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Mammography and Pap Smear Use by Older Rural Women

SYNOPSIS

Objective. To compare the characteristics of older women who did and did not have screening mammograms and Pap smears during the first two years both services were a Medicare Part B benefit.

Methods. A prospective study was conducted in five rural Pennsylvania counties of 2205 female community-dwelling Medicare Part B beneficiaries who volunteered to participate in a Medicare prevention demonstration project. The baseline health risk appraisal included information on demographics, insurance status, disease history, symptomatology, and functional and cognitive status. These variables were tested for their association with the use of mammography and Pap smear using Medicare utilization claims data from 1991 to 1992.

Results. Of 2175 women still alive after three years, 44.6% had had a mammogram and 14.6% had had a Pap smear in either 1991 or 1992. Multivariate logistic regression revealed that women were more likely to have a mammogram if they were younger, were more educated, had supplemental insurance, did not need assistance with activities of daily living, and did not have diabetes or arthritis. Younger, college educated, and non-widowed women were more likely to have Pap smears than women in other categories.

Conclusions. With cost less of a barrier, more aggressive efforts to persuade older women to have mammograms and Pap smears must be developed.

Early detection of breast and cervical cancers is known to reduce morbidity and mortality in women.[1-4] Despite evidence from the National Health Interview Survey (NHIS) and other studies indicating increased use of routine screening mammography and Pap smears, many women are still not being tested.[1,5-8] Furthermore, utilization has been particularly low among certain high risk populations who have been targeted for more aggressive interventions to improve compliance with screening recommendations: specifically older, less educated, poorer, and unmarried women.[7-26]

Until recently, cost was a barrier to obtaining screening mammograms and Pap smears for some women. However, the Health Care Financing Administration (HCFA) began covering these screening services under Part B of Medicare in the early 1990s. Coverage for screening Pap smears began July 1, 1990, and

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for mammograms, January 1, 1991. Under Part B coverage, the beneficiary is responsible for only the co-payment once her deductible has been met (for patients with Medicaid coverage, there is no co-payment). These new Medicare benefits along with the implementation of HCFA's new National Claims History files (NCH) provide an opportunity to examine the use of these services through a review of administrative records documenting claims for reimbursement.

We examined the use of mammograms and Pap smears by older, rural, community-dwelling women as recorded in Medicare claims data during the first two full years these services were covered by Medicare (January 1, 1991 through December 31, 1992). In contrast to previously published studies, we used Medicare claims data, not self-reports, as our data source. The study population was women who participated in the Rural Health Promotion Project (RHPP), a Medicare-funded demonstration project under which beneficiaries were offered health risk assessments at no cost (some were also offered disease risk factor interventions such as smoking cessation programs). Cancer screening, including mammograms and Pap smears, was not covered under the demonstration project. We examined the demographic characteristics, disease history, and functional status of RHPP women to identify the characteristics of users and nonusers of these cancer screening services.

> Thirty-four percent of the women had mammography only, 3% had Pap smear only, 11% had both services, and 52% had neither.

Methods

The catchment area for the Rural Health Promotion Project was five rural counties in northwestern Pennsylvania. Recruitment strategies, study design, and characteristics of participating people have been described previously.[25-27] Briefly, eligible people had to be 65 to 79 years of age, residents of a participating county, and covered under Part B of Medicare. Persons who were institutionalized, bedridden, or had a recent cancer diagnosis were excluded from the project. Three thousand eight hundred and eighty-four community-dwelling Medicare beneficiaries, of whom 2205 (56.8%) were women, volunteered, were eligible, and participated in the demonstration. Of these women, 2175 were alive in January 1991.

Data on the characteristics of the RHPP participants were obtained from a health risk appraisal (HRA), which included questions on demographics, health habits, insurance status, disability, and self-reported disease history and symptomatology. In addition, standardized screening

instruments were administered, including the Mini-Mental State Exam (MMSE), which tests for cognitive impairment, the Centers for Epidemiologic Studies of Depression scale (CES-D), and measures of activities and instrumental activities of daily living (ADLs and IADLs).[28-30] Possible cognitive impairment was defined as an MMSE score $\leq$ 23/30, and possible depression as a CES-D score $\geq$ 16/60. ADLs were categorized according to whether or not assistance was needed to complete the identified tasks.

The RHPP women's utilization of mammograms and Pap smears was determined from HCFA's National Claims History (NCH) files for the period 1 January 1991 through 31 December 1992. We searched all Part B outpatient and physician/supplier data within the NCH for the appropriate HCFA Common Procedure Code System codes: 76090-76092 for mammograms and 88150, 88151, and 88155 for Pap smears.

