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Validation of a Cultural Cancer Screening Scale for Mammogram Utilization in a Sample of African American Women

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Abstract

Background: The Cultural Cancer Screening Scale (CCSS) was developed to identify cultural factors relevant to breast and cervical cancer screening in a sample of Hispanic and White women in Southern California. This scale identified five distinct cultural factors as relevant in cancer screening decision making.

Objective: The purpose of this study was to consider psychometric estimates of the validity and reliability of this scale in a sample of African American women residing in an urban area of New Jersey.

Interventions/Methods: One hundred and twenty-two women, aged 40 to 90, with no prior history of breast cancer participated in the study. Internal consistency, reliability, construct and predictive validity were assessed.

Results: Exploratory factor analysis resulted in the formation of five subsets: cancer screening fatalism; negative beliefs about health professionals; catastrophic disease expectations; symptomatic deterrents; and sociocultural deterrents, all clearly independent of each other. The Chronbach's alpha for the composite score of the scale was 0.89. Predictive validity of the composite scale score was not significant, But four cultural items: 'problems making an appointment'; 'lack of transportation'; 'discomfort with health professionals'; and 'health professionals inappropriately touch their patients' were significant.

Conclusions: Overall, the CCSS demonstrated acceptable preliminary values of reliability and validity in this population.

Implications for Practice: Cultural and social factors relevant to cancer screening are very important for all women. The CCSS has not yet been used in nursing research, but would be very

appropriate for nurses to use to better understand why women choose to access cancer screening services.

Background

African American women younger than 40 years of age have a higher incidence of breast cancer than non-Hispanic White women.[1] This incidence declines below that of White women for women 40 and older, yet African American women are more likely to die from the disease at any age than are White or Hispanic women.[1] African American women are more likely to be diagnosed with tumors of larger size and with distant stage.[1] And while the five year relative survival rates have increased for both White and African American women since 1975, a significant survival disparity remains. Data from 2010 show a five year relative survival rate for African American women at 77% as compared to 90% for white women.[2] This disparity has been attributed to later stage at diagnosis, poorer stage-specific survival, and more aggressive tumor characteristics for African American women.[1]

Socio-economic and demographic factors must be taken into account when considering stage at diagnosis and survival for women of diverse race and ethnicity with breast cancer. Poverty and a lack of insurance have been associated with lower survival rates.[3] There is a consistent association between diagnosis at later stage and survival after a breast cancer diagnosis and socioeconomic status – lower income women have a significantly greater risk of dying of breast cancer than do higher income women.[4-6] It can be difficult to tease apart the associations between low socioeconomic status and race and their separate direct and indirect effects on cancer stage at diagnosis and mortality (perhaps related to access to cancer screening, insurance status, trust in medical personal, or genetic/genomic effects). Further influencing prognosis, in a study of the effect of race and ethnicity on access to care, treatment delays were found for African American women. These delays were independent of health insurance, stage at diagnosis, and age.[7]

Most studies that have examined breast cancer outcomes across racial and ethnic groups have focused on access to and utilization of screening services. Obtaining a mammogram is one of the most effective means of identifying breast cancer at an early stage, but adherence to a regular schedule of mammography is necessary to gain the full benefits of early detection: improved prognosis and wider range of treatment options.[1] Many studies have found that minority women are less likely to be screened, or to maintain adherence.[8-10] Various factors have been proposed to explain the decreased likelihood of minority women to be screened, these include poverty, lack of insurance and decreased access to services[3,6], lack of knowledge[11,] fear and fatalism[9, 10] health care discrimination[11], or a lack of social support.[12,13] Betancourt and colleagues suggest that associations between such factors and health disparities may be related to cultural differences between health care professionals and the culturally diverse patient populations whom they serve.[14] These authors suggest that these possible cultural differences should be identified and measured in populations of women, so that this information can be used to develop tailored interventions to increase cancer screening behaviors in diverse populations of women.

