California Health Interview Survey (CHIS), a collaborative project of the UCLA Center for Health Policy Research, the California Department of Health Services, and the Public Health Institute. CHIS collected data via a telephone survey using random digit dialing samples of landline and cellular telephone numbers, as well as list samples used to augment the yield for certain racial and ethnic groups and an area sample to assess nonresponse bias. The survey has been culturally adapted for and translated into four languages outside of English: Spanish, Chinese, Korean and Vietnamese. For the purpose of this study, only individuals 65+ who reported that a doctor told them they had heart disease were selected (n= 3,026).

Dependent Variables: Negative Health Behaviors

a) The CDC (2015) includes physical inactivity, poor diet, smoking and binge drinking as risk factors for heart disease. The American Heart Association and American College of Cardiology Foundation, as well as the NIH, also recommend these changes in their treatment guidelines (Eckel et al., 2014; Tricoci, Allen, Kramer, Califf, & Smith, 2009) and used these variables as measuring adherence for heart disease prevention and recommendations (Ornish et al., 1998; Perk et al., 2012). Negative health behavior is defined by using 4 variables: low physical activity, negative dietary behavior, smoking habit and binge drinking.

b) Low physical activity combined 2 dichotomous questions measuring levels of physical activity, ranging from walking at least 10 minutes for transportation purposes to vigorous exercise in the past 7 days (Yes =1/No=2). This created a scale of 2-4, with 4 indicating less physical activity. Negative dietary behavior was created by adding together 3 questions pertaining to negative dietary behaviors. Two questions asked the number of times a participant ate fries or drank soda in the past month. These questions were recoded for a weekly average and combined with the question that asked how many times the participant ate fast food within the last week. This created a scale that ranged from 0-48. Smoking was created by CHIS and measured how many cigarettes were smoked a day in the past year. It was an ordinal variable with 6 answer choices: 1) none, 2) ≤ 1 cigarette, 3) 2-5 cigarettes, 4) 6-10 cigarettes, 5) 11-19 cigarettes, 6) ≥ 20 cigarettes. Binge drinking was also created by CHIS. For males the criteria for binge drinking are 5 and more drinks in a row on one occasion, and 4 or more drinks in a row on one occasion for females. The ordinal variable had 6 answer choices regarding drinking in the past year: 1) no binge drinking, 2) once a year, 3) less than monthly, more than once a year, 4) monthly, 5) less than weekly but more than monthly, 6) daily or weekly.

Independent Variables: Self-Management

Self-management included two variables. The first was a dichotomous question that asked whether their medical provider had created a self-management plan regarding their heart disease (Y=1/N=2). The second was a self-efficacy variable that captured how confident the participants felt managing their disease; answer choices ranged from 1=very confident to 4=not at all. Previous studies have used presence of a self-management plan as a measure of self-management (Bodenheimer et al., 2002; Lewin et al., 2002) as well as measures of self-efficacy to carry out a self-management plan (Bodenheimer et al., 2002; Sarkar et al., 2007; Sniehotta, Scholz, & Schwarzer, 2005)

Control Variables

The control variables used were age, gender (M=1, F=2), Elder Index, type of health insurance, and race. Income was measured using the Elder Index, which is a dichotomous measure of income inadequacy for adults 65+, who reside in families with 2 or fewer persons. As opposed to the Federal Poverty Level guidelines, The Elder Index has been shown to be a more accurate measure of poverty and takes into account the local cost of living. This is particularly relevant in high costs states, such as California (Wallace & Molina, 2008). Insurance coverage was a variable created by CHIS and categorized into insurance coverage specifically for the elderly over 65: 1) Medicare and Medical, 2)

Medicare and Other, 3) Medicare only, 4) Other only, and 5) Uninsured. Race/ethnicity was measured using the CHIS variable, which is based off of the Office of Management and Budget-revised guidelines (Office of Management and Budget, 1997) and the Census modification of the OMB guidelines. The variable had the following 7 values: 1) Hispanic, 2) Non-Hispanic White, 3) Non-Hispanic African American, 4) Non-Hispanic American Indian, Alaska Native, 5) Non-Hispanic Asian, 6) Non-Hispanic Native Hawaiian, Other Pacific Islander, 7) Non-Hispanic White More than one race.

