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Perceptions of one's neighborhood and mammogram use among a sample of low-income Women at risk for HIV/STIs

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Introduction

In the US, one in eight women will be diagnosed with breast cancer (American Cancer Society, 2013) in their lifetime. While breast cancer incidence is associated with higher individual socioeconomic status (Robert et al., 2004), screening rates are lower for women with lower socioeconomic status (Bradley, Given, & Roberts, 2001; Katz & Hofer, 1994) and mortality is higher in poorer regions compared to wealthier regions of the US (Singh, Miller, Hankey, & Edwards, 2003). Emerging research has explored the role of geographic factors on breast cancer incidence and screening.

Previous research has shown that area-level income and economic instability have strong influences on cancer screening rates (Grillo, Vallée, & Chauvin, 2012 Mar-Apr; Wee et al., 2012). Individuals living in low-income, poverty stricken neighborhoods are less likely to participate in cancer screening (Elit et al., 2012; Mobley, Kuo, Urato, & Subramanian, 2010).

A substantial body of research has explored how neighborhoods or area of residence is associated with cancer screening (Bergamini et al., 2007; Luengo et al., 1996; Simou, Maniadakis, Pallis, Foundoulakis, & Kourlaba, 2010; Todorova, Baban, Alexandrova-

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Karamanova, & Bradley, 2009). Researchers have shown that geographical access to mammography, such as distance to and transportation, increases utilization (Akinyemiju et al., 2012; Eberth et al., 2014; Peipins et al., 2011). In addition, socioeconomic status within an area of residence has been associated with breast cancer screening (Pruitt, Shim, Mullen, Vernon, & Amick, 2009). Dailey et al. reported that women who lived in impoverished neighborhoods were less likely to get repeat mammograms. Structural factors, such as neighborhoods, may influence individual level factors leading to mammograms.

Several studies have shown a strong link between perceptions of neighborhood disorder and psychological distress including anxiety, fear, and depressive symptoms (Casciano & Massey, 2012). Other studies have demonstrated that neighborhood disorder is associated with a number of other health outcomes such as HIV risk behavior (Latkin, Williams, Wang, & Curry, 2005; Latkin, Curry, Hua, & Davey, 2007), drug use (Latkin et al., 2007; Theall, Sterk, & Elifson, 2009), smoking (Miles R., 2006), alcohol use (Hill & Angel, 2005; Kuipers, van Poppel, van den Brink, Wingen, & Kunst, 2012; Mulia, Schmidt, Bond, Jacobs, & Korch, 2008; Reyes et al., 2006), and body mass index (Burdette & Hill, 2008; Burdette & Needham, 2012).

Poor mental health has also been associated with lower levels of breast cancer screening among several populations. A study among healthy post-menopausal women found that depressive symptoms (Aggarwal et al., 2008) were associated with lower levels of mammography. In another study of women participating in a mammography screening program, researchers examined women who did not participate in the program. These women were more socially isolated and exhibited higher levels of anxiety and depression (Aro, de Koning, Absetz, & Schreck, 2001).

In other studies, fear and anxiety associated with the procedure itself or with the possibility of a cancer diagnosis were identified as major barriers to breast and cervical cancer screening (Ahmed, Winter, Albatineh, & Haber, 2012; Andrasik, Rose, Pereira, & Antoni, 2008; Watson-Johnson et al., 2011). In a study that included both men and women, fear of cancer diagnosis appeared to be a barrier for cancer screening for women but not for men (Ramos, Taltavull, Pineiro, Nieto, & Llagostera, 2012). This study also found that women were more likely than men to ignore symptoms (Ramos et al., 2012). Watson-Johnson reported that while fear was a barrier to cancer screening, some women simply did not consider their own health a high priority (Watson-Johnson et al., 2011). In neighborhoods where fear and anxiety are provoked by high levels of disorder, women may feel less inclined to undergo a screening procedure that could produce additional fear and anxiety.

There is a paucity of research that has explored how perceptions of one's neighborhoods are related to mammography. We sought to examine the relationship between neighborhood disorder and receiving a mammogram among a sample of predominantly impoverished African American women. We conducted analyses with women 40-49 years and women 50 years and older.