Research Instrument

Betancourt and colleagues developed the Cultural Cancer Screening Scale (CCSS) to identify cultural factors relevant to breast and cervical cancer screening. This tool was developed and validated in a sample of 314 women (165 Hispanic and 149 White women) in Southern California. Five distinct cultural factors were first expressed in interviews and then validated as relevant in cancer screening decision making: sociocultural deterrents (e.g. having problems making an appointment, lack of transportation); cancer screening fatalism (e.g. it is not important to screen regularly because everyone will eventually die of something); symptomatic deterrents

(e.g. feeling healthy is a reason not to screen); catastrophic disease expectations (e.g. breast cancer is the worst thing that could happen); and negative beliefs about health professionals (e.g. health professionals are not compassionate). Chronbach's alphas for the overall CCSS were high (0.84 in the Hispanic sample, 0.83 in the sample of White women, 0.84 for the total sample). Significant differences were noted between the White and Hispanic samples of women, with Hispanic women scoring higher on individual cultural factors and the overall CCSS. A structural equation model was used to test the predictive validity of the CCSS demonstrating a good fit of the data; women with higher composite scores on the CCSS were less likely to be adherent with mammogram screening (one screening a year over five years) ($b = 0.26$, $P < 0.01$).[14]

Chang and Chau explain that the best way to describe and measure a construct is by developing a research tool from the perspective of the culture to be studied.[15] Time and cost make this rarely feasible, particularly so if you consider the methodology used by Betancourt et al, which began with observations from semi-structured interviews, lead to the development of an instrument, and concluded with the testing of hypotheses using the new tool.[14] Li and colleagues suggest that researchers should make use of existing knowledge by building on the work of other researchers.[16] Medina-Shepherd and Kleier describe the adaptation and psychometric testing in a new cultural group of an instrument developed and validated in a different cultural group as a way to not only save time and money, but also to facilitate the exchange of ideas between researchers.[17]

Purpose

The primary purpose of this study was to validate the CCSS in a sample of African American women for whom the diagnosis of breast cancer is a significant health challenge. If the

CCSS is predictive of mammogram utilization in this population, then it can be used in the development of tailored interventions for this population. Secondarily, if the social and cultural factors included in the CCSS are found to be relevant in a sample of African American women, as they have been found to be previously in Hispanic and White women, perhaps researchers can find overriding cultural themes relevant across racial and ethnic groups of women that can be utilized in broader outreach efforts in cancer screening.

Methods

This study was conducted in two primarily African American Baptist churches in a low income urban area of New Jersey. The eligibility criteria for participation was literacy in English, and age 40 and older (the American Cancer Society recommends that screening mammography begin at 40 years of age[18]). During a Sunday service, either the researcher or a research assistant, who was a student nurse and a well-respected member of one of the congregations, spoke to the parishioners describing the study, which was to be held immediately after the service on the church grounds. Any woman who was interested in participating and met the eligibility criteria was given a consent form. Following the return receipt of a signed consent, women were given the surveys. The women received five dollar gift cards for their effort. The researcher and the research assistant were available to answer questions and assist women in completing the survey. This study was approved by the Institutional Review Board of Rutgers University.

Measures

The CCSS is a 20 item multidimensional self-report scale that measures five distinct cultural factors: cancer screening fatalism (CSF); negative beliefs about health professionals (NBHP); catastrophic disease expectations (CDE); symptomatic deterrents (D); and sociocultural

deterrents (SCD).[14] Betancourt and colleagues describe a bottom up approach in this instrument's development in which observations were made directly from the population of interest through open-ended, semi-structured interviews.[14] Many of the items included in the scale were developed using the exact terminology and language that women used during their interviews.[14] These items have been collapsed into three sections, section one includes 2 CDE and 3 CSF items, section 2 includes 7 SCD and 3 SD items, and section 3 includes 5 NBHP items all with the same seven point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree).[14] This researcher added six questions addressing demographics and mammogram utilization to the CCSS. The entire survey took the women approximately 15 minutes to complete.

Data Analysis

Data were analyzed with SAS version 9.3.[19] Descriptive statistics were generated to describe the sample demographics. The internal consistency of the CCSS was evaluated using the Cronbach's alpha coefficient and corrected item-total correlation for the overall scale and for each of the three subscales. Construct validity was examined with exploratory factor analysis. Predictive validity for each CCSS scale item, for the total score of each of the 3 sections and for the composite CCSS score was assessed. Two outcome variables were measured, whether the participant had ever had a mammogram, and whether she had had a mammogram within the previous year. We hypothesized that women with a higher score on the CCSS would be less likely to have had a mammogram in the past year, as was found in the tool's initial testing.[14] We developed a logistic regression model for the outcome variable 'mammogram within the past year'. A receiver operating characteristic (ROC) analysis was conducted to examine the ability of the CCSS to predict or explain the mammography decision making in this sample of women. The ROC statistic provides a measure of a test's diagnostic ability, in that a test should be able to

predict or discriminate between the two cases or states of the subject – in this case women who have had a mammogram in the last year and women who have not had a mammogram in the last year. By convention the ROC statistic is considered to be a value between 1.0 and 0.5.[20, 21]

