Published in final edited form as:

J Cardiovasc Nurs. 2015 ; 30(5): 447–455. doi:10.1097/JCN.0000000000000181.

Awareness of Cardiovascular Disease and Preventive Behaviors among Overweight Immigrant Latinas

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Cardiovascular disease (CVD), including heart disease and stroke, is the leading cause of death among Latino females (31.5%), exceeding rates for males.¹ Latinas' knowledge about CVD can influence their adopting healthy lifestyle behaviors. Lack of knowledge and misperceptions about women's CVD risk can lead to delays in seeking treatment and increased risk for sudden death.² The Heart Truth campaign (National Heart, Lung, and Blood Institute [NHLBI]) introduced the "Red Dress" in 2002 as a symbol for women's heart disease awareness.³ Several national organizations, including the American Heart Association (AHA), the National Alliance for Hispanic Health, and the Office of Women's Health, have developed initiatives specifically to raise Latinos' understanding about heart disease in women. *Salud Para Su Corazón* (SPSC), designed to increase knowledge about risk factors and heart-healthy behaviors, was launched 2 decades ago by NHLBI^{4,5} and continues today with promotora-led interventions.⁶⁻⁸ Despite great strides in promoting public health outreach educational programs, survey findings still show that ethnic/racial minority populations face disparities in awareness and knowledge about heart disease and prevention strategies. Although Latinos/Hispanics (terms used interchangeably here) are included in these surveys, those at higher risk for CVD--overweight, immigrant Latinas, particularly those of Mexican descent--are not purposefully recruited. A number of factors in addition to weight may contribute to the risk of CVD in this subpopulation, including sedentary lifestyles;⁹ high rates of diabetes, metabolic syndrome, and other chronic conditions (e.g., hypertension, hypercholesterolemia);^{10,11} and socio-environmental factors.¹¹

Background

The AHA commissioned a national survey, based on random-digit telephone dialing and data from Harris Poll Online, to examine awareness of CVD and stroke.¹² Findings showed that although awareness of CVD as the leading cause of death in women improved from 1997 to 2012, substantial racial/ethnic minority gaps continue to exist, with level of awareness among Latino women ($n=200$) remaining low (34%). Similar knowledge gaps

were evident for recognition of atypical heart attack symptoms (e.g., nausea, fatigue), response to signs of heart attack by taking an aspirin (10%), and report that their doctor has ever discussed their risk for heart disease (12%). Pooled analyses of data from two other random digit dialing surveys of English-speaking, multiethnic women ($N=2147$) conducted by the AHA (2006 and 2009), revealed that age (<55 years), education (<high school) and income (<\$35,000 per year) are significant predictors of lower awareness that heart disease is the leading cause of death among women; Hispanic women ($n=325$) were less likely than non-Hispanic white (NHW) women to perceive themselves as being very well or well informed about heart disease, independent of these confounders.¹³ Other AHA survey findings indicate that Hispanics are less likely than NHW/others to know the optimal high-density lipoprotein cholesterol (HDL-C) level. Although they did not vary substantially from other groups in taking preventive actions for themselves, Hispanic women were more likely to help their children or someone else (spouse or sibling) add physical activity to their lifestyle and lose weight in the past year.¹⁴ Data from the REACH U.S. Risk Factor Survey show that fewer women and men reported having cholesterol checked in the preceding 5 years in all Hispanic communities vs. comparison populations in the same county and state.¹⁵

Findings about the relationship of CVD awareness and background characteristics among Latinos remain inconsistent across studies, with differences possibly related to the specific question raised and sample composition. Age and education reportedly are significant correlates to knowledge about heart attack symptoms.¹⁶ Moreover, among higher-risk women, based on the Framingham Risk Survey or >3 components of metabolic syndrome (MetS), Hispanics have lower awareness of leading cause of death (26% vs. 88% of NHW) and are less likely to know heart attack symptoms (58% vs. 81%, respectively).¹⁷

