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Mammography Social Support for Women Living in a Midwestern City: Toward Screening Promotion via Social Interactions

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Abstract

Notwithstanding recommendations and interventions, the percentage of 50 – 74-year-old U.S. women who reported having had a mammography in the past two years remained below target coverage. Social interactions may influence mammography rates. To measure characteristics of social interactions in a Midwestern city as they relate to social support for mammography received by women older than 40 years of age. A cross-sectional study was conducted in Bloomington, Indiana, sending mail surveys to 3,000 telephone directory addresses selected by simple random sampling. An anonymous, self-administered, closed-ended, questionnaire with eight checklist items (for demographics) and six multipart semantic differential scale items (for social support), derived from validated instruments, was used. Social support for mammography in women who had undergone regular screening was analyzed using chi-square test and logistic regression. Of 450 respondents with valid responses, 91% were white; 47% were older than 80; 92% had good health insurance coverage; and 82% had undergone regular mammography. Healthcare workers provided the highest support, followed by children, siblings, and relatives. Friends, neighbors, and co-workers were least supportive. In social interactions, emotional support was the most prominent, followed by informational, appraisal, and instrumental supports. Having higher income and being married were associated with receiving greater support. Although mammography provides limited benefits after age 74, women older than 80 years of age received the highest support. Identifying the structural and functional characteristics of social interactions is important for: 1) designing interventions that enhance social support, and 2) expanding breast cancer screening via personalized approaches using existing social interactions.

Keywords

Social support, Mammography, Breast cancer

Acknowledgements/Disclaimers/Disclosures

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Abstract

Notwithstanding recommendations and interventions, the percentage of 50 – 74-year-old U.S. women who reported having had a mammography in the past two years remained below target coverage. Social interactions may influence mammography rates. To measure characteristics of social interactions in a Midwestern city as they relate to social support for mammography received by women older than 40 years of age. A cross-sectional study was conducted in Bloomington, Indiana, sending mail surveys to 3,000 telephone directory addresses selected by simple random sampling. An anonymous, self-administered, closed-ended, questionnaire with eight checklist items (for demographics) and six multipart semantic differential scale items (for social support), derived from validated instruments, was used. Social support for mammography in women who had undergone regular screening was analyzed using chi-square test and logistic regression. Of 450 respondents with valid responses, 91% were white; 47% were older than 80; 92% had good health insurance coverage; and 82% had undergone regular mammography. Healthcare workers provided the highest support, followed by children, siblings, and relatives. Friends, neighbors, and co-workers were least supportive. In social interactions, emotional support was the most prominent, followed by informational, appraisal, and instrumental supports. Having higher income and being married were associated with receiving greater support. Although mammography provides limited benefits after age 74, women older than 80 years of age received the highest support. Identifying the structural and functional characteristics of social interactions is important for: 1) designing interventions that enhance social support, and 2) expanding breast cancer screening via personalized approaches using existing social interactions.

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Introduction

The U.S. Preventive Services Task Force (USPSTF) recommends all women begin mammography screening at age 50 and repeat the test biennially until age 74 (Nelson, Fu, et al. 2016). The 2015 National Health Interview Survey, however, revealed that only 58.3%, 71.3%, and 63.3% of women in age groups 40 – 49, 50 – 74, and 65 or older, respectively, followed the USPSTF recommendation for use of mammography (National Center for Health Statistics, 2016), considerably less than the Healthy People 2020 target of 81.1% (Office of Disease Prevention and Health Promotion, 2011).

Social support (SS) is one of several factors that affect breast cancer screening rates (Katapodi, Facione, Miaskowski, Dodd, & Waters, 2002). According to a nationwide study, repeated mammography screening decreased when emotional and informational support and positive social interactions decreased (Messina et al., 2004). Evidence is available for population

subgroups as well, for example, Latina women whose family or friend recommended they get a mammography within the past 12 months were more likely to report mammography intentions, SS, and favorable norms (Molina et al., 2015). SS is the exchange of resources between individuals, with the support provider intending to improve the well-being of the recipient. Social interactions can be characterized based on structure (i.e., sources of support, such as spouse, friends, etc.) and function (i.e., types of support; Fleury, Keller, & Perez, 2009: informational – important information and advice for problem solving; emotional – love, trust, esteem, listening, and concern, usually provided by intimate partners, parents, children, relatives, and friends; instrumental – assist with money, materials, labor, and time; appraisal – encouragement of sustaining a good behavior).

While the structural and functional characteristics of social interactions can vary widely by demographic and geographic factors (Farhadifar, Taymoori, Bahrami, & Zarea, 2015; Manjer, Emilsson, & Zackrisson, 2015), based on published literature, no study so far has characterized SS for mammography in a predominantly white population in the Midwestern United States. This study aimed to address this gap, and measure both structural and functional characteristics of social interactions as they relate to mammography among women older than 40 years of age.