Results

One hundred and twenty two women completed the survey. The mean age was 63.7, with a range of 40 to 90 years of age. Forty four percent of the women were married and 38% were college graduates. Only 8.2% of the women reported being uninsured; 45.8% were Medicare beneficiaries. Almost all of the women reported having ever had a mammogram (95.9%) with a high number of women (78.7%) reporting having had a mammogram in the last year as well. See Table 1 for these descriptive statistics.

Reliability

To evaluate internal consistency, Chronbach's alpha was calculated for the overall CCSS and each of the three subscales. The Chronbach's alpha for the composite score was 0.89. To identify poorly functioning items within the subscales, correlations between subscale items were performed. A correlation of less than 0.30 between an item and the subscale score was consistent with a poorly functioning item. Items one and two, the only measures of "catastrophic disease expectations", while correlated with each other, had correlations below 0.2 with the other items in the first subscale. When items one and two were deleted the Chronbach's alpha for the first subscale (0.65) increased to 0.66 (item one) and 0.67 (item two). For the other items and subscales, significant bivariate correlations were detected.

Construct Validity

To examine the construct validity of the CCSS scale, the items of the 3 subscales were pooled and exploratory factor analysis was employed. A principal component analysis was used to provide factors. The factors were then rotated orthogonally using the varimax procedure (without Kaiser normalization). The rotated factor matrix is presented in Table 2. Factor extraction was guided by the theory used in development of the scale, and the criteria that only factor loadings over 0.3 would be retained. Five factors were extracted, which correlated exactly with the theoretical underpinnings of the scale development. These five factors accounted for 92% of the total variance. The communalities listed in Table 3 reflect the amount of variance in one variable shared by all the other variables. Low values indicate unreliable variables. The communalities range from 0.34 to 0.94.

Predictive Validity

Predictive validity of the scale was evaluated in this population through the development of a logistic regression model. The outcome variable 'having had a mammogram in the last year' was used for the logistic regression model. Results of the logistic regression are presented in Table 3. While the composite score for each of the three subscales and the total scale were not significant, four items of the CCSS scale were found to be significant in the logistic regression model. Having problems making an appointment (sociocultural deterrent) decreases the odds of obtaining a mammogram within the last year. Specifically, the odds of having a mammogram within the last year decreases 18% with each unit increase in the level of difficulty in making an appointment (p-value: 0.05). Not having transportation (sociocultural deterrent) to get to my appointment decreases the likelihood of obtaining a mammogram within the last year. Specifically, the odds of having a mammogram within the last year decreases 29% with each unit increase in the level of difficulty in finding transportation to appointment (p-value: 0.003). Not

feeling comfortable with health professionals doing the screening examination (negative beliefs about health professionals) decreases the chances of obtaining a mammogram within the last year that is, the odds of having a mammogram within the last year decreases 18% with each unit increase in the level of discomfort with health professionals doing the screening examination (p-value: 0.05). And the feeling that some health professionals inappropriately touch their patients during the screening examination (negative beliefs about health professionals) decreases the chances of obtaining a mammogram within the last year. The odds of having a mammogram within the last year decreases 19% with each unit increase of feeling that some health professionals inappropriately touch their patients during the screening examination (p-value: 0.05). Although these individual items predicted the outcome, there was no statistically significant association between the three subscales composite scores of the CCSS and whether the participant reported obtaining mammogram within the last year (p-value > 0.085). Furthermore, demographic variables such as marital status, type of insurance, and years of school were not statistically associated with the outcome variable (p-value > 0.113). The ROC statistic for the composite score was not reflective of predictive validity in this sample.

Discussion

In this study the researcher chose to test a survey tool developed and validated in a sample of Hispanic and White women in Southern California with a sample of African American women in a low income urban area of New Jersey. Preliminary evidence of reliability and validity were found, and although predictive validity of various items in the scale was found, validity based on the composite score was not demonstrated.

