Factors Influencing Mammography Use Among Women in Medicare Managed Care

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This article presents findings about the mammography screening experience of Medicare members of a health maintenance organization (HMO). Based on a mail survey of 309 women, we assessed factors that may be facilitators or barriers to this service for older women. The results indicate that these respondents generally are receiving timely mammograms; over three-quarters (79 percent) reported having a mammogram in the past 2 years. Multivariate analysis showed that women who were younger (under 75 years of age), believed in the importance of screening, had been told by a physician to obtain a mammogram, and were more satisfied with their physician and more likely to report mammography use.

INTRODUCTION

In the continuing effort to understand factors that facilitate or act as barriers to older women's use of mammography screening, especially under managed care, and to develop interventions that will address these concerns, a mail survey of

Medicare beneficiaries was conducted. Based on the literature, this study was designed to assess health beliefs that act as facilitators or barriers to the use of mammography, while controlling for the effects of demographic and health plan characteristics. In addition, because this is a Medicare population of older women who might not receive mammograms due to other health considerations, we included a measure of health status. This article presents the findings about mammography use based on the beneficiary survey data.

OLDER WOMEN, BREAST CANCER, AND MAMMOGRAPHY

Older age is the single greatest risk factor for breast cancer in women. According to the American Cancer Society (1999), breast cancer risk increases from 1 in 67 at age 40 to 1 in 25 at age 70, and the incidence continues increasing to age 80. More than one-half of all breast cancers occur in women age 65 or over. Mammography screening has been demonstrated to reduce breast cancer mortality (Shapiro et al., 1982), especially among women in the age group 50-74 compared with those without mammography (Kerlikowske et al., 1995). While prospective trials have typically not included women age 70 or over, two recent reports addressed the efficacy of mammography in older women. The researchers found that, compared with younger women, women age 70 or over benefit from screening in terms of early diagnosis (Hwang and Cody, 1998). In the

other study, the age group 70-79 would have a small increase in life expectancy from biennial mammograms, compared with the gains from screening at age 65-69 (Kerlikowske et al., 1999).

Guidelines for the use of screening mammography from the American Cancer Society, the American College of Radiology, the U.S. Preventive Services Task Force, and the American College of Preventive Medicine, among various authorities, generally agree on mammograms every 1 to 2 years for women up to age 70 (National Guideline Clearinghouse, 2000. The National Committee on Quality Assurance (NCQA) measures performance of managed care plans according to the standard of a screening mammogram in the past 2-year measurement period for women in the age group 52-69 (National Committee on Quality Assurance, 2000). Most of the guidelines do not specify the continuation of mammography for those age 70 or over, because gains in life expectancy from mammograms may be limited by comorbidities (Kerlikowske et al., 1999). However, some of the guidelines do not specify an upper age limit, and mammography has been recommended for women age 75 or over who have good general health and life expectancy (Blustein and Weiss, 1998).

Yet, biennial mammogram rates remain lower among women age 70 or over (Blackman, Bennett, and Miller, 1999). Based on data from the Behavioral Risk Factor Surveillance System from 1989-1997, women age 70 or over are considerably less likely to report having a mammogram within the past 2 years (66.7 percent) than women age 60-69 (77.1 percent) or age 50-59 (78.0 percent). This differential between these age groups was larger in 1997 than in the previous 2 years (Blackman, Bennett, and Miller, 1999). A similar differential for women age 75 or over was found for 1-year mammogram rates on the 1992 National Health Interview Survey and in 1992 Medicare claims data, although the self-reported rates were higher than those based on claims (May and Trontell, 1998). Blustein and Weiss (1998), based on an analysis of data from the Medicare Current Beneficiary Survey, concluded that advanced age and impaired functional status were related to reduced likelihood of mammography among women age 75 or over; women age 85 or over were less likely to have a mammogram regardless of health and functional status, and several comorbid conditions were unrelated to mammography use.