Methods

Data for this study were collected from participants in the CHAT study, a social network-oriented HIV prevention intervention. Participants were recruited through street outreach, newspaper advertisements, and referrals from community agencies. Since the focus of the parent study was on HIV prevention peer education, two types of study participants (Index and Network) were enrolled in the study. Inclusion criteria for index participants included: female, aged 18-55 years old, did not inject drugs in the past 6 months; self-reported sex with at least one male partner in the past 6 months; and at least one HIV related sexual risk behavior in the past 6 months (i.e. 2+ sex partners, recent STI diagnosis, and having a high-risk sex partner). Index participants referred social network members to the study. Inclusion criteria for network participants included: injected heroin or cocaine, being a sex partner of the index participant, or being people the index participant felt comfortable talking to about HIV or STIs. Index participants were randomized into the peer education or control conditions (see (Davey-Rothwell, Tobin, Yang, Sun, & Latkin, 2011) for details on the intervention and parent study).

After providing written consent, participants were interviewed. While most of the survey was administered by a trained interviewer one section on risk behaviors was administered through Audio-Computer-Assisted Self-Interview. Participants were compensated \$35 for completion of the interview. Interviews were conducted from May 2006 through June 2008. Although male network members were enrolled, the present study focuses solely on women.

We focused on two samples in this study based on recommendations for getting a mammogram. First, we focused on women 40 years-49 years ($n=233$, 75.6% index participants), since the several organizations, such as the American Cancer Society and National Cancer Institute, continue to recommend screening for women 40 and older (American Cancer Society, 2013); (National Cancer Institute, 2014). We then analyzed the sample women 50 years and older ($n=83$, 66.2% index participants) based on updated recommendations by the U.S. Preventive Services Task Force recommending mammography screening for this age (US Preventative Services Task Force, 2009). Study protocols were reviewed and approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Measures

Mammogram—Participants were asked about their history of receiving a mammogram: “A mammogram is an x-ray of the breast to look for breast cancer. When was the last time you had a mammogram?” Responses were recoded as had a mammogram vs. never a mammogram.

Neighborhood disorder—Neighborhood disorder was measured by an adapted 10-item scale developed by Perkins and colleagues (Perkins, Meeks, & Taylor, 1992) to assess physical and social disorder. Participants were asked to what extent the following 10 neighborhood features were a problem in their neighborhood: 1) vandalism, 2) vacant housing, 3) people who don’t keep up their property or yards, 4) people who say insulting things or bother other people when they walk down the street, 5) litter or trash in the street;

6) groups of teenagers hanging out on the street, 7) people fighting or arguing, 8) burglary like people's houses or stores getting broken into, 9) selling drugs, and 10) people getting robbed or beaten up on the street. Response options include not a problem (0) somewhat of a problem (1), and a big problem (2). Response were summed into a score (Range: 0-20, mean: 6.24, median: 5.00). The scale had a high level of internal consistency (Cronbach alpha= 0.90). Since the scores were not normally distributed, a median cut was utilized (less than 5 vs. 5 or more).

Sociodemographics—We also examined several sociodemographic variables that may influence obtaining a mammogram. Participants were asked about their current employment status which was coded as employed (full or part-time) or not employed. Homelessness was measured as a self-report of being homeless for any time in the past 6 months. Total personal income was defined as total amount of income, regardless of source, in the past 30 days. This variable was dichotomized as less than \$500 versus \$500 or more. Having a main sex partner was assessed by the question “Do you currently have a main sex partner?” Participants were also asked if they had used cocaine or heroin past 6 months. We also inquired about the last time participants saw a primary care or general doctor. Finally, self-reported HIV status was assessed. HIV antibody tests were also conducted but it was anticipated that knowledge of HIV status would have a greater impact on behavior than serostatus.

Data Analysis—The data for the present study were collected as part of the 6-month follow-up survey completed by both index and network participants. The baseline survey did not include measures of mammography utilization.

The baseline dataset included 567 (76%) women. Follow-up assessments were completed with 447 women (79% retention rate). One hundred thirty one cases were removed because the participant was younger than 40 or had missing data. The sample for the current study consists of 233 women who were age 40 -49 years older and 83 women who were 50 years and older.