Data from the 2003 Behavior Risk Surveillance System (BRFSS) not only show that Hispanics in general have significantly less awareness of heart attack symptoms requiring immediate attention, but that lack of English proficiency identifies a subpopulation of Spanish-speaking Hispanics ($n=527$) with significantly less awareness of even the most commonly recognized warning symptoms, in comparison to English-speaking Hispanics ($n=698$).¹⁸ Other studies confirm significant differences in heart-related knowledge based upon language spoken among Hispanics.¹⁶ A literature review examining symptom awareness and other factors affecting treatment-seeking in Hispanics with symptoms of myocardial infarction showed that acculturation, language spoken, education, socioeconomic status, and access to health care are modifying factors influencing decision-making.¹⁹

Improvements in awareness of CVD risk factors have been reported among Latinos participating in promotor-led, healthy lifestyle intervention programs based upon *Su Corazón, Su Vida/Your Heart, Your Life (Su Corazón)*.^{20,21} This culturally-tailored intervention for Latinos, a NHLBI model curriculum, includes a variety of interactive teaching strategies.²² Similarly positive outcomes are reported from a multi-site study involving culturally diverse, high-risk women attending a comprehensive heart care program within hospital clinics and healthcare centers.²³ Pre/post-evaluations of participants in the

intervention show significant improvements in knowledge by 6 months (e.g., CVD as the leading killer of women; early warning symptoms and signs of a heart attack).

Most studies examining the question of whether knowledge of heart disease or perceptions of CVD risk influence health promotion behaviors have been conducted with predominantly white samples. The need for more studies involving women from Hispanic and other ethnic/racial minority backgrounds was identified in a comprehensive review of nursing research on women's perceptions of coronary heart disease (CHD), a type of CVD.²⁴ This review found no relationship between women's knowledge of risk factors or self-perception of risk and health promoting behaviors. Results of a recent study support this finding, showing heart-healthy behaviors (including physical activity and dietary intake) of middle-aged white women were not predicted by knowledge of CVD risk factors.²⁵ Knowledge level was positively associated with higher education and less financial strain.

In summary, existing data from surveys show evidence of improving CVD knowledge among women; however, ethnic/racial disparities in awareness continue to exist. Although Latinas are included in several surveys, underrepresented groups such as non- or low-English-speaking immigrants and overweight women are not specifically targeted in descriptive or CVD prevention studies. This study addresses gaps in current research on awareness of CVD risk factors and prevention strategies among overweight, Spanish-speaking, immigrant Latinas and the effect of a lifestyle behavior intervention on their knowledge. Knowledge also is examined in relation to dietary habits and physical activity.

Methods

This randomized controlled trial (RCT) builds upon a community-academic partnership begun over a decade ago for the purposes of conducting a health needs assessment and subsequently testing a cardiovascular health promotion outreach program utilizing lay health advisors (promotoras) under the oversight of a community advisory board (CAB).^{26,27} Past partners, as well as new members, formed the CAB that met regularly to provide guidance in all phases of this RCT. The purpose of the study was to evaluate the effects of a 6-month lifestyle behavior intervention (LSBI) that included group education to prevent CVD (first 2 months), followed by individual teaching and coaching (4 months). Participants were assigned, using a computerized randomization procedure, to either the experimental or a comparable length control condition (safety/ disaster preparedness education). All research protocols were approved by the Institutional Review Board of the University of California, Los Angeles. The data reported here are based upon a pre/post-evaluation of the group education component of the LSBI (experimental treatment). The LSBI group was composed of 111 women; complete data are available on 90 of these women who comprise the sample for this report.