Data Analysis

SPSS statistical software (Version 18) was used to perform the statistical analysis. For low physical activity and negative dietary behaviors, a multivariate regression was run. In the multiple linear regressions, insurance status and race were dummy coded. For insurance status, “Medi-care only” was the reference category and for Race the reference category was “White.”

Smoking and binge drinking were CHIS variables and were coded as ordinal; therefore, a multivariate ordinal logistic regression was planned. However, before running the model, cell sizes were checked to determine if they would be large enough. In both smoking and binge drinking it was determined that a large percentage of the cells were too small and would cause a problem in running the models. Based on the distribution of the variables (both had a large percentage that answered ‘No’), smoking and binge drinking were dichotomized into N/Y variables with higher score engaging in the negative health behavior and multiple logistic regressions were performed.

Results

Table I shows socio-demographic characteristics. Participants in this study were 65 years and up, and all had heart disease, their mean age was 76.51 (SD=6.574). There was a relatively even split of males (48.4%) and females (51.6%). The predominant race represented was White (78.2%). The majority of participants were married (45%) with the next group being divorced/separated (33.5%). Almost two-thirds of the participants had Medicare and another form of health insurance. One third of the participants had an income below the county threshold. With respect to the self-management variables, more than two-thirds had a heart disease plan. And over half felt “very confident” in managing their disease; approximately one-third felt “somewhat confident.” With a range from 2-4 and a higher score meaning more physical inactivity, the mean score was 3.14. Mean score for negative dietary behaviors was 2.5. Less than 10% of the participants were current smokers (6.1%) or binge drinkers (8.4%).

Two multivariate linear regressions were performed on the dependent variables: low physical activity (2-4) and negative dietary behaviors (0-48) (See Table II). The first model looked at low physical activity. Results showed that both self management variables were significant. Individuals who did not have a disease management plan ($B=.118$, $p<.01$) and had less confidence to manage the disease ($B=.035$, $p<.05$) engaged in significantly less physical activity. Females over the age of 65+ engaged in less physical activity than males, ($B=.111$, $p<0.001$). Elder Index and insurance coverage were not significantly related to low

physical activity. With respect to racial/ethnic comparisons, Hispanics ($B=.121$, $p<0.05$), Asians ($B=.264$, $p<.001$), and Pacific Islanders ($B=-1.081$, $p<0.05$) were significantly less likely to engage in low physical activity compared to Whites. The second model looked at negative dietary behaviors. Both self management variables were significant. Individuals who did not have a disease management plan ($B=.444$, $p<.05$) and had less confidence managing the disease ($B=.214$, $p<.05$) engaged in significantly more negative dietary behaviors. Elder Index and insurance coverage were not significantly related to negative dietary behaviors. African Americans ($B=1.307$, $p<0.01$) were more likely and Asians ($B=-1.496$, $p<.001$) were less likely to engage in negative dietary behaviors compared to Whites.

Table III shows the results of the two multiple logistic regressions. The first logistic regression looked at whether the participant smoked in the past year (N/Y). Neither self-management variable was significant. Participants who were older (OR: 1.115, 95% CI: 1.087– 1.143) and whose income was below the county threshold (OR: 1.480, 95% CI: 1.187– 1.844) were more likely to be current smokers. And Hispanics (OR 1.941, 95% CI: 1.095– 3.441) and Asian Americans (OR: 3.387, 95% CI: 1.416– 8.099) were more likely to be current smokers compared to Whites. The second logistic regression looked at whether the participants were binge drinkers in the past year. Similar to smoking, neither self-management variable was significant. Only two variables were significant: gender and age. Females were less likely to binge drink (OR: .607, 95% CI: .462– .796) and as participants got older, they were less likely (OR: .939, 95% CI: .920– .958).