Exploratory factor analysis was found to support the construct validity of the scale. Items formed five subsets which were clearly independent of each other and divided along the theoretical lines by which the authors developed the tool. The subscales that the items loaded onto and in which they correlated with each other were: cancer screening fatalism; negative beliefs about health professionals; catastrophic disease expectations; symptomatic deterrents; and sociocultural deterrents. All factors loaded at 0.3 or above.

Reliability was evaluated using Chronbach's alpha as was used in the initial scale development and validation with Hispanic and White women. The composite scale alpha was 0.89, which was higher than that found by the authors in the initial testing (Latino 0.84, Anglo 0.83, total, 0.84).[14] Alphas for the cultural items ranged from 0.66 to 0.90 in the initial testing, whereas in this testing we had three items with alphas of 0.55. All of these items were testing the concept of Cancer Screening Fatalism. While a number of studies have found that fear and fatalism are significant factors determining African American women's use of preventive health care and cancer screening services, it is possible that in this sample, with its very high rate of women who have been screened, that fear and fatalism was not relevant.[10, 22-24] Studies looking at such cultural barriers as fear and fatalism, have found correlations between these factors and low income and lack of education.[23, 25] This sample of women, with its higher than expected education level, would likely not fit that assumption.

In this sample predictive validity based on the composite CCSS was tested through the use of logistic regression, and was not found to hold true. Significant associations were found for four of the sociocultural items, all of which made logical sense: having difficulty making an appointment and not having transportation would decrease a woman's likelihood of being screened as would discomfort with the health professionals who perform the screening.

Betancourt and colleagues used structural modeling to test the predictive validity of the CCSS. These authors found that women who scored higher on the CCSS were less likely to be compliant with mammography screening, and that the CCSS accounted for 26% of the variance in screening. These authors suggest that some of the cultural factors tested by the CCSS were associated with psychological processes such as emotions that are then related to screening behaviors (so an indirect association) rather than a direct association with screening behaviors, so that the association between the social and cultural factors addressed by the CCSS was through both a direct effect on screening behavior and an indirect effect on mammography emotions. They go on to suggest that when research is confined only to the direct influence of cultural factors on health behavior, ignoring potential indirect psychological effects, important cultural factors may appear to be unrelated. This logistic regression model may miss these indirect effects, and so negate the importance of emotional responses to cultural and social factors.

Limitations:

This sample was small and the group was fairly homogeneous, with a high level of screening reported and little variability in this self-report. These results reflect the demographics and culture of an urban area of New Jersey and therefore generalizations to the larger population of African American women in the US should not be made.

Another limitation is that women were not asked about their family income; the fact that the woman was attending a church in a very low income neighborhood was considered a proxy for low family income. However, considering the low number of women who reported being uninsured, and the high percentage of women who reported education past high school graduation, it is likely that many of these women who worship in these churches do not necessarily live in the immediate area; therefore inferences about income cannot be made.

Conclusion

According to Champion and colleagues the need to identify valid and reliable measures of women's health seeking behavior that are specific to race and ethnicity is essential to eliminate disparities.[26] Pasick and Burke discuss the social context, or the sociocultural forces that shape a person's life, health and behavior, as a relevant factor in evaluating the level of ability or confidence a woman has to change her own behavior.[27] The Cultural Cancer Screening Scale is a valuable tool which incorporates sociocultural factors found relevant in a population of Hispanic and White women into a tool which has been found to be valid and reliable in these populations.[14]

This study found preliminary evidence that the CCSS has construct validity, reliability, and internal consistency, and is theoretically relevant to a population of African American women. Many studies and targeted interventions have been developed for use in health promotion and cancer screening projects. The CCSS provides another tool by which health providers and researchers can target interventions to African American women.

Implications for Nursing Practice

The lack of insurance has been found to be a barrier against screening, yet being insured, in and of itself, does not appear to be sufficient motivation for screening.[1, 27] In 2014, with implementation of the Affordable Care Act, some thirty million more people will be insured in the US.[28] Yet despite insurance and availability of services, a woman's decision making in regards to preventive care will remain a function of knowledge, emotions, demographics, and sociocultural factors. Nurses must be cognizant of the factors that enable women to seek preventive care, in order to encourage and support women in their health seeking efforts.