Studies have consistently shown that the major facilitating factor is a physician's recommendation or referral (Rimer, Trock, and Engstrom, 1991; Lerman et al., 1990; Friedman et al., 1995). Barriers that may deter older women from getting mammography screening have been documented. In addition to the lack of a physician's recommendation (National Cancer Institute Breast Cancer Screening Consortium, 1990; Rimer, 1993), other barriers include: concerns about cost and lack of knowledge about the Medicare benefit; lack of transportation and/or time; belief that breast cancer is not a problem; concerns about the effects of radiation; embarrassment and anxiety or fear of cancer (Lerman et al., 1990; Rimer, Trock, Engstrom, 1991; Glockner et al., 1992; Friedman et al., 1995; Rubenstein, 1994). Older women may not realize that age places them at greater risk of breast cancer (Rubenstein, 1994; Friedman, et al., 1998). More than one-third of older women responding to a National Cancer Institute Survey (1999) said they were not as concerned about getting breast cancer as they had been at younger ages.

MEDICARE COVERAGE

One factor that may facilitate mammography for older women is the Medicare benefit. Since 1991, Medicare has covered biennial mammography without regard to an upper age limit or health status. Since January 1999, the Medicare benefit has been extended to annual mammography for women age 50 or over. To help ensure that women take advantage of this benefit, CMS has included mammography screening as a focus for quality improvement through the peer review organization (PRO) program in every State. National and statewide statistics on mammography screening, based on Medicare claims, are made available to the PROs in each State; interventions to increase the rate of mammography screening are supported; and the PROs are evaluated on the extent to which they meet the goal of increasing mammography screening in the States.

PREVENTION IN MANAGED CARE

The provision of preventive health services has been an integral part of the comprehensive services offered by HMOs and managed care plans (Weinick and Beauregard, 1997; Tu, Kemper, and Wong, 1999-2000). Women enrolled in a Medicare risk managed care plan are part of a population-focused effort to increase the rate of preventive services among their members, including mammography screening. NCQA includes biennial mammogram rates for women age 52-69 in their Health Plan Data and Information Set (HEDIS®) measurement for health plans and requires plans to demonstrate significant improvement in these rates over time as part of the accreditation process (National Committee on Quality Assurance, 2000). The emphasis in managed care on preventive services means that health plans have launched pro-

grams to encourage their members to get a mammogram and to reduce barriers to mammography (Heiser and St. Peter, 1997; Thompson et al., 1995). Despite such efforts, barriers remain among women with all types of coverage. However, information on the mammography experience of Medicare members of HMOs generally has not been available in Medicare claims files (Blustein, 1995).

This study offers the opportunity to investigate factors related to rates of mammography utilization among women enrolled in Medicare managed care. This focus is important because relatively few studies have investigated mammography screening among older women in managed care. Some studies of older women have specifically excluded those in HMOs (Blustein, 1995; Fox, Siu, and Stein, 1994; May and Trontell, 1998), while others have excluded older women from studies of mammography in HMOs compared with fee-for-service (Tu, Kemper, and Wong, 1999-2000; Weinick and Beauregard, 1997). A few studies of mammography in HMOs included both younger and older women (Taplin and Montano, 1993; King et al., 1994; Lerman et al. 1990), and one study compared HMO and non-HMO enrollees, including older women (Stoddard, Rimer, and Lane, 1998). This article adds to the literature by focusing on the beliefs and attitudes related to timely mammography screening among older women enrolled in Medicare managed care in a network model HMO.

METHODOLOGY

Design

Qualidigm®, a not-for-profit health care quality improvement organization that is the PRO for Connecticut, developed the study in collaboration with the managed

care plan. This network model HMO enrolls Medicare beneficiaries in a plan that provides a comprehensive set of services for a fixed contractual premium. Other collaborators were the University of Connecticut Health Center (School of Dental Medicine, Department of Behavioral Science and Community Health) and Yale University Robert Wood Johnson Scholars Program. The design was a cross-sectional mail survey. Questionnaires were mailed to the study sample by the University of Connecticut. A followup postcard reminder was sent to the entire sample approximately 2 weeks after the initial mailing; 2 weeks later, a followup cover letter and second copy of the questionnaire was sent to anyone in the sample who had not yet responded.

Sample

Data were derived from a mail survey of Medicare beneficiaries who were members of the participating Medicare managed care plan in Connecticut. As part of a study of preventive services, the health plan generated a listing of 492 women who met the criteria for inclusion: age 65 or over, and continuous enrollment in the HMO with the same primary care physician for at least 2 years. These criteria were used to ensure the same exposure to the opportunity for mammography referral for all women in the study during the 2-year measurement period and to remove continuity of provider as a variable. The sample included all health plan members who were Medicare beneficiaries and who met the entry criteria at that time. After adjustment for ineligibles (i.e., survey undeliverable; no longer a member of the plan; deceased/other), the response rate for these women was 66.5 percent, yielding 309 valid questionnaires.