Discussion

As the older population grows, the importance of self-monitoring of health becomes increasingly important to the overall health of the nation. The hypothesis was supported with physical activity and negative dietary behaviors. Those not having a disease management plan and having less confidence in one's ability to manage the disease were more likely to have low physical activity and negative dietary behaviors. However, having a plan and self-efficacy were not related to smoking or binge drinking. Age and gender were significant for three behaviors, but with varying effects. Low physical activity and smoking increased with age, but negative dietary behaviors decreased. And while females engaged in less physical activity, they were also less likely to have negative dietary behaviors. Income was only related to smoking; those who fell below the Elder Income Index were more likely to smoke. Health insurance was not related to any of the four behaviors. And with respect to ethnicity and race, Hispanics, Asian Americans, and Pacific Islanders were less likely to engage low physical activity than Whites. Hispanics and Asian Americans were more likely to smoke compared to Whites. African Americans were more likely to engage in negative dietary behaviors compared to Whites. There were no racial differences with respect to binge drinking.

An important aspect of self-management is self-efficacy and while it has been identified as a factor in increasing physical activity in older adults (Gill, Kelley, Williams, & Martin 1994; Grembowski et al., 1993), confidence to manage disease has not been studied extensively with older adults. The importance of having a self-management plan is evident when

looking at the theoretical shift made in the medical field. Traditionally, patients were given a predetermined treatment plan and expected to adhere to it. Contemporarily, this plan is a collaborative experience between healthcare provider and patient (Shoor & Lorig, 2002). Usage of self-management plans with those with chronic illness, such as heart disease, have been effective in reducing both mortality and hospitalization rates (Graven & Grant, 2014).

The lack of a significant relationship for smoking and binge drinking may have more to do with the variables than the behaviors themselves. Both variables were coded as ordinal variables in CHIS. However, before running the multivariate ordinal logistic regression, cell sizes for both variables were too small. We dichotomized the variable to yes/no; however, one consideration is that if participants did not smoke or binge drink (which as a large percentage), the self-management plan may not have included direction about these behaviors. Similarly, confidence to manage the disease would not be related if participants did not feel smoking or drinking were concerns.

The findings of this study have implications for clinical practice and future research. For those with heart disease, maintaining health means adhering to a self-management plan which includes physical activity, positive dietary behaviors, and reduction of smoking and binge drinking. Further, this study highlights the importance of self-efficacy on patient health management. Practitioners should consider patients' level of confidence in managing their disease and interventions for individuals with chronic diseases may include increasing confidence levels. Self-management education may include traditional patient education regarding the chronic disease as well as increase the patient's confidence in following the plan. Interventions should also underscore the importance of the collaborative relationship between the healthcare provider and the patient as that may influence adherence to self-management plan. Given that some racial groups were more prone to negative behaviors, even after controlling for self-management, future research should focus on exploring how race and culture influence health behaviors and how self-management plans should take those factors into consideration. One limitation of the study is that other psychosocial factors, such as depression, were not examined. Co-morbidity with depression may influence treatment of the chronic heart disease due to interactions in medications and management of the disease. It is important to have multidisciplinary treatment teams that include physicians, nurses, social workers, and community health workers to address issues of socio-cultural health literacy (Caughey, Roughead, Shakib, Vitry, & Gilbert, 2011; Ell, Oh, Lee, Guterman, 2014). Finally, given that one-third of the sample of elderly below the county threshold, future studies should take into consideration the specific needs of low-income patients.