We used the SAS statistical analysis system for data analyses.[31] Frequency distributions and univariate analyses were done with the FREQ procedure, logistic regressions with the LOGIST procedure. Multiple logistic regression models for both screening procedures included all independent variables demonstrating univariate association with either screening method, using p<.05 as the criterion for statistical significance.

Results

The general demographic and health status characteristics of the 2205 female RHPP participants are presented in table 1. According to Medicare Part B claims data, 970 (44.6%) of the 2175 RHPP women still living as of January 1, 1991 had a mammogram claim during either 1991 or 1992, while 317 (14.6%) of these women had a Pap smear in either year.

We examined the proportions of RHPP women who had mammography only, Pap smear only, both services, and neither service within the two-year period. Of the 2175 women, 34% had mammography only, 3% had Pap smear only, 11% had both services, and 52% had neither. Univariate analysis revealed that RHPP women were much more likely to have a mammogram if they were younger ($P<.001$), more educated ($P<.001$), married ($P=.001$), or had supplemental insurance ($P=.004$) (table 2). They were also more likely to undergo mammography if they were healthier in terms of having no history of myocardial infarction ($P=.029$) or diabetes

Table I. Demographic and health status, characteristics of 2205 women participating in the Rural Health Promotion Project

Characteristic	Number	Percent
Age (years)		
65–69	914	41.5
70–74	858	38.9
75–79	433	19.6
Education (years)		
0–8	444	20.2
9–12	1391	63.1
Post high school	368	16.7
Marital status		
Married	1215	55.3
Widowed	822	37.4
Divorced/separated	57	2.6
Never married	103	4.7
Insurance		
Medicare and Medicaid	84	3.8
Medicare only	214	9.7
Medicare and Medigap	1907	86.5
ADLs		
Independent	2081	95.3
Needs Assistance	103	4.7
IADLs		
Independent	1471	68.5
Needs Assistance	677	31.5
History of myocardial infarction		
Yes	204	9.3
No	1991	90.7
History of angina pectoris		
Yes	333	15.1
No	1869	84.9
History of diabetes		
Yes	347	15.8
No	1854	84.2
History of pulmonary disease		
Yes	356	16.1
No	1849	83.9
History of cerebrovascular disease		
Yes	119	5.4
No	2082	94.6
History of arthritis		
Yes	1297	59.0
No	902	41.0
Depression screening		
Not depressed	105	4.8
Possibly depressed	2087	95.2
Dementia screening		
Not demented	230	10.5
Possibly demented	1966	89.5

($P=.001$). Interestingly, arthritis history increased the likelihood of a women having a mammogram ($P=.021$). Disability in terms of scoring abnormally on measures of depression ($P=.008$) or cognitive function ($P=.008$) and needing assistance with IADLs ($P=.008$) and ADLs ($P=.002$) were asso-

Table 2. Factors associated with mammography and Pap smear utilization in 2175 RHPP women, NCH data 1991–1992

Variable	Mammography		Pap smear	
Overall	44.6%		14.6%	
Age (years)				
65–69	54.4%	P<0.001	17.3%	P=0.002
70–74	41.1%		14.0%	
75–79	30.6%		10.1%	
Education (years)				
0–8	31.8%	P<0.001	10.8%	P=0.001
9–12	47.0%		14.4%	
Post high school	50.8%		19.9%	
Marital status				
Married	48.3%	P=0.001	17.0%	P=0.003
Widowed	39.7%		11.3%	
Divorced/separated	41.1%		8.9%	
Never married	39.6%		13.9%	
Insurance status				
Medicare & Medicaid	29.3%	P=0.004	NS	
Medicare Only	39.5%			
Medicare & Medigap	45.8%			
History of myocardial infarction				
Yes	37.4%	P=0.029	NS	
No	45.5%			
History of diabetes				
Yes	36.2%	P=0.001	NS	
No	46.2%			
History of arthritis				
Yes	46.7%	P=0.021	NS	
No	41.7%			
Depression screening				
Possibly depressed	36.3%	P=0.008	NS	
Not depressed	45.6%			
Dementia screening				
Possibly demented	32.0%	P=0.008	6.8%	P=0.022
Not demented	45.3%		15.0%	
ADLs				
Independent	45.3%	P=0.002	NS	
Needs Assistance	29.3%		.	
IADLs				
Independent	46.7%	P=0.008	NS	
Needs Assistance	40.5%			