Dependent Variable

Mammography use, the dependent variable, was determined by self-report as a two-part item asking first whether the participant ever had a mammogram and, if yes, in what year the last mammogram was obtained. A woman was categorized as having a mammogram if it had been received within the past 2 years.

Independent Variables

The questionnaire assessed the following domains: demographic data, self-report of health status (SF-12), health beliefs and attitudes about breast cancer and mammography, and health plan experience. The demographic domain includes age and education. Age was measured by asking the respondent to write in the age in years. Education was categorized as: eighth grade or less, some high school, completed high school/general equivalency degree, some college/technical school, completed college, graduate school. Although race/ethnicity is an important factor to consider in studying use of mammograms, it was not included in the survey primarily because of the distribution of race/ethnicity among the Medicare eligible population in Connecticut. Less than 7 percent of women age 65 or over in Connecticut are non-white (5 percent black and 2 percent Hispanic). Anecdotally, the enrollment of non-white beneficiaries in managed care is even lower.

Self-report of health status was measured using the shortened version of the Medical Outcomes Study health status assessment questionnaire, the SF-12. The SF-12 consists of 12 items from which two subscales are calculated, the Physical Component Score (PCS) and the Mental Component Score (MCS) (Ware, Kosinski, and Keller, 1998). Each component score

is normalized with a mean of 50 and standard deviation (SD) of 10. Scores above 50 indicate better health status. The mean score in the United States for the age group 64-75 (n=408) is 43.6 (SD=11.0) for the PCS and 52.1 (SD=9.5) for the MCS (Ware, Kosinski, and Keller, 1998).

Health beliefs have been assessed in relation to mammography in a number of studies. We assessed health beliefs about mammography to determine both facilitators and barriers (Becker and Maiman, 1975). These items were adapted from previous work that assessed the relationship between breast cancer attitudes and mammography screening (Aiken et al., 1994; Rimer, 1993; Taplin and Montano, 1993; Grady et al., 1992; Fulton et al., 1991; Lerman et al., 1990). Facilitators included efficacy and importance of mammograms; barriers addressed susceptibility to breast cancer, fears about radiation (Fox, Siu, and Stein, 1994; Lerman et al., 1990) or the test result, discomfort of test as embarrassing or painful, and a doctor's recommendation as a cue to action. A 5-point Likert-type response set (strongly agree, agree, neutral, disagree, strongly disagree) was used for these items. Based on the maximum-likelihood method, factor analysis of the health belief items supported a four-factor solution. The factors include: (1) Facilitators Score ("a mammogram is a good way to find early breast cancer" and "it is important for me to get a mammogram"); (2) Barriers Score ("I could get cancer from the radiation of a mammogram"; "the test is embarrassing"; "the test is painful"); and (3) Fear of Breast Cancer Score ("I'm afraid the test may show something wrong," and "I might get breast cancer in the future") and a single item (4) lack of a physician's recommendation ("my doctor never told me I should have a mammogram"). This item represents a lifetime Cue to Action, in that the item does not identify a specific time period as a reference point but asks whether a mammogram has ever been recommended. In prior work (Aiken et al., 1994, Grady et al., 1992), this item has been shown to be strongly related to having a mammogram or not in the past year for women age 50 or over. The Bartlett (1937) scoring method was used to calculate the factor scores based on related factors. All the scores and the Cue to Action item were normalized to a 0-100 range. Any missing values on the items were replaced with the neutral response.

Five variables related to the health plan domain were assessed: (1) satisfaction with the physician, (2) satisfaction with the health plan, (3) utilization of physician visits, (4) enrollment history, and (5) access to care. Satisfaction with the primary care physician was measured with one item asking the respondents to rate how satisfied they were with the quality of care and services they received from their physician; the 5-point Likert-type response set ranged from extremely satisfied to extremely dissatisfied. Satisfaction with the health plan was measured the same way. Utilization was measured by a question asking the number of times the respondent visited their family doctor in the past year (never, 1-2, 3-5, 6-9, 10 or more). Number of years enrolled in the health plan was asked. An Access Problems Score was developed with factor analysis using five items indicating reported problems for any preventive services; the problems included: (1) transportation, (2) too sick, (3) put off going to the doctor, (4) difficulty getting in and out of the office, and (5) no insurance for preventive services. (Cronbach's alpha = 0.82 for the five-item score.) The factor analysis identified a one-factor solution, and it was used to generate a score for the access problems factor normalized to a range of 0-100. Any missing values on the items were replaced with the neutral response.