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References

- Anand SS, Islam S, Rosengren A, Franzosi MG, Steyn K, Yusufali AH, Yusuf S. Risk factors for myocardial infarction in women and men: insights from the INTERHEART study. *European Heart Journal*. 2008; 29:932–940. doi: <http://dx.doi.org/10.1093/eurheartj/ehn018>. [PubMed: 18334475]
- Bandura A. Self-efficacy: The exercise of control. WH Freeman & Company; New York, NY: 1997.
- Bandura A. Health promotion by social cognitive means. *Health Education & Behavior*. 2004; 31:143–164. [PubMed: 15090118]
- Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. *The Journal of the American Medical Association*. 2002; 288:2469–2475. [PubMed: 12435261]
- Brown WJ, Pavey T, Bauman AE. Comparing population attributable risks for heart disease across the adult lifespan in women. *British Journal of Sports Medicine*. 2014 doi: 10.1136/bjsports-2013-093090.
- Carter BD, Abnet CC, Feskanich D, Freedman ND, Hartge P, Lewis CE, Jacobs EJ. Smoking and mortality—beyond established causes. *The New England Journal of Medicine*. 2015; 372:631–640. doi: 10.1056/NEJMsa1407211. [PubMed: 25671255]
- Caughey GE, Roughead EE, Shakib S, Vitry AI, Gilbert AL. Co-morbidity and potential treatment conflicts in elderly heart failure patients: A retrospective, cross-sectional study of administrative claims data. *Drugs & Aging*. 2011; 28(7):575–581. doi:10.2165/11591090-000000000-00000. [PubMed: 21721601]
- Centers for Disease Control and Prevention. Heart Disease Fact Sheet. 2015. Retrieved from http://www.cdc.gov/dhds/data_statistics/fact_sheets/fs_heart_disease.htm
- Chin MH, Goldman L. Factors contributing to hospitalization of patients with congestive heart failure. *The American Journal of Public Health*. 1997; 87:643–648. [PubMed: 9146445]
- Eckel RH, Jakicic JM, Ard JD, Hubbard VS, De Jesus JM, Lee I-M, Tomaselli GF. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: A report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. *Circulation*. 2014; 129:S76–S99. doi: 10.1161/01.cir.0000437740.48606.d1. [PubMed: 24222015]
- Ell K, Oh H, Lee P, Guterman J. Collaborative health literate depression care among predominantly hispanic patients with coronary heart disease in safety net care. *Psychosomatics: Journal Of Consultation And Liaison Psychiatry*. 2014; 55(6):555–565. doi:10.1016/j.psych.2014.03.007.
- Farrell K, Wicks MN, Martin JC. Chronic disease self-management improved with enhanced self-efficacy. *Clinical Nursing Research*. 2004; 13:289–308. [PubMed: 15448281]
- Gill DL, Kelley BC, Williams K, Martin JJ. The relationship of self-efficacy and perceived well-being to physical activity and stair climbing in older adults. *Research Quarterly for Exercise and Sport*. 1994; 65:367–371. doi: 10.1080/02701367.1994.10607642. [PubMed: 7886287]
- Glassman, P.; Booss, J.; Ciraulo, D.; Cusack, B. The pharmacological management of congestive heart failure. Department of Veterans Affairs, Veterans Health Administration, Publication No. 97-0007; Washington, DC: 1997.
- Graven LJ, Grant JS. Social support and self-care behaviors in individuals with heart failure: an integrative review. *International Journal of Nursing Studies*. 2014; 51:320–333. doi: 10.1016/j.ijnurstu.2013.06.013. [PubMed: 23850389]
- Grembowski D, Patrick D, Diehr P, Durham M, Beresford S, Kay E, Heecht J. Self-efficacy and health behavior among older adults. *Journal of Health and Social Behavior*. 1993; 34:189–194.
- Haynes RB, McDonald H, Garg AX, Montague P. Interventions for helping patients to follow prescriptions for medications. *Cochrane Database Systemic Reviews*. 2002; 2:CD000011. doi: 10.1002/14651858.CD000011.
- Haynes RB, McDonald HP, Garg AX. Helping patients follow prescribed treatment: Clinical applications. *The Journal of the American Medical Association*. 2002; 288:2880–2883. doi: 10.1001/jama.288.22.2880. [PubMed: 12472330]
- He J, Ogden LG, Vupputuri S, Bazzano LA, Loria C, Whelton PK. Dietary sodium intake and subsequent risk of cardiovascular disease in overweight adults. *The Journal of the American Medical Association*. 1999; 282:2027–2034. doi: 10.1001/jama.282.21.2027. [PubMed: 10591385]

