Breast Cancer Screening in Rockland County, New York: A Survey of Attitudes and Behaviors

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Objectives: Higher-than-average breast cancer incidence and mortality rates in Rockland County (NY) may be explained by higher screening rates, but screening frequency has not been measured at the county level. This study was conducted to determine adherence to breast cancer screening guidelines in Rockland, and whether adherence differs by ethnicity, age, educational level, insurance status, and race.

Methods: A telephone survey of screening behaviors and attitudes was administered to a random sample of Rockland County women age ≥40 years. Prevalence estimates of mammography, clinical breast exam (CBE), and breast self-examination (BSE) were derived by using exact confidence intervals (CIs) for proportions. Differences in demographic groups were assessed with chi-square tests and 95% CIs. Logistic regression was used to determine independent contributions of demographic characteristics after adjustment.

Results: Overall, 76.4% of respondents received a mammogram and CBE in the past year, compared with 60.3% in New York State and 55.5% in the United States. Significant predictors of a mammogram in the past year were age, education, marital status, and health insurance; of CBE in the past year were age, education, and marital status; of BSE at least monthly was marital status. Being Jewish was associated with a mammogram and CBE in the past year but did not attain significance (P=.06 and .08, respectively).

Conclusions: Mammography and CBE usage in Rockland County appear to exceed that of New York State and the United States. The county health department can target relevant demographic subgroups for health education programs. (*Ethn Dis*. 2006;16:428–434)

Key Words: Attitudes, Breast Self-Examination, Health Knowledge, Mammography, Practice

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Introduction

Rockland County, New York, is located ≈30 miles northwest of New York City, bounded on the east by the Hudson River and the south by Bergen County, New Jersey. With a population estimated in 2003 at 293,000,[1] it is a relatively affluent county; 35% of households reported an annual income ≥$100,000 in 2003.[2] Median family income in 2003 was significantly higher in Rockland than in New York State: $83,543 vs $55,309, respectively.[3] The foreign-born population makes up 20.6%[4] and the Jewish population is estimated to be ≈25% of the county.[5]

Since 1985, breast cancer incidence and mortality rates in Rockland County have exceeded those in New York State as a whole. The incidence and mortality rates in Rockland for the five-year period 1995–1999 were 149.4 and 32.6 per 100,000, respectively, as compared with New York State, where the rates were 132.6 and 31.6 per 100,000, respectively.[6] The American Cancer Society (ACS) recommends an annual mammogram for all women age ≥40 years. The proportion of New York State women age ≥40 years who have had a mammogram within the past year is 68.2%.[7] Although this level of compliance is substantially below the ACS 2015 objective of 90%, it is higher than the national average of 62.6%[1] and very close to the Healthy People 2010 goal of 70%.[8]

The incidence and mortality rates in Rockland for the five-year period 1995–1999 were 149.4 and 32.6 per 100,000, respectively, as compared with New York State, where the rates were 132.6 and 31.6 per 100,000, respectively.[6]

The higher incidence in Rockland County may be attributable to more widespread breast cancer screening, but mammography usage has not been measured at the county level. To test this theory, we conducted a survey to determine how well women in Rockland County adhere to screening guidelines, and whether adherence differs by ethnicity, race, age, educational level, and insurance status. Knowledge and attitudes about cancer screening and risk factors are also included in this survey to measure perceptions of breast cancer risk and efficacy of mammography, clinical breast exams (CBEs), and breast self-examinations (BSEs).

Methods

Study Population

Our target population was women age ≥40 years residing in Rockland County, New York. No length of residency was required. From the 2000 Census, the estimated population of

Table 1. Demographic characteristics of study population: *n*=1659

Characteristic	Number	%
Age		
40–64 years	1153	69.5
≥65 years	506	30.5
Race		
Caucasian	1260	76.0
African American	104	6.3
Asian	92	5.6
Did not designate	201	12.1
Ethnicity		
Latino	107	6.4
Jewish	406	24.5
All others	1146	69.1
Marital status		
Currently married	1188	72.0
All others	461	28.0
Education		
College graduate	501	30.2
Some college	284	17.1
High school graduate	392	23.7
Less than high school	51	3.7
Trade school	41	2.5
Employment status		
Full-time	744	44.9
Other than full-time	915	55.1
Health insurance status		
From work	1082	65.3
Medicare	288	17.4
Medicaid	30	1.8
Self-paid	92	5.6
Uninsured	41	2.5
All other	124	7.5

Rockland County women in this age category was 67,802. The target sample was 2000 women, representing ≈3% of the eligible women of the county.

Survey Instrument

The survey consisted of 71 questions in three main areas: 1) general demographics; 2) knowledge, attitudes, and beliefs; and 3) self-reported behaviors pertaining to mammography, CBEs, and BSEs. The survey took 15–20 minutes to complete by telephone.

Survey Procedures

Telephone interviews were conducted by using random digit dialing. To maximize participation, female interviewers were used, Spanish-speaking interviewers were available, and interviews were conducted daily during daytime and evening hours. No information about nonresponders was collected, either in terms of their demographic characteristics or the reason for their refusal to participate. The protocol and survey were piloted in early April of 2002, and formal data collection was initiated and continued through September 2002.