Research Questions

1. Do the types of mammography SS in women's social interactions vary by social groups who provide support?
2. Do the types of mammography SS vary by demographic characteristics of women who receive support?

Methods

Sample

This is a cross-sectional study in a Midwestern college town with predominantly (83%) white residents (population = 80,405; females = 49.7%; females > 40 years = 13.2%) (U.S. Census Bureau, 2011). Simple random sampling was conducted using the telephone directory. Each of the 3,000 selected households was sent one questionnaire along with a study information sheet. If more than one female (> 40 years) lived in a household, family had the choice to decide which female was going to participate in the study. To increase the response rate, a prepaid return envelope was sent with each survey. As the number of households with at least one eligible woman was not known, the response rate could not be calculated. Over 15% of 3,000 surveys were returned. The study was approved by the institutional review board of the authors' university.

Measures

The anonymous, self-administered, closed-ended, postal questionnaire with eight checklist items and six multipart semantic differential scale items could be answered within 5 – 10 minutes. The questionnaire utilized validated items from empirical studies (Dantas, Alchieri, & Maia, 2015; Katapodi et al., 2002; Lischka, Popien, & Linden, 2005). The instrument was revised and reviewed by 3 experts, and was pilot tested on 10 women who were 45 – 80

years old. Checklist items asked about demographic characteristics, perceived breast cancer risk, health insurance status, and breast cancer screening status. The types of perceived SS were examined using semantic differential scale items – two each for informational and emotional supports, and one each for instrumental and appraisal supports. For example, a question on informational support asked – “*How much you got to know from.....about importance of mammography screening?*”, where participants ranked each social group [(1) husband/partner/boyfriend; (2) son/daughter/relative; (3) friend/neighbor; (4) doctor/nurse/healthcare worker; (5) books/media/internet/etc.)] based on the level of support they receive (0 = no support; 1 = some support; 2 = good support).

Analysis

All variables were either categorical (e.g., demographic) or semantic differential scale (e.g., SS) and were subsequently dichotomized for analysis. For a meaningful explanation, two kinds of social interactions were identified – ‘natural’ (spouse, partner, boyfriend, children, relatives, friends, neighbors, and co-workers) and ‘extended’ (‘natural’ interactions plus healthcare workers). Perceived support was dichotomized – receiving “good support” and “at least some support” were summed to compare with “no support.” Data were analyzed using SAS 9.3®. As missing data were < 5% for most variables, cases with missing values were deleted listwise. A chi-square test examined whether SS depended on the social groups that provided support. Logistic regression was conducted to examine differences between demographic groups relative to receipt of SS, using unadjusted odds ratios.

Results

Of the 462 returned surveys, 450 were considered usable. Twelve of the returned surveys had less than 80% survey completion, so were not included in the analysis. Percentages of participants in 40 – 50, 51 – 65, 66 – 80, and > 80 age groups were 19%, 15%, 19%, and 47%, respectively. Participants were predominantly white (91%). Only 6% were unmarried, 40% married, 1% cohabiting, 2% separated, 9% divorced, and 42% widowed. About 10% had not completed high school, while 43% had some college, and 26% had postgraduate degrees. Annual income of 63% of participants was \geq \$45,000. Almost 90% reported good health insurance coverage. About 35% believed that they were at risk for breast cancer, while 36% perceived no risk. Others did not report their perceived risk. Of those who perceived some risk for breast cancer, 57% were over age 65; 75% had some college; 51% were without a partner; 92% had good health insurance coverage; and 65% had income \geq \$45,000. Eighty-two percent had regular mammography as recommended, 12% had screening irregularly, and 5% had no screening at all; 1% did not report screening status.

Regular screening was associated with perceived risk (OR = 1.85; 95%CI = 1.26-2.73) and having full or good health insurance coverage (OR = 1.53; 95%CI = 1.05-2.23). In natural interactions, no significant relationship existed between receiving any SS from any group and participation in regular mammography (OR = 0.71; 95%CI = 0.49-1.04).

In extended interactions, receipt of emotional support was the most common type of support (39%), followed by informational (33%), appraisal (16%), and instrumental support (13%). Healthcare providers (48%) accounted for most support, followed by children/relatives (22%), spouses/partners (18%), and friends/co-workers (12%). Considering the unique function

of provider-patient interactions, subsequent comparisons included natural interactions only. Compared to children/relatives, spouses/partners and friends/co-workers less frequently provided each type of support (Table 1). Demographic characteristics affecting the receipt of SS were age, income, and marital status (Table 2). Effects of race/ethnicity and education level on SS were not statistically significant.

