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JOGNN CLINICAL ISSUES

Black, Hispanic, and White Women's Knowledge of the Symptoms of Acute Myocardial Infarction

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Objective: To examine Black, Hispanic, and White women's knowledge of the symptoms of acute myocardial infarction.

Design: Descriptive, nonexperimental design.

Setting: Detroit, Michigan, and San Antonio, Texas, metropolitan areas.

Participants: A convenience sample of 78 ethnically diverse women. Hispanics (n = 26) were recruited from San Antonio, Texas; Blacks (n = 26) were recruited from Detroit, Michigan; and Whites were recruited from San Antonio, Texas (n = 13), and Detroit, Michigan (n = 13).

Main Outcome Measures: Participants ranked 10 acute symptoms they believed represented a myocardial infarction: anxiety, arms ache, change in thinking, chest pain, cough, fatigue, decreased appetite, headache, indigestion, and shortness of breath. Next, participants assigned a likelihood score for each acute symptom as representing a myocardial infarction.

Results: Hispanic women were more likely than Black women to perceive the symptom of headache as indicative of a myocardial infarction. Women older than age 45 were more likely to assign a higher likelihood score to the symptom of shortness of breath than were women age 45 or younger.

Conclusions: Age and ethnic differences were noted in women's perception of the signs and symptoms indicative of a myocardial infarction. *JOGNN*, 34, 505-511; 2005. DOI: 10.1177/0884217505278222

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Despite the fact that women are more likely than men to die after a myocardial infarction (MI) (Vaccarino et al., 1998; Vaccarino, Parsons, Every, Barron, & Krumholz, 1999), women are less likely than men to seek medical attention after the onset of initial symptoms (Gurwitz et al., 1997; Penque et al., 1998) because of family and social responsibilities (Arslanian-Engoren, 2000) and issues related to cost, transportation, and previous experiences with the health care system (Lesneski & Morton, 2000).

Explanations for these delays have been linked to perceptions of low heart disease risk (Finnegan et al., 2000), lack of recognition of initial symptoms (Dempsey, Dracup, & Moser, 1995; Meischke et al., 1999), differences in symptoms experienced and symptoms expected (Horne, James, Petrie, Weinman, & Vincent, 2000), and the desire to self-treat to maintain control (Caldwell & Miaskowski, 2000). In addition, patient age (Dracup & Moser, 1997) and race (Lee, 1997) have been identified as factors that influence the delay of treatment-seeking behaviors. Delays among Black patients have been associated with an increased incidence of dyspnea and decreased incidence of chest pain (Lee, 1997).

This investigation determined the symptoms women think most likely indicate a MI and whether they differ for Black, Hispanic, and White women.

Women's knowledge of MI symptoms informs their decisions to seek or avoid emergency care. Uncovering this knowledge is critical to developing interventions aimed at decreasing the time it takes women to seek treatment after the initial onset of acute cardiac symptoms. The purpose of this study was to determine the symptoms women think most likely indicate a MI and to determine whether these perceptions differ for Black, Hispanic, and White women.

Literature Review

Coronary heart disease (CHD), the single largest killer of American women, affects women of all ethnic and racial groups (American Heart Association, 2003). However, Black women have the highest overall CHD death rates and the highest age-adjusted out-of-hospital or emergency room death rates (Gillum, 1997). Collectively, Black and Hispanic women account for approximately 25% of the CHD deaths among women. In addition, increased mortality has been noted among Blacks and Whites who reside in the rural South and among Blacks who reside outside the South in major metropolitan areas (Barnett & Halverson, 2000).

Risk factors for CHD include age, race, family history of CHD, diabetes mellitus, hypertension, hyperlipidemia, obesity, cigarette smoking, menopause, and sedentary lifestyle (American Heart Association, 2003). Although the incidence and mortality rates from CHD increase with age, CHD does affect younger adult women. Approximately 3% of women 25 to 44 years of age have known disease, compared with approximately 27% of women age 65 and older (American Heart Association, 2003).