Analysis

Bivariate analysis and hierarchical multivariate logistic regression modeling techniques were employed to assess a statistical model for having or not having a mammogram within the past 2 years. Due to inability to determine the exact date of the prior mammogram, nine women who reported a prior mammogram were categorized as not having a mammogram in the past 2 years for the analysis. The major independent variables were first assessed through bivariate analysis. Then, the variables were subjected to logistic regression to assess their independent effects once other key variables had been considered. Hierarchical techniques were used to assess how the independent variables influenced each other in the analysis. The focus was on assessing facilitators and barriers to mammography and finding the factors that best predicted having a mammogram in the past 2 years. The Hosmer-Lemeshow goodness-of-fit method (Hosmer and Lemeshow, 1980; Hosmer, Lemshow, and Klar, 1988) was used to evaluate the fit of the logistic regression model. To evaluate the discriminating power of the fitted model, the area under the receiver-operator characteristic curve was calculated.

RESULTS

Reported Mammography Use

Of the 309 women age 65 or over in the analysis, 243 or 79 percent reported that they received a mammogram in the past 2 years. This compares favorably with the overall rate of 82 percent for Connecticut Medicare beneficiaries in the age group 52-69 in managed care plans based on HEDIS® data (Health Care Financing Administration, 2000). This reported level of mammography screening is higher than the 65-percent rate for HMO Medicare participants reported in an earlier study (Taplin and Montano, 1993), but is similar to the 1997 adjusted rate (74 percent) reported on the BRFSS by Connecticut women (Blackman, Bennett, and Miller, 1999). These higher rates follow the trends for increasing levels of screening with each year (Blackman, Bennett, and Miller, 1999).

Descriptive Characteristics of the Sample

Table 1 presents the descriptive characteristics of the sample of women responding to the survey (N=309). The average age of these women was 73.8 years (SD=5.8), with the majority being age 70 or over and 36 percent age 75 or over. Sixty-one percent of the respondents had some high school or completed high school, and 26 percent had some college education. Most women were relatively healthy as measured by the SF-12, with an average score of 44.1 (SD = 9.7) on the PCS and an average score of 52.6 (SD= 8.0) on the MCS. These scores are similar to a normative age-matched group (Ware, Kosinski, and Keller, 1998).

Three scores assessing Facilitators, Barriers, and Fear of Breast Cancer were calculated. As shown in Table 1, the participants scored fairly high on facilitating perceptions (mean = 62.5; SD=19.0), low on barriers (mean = 43.5; SD= 18.1), and mid-range on being fearful of breast cancer (mean = 49.9; SD=17.4). Relatively few women reported that their physician had never recommended a mammogram (mean = 34.4; SD=19.1), indicating that most women had received a physician recommendation at some point in their lifetime.

Seventy-two percent of the women had been with the plan for over 2 years, and a majority, 60 percent, had more than two

Table 1
Bivariate Analysis of Variables Associated with Mammogram Use

Characteristic	Total Sample (*N*=309)	With Mammogram (*n*=243)	Without Mammogram (*n*=66)
Age*		Percent	
65-69 Years	27	30	17
70-74 Years	37	40	24
75 Years or Over	36	30	59
Education*			
Eighth Grade or Less	13	10	23
Some/Completed High School	61	63	59
Some College or Above	26	28	18
Health Status: SF-12			
Physical Component Score 75th Percentile	23	24	18
Physical Component Score 25th Percentile	25	25	26
Mental Component Score 75th Percentile	24	26	18
Mental Component Score 25th Percentile	24	23	27
		Mean (Standard Deviation)	
Physical Component Score	44.1 (9.7)	44.3 (9.8)	43.5 (9.4)
Mental Component Score	52 .6 (8.0)	52.8 (8.1)	51.7 (7.6)
Health Beliefs			
Facilitators Score[1] (0-100)	62.5 (19.0)	67.6 (15.1)	43.7 (20.1)
Barriers Score[2] (0-100)	43.5 (18.1)	43.0 (18.4)	45.1 (17.3)
Fear of Breast Cancer Score[3] (0-100)	49.9 (17.4)	49.9 (18.3)	50.0 (13.6)
Cue to Action[4] (0-100)	34.4 (19.1)	32.7 (18.8)	40.8 (18.8)
Health Plan Experience		Percent	
More than 2 Years in Plan	72	74	77
More than 2 Visits in Past Year*	60	63	50
Satisfied with Doctor**	88	90	77
Satisfied with Plan	76	78	68
		Mean (Standard Deviation)	
Access			
Access Problems Score[5] (0-100)***	30.4 (19.8)	28.5 (18.8)	37.5 (21.6)