- Heidenreich PA, Trogon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, Woo J. Forecasting the future of cardiovascular disease in the United States: A policy statement from the American Heart Association. *Circulation*. 2011; 123:933 doi: 10.1161/CIR.0b013e31820a55f5.
- Hiltunen EF, Winder PA, Rait MA, Buselli EF, Carroll DL, Rankin SH. Implementation of efficacy enhancement nursing interventions with cardiac elders. *Rehabilitation Nursing*. 2005; 30:221–229. [PubMed: 16294801]
- Hunt SA, Baker DW, Chin MH, Cinquegrani MP, Feldman AM, Francis GA, Smith SC Jr. ACC/AHA guidelines for the evaluation and management of chronic heart failure in the adult: Executive summary: A report of the American College of Cardiology/American Heart Association task force on practice guidelines (committee to revise the 1995 guidelines for the evaluation and management of heart failure). *Circulation*. 2001; 104:2996–3007. doi: 10.1161/hc4901.102568. [PubMed: 11739319]
- Jousilahti P, Vartiainen E, Tuomilehto J, Puska P. Sex, age, cardiovascular risk factors, and coronary heart disease: a prospective follow-up study of 14 786 middle-aged men and women in Finland. *Circulation*. 1999; 99:1165–1172. [PubMed: 10069784]
- Jovicic A, Holroyd-Leduc JM, Straus SE. Effects of self-management intervention on health outcomes of patients with heart failure: A systematic review of randomized controlled trials. *BMC Cardiovascular Disorders*. 2006; 6:43. doi: 10.1186/1471-2261-6-43. [PubMed: 17081306]
- Kasper EK, Gerstenblith G, Hefter G, Van Anden E, Brinker JA, Theimann DR, Gottlieb SH. A randomized trial of the efficacy of multidisciplinary care in heart failure outpatients at high risk of hospital readmission. *Journal of the American College of Cardiology*. 2002; 39:471–480. doi: 10.1016/S0735-1097(01)01761-2. [PubMed: 11823086]
- Lewin RJP, Furze G, Robinson J, Griffith K, Wiseman S, Pye M, Boyle R. A randomised controlled trial of a self-management plan for patients with newly diagnosed angina. *The British Journal of General Practice*. 2002; 52:194–201. [PubMed: 12030661]
- Lloyd-Jones D, Adams RJ, Brown TM, Carnethon M, Dai S, De Simone G, Wylie-Rosett J. Heart disease and stroke statistics-2010 update: A report from the American Heart Association. *Circulation*. 2010; 121:e46–e215. doi: 10.1161/CIRCULATIONAHA.109.192667. [PubMed: 20019324]
- Lorig KR, Holman HR. Self-management education: history, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine*. 2003; 26:1–7. [PubMed: 12867348]
- Lorig KR, Sobel D, Ritter PL, Hobbs M, Laurent D. Effect of a self-management program on patients with chronic disease. *Effective Clinical Practice*. 2001; 4:256
- McAlister FA, Lawson FM, Teo KK, Armstrong PW. A systematic review of randomized trials of disease management programs in heart failure. *The American Journal of Medicine*. 2001; 110:378–384. doi: [http://dx.doi.org/10.1016/S0002-9343\(00\)00743-9](http://dx.doi.org/10.1016/S0002-9343(00)00743-9). [PubMed: 11286953]
- Nakamura K, Fuster JJ, Walsh K. Adipokines: A link between obesity and cardiovascular disease. *Journal of Cardiology*. 2014; 63:250 doi: 10.1016/j.jjcc.2013.11.006.
- O'Keefe JH, Bhatti SK, Bajwa A, DiNicolantonio JJ, Lavie CJ. Alcohol and cardiovascular health: The dose makes the poison...or the remedy. *Mayo Clinic Proceedings*. 2014; 89:382–393. doi: <http://dx.doi.org/10.1016/j.mayocp.2013.11.005>. [PubMed: 24582196]
- Office of Management and Budget. Revisions to the standards for the classifications of federal data on race and ethnicity. Office of Management and Budget; Washington, DC: 1997.
- Ofili EO, Mayberry R, Alema-Mensah E, Saleem S, Hamirani K, Jones C, Igbo-Pemu P. Gender differences and practice implications of risk factors for frequent hospitalization for heart failure in an urban center serving predominantly African-American patients. *The American Journal of Cardiology*. 1999; 83:1350 doi: [http://dx.doi.org/10.1016/S0002-9149\(99\)00099-5](http://dx.doi.org/10.1016/S0002-9149(99)00099-5).
- Ornish D, Scherwitz LW, Billings JH, Brown SE, Gould KL, Merritt TA, Brand RJ. Intensive lifestyle changes for reversal of coronary heart disease. *The Journal of the American Medical Association*. 1998; 280:2001–2007. doi: 10.1001/jama.280.23.2001. [PubMed: 9863851]
- Perk J, De Backer G, Gohlke H, Graham I, Reiner Z, Monique Verschuren WM, Zannad F. European guidelines on cardiovascular disease prevention in clinical practice (version 2012): The fifth joint task force of the European Society of Cardiology and other societies on cardiovascular disease