Participants

Participants were screened and enrolled in four consecutive cycles from January to July 2010, conducted in two adjacent communities with similar sociodemographic profiles. Recruitment strategies included small group and individual presentations providing an overview of the study and program announcements at community settings such as parent

education centers, churches, laundromats, and organizations providing services to children and families (e.g., English-as-a-Second-Language classes, job training). Eligible women were self-reported Latina, 35-64 years of age, Spanish- and/or English-speaking, and had a BMI ≥ 25 . Women were excluded from participation if they had impaired physical mobility, type 1 diabetes, uncontrolled hypertension, or history of a heart attack or stroke. A health clearance was required for those with type 2 diabetes or hypertension controlled by diet and/or oral medications.

Lifestyle Behavior Intervention (Experimental Group)

An adapted form of *Su Corazón*⁷ was delivered in Spanish over 8 weekly sessions to small groups of 10-15 women. Four series of classes were conducted in each community (total 8 groups). Specially trained pairs of promotoras facilitated the 2-hour classes based upon sessions in the community health worker's manual for the SPSC curriculum.²² The manual was designed to train community health workers on risk factors for heart disease and to build knowledge and skills to achieve heart healthy behaviors. The sessions include cultural and language-appropriate presentations and other educational materials. In our adaptation of the curriculum, the emphasis on strategies to promote weight loss and increase physical activity was enhanced without changing basic information contained in the manual. Core content addresses areas such as heart functioning, risk factors for heart disease, symptoms of a heart attack, heart healthy eating within families, becoming more physically active, controlling blood pressure, taking care of diabetes, living smoke free, and keeping cholesterol in check. Teaching scripts, picture cards, and flip charts were among the instructional materials used by the promotoras. A variety of interactive activities and structured learning experiences were included (e.g., hands-on demonstrations, role playing and other group activities, photonovelas) as well as supplemental handouts (e.g., booklets, recipes, exercise DVD). Each class included one 10-minute physical activity break, in which participants engaged in stretching and simple exercises, along with a DVD illustration and the promotoras. Incentives given for participation included pedometers and food diaries for increasing awareness and self-monitoring of lifestyle behaviors, \$25 gift cards for each evaluation, and small gifts for class attendance.

To ensure fidelity of study protocols, a variety of activities were conducted. Initially, promotoras received 4 days of didactic content and practice teaching opportunities in implementation of *Su Corazón*, conducted by a bilingual promotora trainer with extensive experience. Members of the research team provided instruction on basic principles of research, protection of human subjects, and study protocols. Class observations, regular staff meetings, and promotora self-evaluations were performed to ensure intervention adherence over time.

Data Collection and Instruments

Prior to randomization, baseline data were collected via face-to-face interviews (dietary habits, sociodemographic questionnaire) and clinical evaluations (e.g., BMI, weight) performed by bilingual research assistants in a community setting. The CVD knowledge questionnaires were read aloud in Spanish to participants just prior to the first class and at

the end of the last class. Individual assistance was available in completing items as necessary.

CVD knowledge—Participants responded to 11 true/false statements assessing general knowledge about CVD and prevention measures; for example, “Heart disease is the leading cause of death in women,” “Men and women experience the same symptoms of a heart attack,” “Overweight women face increased risk for heart disease and diabetes,” and “Physical activity can lower a woman's risk of getting heart disease.” An item also assessed awareness that early treatment exists. The questionnaire was adapted from items administered in a telephone survey conducted by a national opinion research company (Harris Interactive Inc) to evaluate women's awareness, perception, and knowledge of CVD.²⁸ Several steps were taken in assessing the appropriateness of the questionnaire (Spanish and English versions). A draft was initially reviewed for cultural and linguistic appropriateness by four Latina community health workers representative of the target sample. The questionnaire was translated into Spanish and then back-translated. A six-member judge panel established content validity of both the Spanish and English versions. Baseline reliability for this sample was acceptable ($\alpha = .80$).