The past medical history for women with CHD is likely to include systemic hypertension (Coronado, Griffith, Beshansky, & Selker, 1997; Zucker, Griffith, Beshansky, & Selker, 1997), diabetes mellitus (Coronado et al., 1997; Zucker et al., 1997), and heart failure (Vaccarino, Krumholz, Yarzebski, Gore, & Goldberg, 2001; Zucker et al., 1997). Diabetes mellitus is more common in women having a first MI and increases the risk of atypical angina and silent MI (Peberdy & Ornato, 1992). In addition, the majority of women with MI experience at least one symptom prior to the actual MI (McSweeney, Cody, & Crane, 2001; McSweeney & Crane, 2000), such as unusual fatigue, shortness of breath, upper back pain (McSweeney et al., 2001) and sleep disturbance (McSweeney et al., 2003).

Women with MI often have non–Q wave changes on electrocardiogram, complain of pain in the chest, arm, neck, epigastric or back areas, and complain of nausea or loss of appetite. Other complaints include intrascapular pain, severe fatigue, shortness of breath, and dull pain between the breasts (Arnstein, Buselli, & Rankin, 1996).

The purpose of this study was to examine women's knowledge of acute MI symptoms. Risk reduction requires accurate knowledge of how to remain healthy and avoid or minimize health threats. The Health Belief Model (Becker, 1974; Becker & Maiman, 1980; Janz & Becker, 1984) provided the theoretical framework for this investigation. The concepts believed to predict health-promoting behavior include the following: perceived susceptibility to illness, perceived severity of illness, perceived threat of illness, perceived benefits of health-promoting behavior, perceived barriers to healthy behavior, cues to action to perform healthy behaviors, and self-efficacy to perform them.

This study addressed several components of the model. Perceived susceptibility is defined as one's belief or opinion that one will contract a specific health condition, whereas perceived severity is one's belief or opinion of the medical and social consequences of a given health condition and its sequelae. Perceived threat is a combination of perceived susceptibility and perceived severity. Cues to action are salient triggers (e.g., education, symptoms, media information) that precipitate a decision to act. Asking women to rank the acute symptoms most associated with MI helps to illuminate the bodily cues that might precipitate or hinder prompt treatment seeking.

Methods

After obtaining University Institutional Review Board and data collection site approval, a descriptive study was conducted. Participants were recruited from churches and community centers located in the Detroit, Michigan, and San Antonio, Texas, metropolitan areas. These areas were selected for their demographic characteristics and representative populations of Black, Hispanic, and White women. Twenty-six Hispanic women (n = 26) were recruited from the San Antonio, Texas, area; 26 Black women (n = 26) were recruited from the Detroit, Michigan, area. Equal numbers of White women were recruited from San Antonio, Texas (n = 13), and Detroit, Michigan (n = 13). Participants met the following inclusion criteria: (a) female; (b) 18 years or older; (c) self-identified as Black, White, or Hispanic; (d) a resident of the Detroit, Michigan, or San Antonio, Texas, metropolitan area; and (e) able to read and speak English. Excluded from this study were women with known cancers, mental health disorders, brain disorders, or CHD.

Sample Size

Quota sampling strategies were used to achieve equal numbers of women from diverse ethnic backgrounds. It was important to compare the responses of ethnically diverse women, as women of different ethnicities have disparate cardiac outcomes (American Heart Association,

2003). Explicating the factors that contribute to these disparities will help minimize the negative consequences of all women, particularly women of color, who suffer a MI.

Based on the power analysis methods and definitions of Cohen (1988), a total of 78 participants was needed for the study. The sample size of 26 per group was selected to provide 80% power to detect large differences between group means at an alpha level of .05 for a two-tailed test. However, because 8 of the 78 participants provided inconsistent responses between the rankings assigned to the symptom and the corresponding MI likelihood scores, the responses of these eight participants were deleted from the final analysis. Therefore, the final sample size was 70 participants.

Data Collection Procedure

To gain access to community-dwelling women in the Detroit, Michigan, and San Antonio, Texas, metropolitan areas, clergy members and executive directors at churches and community centers were contacted. The nature of the investigation, the time commitment, and the amount of participant involvement were explained. After obtaining permission to collect data, recruitment flyers were posted at each data collection site. Interested participants contacted the principal investigator or research assistant designee by telephone or by e-mail, indicating their willingness to participate.

At the time of contact, the nature of the investigation, the amount of participant involvement, and the participant's questions were addressed. After obtaining verbal agreement to participate, data collection was scheduled at a mutually convenient time. The data collection sessions occurred in quiet, well-lit rooms, which were easily accessible and conveniently located.