Discussion

Compared to men, women are more likely to perform healthy behaviors when they have adequate SS (Rollero, Gattino, & De Piccoli, 2014). Therefore, women's attitudes about breast cancer screening are expected to be influenced by their SS. Based on recent evidence from literature, this study is the first to characterize SS for mammography as perceived by middle-aged and elderly women in a Midwestern city. The role of perceived risk and good health insurance coverage in adherence to regular breast screening is compatible with past findings (Schueler, Chu, & Smith-Bindman, 2008).

Mammography has evidence of benefit for 40 – 74 year old women, because it has reduced mortality due to breast cancer by 15-20% (Nelson, Fu, et al., 2016). There are also harmful effects of mammography, such as overdiagnosis and resulting treatment of unimportant tumors (Welch & Black, 2010), false positives with additional testing and anxiety (Hubbard et al., 2011), false negatives with false sense of security and potential delay in cancer diagnosis (Nelson, O'Meara, Kerlikowske, Balch, & Miglioretti, 2016), and radiation-induced breast cancer (Ronckers, Erdmann, & Land, 2004). Therefore, despite likely benefits of mammography, it has only marginally reduced the rate at which females present with advanced cancer (Bleyer & Welch, 2012). Although this study did not reveal significant associations between SS and screening (probably due to the small number of participants who reported irregular or no screening), informational support may encourage participants to undergo mammography by counteracting information from diverse sources about adverse effects and false positives/negatives.

Furthermore, mammography guidelines are inconsistent across professional organizations, for example, USPSTF guidelines differ from those of the American Cancer Society, which recommends screening to begin at age 40, repeated annually (American Cancer Society, 2012; U.S. Preventive Services Task Force, 2010). Therefore, healthcare providers may have contradicting opinions about recommending mammography for their clients. This is reflected in that about one-fourth of participants admitted they did not receive any informational or emotional support from healthcare providers. However, findings also indicate that healthcare workers still provided more SS than any other group. This is compatible with the finding on the importance of physicians as part of the perceived SS for mammography (Schueler et al., 2008).

Medicare covers annual mammography for all female beneficiaries who are 40 or older (Rosenkrantz, Fleming, & Duszak, 2017). For most women with private insurance, the cost of mammography is covered without copayments or deductibles, although women have to contact their mammogram facility and health insurance company for confirmation. Additionally, indirect costs exist (Feldstein et al., 2011) – both tangible (e.g., obtaining transport; absence from work, and childcare) and intangible (pain; cultural beliefs). Instrumental (e.g., providing transport; helping with childcare), emotional (e.g., reassuring against the fear of pain; discussing cultural beliefs) (Pedersen, Zachariae, Jensen, Christensen, & Lassesen, 2004), and appraisal (e.g., welcoming the decision to have mammography) supports often encourage women to overcome these barriers in critical times of decision making and adopt the behavior of regular screening.

Table 1

Differences in Receipt of Each Type of Social Support[‡] in Natural Interactions[†]

Type of SS	% Receiving Support from a Child/Relative (Reference); <i>n</i> = 418	Spouse/Partner; <i>n</i> = 184			Friend/Coworker; <i>n</i> = 441		
		% Support Receiving from	Z Value	Two-tail <i>p</i> -Value	% Support Receiving from	Z Value	Two-Tail <i>p</i> -Value
Informational: Importance of having mammogram	39%	27%	2.794	0.005	25%	4.421	< 0.001
Informational: How/where to have a mammogram	24%	11%	3.693	< 0.001	22%	0.672	0.502
Emotional: Discuss barriers to mammogram	44%	36%	1.869	0.062	29%	4.567	< 0.001
Emotional: Encourage to have mammogram	35%	29%	1.471	0.141	24%	3.504	< 0.001
Instrumental: Facilitate/help to have mammogram	24%	22%	0.438	0.661	12%	4.558	< 0.001
Appraisal: Feedback on having mammogram done	31%	23%	2.070	0.039	18%	4.502	< 0.001

Note. Reference for each type of social support is the percent of participants receiving at least some SS from child or a relative. Number of participants who reported having a child/relative, spouse/partner, and friend/coworker is 418, 184, and 441, respectively.

[‡] Receipt of social support is defined as receiving either some support or good support, compared to receiving no support.