prevention in clinical practice (constituted by representatives of nine societies and by invited experts). *European Heart Journal*. 2012; 33:2126–2126. doi: 10.1093/eurheartj/ehs092.

- Rich MW, Beckham V, Wittenberg C, Leven CL, Freedland KE, Carney RM. A multidisciplinary intervention to prevent readmission of elderly patients with congestive heart failure. *The New England Journal of Medicine*. 1995; 333:1190–1195. doi: 10.1056/NEJM199511023331806. [PubMed: 7565975]
- Rosenberg D, Lin E, Peterson D, Ludman E, Von Korff M, Wayne K. Integrated medical care management and behavioral risk factor reduction for multicondition patients: Behavioral outcomes of the TEAMcare trial. *General Hospital Psychiatry*. 2014; 36:129–134. doi: 10.1016/j.genhosppsych.2013.10.017. [PubMed: 24333157]
- Sarkar U, Ali S, Whooley MA. Self-efficacy and health status in patients with coronary heart disease: Findings from the Heart and Soul study. *Psychosomatic Medicine*. 2007; 69:306–312. doi: 10.1097/PSY.0b013e3180514d57. [PubMed: 17510290]
- Shoor S, Lorig K. Self-care and the doctor-patient relationship. *Medical Care*. 2002; 40(4 suppl):II-40–II-44. [PubMed: 12064580]
- Sniehotta FF, Scholz U, Schwarzer R. Bridging the intention–behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health*. 2005; 20:143–160. doi: 10.1080/08870440512331317670.
- Stewart S, Marley JE, Horowitz JD. Effects of a multidisciplinary, home-based intervention on unplanned readmissions and survival among patients with chronic congestive heart failure: A randomised controlled study. *Lancet*. 1999; 354:1077–1083. [PubMed: 10509499]
- Sundquist J, Winkleby MA, Pudarc S. Cardiovascular disease risk factors among older black, Mexican-American, and white women and men: An analysis of NHANES III, 1988–1994. *Journal of the American Geriatrics Society*. 2001; 49:109–116. [PubMed: 11207863]
- Town GI, Hodges ID, Wilkie AT, Toop LJ, Graham P, Drennan CJ. A community wide promotion of asthma self-management in New Zealand. *Patient Education Counseling*. 1995; 26:219 doi: 10.1016/0738-3991(94)00743-6.
- Tricoci P, Allen JM, Kramer JM, Califf RM, Smith SC. Scientific evidence underlying the ACC/AHA clinical practice guidelines. *The Journal of the American Medical Association*. 2009; 301:831–841. doi: 10.1001/jama.2009.205. [PubMed: 19244190]
- Vinson JM, Rich MW, Sperry JC, Shah AS, McNamara T. Early readmission of elderly patients with chronic heart failure. *Journal of the American Geriatrics Society*. 1990; 38:1290
- Wallace, SP.; Molina, LC. UCLA Center for Health Policy Research; Los Angeles, CA: 2008. Federal poverty guideline underestimates costs of living for older persons in California.
- Waszkiewicz N, Szulc A, Zwierz K. Binge drinking–induced subtle myocardial injury. *Alcoholism: Clinical & Experimental Research*. 2013; 37:1261–1263. doi: 10.1111/acer.12208.
- Watson PB, Town GI, Holbrook N, Dwan C, Toop LJ, Drennan CJ. Evaluation of a self-management plan for chronic obstructive pulmonary disease. *European Respiratory Journal*. 1997; 10:1267–1271. doi: 10.1183/09031936.97.10061267. [PubMed: 9192927]
- Young, LH. Heart disease in the elderly. *Yale University School of Medicine heart book*. Zaret, BL.; Moser, M.; Cohen, LS., editors. Hearst Books; New York, NY: 1992. p. 263-272.