Dietary habits—Heart-healthy dietary behaviors associated with salt and sodium consumption, cholesterol and fat intake, and weight control practices were evaluated with a 27-item instrument used extensively in past *Su Corazón* research with Latinas^{7,29,30} Participants responded using a 4-point scale (0 = never to 3 = always) to the question, “How often do you do the following?”; e.g., “Cut the fat from beef and skin from chicken/turkey before cooking,” “Bake fish or other foods instead of frying,” and “Choose foods labeled low sodium, sodium free, or no salt added.” Internal consistency is acceptable in past research and satisfactory for this sample (Cronbach's $\alpha = .80$). The measure, originally developed in Spanish as part of the NHLBI Initiative for Latino CVD Prevention, has undergone translation procedures to establish conceptual equivalence, content validity, and cultural appropriateness for varying groups of Latinos.³⁰

Physical activity—The *Kenz Lifecorder Plus Accelerometer* (Kenz, Nagoya) was used to measure physical activity during waking hours for 7 consecutive days as part of the baseline evaluation. This accelerometer assesses vertical acceleration and generates “counts” of movement highly correlated with steady-state oxygen consumption ($r=.88$).³¹ Research supports the reliability and validity of the accelerometer.³²⁻³⁵ Both verbal and written instructions with illustrations were provided to ensure compliance.

Sociodemographic questionnaire and clinical measures—A basic questionnaire assessed background variables, including age, education, marital status, place of birth, length of time living in U.S., and acculturation (the latter was measured using a validated 5-item scale developed by Balcázar and colleagues;³⁶ a high score indicated greater acculturation).

Other measures—Weight was measured using a digital scale (SECA 769) to the closest 0.2 lb., with women wearing light clothing and no shoes. Height was measured to the closest

0.1 cm using the SECA 220 Hite-Mobile Portable Stadiometer. BMI was calculated as kg/m².

Data Analysis

Preliminary analyses included comparison of the 90 participants comprising the study sample with the additional 21 women from the LSBI group who did not have complete data for the CVD knowledge questionnaire; these comparisons used t-tests for normally distributed characteristics and chi-square for categorical characteristics. Change from baseline to post-intervention in the total CVD knowledge score and individual items was assessed using generalized estimating equations (GEE) for repeated measures, examining the main effect of time. The GEE models were specialized to the measurement characteristics of the outcome measure: normally distributed for the total knowledge score and binary (correct vs. incorrect) for individual items; in addition, age and education level were included in the models as covariates. Pairwise relationships of CVD knowledge scores with physical activity, dietary habits scores, and demographic variables were examined using Pearson correlation coefficients. In addition, regression analysis was used to examine the relationship of CVD knowledge scores to dietary habits and physical activity, controlling for age and education. Analyses were done using SAS 9.2.

Results

Sample

Sociodemographic and clinical characteristics of participants are displayed in Table 1. The sample was comprised of low-income women, aged 35 to 62 years (mean = 42.6, SD = 7.0), predominantly of Mexican descent (83%), with low acculturation (mean = 1.4, SD = 0.4) and educational attainment (51.7% 8th grade), and classified as obese based on BMI (mean = 32.5, SD = 5.2).

Comparison of the of the study sample ($n=90$) and the remaining 21 women enrolled in the LSBI, who were excluded on the variables in Table 1, revealed no significant differences except for age; the study sample was significantly ($p=.045$) younger than those without complete CVD knowledge scores (42.6 vs. 46.2 years).

CVD knowledge

A comparison of pre- and post-test overall scores on the Heart Disease Knowledge Questionnaire for LSBI participants showed a statistically significant change (chi square = 23.44, df = 1, $p<.001$ [from GEE analysis]), with means of 7.9 (SD $\pm$ 2.6) and 9.4 (SD $\pm$ 1.0), respectively, controlling for age and education. This improvement in scores reflects an increase in knowledge from the beginning to end of the group education with *Su Corazón*. The number and percentage of participants with correct and incorrect answers to individual items on the pre-/post-intervention questionnaires is shown in Table 2. Results of the GEE for repeated measures showed that scores significantly improved for 9 of the 11 items on the questionnaire following completion of classes, controlling for age and education. The percentage of participants aware that heart disease is the leading cause of death in women increased from 59% to 91%. Similarly, knowledge of a heart healthy diet (item #2) sharply

increased (64% to 89%), as did recognition of early treatment availability after the onset of heart attack or stroke symptoms (item #10). Risk factors for heart disease related to weight, blood pressure, and cholesterol were correctly identified by the large majority of participants at both evaluation periods; however, scores significantly increased post-intervention. An unexplained finding, of concern given the nature of the intervention, was the failure of the majority to understand that men and women may experience different symptoms of a heart attack (item #9).