At the beginning of the data collection session, participants were informed that completion of the demographic questionnaire was indicative of informed consent. Upon collection of the demographic questionnaire, participants completed a brief quantitative questionnaire in which they were asked to rank a list of 10 acute symptoms: anxiety, arms ache, change in thinking, chest pain, cough, decreased appetite, fatigue, headache, indigestion, and shortness of breath. Symptoms were selected based on a literature review of acute symptoms of women with MI.

Next, participants were asked to assign a likelihood score for each acute symptom, using a visual analog scale from 0 mm (*not very likely*) to 100 mm (*very likely*). Visual analog scales are considered reliable, valid, and sensitive measures of subjective experiences (Gift, 1989) and were selected for their ease of completion, convenience, and low degree of participant burden (Wewers & Lowe, 1990). At the completion of the data collection session, each participant received a University of Michigan School of Nursing pen and a certificate of appreciation for their time and involvement.

Data Analysis

Data analysis included descriptive and bivariate analyses. Descriptive statistics stratified by ethnic group were used to characterize the sample. A significance level of $p < .05$ was established for all statistical analyses (SPSS 11.0, SPSS Science Inc., Chicago, IL). Chi-square and analysis of variance procedures were used to analyze overall MI likelihood scores as well as group differences in MI likelihood scores. Given that analysis of variance procedures only determine between-group differences without specification of how the groups actually differed, additional analytic procedures (post hoc Tukey) were used to determine which ethnic groups differed.

Results

Demographic Characteristics

Participants ranged in age from 18 to 80 years of age, and most were employed and married. The demographic characteristics of the 78 participants by ethnic group are presented in Table 1.

Despite differences in ethnicity, age, and geographic residence, participants were able to identify correctly acute symptoms of MI.

The ethnic groups differed in educational preparation [$F(2,75) = 9.974$, $p < .001$], household income [$F(2,74) = 10.539$, $p < .001$], and family history of heart disease [$F(2,75) = 3.571$, $p = .033$). Post hoc analysis revealed that Hispanic participants were less likely to have completed college than were Black ($p < .001$) or White participants ($p = .008$). Hispanic participants were more likely to have an annual household income of less than $40,000, compared with Black ($p < .001$) and White participants ($p = .017$). On post hoc analysis, family history of heart disease was not significantly different between the groups.

Acute Symptoms

The participants' ranking of the 10 acute symptoms from 1 (*greatest association with MI*) to 10 (*least associated with MI*) were compared across ethnic groups (Table 2). Ethnic differences were found in the ranking of two acute symptoms: chest pain [$F(2,67) = 3.589$, $p = .033$] and headache [$F(2,67) = 4.557$, $p = .014$]. Post hoc analy-

TABLE 1
Participants' Demographic Characteristics (N = 78)

Characteristic	Black	Hispanic	White	All
Age, Mean ± *SD*	48 ± 13	42 ± 8	49 ± 14	46 ±12
Characteristic, frequency (%)				
Ethnicity	26 (33%)	26 (33%)	26 (33%)	78 (100%)
Marital status				
Married	19 (73%)	12 (46%)	13 (50%)	44 (56%)
Education				
College	17 (65%)**	3 (11%)**†	13 (50%)†	33 (42%)
Employed				
Yes	19 (73%)	19 (73%)	19 (73%)	57 (73%)
Household income				
<$40,000	6 (23%)	21 (81%)	7 (27%)	34 (44%)
≥$40,000	19 (73%)	5 (19%)	19 (73%)	43 (55%)
Past medical history				
Diabetes mellitus	7 (27%)	3 (12%)	3 (12%)	13 (17%)
Smoking	3 (12%)	4 (15%)	4 (15%)	11 (14%)
Family history CHD	8 (31%)	8 (31%)	16 (62%)	32 (41%)
Hypertension	12 (46%)	8 (31%)	4 (15%)	24 (30%)
Ulcers	3 (12%)	2 (8%)	3 (12%)	8 (10%)
GERD	3 (12%)	4 (15%)	6 (23%)	13 (17%)
BMI ≥ 30	10 (38%)	10 (38%)	9 (35%)	29 (37%)

Note. CHD = coronary heart disease; GERD = gastroesophageal reflux disease; BMI = body mass index.