Table 1

Demographics of participants with heart disease, age 65 and over (N =3026)

Characteristic		%
Sex	Female	51.6%
	Male	48.4%
Age (65-85), mean (SD)		76.51 (6.57)
Race	Latino	8.8%
	American Indian	3.3%
	Asian	6.3%
	African American	3.9%
	White	84.9%
	2+ Race	3.4%
Marital Status	Married	45.0%
	Living with partner	2.3%
	Divorced/separated	33.5%
	Never married	5.0%
Low physical activity (2-4), mean (SD)		3.14 (.75)
Negative dietary behaviors (0-47.5), mean (SD)		2.52(4.02)
Smoking: Number of cigarettes a day in past year		
	None	93.9%
	1	.2%
	2-5	1.5%
	6-10	1.7%
	11-19	0.9%
	20+	1.9%
Binge drinking in past year		
	None	91.6%
	Once a year	1.6%
	Less than monthly, but once or more than once a year	3.8%
	Monthly	.8%
	Less than weekly but more than monthly	1.1%
	Daily or weekly	1.2%

Table 2

Multiple Regressions for Low Physical Activity and Negative Dietary Behaviors

	Low Physical Activity ^a			Negative Dietary behaviors ^b		
	B	se	t	β	se	t
Disease management plan (Y/N)	.118**	.034	3.462	.444*	.181	2.453
Self efficacy—less confidence to manage	.035*	.016	2.231	.214*	.083	2.573
Age	.011***	.002	5.200	-.056***	.011	-5.038
Sex	.111***	.028	4.019	-.978***	.147	-6.658
Elder Index	-.024	.025	-.942	-.136	.133	-1.024
Medicare only—reference group						
Medicare + Medical	.009	.064	.113	.177	.342	.517
Medicare + other	.048	.056	.855	-.204	.297	-.688
Other insurance only	.142	.096	1.482	.289	.511	.566
Uninsured	.074	.22	.333	-1.381	1.182	-1.168
White—reference group						
Hispanic	-.121*	.051	-2.374	.469	.272	1.723
African American	.101	.074	1.362	1.307**	.395	3.312
American Indian	.213	.118	1.805	1.525*	.631	2.417
Asian	-.264***	.060	-4.370	-1.496***	.322	-4.640
Pacific Islander	-1.081*	.522	-2.072	-2.274	2.786	.414
2+ Race	-.089	.099	-.906	-.097	.526	-.185

^a $F(15,3010)=7.229***$; $R^2 = .035$.^b $F(15,3010)=9.475***$; $R^2 = .045$.* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Table 3

Logistic Regressions for Smoking and Binge Drinking

	Smoking			Binge Drinking		
	OR	95% CI		OR	95% CI	
Disease management plan (Y/N)	.976	.664	1.435	.918	.651	1.295
Self efficacy –less confidence	.861	.711	1.043	.914	.784	1.065
Age	1.115***	1.087	1.143	.939***	.920	.958
Sex	.802	.584	1.102	.607***	.462	.796
Elder Income Index	1.480***	1.187	1.844	1.106	.867	1.412
Medicare only—reference group						
Medicare + Medical	.746	.406	1.369	.705	.399	1.246
Medicare + other	1.559	.886	2.744	.663	.413	1.063
Other insurance only	1.185	.458	3.069	.752	.328	1.724
Uninsured	179129314	.000	—	.641	.076	5.411
White—reference group						
Hispanic	1.941*	1.095	3.441	1.040	.625	1.660
African American	.625	.340	1.148	.841	.395	1.792
American Indian	1.000	.332	3.012	.757	.228	2.514
Asian American	3.387**	1.416	8.099	.639	.330	1.239
Pacific Islander	83152083.5	.000	—	.000	.000	—
2+ Race	.725	.307	1.713	.517	.158	1.689
–2 log likelihood	1244.919			1678.101		
Chi-square	147.550***			66.608***		
Nagelkerke R ²	.129			.050		

*
p<0.05**
p<0.01***
p<0.001