Relationship of CVD knowledge, dietary habits and physical activity, and sociodemographic characteristics

Simple pairwise correlations showed no significant relationship between CVD knowledge scores (number correct) and overall dietary habits score, background characteristics (age, education, acculturation, and years living in U.S.), BMI, or physical activity. However, an association was found with the subgroup of items related to salt consumption ($r=0.255$, $p=0.015$). For example, participants with higher CVD knowledge were more likely to “Choose foods labeled low sodium, sodium free, or no salt added.” The knowledge score was not significantly related, using multivariable linear regression, to background characteristics (age, education, acculturation level, years living in US), BMI, or physical activity.

Discussion

Our findings contribute to understanding about CVD awareness of Latinas and how a promotora-facilitated group education may influence their knowledge. Our study is unique in that it included only Spanish-speaking immigrant Latinas who were overweight/obese and recruited in a community-based prevention effort rather than a clinic-affiliated intervention for women with identified health risks. Community-based cardiovascular health programs for vulnerable populations are most commonly delivered by healthcare providers as the interventionists.³⁷ Our sample was rather homogeneous in terms of most participants having low levels of education and acculturation, which may have contributed to the lack of predictive value of these background characteristics on CVD awareness. Results show that many women possessed limited knowledge in relation to selected facts about heart disease and prevention strategies. Following participation in the 8-session, culturally-tailored *Su Corazón*, statistically significant improvements were observed in their overall scores on the CVD knowledge questionnaire and nearly all of the individual items within the measure. This improved knowledge reflects content areas covered within the curriculum. Earlier community-based studies evaluating *Su Corazón* report similar findings about knowledge development.^{6,7,8} Of particular importance is the increased percentage of Latinas aware that heart disease is the leading cause of death in women following the group education (91%) in comparison to the prior low percentage (59%). This finding also is markedly higher than data reported about responses to this item among Latinas in national surveys.^{12,13} Similarly, women's recognition that treatment is available in the first few hours after the onset of heart attack symptoms is notable, given this knowledge may lead to life saving actions. Although nearly one-quarter of the women did not understand that high blood pressure was a CVD risk factor at baseline, 94% recognized this fact following completion of classes. Similarly,

significant improvements were observed for knowledge about preventive measures such as physical activity and losing weight through portion control and other dietary measures. The one area where knowledge did not improve was recognition that men and women may demonstrate differing symptoms of heart attack. This finding suggests that further attention needs to be directed towards enhancing understanding about gender differences in heart attack symptoms and the unique warning signs that women may experience.

At baseline CVD knowledge did not correlate with dietary habits or physical activity. Other studies report weak or no associations between knowledge and positive health behaviors.^{24,38,39} Although knowledge may not directly lead to behavior change, it is associated with self-regulation skills and abilities that influence engagement in self-management behaviors.⁴⁰ Social support is an important facilitator of both self-regulation and engagement in self-management behaviors.

Our findings are consistent with past research showing Latinas have limited knowledge about heart disease as the leading cause of death in women.^{12,41} The scope of our questionnaire enables us to expand understanding about knowledge of specific preventive behaviors, risk factors, and strategies for reducing CVD risk. Most Latinas in our sample were aware that overweight women face increased risk for heart disease and diabetes. However, it is unclear whether they viewed themselves at risk when this condition was present. Similarly, most women knew that eating smaller portions of foods lower in fat and calories is the healthiest way to lose weight. Nonetheless, portion control remained a challenging issue in their lives.