*Significant differences at $p < .05$; ** significant differences at $p < .001$.

†Significant differences at $p = .008$.

TABLE 2
Rankings of Acute Symptoms as Indicating Myocardial Infarction (n = 70)

Acute Symptom	Black Mean ± SD	Hispanic Mean ± SD	White Mean ± SD	All Mean ± SD
Anxiety	5.7 ± 2.0	5.8 ± 2.0	5.7 ± 1.9	5.8 ± 1.9
Arms ache	3.6 ± 2.2	4.0 ± 2.8	3.4 ± 2.4	3.7 ± 2.5
Change in thinking	7.4 ± 2.5	7.3 ± 3.2	8.5 ± 1.6	7.6 ± 2.5
Chest pain	1.4 ± 1.2	2.7 ± 2.9	1.4 ± 0.7	1.8 ± 1.9
Cough	7.9 ± 1.9	7.6 ± 2.5	7.8 ± 2.2	7.8 ± 2.2
Decreased appetite	8.4 ± 2.0	7.7 ± 1.5	7.3 ± 1.9	7.8 ± 1.8
Fatigue	5.5 ± 2.2	5.0 ± 2.1	5.3 ± 2.2	5.2 ± 2.2
Headache	6.7 ± 1.7*	5.2 ± 2.0*	6.4 ± 2.1	6.1 ± 2.1
Indigestion	5.5 ± 1.9	6.2 ± 2.0	5.3 ± 2.2	5.7 ± 2.0
Shortness of breath	2.7 ± 1.4	3.4 ± 2.4	3.0 ± 1.6	3.0 ± 1.8

Note. Symptoms ranked on 1 to 10 scale, with 1 being the greatest association with myocardial infarction and 10 being the least association with MI.

*Significant differences at alpha .05.

sis revealed differences between Hispanic and Black women's perception of headache as a symptom of MI ($p = .013$). Hispanic participants were more likely to rank headache as a symptom indicative of MI than were Black participants. In addition, a trend was noted ($p = .058$) for Hispanic participants to be less likely to associate chest pain with MI.

When responses were analyzed by geographical area, women who resided in the San Antonio, Texas, metropolitan area ranked the symptom of headache as more indicative of MI (mean = 5.4, *SD* = 1.8) than did participants who resided in the Detroit, Michigan, area (mean = 6.9, *SD* = 2.0); $t = 3.360$, $df = 68$, $p = .001$). In contrast, women who resided in the Detroit, Michigan, area rated the symptoms of shortness of breath (mean = 2.6, *SD* = 1.2) and indigestion (mean = 5.11, *SD* = 1.7) as more indicative of MI than did women in the San Antonio, Texas, area (mean = 3.4, *SD* = 2.3 and mean = 6.22, *SD* = 2.2, respectively). Geographical differences were significant for two of these three symptoms: headache ($t = 3.36$, $df = 68$, $p = .001$) and indigestion ($t = 2.35$, $df = 64.68$, $p = .022$). Differences in ratings of shortness of breath trended toward significance ($t = 1.989$, $df = 51.67$, $p = .052$) but were not statistically different. No other group differences were noted.

MI Likelihood Scores

The MI likelihood scores for each symptom, with a possible range of 0 (*not likely*) to 100 (*very likely*), were tabulated and compared across ethnic groups (Table 3). Differences were seen in MI likelihood scores for the symptom of headache. Hispanic participants assigned the symptom of headache a higher mean likelihood score than did Black participants. There was no difference in likelihood scores for the headache symptom between White participants and either Black or Hispanic participants. Scores for the remaining symptoms were similar across the three groups.