Nurses can and must play a role in community-based interventions to improve outreach, enhance follow up and provide education at every level of prevention and health promotion.

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Table 1. Characteristics of Survey Respondents

Variable	n	%
Age[a]		
40- 50	21	17.5
51- 60	20	16.7
61- 70	42	35.0
71 +	38	31.7
Marital Status[a]		
Married	54	44.6
Single	67	55.4
Educational level[a]		
< High School	8	6.6
High School Graduate	33	27.3
> High School	80	66.7
Insurance Status		
Private Insurance	49	40.2
Medicare	55	45.8
Medicaid	8	6.6
Uninsured	10	8.2
Have ever had a mammogram	117	95.9
Mammogram in the past year	96	78.7

[a] missing data.

Table 2. Summary of Items and Factor Loadings for the Varimax Orthogonal

5-Factor Solution for the CCSS Scale

Item	Factor Loading 1	2	3	4	5	Communality
Catastrophic: Worst thing	0.04	0.02	0.09	0.09	**0.66**	0.47
Catastrophic: Deadly disease	-0.15	0.07	-0.12	0.02	**0.59**	0.42
Fatalism: Eventually die	-0.03	0.07	0.16	**0.59**	0.14	0.42
Fatalism: God's hands	0.24	0.14	0.06	**0.76**	-0.01	0.69
Fatalism: Meant to get cancer	0.09	0.08	0.34	**0.72**	0.03	0.69
Sociocultural: Problems making an appointment	**0.41**	0.26	0.20	0.14	-0.01	0.69
Sociocultural: Not knowing where	**0.64**	0.14	0.11	0.18	-0.04	0.69
Sociocultural: No time off from work	**0.68**	0.11	0.28	0.12	-0.09	0.70
Sociocultural: No transportation	**0.78**	0.27	0.09	0.10	0.01	0.74
Sociocultural: No reminder postcard	**0.49**	0.12	0.41	0.11	-0.06	0.73
Sociocultural: Have to take care of family	**0.68**	0.18	0.31	0.97	-0.02	0.78
Sociocultural: No insurance or money	**0.75**	0.14	0.26	0.01	0.03	0.75
Symptomatic: Feeling healthy	0.07	0.15	**0.93**	0.12	0.01	0.94
Symptomatic: several normal screenings	0.25	0.21	**0.89**	0.13	0.02	0.93
Symptomatic: No abnormal feelings	0.31	0.30	**0.72**	0.04	-0.6	0.78
Negative beliefs: Health professionals are not compassionate	0.14	**0.30**	-0.00	-0.00	0.04	0.34
Negative beliefs: Health professionals are always in a hurry	0.15	**0.78**	0.23	-0.01	-0.07	0.78
Negative beliefs: I do not feel comfortable with health professionals	0.23	**0.79**	0.18	0.04	0.16	0.79
Negative beliefs: Health professionals inappropriately touch their patients	0.09	**0.87**	0.17	0.10	-0.06	0.83
Negative beliefs: Health professionals are not trustworthy	0.14	**0.84**	0.16	0.12	0.05	0.82
Eigenvalues	7.15	1.90	1.55	1.26	0.80	

Percent of variance	25.61	24.75	22.89	12.49	6.71	

Boldface indicates highest factor loadings

Table 3. Predictors of Whether the Participant Received a Mammogram Within the Last Year.

Variable	OR	95% CI	p-value	ROC
Problems making an appointment	0.82	[0.67, 0.99]	0.049	0.581
No transportation	0.71	[0.56, 0.89]	0.003	0.634
Not comfortable with health professionals	0.82	[0.68, 0.99]	0.047	0.618
Health professionals inappropriately touch their patients	0.81	[0.64, 0.99]	0.048	0.608
Catastrophic and Fatalism subscale	0.99	[0.93, 1.06]	0.799	0.509
Sociocultural and Symptomatic subscale	0.98	[0.95, 1.01]	0.134	0.591
Negative beliefs subscale	0.95	[0.90, 1.01]	0.085	0.599
Composite score total scale	0.98	[0.96, 1.00]	0.101	0.597

Abbreviations: *CI*, confidence interval; *OR*, odds ratio; *ROC*-statistic, area under the curve.

The reference category is 'having no mammogram'.

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