[†] Spouse/Partner, Child/Relative, Friend/Coworker

Table 2

Demographic Differences in Receiving Any Social Support[‡] in Natural Interactions[†] (N = 450)

Variable	Level	Overall		Informational		Emotional		Instrumental		Appraisal	
		%	OR (95%CI)	%	OR (95%CI)	%	OR (95%CI)	%	OR (95%CI)	%	OR (95%CI)
Age Group	> 80 Years	68	3.19*	44	3.31*	39	2.27*	33	3.61*	29	2.69*
	40-80 Years (Ref)	40	(2.16-4.71)	19	(2.17-5.04)	22	(1.50-3.42)	12	(2.23-5.85)	13	(1.67-4.33)
Education	College or More	60	1.31	32	1.34	31	0.87	24	1.44	22	1.18
	No College (Ref)	53	(0.88-1.95)	26	(0.86-2.08)	34	(0.57-1.32)	18	(0.91-2.27)	19	(0.72-1.92)
Income	≥ \$45,000	62	1.51*	31	1.41	29	0.77	26	2.16*	24	1.35
	< \$45,000 (Ref)	52	(1.03-2.19)	24	(0.93-2.15)	35	(0.51-1.14)	14	(1.34-3.48)	19	(0.85-2.13)
Marital Status	Married/Cohabit	67	2.47*	42	2.40*	37	2.26*	29	3.00*	31	2.97*
	All Others (Ref)	45	(1.55-3.94)	23	(1.51-3.84)	25	(1.39-3.68)	12	(1.75-5.13)	13	(1.76-5.02)

Note. For each demographic variable, percentages in the "overall" support column indicate the participants who reported receiving at least one of the four types of social support from at least one of the three social groups - spouse/partner, child/relative, friend/coworker

[‡] Receipt of social support is defined as receiving either some support or good support, compared to receiving no support.

[†] Spouse/Partner, Child/Relative, Friend/Coworker

* statistically significant ($p < 0.05$)

In natural interactions, children, siblings, and relatives played a considerably greater role in providing all four types of SS than spouses, partners, boyfriends, friends, neighbors, and co-workers. Complexity (i.e., extent to which the social relationship serves many functions) as well as reciprocity (i.e., extent to which resources and support are both given and received) of the parent-child relationship are important characteristics that may have contributed to greater support from children. The support from children can also be explained with the finding that women older than 80 years of age received significantly greater support than younger women. Two-thirds of these older women reported that they were widowed, leaving children as a major source of SS. With regard to older women, the social interaction density (i.e., number of social connections and the extent to which members interact with each other) is probably greater because of their extensive cumulative exposure to social interactions. However, this social influence is neither rational nor helpful because some professional organizations recommend that mammography screening be stopped at age 74 due to limited benefits (U.S. Preventive Services Task Force, 2010).

Although spouses, partners, and boyfriends provided less support than children, siblings, and relatives, being married or cohabiting showed a significant relationship with receiving greater SS of all types, confirming from past studies that intimate relationships play an important role in receiving SS. Intensity of SS (i.e., extent to which a social relationship offers emotional closeness) is an important element that may have contributed to higher support from spouses, partners, and boyfriends. More affluent people are more capable in finding (or “buying”) adequate SS and are likely to become members of diverse social interactions that involve a broader variety of resources. Consistent with this finding (Katapodi et al., 2002), women with higher income perceived greater SS, including instrumental support. However, contrary to past research (Katapodi et al., 2002), this study did not detect any relationship between education and SS. Furthermore, this research did not reveal any relationship between race/ethnicity and SS, probably due to the low number of non-white/Hispanic women studied.

This study has several limitations. First, the potential participants were selected from the names in a telephone directory, which excluded a considerable proportion of women in the town, for example women who only use mobile phones, as their names were not included in the telephone directory. A possibility exists that these ineligible women were not demographically and behaviorally similar to surveyed women. Second, 24% of the sample did not report their perceived risk (Manjer et al., 2015). Third, the final instrument with revised questions was not validated. Fourth, generalizability of the findings is limited due to lack of diversity in the sample: predominantly white, > 65 years, with higher than average per-capita income for the state, and prior mammography experience. Fifth, a selection bias may have occurred due to method of recruiting participants. Women who did not respond to postal surveys could be different from participants, demographically and/or behaviorally.

Conclusion

Healthcare workers provided the highest SS, followed by children, siblings, and relatives. Having higher income and being married were associated with receiving greater SS. Although some recommend that mammography screening be stopped at age 74 due to limited benefits, women older than 80 years of age received the highest support. Women perceived the least support from friends, neighbors, and co-workers. Provision of emotional support was the most prominent, followed by informational, appraisal, and instrumental supports. Healthcare workers provided the greatest support in relation to information. Understanding the structural and

functional characteristics of social interactions is important for designing interventions to enhance SS and improving breast cancer screening via social interactions (McFall & Davila, 2008).

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