Study limitations and recommendations. Because evaluations of heart knowledge were conducted prior to and following group education for the LSBI group only, we are unable to evaluate change in knowledge over time across the experimental and control groups. Further, the study design prevents examination of the temporal sequence of knowledge development and change in lifestyle behaviors. The dietary habits are self-reported behavior, which is prone to subjective bias. Our findings are limited to immigrant, Spanish-speaking Latinas of predominantly Mexican descent and not generalizable to other Latino subgroups. Further research is needed to determine whether Mexican women and other Latinas with limited or no English-speaking skills are being made aware of preventative measures, in addition to CVD risk factors, in medical settings. We also recommend examining the relationships among CVD knowledge, risk perception, and change in lifestyle behavior in this population. Identification of strategies to enhance translation of knowledge into health-promoting behaviors is particularly important.

Conclusions and Implications

Our data provide evidence that a culturally tailored CVD prevention intervention for Latinas, delivered by promotoras in participants' preferred language, can make a difference in improving awareness of heart disease and prevention methods. Important opportunities exist for the involvement of promotoras as intervention facilitators with underserved, immigrant Latinas in community settings. Their preparation for this role involves specialized training by nurses and other promotora educators. The use of a standardized

manual for skill training in the *Su Corazón* curriculum prepared promotoras for their responsibilities as educators and guided them as they led sessions. Our understanding about the valuable role of promotoras in imparting knowledge was enhanced through qualitative interviews of a subsample of participants.⁴² We learned that knowledge was not simply perceived as cognitive content (facts and ideas) by Latinas; rather, knowledge development included an interactional process experienced by participants while engaged in dialogue with the promotora and other women.

Community-based prevention efforts are needed to reach many immigrant Latinas, particularly those who are disenfranchised from the mainstream health care system and those lacking English-language literacy. These Latinas may face challenges in accessing information and finding health resources and services related to CVD prevention. Balcázar and associates recommend a new paradigm for public health that integrates CHWs (promotoras) into organized community-based prevention efforts.⁶ Similarly, the Institute of Medicine called for greater roles and responsibilities for CHWs in helping to eliminate health inequities among vulnerable populations.⁴³ The effectiveness of using the CHW model to improve heart health knowledge and behaviors among minorities is further supported by findings from the largest multi-site program to date.⁴⁴ A 1-group pretest-posttest design was used to evaluate heart healthy knowledge of the 849 culturally diverse women and men (50% Hispanic) who participated in this evaluation of the NHLBI's heart health curricula.

Based upon our findings, we believe that use of CHWs/promotoras provides an excellent model for expanding access to health information that may help to reduce racial/ethnic disparities in CVD knowledge. Because promotoras are trusted and respected members of communities, they are able to recruit Latinas into community prevention efforts. Promotoras can assist nurses by locating and bringing in individuals who need nursing services, as well as by providing information about local venues where the target population may be found. They also can work towards ensuring cultural competence among nurses serving vulnerable populations and enhance their understanding about cultural health beliefs of communities.⁴⁵ As health promoters and patient advocates, nurses need to continue exploring ways to increase Spanish-speaking Latinas' awareness of CVD and prevention methods. Working with promotoras in lifestyle behavior programs for overweight, immigrant Latinas will broaden efforts at CVD prevention within communities and could potentially minimize mistrust of healthcare systems. Nurses can assist in community-based education and prevention efforts by working as members of health care teams including promotoras and by advocating for the importance of the promotora role with underserved populations. A team based approach to education about heart disease and its relationship to lifestyle behaviors, including weight management, is critical for addressing modifiable CVD risk factors.

Acknowledgements

This study was supported by funding from the National Heart, Lung, and Blood Institute (R01HL086931). The authors thank the co-investigators, Gail Harrison, Ph.D., Aurelia O'Connell, PhD, RN., and the late Antronette Yancey, M.D., M.P.H., as well as other members of the research team, Marylee Melendrez, Juan Villegas and Sumiko Takayanagi and Carmen Turner, for their assistance. This study would not have been possible without the commitment and contributions of the promotoras and Latina participants, and our community partners who graciously shared their time and efforts in this research.