*$p<0.05$.

**$p<0.01$.

***$p<0.001$ (percent with mammogram versus percent without).

[1] Facilitators Score—mammogram is a good way to find early breast cancer; and importance to get a mammogram (Cronbach's alpha=0.89).

[2] Barriers Score—could get cancer from radiation from mammogram; test embarrassing; and test painful (Cronbach's alpha=0.85).

[3] Fear of Breast Cancer Score—afraid test may show something wrong; and might get breast cancer in the future (Cronbach's alpha=0.48).

[4] Cue to Action—doctor never told me I should have a mammogram.

[5] Access Problems Score—sum of responses to: problems with transportation; too sick; difficulty getting in and out of doctor's office; put off going to doctor; and insurance does not pay for preventive services.

SOURCE: Qualidigm®, Middletown, CT, 2001.

visits to the physician in the past year. Most members (88 percent) were satisfied with their physicians (38 percent extremely satisfied; 50 percent satisfied). Three-quarters (76 percent) of the women were satisfied (28 percent extremely satisfied; 48 percent satisfied) with the health plan. The mean Access Problems Score was relatively low, with an average of 30.4 (SD=19.8), indicating that these women perceived relatively few problems accessing preventive health services.

Bivariate Analysis

Table 1 also presents the bivariate analysis of demographic characteristics, health status, health belief factors, health plan variables, and access with having or not having a mammogram in the past 2 years.

Age was significantly related to having had a mammogram in the past 2 years: the proportion not having a mammogram was 17 percent in the age group 65-69, 24 percent in the age group 70-74, and 59 percent

in the age group 75 or over. Only 65 percent of the oldest women (75 or over) had a mammogram, compared with 87 percent and 86 percent in the younger age groups. Education also was significantly related to having a mammogram: those with an education of eighth grade or less education were less likely to obtain a mammogram. Health status as measured by the SF-12 was unrelated to mammography use, although those without a mammogram had a slightly lower mean score on the PCS and MCS than those with a mammogram. Of the health beliefs, only the Facilitators Score was significantly associated with having a mammogram, with those scoring high more likely to have had a mammogram. Having more visits to the physician, being satisfied with the physician, and perceiving fewer access problems to health care were significantly related to having a mammogram, as well.

Multivariate Model

Table 2 presents the results of the hierarchical multivariate logistic regression analysis. At the first step of the analysis, both age and education were significant factors. Those under age 75 were more than three times as likely to obtain a mammogram as older women. Those with some college education were more likely than those with less than a high school education to obtain a mammogram. At the second step with demographic and health status variables in the analysis, the effects of age and education remained largely unchanged. Health status was not significant, nor were there significant interaction effects between age and health status on mammography utilization. At the final step, taking into account all other independent variables, age remained significantly related to mammography use in this sample. Women in the age group 75 years or over

were less likely to have received a mammogram in the last 2 years compared with younger women. Health beliefs also were important. Those who scored high on the facilitator measure were significantly more likely to have obtained a mammogram (OR=1.09; CI = 1.06-1.11; $p<0.001$). The Cue to Action measure emerged as an important variable, as those who had never been told by a physician to obtain a mammogram were significantly less likely to report this service. Finally, satisfaction with physician remained important; those who were satisfied were more than twice as likely to have received a mammogram as those who were not satisfied (OR=2.68; CI=1.01-7.42; $p<0.05$). Factors that were not significant predictors of mammography use in the multivariate model include education, health status, attitudinal barriers, fear of breast cancer, number of visits, and perceived access problems. The logistic regression model was a good fit, explaining 36 percent of the variance in reporting a mammogram in the past 2 years.