For each age group, we conducted Chi-Square analyses to compare women who ever received a mammogram and those who did not. Then, we computed unadjusted and adjusted logistic regression models to assess the relationship between neighborhood disorder and mammography independently and controlling for variables that may influence this relationship. The model controlled for participation in the HIV prevention intervention. While the HIV risk reduction intervention did not include messages on mammography, we controlled for this variable in case participation in the intervention impacted participants' overall health-seeking behaviors. We also controlled for income level and primary care utilization because we thought these factors could influence mammogram use.

Results

Among women age 40-49 years, 66.1% (n=154) reported getting a mammogram. Approximately 38% (n=89) received a mammogram in the past year. Among women 50 years and older, 81.9% (n=68) of women 50 and older reported receiving a mammogram, of

which 43.8% (n=39) got it done in the past year. Sample characteristics are shown in Table 1. Among this low employment and income sample, more than half reported using any heroin or cocaine in the past 6 months. The vast majority of women reported visiting a doctor in the past 6 months. Among women 40-49 years, there was a marginally significant association between getting a mammogram and income and relationships status. Also, women 40-49 years who got a mammogram were more likely to be African American. There were no differences among women 50 and older who got a mammogram and those who did not get a mammogram.

Data in Table 2 show the relationship between neighborhood disorder and mammography. Among women 40-49 years, there were no statistically significant associations between neighborhood disorder and getting a mammogram. However, women age 50 and older who lived in a neighborhood with disorder were 72% less likely to have obtained a mammogram in both the unadjusted and adjusted analyses. There were no associations between getting a mammogram and the two control variables.

Discussion

In this study, we explored contextual effects on obtaining a mammogram among women in their 40s and 50 years and older. Living in an area with neighborhood disorder decreased the likelihood of women 50 years and older reporting that they had received a mammogram. There was no significant association for women 40 years and older.

Our study expanded the literature on geography and mammography by focusing on perceptions of disorder in one's neighborhood rather than geographical location. Perceiving disorder in one's neighborhood may influence women's health seeking behaviors. Older women living in neighborhoods with high levels of drug activity and crime, signs of disorder, may not view cancer screening as a priority compared to the more salient needs for survival and safety.

It is interesting to note that the relationship between neighborhood disorder and getting a mammogram was only significant for women 50 years and older. We explored the possibility of an interaction between these variables (data not shown). However, the interaction was not significant. One reason for this finding is that older adults living in a neighborhood with disorder may be less inclined to leave their house. Or, they may not have needed assistance to travel to a health provider.

Social capital, a significant determinant of health, has been linked to health behaviors, including cancer screening (Leader & Michael, 2013). Dean and colleagues found that African American women 40 years and older who perceived that their neighborhoods had high social capital were more likely to receive a mammogram (Dean et al., 2014). The researchers posit that women may be exposed to more health messages and discussions about mammography among community members. In addition, more resources may flow through communities with higher social capital. Neighborhoods with disorder may have limited social capital. Thus, these same opportunities may not exist.

Neighborhood disorder has also shown to be associated with depression and in turn, people who are depressed may not engage in preventive health practices (Aggarwal et al., 2008; Latkin & Curry, 2003). Depression may lower motivation for health practices. The role of depression as a pathway through which neighborhood disorder is related to getting mammogram was not examined in the current study but its influence should be considered in future research on mammography particularly among marginalized women.

The study has some limitations that should be noted. First, the data were drawn from a sample of women from a study focused on HIV risk reduction. By joining the study, women may have been more conscious of their health. This self-selection may account for the relatively high utilization of mammograms and primary care. The data were cross-sectional, thus the findings indicate an association, rather than causation, between neighborhood disorder and mammogram use. Also, we did not ask about important factors, such as family history of breast cancer or overall breast health that may increase the likelihood of getting a mammogram. In addition, we did not have data on insurance status at the 6 month visit. Currently there is ongoing discussion about what age is best for women to get mammograms. Due to the inconsistencies in breast cancer screening guidelines, we analyzed the data for both women 40 years and older as well as 50 years and older. However, we had limited statistical power in our analyses of women 50 and older due to a small sample. Repeating the study with a larger sample could increase the generalization of these findings. Finally, the levels of neighborhood disorder were lower than expected. This may have resulted from normalization of disorder. For example, women may have habituated seeing signs of disorder that they did not view them as a problem. Despite the study's limitations, the findings demonstrate that attention should be given to the neighborhood environment.