NOTE: NS= Not Significant

Table 3. Logistic regression analyses: mammograms

Variable	Coefficient	P-value	Odds Ratio	(95% CI)
Intercept	-0.8211	0.0060		
Age (years)				
65–69			1.00	
70–74	-0.5250	0.0001	0.59	(0.48,0.72)
75–79	-0.9143	0.0001	0.40	(0.31,0.52)
Education (years)				
0–8			1.00	
9–12	0.5139	0.0001	1.67	(1.31,2.14)
Post high school	0.7305	0.0001	2.08	(1.52,2.84)
Insurance Status				
Medicare and Medicaid			1.00	
Medicare only	0.4571	0.1344	1.58	(0.87,2.87)
Medicare and Medigap	0.5229	0.0526	1.69	(0.99,2.86)
History of myocardial infarction				
No			1.00	
Yes	-0.1631		0.85	(0.61,1.18)
History of diabetes		0.3312		
No			1.00	
Yes	-0.3634	0.0221	0.74	(0.57,0.96)
History of arthritis				
No			1.00	
Yes	0.3634	0.0002	1.44	(1.19,1.74)
ADLS				
Independent			1.00	
Needs assistance	-0.5817	0.0253	0.56	(0.34,0.93)
Marital status				
Married			1.00	
Widowed	-0.1007	0.3238	0.90	(0.74,1.10)
Divorced/separated	-0.1581	0.5878	0.85	(0.48,1.51)
Never married	-0.1229	0.5804	0.88	(0.57,1.37)
Depression screening				
Not depressed			1.00	
Possibly depressed	-0.2687	0.0891	0.76	(0.56,1.04)
Dementia screening				
Not demented			1.00	
Possibly demented	-0.0175	0.9412	0.98	(0.62,1.57)
IADLS				
Independent			1.00	
Needs assistance	-0.0792	0.4646	0.92	(0.75,1.14)

NOTE: Overall Likelihood Ratio χ^2=132.758, 16df (P=0.0001)

ciated with decreased likelihood of having a mammogram.

In contrast, only a few variables in the univariate analysis were associated with having a Pap smear. Age (P=.002), education (P=.001), and marital status (P=.003) were strongly associated with Pap smear use; the women who used this service tended to be more educated, younger, and married (table 2). Disability as defined by possible cognitive impairment (P=.022) was the only functional status variable associated with not having a Pap smear. Disease history was not associated with Pap smear use.

Table 4. Logistic regression analyses: Pap smears

Variable	Coefficient	P-value	Odds Ratio	(95% CI)
Intercept	−1.7928	0.0001		
Age (years)				
65–69			1.00	
70–74	−0.2127	0.1276	0.81	(0.61,1.06)
75–79	−0.5426	0.0074	0.58	(0.39,0.86)
Education (years)				
0–8			1.00	
9–12	0.1963	0.2833	1.22	(0.85,1.74)
Post high school	0.6267	0.0036	1.87	(1.23,2.85)
Marital status				
Married			1.00	
Widowed	−0.3267	0.0247	0.72	(0.54,0.96)
Divorced/separated	−0.6593	0.1696	0.52	(0.20,1.33)
Never married	−0.2164	0.4897	0.81	(0.44,1.49)
Insurance Status				
Medicare and Medicaid			1.00	
Medicare only	0.2582	0.5511	1.29	(0.55,3.03)
Medicare and Medigap	0.1378	0.7221	1.15	(0.54,2.45)
History of myocardial infarction				
No			1.00	
Yes	0.1745	0.4386	1.19	(0.77,1.85)
History of diabetes				
No			1.00	
Yes	0.0276	0.8809	1.03	(0.72,1.47)
History of arthritis				
No			1.00	
Yes	−0.0054	0.9675	0.99	(0.77,1.29)
ADLS				
Independent			1.00	
Needs assistance	−0.5613	0.1725	0.57	(0.25,1.28)
Depression screening				
Not depressed			1.00	
Possibly depressed	−0.4300	0.0857	0.65	(0.40,1.06)
Dementia screening				
Not demented			1.00	
Possibly demented	−0.5157	0.2056	0.60	(0.27,1.33)
IADL				
Independent			1.00	
Needs assistance	−0.0036	0.9809	1.00	(0.74,1.34)

NOTE: Overall likelihood ratio $\chi^2=42.179$, 16df (P=0.0004)

History of angina pectoris, pulmonary disease, and cerebrovascular disease were not included as variables in the multiple logistic analyses because no associations with either screening method were noted in the univariate analyses. Multiple logistic regression analyses revealed that having a mammogram was associated with younger age and more education, and a borderline association was present between having a mammogram and having Medigap insurance (table 3). Having a history of diabetes or of limited functional status as measured by ADLs were associated with not having a mammogram. In addition, history of arthritis was associated with increased likelihood of mammography use. The oldest

age group and widowed women were least likely to have Pap smears, while being educated beyond high school was positively associated with having a Pap smear (table 4).