DISCUSSION

Many studies have assessed factors influencing use of mammography among insured as well as community samples. However, relatively little is known about use of mammography among women enrolled in a Medicare risk-HMO plan. This study found a fairly high rate of mammography use among beneficiaries responding to a questionnaire about use of preventive services. Over three-quarters (79 percent) of those surveyed reported having a mammogram in the past 2 years. This finding is consistent with mammography rates reported for Medicare managed care plans based on HEDIS® data (Health Care Financing Administration, 2000). Age has consistently been an important

Table 2

Logistic Regression Analysis of Variables Associated with Mammogram Use[1]

Variable	Odds Ratio (95 Percent Confidence Interval)
Demographic Only (Step 1)	
Age	
65-69 Years**	3.28 (1.54-6.99)
70-74 Years***	3.18 (1.63-6.18)
75 Years or Over (Referent)	
Education	
Eighth Grade or Less (Referent)	
Some/Completed High School	1.91 (0.89-4.12)
Some College or Above*	2.92 (1.16-7.33)
Demographic and Health Status (Step 2)	
Age	
65-69 Years**	3.18 (1.48-6.85)
70-74 Years***	3.08 (1.56-6.07)
75 Years or Over (Referent)	
Education	
Eighth Grade or Less (Referent)	
Some/Completed High School	1.92 (0.89-4.13)
Some College or Above*	2.88 (1.14-7.26)
Health Status	
Physical Component Score>75th Percentile	1.05 (0.51-2.18)
Mental Component Score >75th Percentile	1.23 (0.60-2.54)
Demographics, Health Status, Health Beliefs, and Health Plan (Step 3)	
Age	
65-69 Years	2.21 (0.87-5.60)
70-74 Years**	3.92 (1-60-9.60)
75 Years or Over (Referent)	
Education	
Eighth Grade or Less (Referent)	
Some/Completed High School	1.03 (0.38-2.80)
Some College or Above	1.68 (0.52-5.40)
Health Status	
Physical Component Score>75th Percentile	0.93 (0.38-2.28)
Mental Component Score >75th Percentile	1.06 (0.43-2.61)
Health Beliefs	
Facilitators Score***	1.09 (1.06-1.11)
Barriers Score	0.99 (0.96-1.01)
Fear of Breast Cancer Score	1.00 (0.98-1.03)
Cue to Action***	0.95 (0.94-0.99)
Health Plan	
Satisfied with Doctor*	2.68 (1.01-7.42)
More than 2 Visits in Past Year	1.01 (0.48-2.13)
Access Problems Score	1.00 (0.99-1.03)

*$p<0.05$.

** $p<0.01$.

***$p<0.001$.

[1] N=309.

NOTES: R^2=0.36; the area under the curve (receiver-operator characteristic) = 0.87; and Hosmer-Lemeshow test for goodness-of-fit = 0.34.

SOURCE: Qualidigm®, Middletown, CT, 2001.

factor influencing use of mammography in other studies, with older women who are at greatest risk for breast cancer having a lower screening rate, consistent with guidelines and recommendations. This study replicated that finding, although a substantial number of women, 65 percent in the age group 75 or over, had a mammogram in the previous 2 years. This finding demonstrates that, while older women are

less likely to be screened, it is possible to achieve relatively high rates of mammography in this age group. However, there may be some upper limit on the rate of mammography achievable among older women, depending on comorbidities and life expectancy (Kerlikowske et al., 1999).

A high Facilitators Score and a physician's recommendation also were significant factors, and their effects on obtaining a mammogram were substantial. The odds ratio for the Facilitators Score indicates that for every increase of one point in the score, there is a 9-percent increase in the likelihood of obtaining a mammogram. Enhancing beliefs about the importance and efficacy of mammography screening for cancer detection among older women could greatly increase their mammogram rates, especially in view of the lack of understanding about mammography efficacy noted in prior work (Taplin and Montano, 1993).

Likewise, based on the results of the logistic regression, interventions that would increase physician recommendations for mammograms would significantly increase mammography utilization. The use of "ever" having a recommendation as the measure may have attenuated this relationship if the recommendation was not a recent one (Aiken et al., 1994). Even with this more conservative measure of the Cue to Action, the recommendation of a physician remains an important variable in whether or not a woman receives a mammogram.