Women living in neighborhoods with disorder are faced with many challenges, including poverty, unstable housing, and crime. Dealing with these everyday challenges may take priority over their own preventative health behaviors. All of these challenges may contribute to disparities in mammography. Thus, interventions are needed to expand mammogram use among women in disordered neighborhoods.

Implications for Practice and/or Policy

Bowie and colleagues found that being knowledgeable about screening guidelines increased the likelihood of getting a mammogram among women age 40 and older (Bowie JV, Wells AM, Juon HS, Sydnor KD, Rodriguez EM., 2008). Interventions are needed to increase awareness about the importance of cancer screening. Healthcare and social service providers may a crucial role in continuously encourage women to get a mammogram.

Other interventions are also promising. A recent review by Gardner and colleagues found interventions that utilize multiple strategies, such as group sessions and a home visit had the greatest impact on mammography screening (Gardner, Adams, & Jeffreys, 2013). One approach is to train women who live in neighborhoods with high levels of disorder and have received a mammogram to become peer educators. The peer educators may encourage other women to seek mammography as well as create a health-seeking behavioral norm. Peer educators may also accompany women to their mammograms.

A second approach is to expand mobile mammography programs, which have demonstrated success in providing mammograms to women in low-income areas by removing the geographical barriers (Brooks et al., 2013). Finally, structural interventions are also vital to reduce neighborhood disorder. By reducing neighborhood disorder, many adverse health outcomes may be overcome. Programs to increase neighborhood cohesion, social control, and empowerment could integrate health promotion programs to both reduce disorder and increase health behaviors.

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Table 1

Comparison of women who had a mammogram and women who did not by age category.

Sample Characteristics (n, %)	Women aged 40 years and older (n=233)			Women aged 50 years and older (n=83)		
	Had mammogram (n=154)	Never had a mammogram (n=79)	Test statistic & p-value	Had mammogram (n=68)	Never had a mammogram (n=15)	Test statistic & p-value
African American	154 (100.0)	75 (94.9)	7.94*	67 (98.5)	14 (93.3)	1.41
In committed relationship	86 (55.8)	34 (43.6)	3.11 ⁺	21 (30.9)	4 (26.7)	0.10
Homeless in past 6 months	36 (23.4)	15 (19.0)	0.59	18 (26.5)	7 (46.7)	2.38
Employed at least part-time	36 (23.4)	13 (16.5)	1.51	11 (16.2)	4 (26.7)	0.91
Income less than \$500 in past 6 months	87 (56.5)	34 (43.0)	3.79 ⁺	37 (54.4)	8 (53.3)	0.006
Used heroin or cocaine in past 6 months	83 (53.9)	47 (59.5)	0.66	37 (54.4)	8 (53.3)	0.006
Self report HIV ⁺	19 (12.3)	9 (11.4)	0.04	7 (10.3)	3 (20.0)	1.09
Went to primary care/general doctor in past 6 months	128 (83.1)	62 (78.5)	0.75	61 (89.7)	13 (86.7)	0.12

* Note: means p<0.05;

⁺ means p<0.10

Table 2

Logistic models of the association of neighborhood disorder on getting a mammogram among women 40-49 years older and women 50 years and older.

Characteristic	Women 40-49 (n=233)		Women 50 and older (n=83)	
	Unadjusted Odds Ratio [95% CI]	Adjusted Odds Ratio [95% CI]	Unadjusted Odds Ratio [95% CI]	Adjusted Odds Ratio [95% CI]
Neighborhood Disorder	0.73 [0.42, 1.27]	0.76 [0.43, 1.33]	0.28 [0.08, 0.96]*	0.28 [0.07, 0.97]*
Saw primary care doctor in past 6 months	1.35 [0.68, 2.67]	1.38 [0.69, 2.77]	1.34 [0.26, 7.20]	1.06 [0.18, 6.36]
Monthly income, \$500 or less	1.72 [0.99, 2.97]	1.43 [0.94, 2.83]	1.04 [0.34, 3.20]	1.11 [0.34, 3.68]

* Note: means $p < 0.05$