Discussion

The Healthy People 2000 Objectives are to increase to at least 60% the proportion of women ages 50 and older who have received a clinical breast exam and a mammogram in the preceding one to two years and to at least 85% the proportion who have received a Pap test in the preceding one to three years.[32] As a group, the RHPP women failed to meet these objectives. Our findings that those who were older, less educated, unmarried, and poorer (as proxied by coverage with both Medicare and Medicaid)[33] were less likely to have mammograms and Pap smears is consistent with those of other studies.[7-24,34] Further, the fact that having supplemental insurance was related to higher likelihood of having a mammogram suggests that costs may influence behavior. It is noteworthy that half the women reported having had hysterectomies, which would clearly impact Pap smear use. However, despite recent changes in screening recommendations for Pap smears in older women, use of Pap smear screening in the "younger" RHPP women (ages 65 to 69) was still lower than desirable.

The overall screening rates for the RHPP participants are likely to be higher than that of the general population of older rural women. The RHPP women volunteered to be part of a health promotion demonstration and may have been more motivated to use preventive services. There were no differences in use of mammography and Pap smears by women who did and did not receive risk factor interventions. However, there certainly was a large difference in the use of mammograms between participants in the program and other women from the study catchment area. In the group of area female Medicare beneficiaries who did not participate in RHPP because they refused, were ineligible, or were not located during recruitment, mammography claims were about one-third lower than those of participants, and Pap smear claims were less than half of participants'. Thus, the low utilization of these preventive services by older women who participated in a health promotion demonstration is even more troubling because it is likely an overestimate of the true use of these services by all Medicare beneficiaries. Other researchers found 25% utilization during the years 1991 to 1993 in one group of women and 37% during 1992 and 1993 in another group.[35]

This study has shown the value of merging data from the Medicare administrative claims system with data obtained through other means to assess the use of mammograms and Pap smears and more importantly, the relationship between specific population characteristics and utilization.[34] Medicare databases have become increasingly useful in monitoring services in elderly cohorts, but these data are not without limitations.[36] There are differences in the frequency, ease, and amount of claims reimbursement between

screening and diagnostic services; these inconsistencies sometimes result in diagnostic procedure codes being used to claim reimbursement for screening services that would not be reimbursed if claimed under the screening code. We wanted to specifically study screening use but for this reason included HCPCS codes for diagnostic mammography and Pap smear as well.

It is possible that use of NCH claims data leads to an underestimate of the utilization of screening mammograms. Part B of Medicare has a $100 deductible, and some women may have had these screening procedures before their deductible was met. Therefore, the use of these services would not be reflected in the NCH data; unfortunately, the number of such cases cannot be determined. Because managed care and health maintenance organizations had not penetrated the health care environment within this rural area in 1992, these newer reimbursement systems would not have influenced these findings, but may affect analyses of more recent data.

We have some self-report data that provide additional information on the use of mammograms and Pap smears. In analyzing follow-up interviews of RHPP subjects, we found self-reported use of mammography and Pap smear during the previous two years (approximately the same time frame as the HCFA data) to be higher than seen in the HCFA claims. Fifty-seven percent of those interviewed reported having had a mammogram (in contrast to 44.6% by their HCFA claims), and almost 37% reported having had a Pap smear (14.6% by HCFA). The higher rates found in the self-reports may be due to providers not having submitted claims for these newly reimbursable services or may be simply due to inaccurate recall of the time services were received. The percent agreement between self-report and HCFA claims was 73.5% for mammograms and 67.8% for Pap smears. Both data sources have limitations, and the "true" utilization of these screening services is likely to be somewhere between the self-report and HCFA claims data.

RHPP participants receive most of their health care from primary care physicians. Few specialists are present in these rural communities, and other ongoing analyses of RHPP data show that these beneficiaries tend to be treated in large urban areas when specialty care is necessary. The rural primary care physicians are therefore responsible for treating most or all of the medical problems of these older women and, due to time and staffing constraints, may be treating acute illness and existing disease before practicing prevention. This may explain why we found those with most disease histories less likely to use screening services. In addition, a large number of these women are not married, usually through widowhood, and may no longer be sexually active. They may no longer visit a gynecologist and may not realize the importance of continued breast and cervical cancer screening.

Numerous studies have concurred that having a physician recommend screening procedures is one of the biggest factors in getting women to agree to them.[3,8-14,16-18,21,24,37-40]

If we are to successfully meet the Healthy People 2000 objectives for screening mammograms and Pap smears in older women, then their primary care physicians must be educated about the importance and effectiveness of screening in this age group. They must also assume responsibility for the education of their older patients about the importance of these procedures—even for women with higher levels of comorbidity—in improving life expectancy through prevention of disability and death due to breast and cervical cancers, especially now that cost is no longer a major barrier.

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