Multivariate analysis also suggests that the relationship between patient and physician is an important predictor of obtaining a mammogram. Although only a small proportion of the respondents were dissatisfied with the physician, those who were satisfied were more than twice as likely to obtain a mammogram as those who were not satisfied. This finding is consistent with an earlier study of HMOs in California, which found that mammography use was positively associated with the patients' satisfaction with their primary care physicians (Weingarten et al., 1995). It is noteworthy, in our study, with all women continuously enrolled with the same provider for at least 2 years, that satisfaction with the physician as well as physician recommendation made a significant contribution. Physician enthusiasm for mammography when it was discussed at the office visit was associated with having a mammogram in a community study of older women in Los Angeles (Fox, Siu, and Stein, 1994), suggesting that the quality of physician communication can influence a woman's preventive behavior. Similarly, a national study of women in the age group 50-80 (Stoddard, Rimer, Lang, 1998) found that a physician's recommendation for mammography is important for women regardless of their level of cognitive preparedness to take preventive action. These authors emphasize the important role of the physician-patient relationship and the need to improve communication. While a number of intervention studies have been conducted in HMOs to evaluate the effectiveness of physician reminder letters, telephone counseling, and appointment scheduling in increasing mammography screening (Davis et al., 1997; Davis et al., 1997; King et al., 1994), more work is needed to address interventions that inform and educate physicians about the content of the physician-patient interaction and its effect on mammography screening behavior.

Other factors, such as fears associated with mammography and fears associated with breast cancer, were less important for the women in this study than in some prior studies, especially of older women in HMOs (Lerman et al., 1990). It may be that women who have recently selected a

Medicare HMO plan already have beliefs that are consistent with use of preventive services (Fox, Roetzhein, and Kingston, 1997). Prior studies have shown that non-elderly women in HMOs were more likely to have received a mammogram than women with fee-for-service coverage (Weinick and Beauregard, 1997; Tu, Kemper, and Wong, 1999-2000). The findings from this Medicare HMO survey are consistent with such comparisons and may reflect the interventional efforts of health plans to facilitate mammography screening, both by encouraging members to have regular mammograms and by encouraging physicians to refer women for mammograms when they are due (Thompson et al., 1995; Lerman et al., 1990; King et al., 1994; Stoddard et al., 1998).

Most of the findings from this study are consistent with those found for community studies, younger women and those in HMOs. These results indicate that age, strong beliefs in the importance of mammograms, and having a physician recommendation are critical factors for women in a Medicare managed plan, as well, and that interventions aimed at these beneficiaries can be modeled on those shown to be effective for other older women (Stoddard et al., 1998). Although overall rates of mammography are high in this sample, there is considerable room for improvement among the older age groups.

Limitations of this study should be noted. The data are based on self-report and were not independently validated by chart review for this sample. However, accuracy of self-report by women in the age group 50-74 of their most recent mammogram has been demonstrated (Zapka et al., 1996), and the agreement of patient self-reports with medical records has been found to be high (Montano and Phillips, 1995). Also, we do not know whether the absence of a mammogram represents an informed decision on the part of the woman, made perhaps in discussion with a physician, or the physician's considered judgment (Blustein and Weiss, 1998). Moreover, we did not assess mammography history prior to the most recent mammogram. Yet, prior use is a good predictor of current use, especially among Medicare HMO members (Taplin et al., 1994): and this factor may have differentiated those members who reported a timely mammogram from those who did not. Finally, because the sample was limited to those women who had the same physician for 2 years, there may be some bias toward including women who were satisfied with their physician.

CONCLUSIONS

The findings from this study of Medicare members of a network model HMO indicate that women generally are receiving mammography screening within the recommended time interval. Additional interventions to address patient satisfaction with the physician and physician-patient communication about mammography, as well as education for physicians and patients about breast cancer risk with age and the utility of regular mammography, should help to increase women's participation in this preventive service. Medicare managed care plans are a relatively new phenomenon and little is known about use of mammography among women who self-select into this type of health care coverage. This study adds to previous work by specifying facilitating beliefs, rather than fears, that are related to timely screening, as well as confirming the importance of a physician recommendation and the potential for enhanced physician-patient relationships in encouraging women to receive this important preventive service. Finally, the age differential

confirmed in our study may reflect the continuing use of implicit age limits despite open-ended guidelines.

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