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Table 1

Characteristics of Participants (N =90)

Characteristic	Mean (SD)	Range
Age (years)	42.6 (7.0)	35 - 62
Acculturation ^a	1.4 (0.4)	1 - 3
Mean years living in U.S. ^b	14.8 (5.9)	1 - 25
BMI	32.5 (5.2)	25 - 50.1
Weight	175.5 (30.4)	125 - 255
Physical Activity		
Daily Step	8389.0 (3152.5)	2081.5 - 16675.6
Daily Minutes in Moderate/Active Physical Activity	21.8 (18.8)	0.8-86.7
	Frequency	Percent
Birth Place		
Mexico	75	83.3
U.S. (but raised in Mexico)	2	2.2
Other (Dominican, Central or South American)	13	14.4
Education		
8 th grade	46	51.7
9 th -12 th grade	31	34.8
13 years	12	13.5
Marital status		
Married/living with partner	68	75.6
Divorced/widowed/single Income	22	24.4
20,000	47	52.2
\$20,001 - \$40,000	26	28.9
\$40,001 - \$75,000	17	18.9
Unemployed	66	74.1
Uninsured/No health insurance	62	69.9

^aBased on 1-5 questions with the rating scale: 1) only Spanish, 2) Spanish better than English, 3) both English and Spanish equally well, 4) English better than Spanish, 5) only English. Higher score means more acculturated.

^bBased on responses of 68 women; excludes 13 (14% of n=90) women responding >25 years and 9 (10% of n=90) who did not know or refused to respond.

Table 2

Number and Percentage of Participants with Correct/Incorrect Answers for Each Item on CVD Questionnaire, Baseline and Post-Intervention

ITEM	Baseline		Post-intervention	
	Correct	Incorrect ^I	Correct	Incorrect ^I
1. Heart disease is the leading cause of death in women.	53 (58.89%)	37 (41.11%)	82 (91.11%)	8 ^{**} (8.89%)
2. A heart healthy diet includes 6-8 portions of grain per day.	58 (64.44%)	32 (35.56%)	80 (88.89%)	10 ^{**} (11.11%)
3. A heart disease risk factor that you can do something about is high blood pressure.	69 (76.67%)	21 (23.33%)	85 (94.44%)	5 ^{**} (5.56%)
4. Heart disease develops gradually over many years and can easily go undetected.	64 (71.11%)	26 (28.89%)	78 (86.67%)	12 [*] (13.33%)
5. The healthiest way to lose weight is to eat smaller portions of a variety of foods lower in fat and calories.	79 (87.78%)	11 (12.22%)	87 (96.67%)	3 ^{**} (3.33%)
6. Total cholesterol levels should be less than 200.	67 (74.44%)	23 (25.56%)	81 (90%)	9 ^{**} (19%)
7. A heart healthy diet includes large servings of meat.	86 (95.56%)	4 (4.44%)	85 (94.44%)	5 (5.56%)
8. Physical activity can lower a woman's risk of getting heart disease.	75 (83.33%)	15 (16.67%)	86 (95.56%)	4 ^{**} (4.44%)
9. Men and women experience the same symptoms of a heart attack.	16 (17.78%)	74 (82.22%)	11 (12.22%)	79 (87.78%)
10. In the first few hours after the onset of heart attack or stroke symptoms, treatments exist that can break up blood clots to reduce the damage.	62 (68.89%)	28 (31.11%)	81 (90%)	9 ^{**} (19%)
11. Overweight women face increased risk for heart disease and diabetes.	79 (87.78%)	11 (12.22%)	88 (97.78%)	2 [*] (2.22%)

^I items with no answer given were scored as incorrect

^{**}
p<.01

^{*}
p<.05 for assessing change from baseline to post-intervention using GEE