When responses were analyzed by age, women older than age 45 assigned the symptom of shortness of breath a higher likelihood score than did women age 45 or

TABLE 3
Ratings of Likelihood of Myocardial Infarction Associated With Symptoms (n =70)

Acute Symptom	*Black* Mean ± SD	*Hispanic* Mean ± SD	*White* Mean ± SD	*All* Mean ± SD
Anxiety	49 ± 24	50 ± 27	59 ± 19	53 ±24
Arms ache	61 ± 26	67 ± 26	66 ± 23	65 ± 25
Change in thinking	27 ± 22	27 ± 27	29 ± 23	28 ± 24
Chest pain	87 ± 11	88 ± 12	87 ± 10	87 ± 11
Cough	22 ± 16	28 ± 26	22 ± 16	24 ± 20
Decreased appetite	26 ± 25	43 ± 22	38 ± 23	36 ± 24
Fatigue	50 ± 24	54 ± 27	55 ± 23	53 ± 25
Headache	35 ± 21*	53 ± 23*	44 ± 25	44 ± 24
Indigestion	53 ± 28	55 ± 22	54 ± 26	54 ± 25
Shortness of breath	81 ± 16	84 ± 13	76 ± 16	80 ± 15

Note. Likelihood scores measured using horizontal VAS where 0 = not likely, 100 = very likely.

*Significant differences at alpha .05.

younger (mean = 84, *SD* = 11, versus mean = 76, *SD* = 17; $t = 2.185$, $df = 68$, $p = .032$). When geographic regions were compared, women who resided in Texas assigned a higher likelihood score to the symptom of headache than did women who lived in Michigan (mean = 52.76, *SD* = 20.29 versus mean = 35.00, *SD* = 23.47); $t = 3.387$, $df = 68$, $p = .001$).

Discussion

This study showed that despite differences in ethnicity, age, and geographic residence, women participants were able to identify correctly acute symptoms highly indicative of MI. The symptoms of chest pain, shortness of breath, and achy arms were selected in descending order as the top three symptoms of MI by all participants and were ascribed the three highest MI likelihood scores.

However, Hispanic and Black women perceived the symptom of headache differently. Hispanic women perceived the symptom of headache as more indicative of MI and assigned it a higher MI likelihood score than did Black women. In addition, differences in ranking and likelihood scores were noted based on the participants' geographical area of residence. Participants who resided in the San Antonio, Texas, metropolitan area were more likely to consider headache as a significant symptom of MI and more likely to assign it a higher MI likelihood score than were participants who resided in the Detroit, Michigan, metropolitan area. Other than minor differences, participants of different ethnicity, with different levels of education and income, living in different cities provided nearly identical rankings and likelihood scores for symptoms associated with MI.

The identification of shortness of breath as an acute symptom of MI is supported by the findings of McSweeney et al. (2003), in which shortness of breath was one of the most frequently experienced symptoms of women with MI. The ranking of chest pain as the primary symptom of MI by participants in this study was similar to the findings of other studies, in which 67% of Black, Hispanic, and White women rated it as a warning sign of MI (Mosca et al., 2000), as did 58% of an ethnically diverse sample of Black, Hispanic, White, and Asian/Pacific Island women (Goff et al., 1998).

Women of color ranked chest pain as a primary symptom of MI (Goff et al., 1998; Lee, Bahler, Chung, Alonzo, & Zeller, 2000; Milner et al., 1999). However, among studies of predominantly White women, nearly half of all women who had a MI did not experience chest pain (Canto et al., 2000; McSweeney et al., 2003; McSweeney & Crane, 2000).

Findings from this study may be explained by efforts to inform women of MI symptoms. Recent national efforts by the American Heart Association, including the recent Red Dress Campaign, have brought attention to women's MI risk factors, warning signs, and immediate need for prompt medical evaluation and treatment of symptoms. In addition, personal knowledge of MI symptoms may have been acquired vicariously through the experiences of family members, friends, and neighbors.

Two limitations of the current study were the reliance on a convenience sample of women who resided in the Detroit, Michigan, and San Antonio, Texas, metropolitan areas and the small number of study participants. The knowledge of these women may not necessarily reflect the understanding of other women who reside in other geographical areas or regions. Participants were not asked about specific treatment-seeking decisions.

Nurses can utilize women's existing knowledge of MI symptoms to educate them on behaviors that promote cardiac health.

To maximize the cardiac health of all women, especially women of color, it is essential that future studies go beyond increasing women's awareness of MI symptoms and promote healthy lifestyle behaviors, such as exercise

and smoking cessation, to decrease the likelihood of experiencing a MI. Nurses, by virtue of their commitment to patient teaching, are in a unique position to use women's existing knowledge of MI symptoms and to educate them about behaviors that promote cardiac health. Building on this foundation of awareness, future investigations can focus on strategies to help women actualize and sustain heart-healthy behaviors.

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