Data Analysis

Sample size was computed to provide reasonable precision on an estimate of compliance for smaller minority groups in the county. A sample of 100 participants of a particular minority group would provide a 95% confidence width of at most ±10% on an estimate of compliance in this group. Using the population of Asian women in Rockland as a reference (estimated to be ≈5.6% of the eligible female residents), a sample of 2000 participants selected randomly from the population of eligible participants would provide >80% confidence that the sample would have at least 100 Asian participants.[9] For prevalence estimates of women compliant with screening guidelines, exact confidence intervals (CIs) for proportions were used. To determine whether the prevalence of compliance differed by demographic factors such as age or race, chi-square tests and 95% CIs for prevalence odds ratios were used. Multiple logistic regression was used to assess the relationship between screening behaviors and demographic characteristics. Data were analyzed using the Statistical Analysis System (SAS) version 9.[10]

RESULTS

Study Population

A total of 2102 eligible women were contacted, with 1659 agreeing to participate, for a response rate of 78.9%. This number represents 83% of the target sample size. Table 1 shows the demographic characteristics of the study sample.

Overall Adherence to Screening Guidelines

As shown in Table 2, the percentage of Rockland County women ≥40 years reporting a mammogram in the past year (81.0%) exceeded that of women in New York State (68.2%) and the United States as a whole (62.6%). Similarly, the percentage of women reporting both a mammogram and a CBE within the past year (76.4% for the year 2000) significantly exceeded that of women in New York State (60.3%) and the United States as a whole (55.5%).

Table 2. Mammography and clinical breast exams, in Rockland County, New York State, and the United States

	Percent Receiving Mammogram in Past Year			Percent Receiving Mammogram and CBE in Past Year		
Age Group	Rockland County	New York State	United States	Rockland County	New York State	United States
≥40	81.1	68.2	62.6	76.4	60.3	55.5
40–64	80.6	69.0	62.5	76.8	62.3	56.9
≥65	82.1	66.7	65.3	75.5	56.1	54.3

Source for New York State and US data: American Cancer Society.[7]
CBE=clinical breast exam.

Table 3. Proportion of respondents reporting screening behaviors by selected demographic subgroups

Screening Behaviors and Demographic Characteristics		Number Positive (%)	95% CI	*P* value
Mammogram in past year				
Overall		1249 (81.1)	79.0–83.0	
Age:	40–49	381 (76.8)	72.8–80.4	.004
	≥50	868 (83.1)	80.6–85.3	
College		881 (82.2)	79.8–84.4	.09
No college		356 (78.4)	74.3–82.1	
Insured		1142 (81.8)	79.6–83.7	<.0001
Uninsured		14 (48.3)	29.4–67.5	
Jewish		331 (85.8)	81.9–89.1	.004
Non-Jewish		873 (79.1)	76.6–81.4	
Currently married		912 (82.4)	80.0–84.6	.03
All others		330 (77.6)	73.4–81.5	
CBE in past year				
Overall		1309 (83.5)	81.6–85.3	
Age:	40–49	436 (83.7)	80.2–86.8	.91
	≥50	873 (83.5)	81.1–85.7	
College		932 (85.4)	83.2–87.5	.004
No college		366 (79.6)	75.6–83.2	
Insured		1193 (84.1)	82.1–85.9	<.0001
Uninsured		19 (54.3)	36.6–71.2	
Jewish		353 (89.1)	85.7–92.0	.003
Non-Jewish		909 (81.4)	79.0–83.6	
Currently married		965 (85.3)	83.1–87.3	.002
All others		338 (78.8)	74.6–82.6	
BSE at least monthly				
Overall		841 (76.9)	74.3–79.4	
Age:	40–49	290 (74.0)	69.3–78.3	.08
	≥50	551 (78.6)	75.4–81.6	
College		581 (75.6)	72.4–78.6	.12
No college		252 (80.0)	75.2–84.3	
Insured		747 (75.8)	73.0–78.5	.60
Uninsured		24 (80.0)	61.4–92.3	
Jewish		197 (76.4)	70.7–81.4	.80
Non-Jewish		621 (77.1)	74.1–80.0	
Currently married		610 (75.2)	72.1–78.2	.02
All others		227 (82.0)	76.9–86.3	

CI=confidence interval; CBE=clinical breast exam; BSE=breast self-exam.

Several items on the questionnaire measured screening behaviors in terms of frequency. For example, questions on mammography included "have you ever had a mammogram?" "was mammography within the past year?" and "was mammography within the past year or two?" The same questions were repeated for CBE. Regarding BSE, the questions were "do you perform BSE regularly?" and "how frequently do you perform BSE?" Responses to selected questions about screening practices are summarized in Table 3. Insurance status was a predictor of adherence. Compared with uninsured women, a significantly higher proportion of insured women reported a mammogram and CBE within the past year, but a significantly lower proportion reported regular BSE. Ethnicity was also a predictor of adherence. Compared with non-Jewish women, a significantly higher proportion of Jewish women reported a mammogram and CBE within the past year, but no difference was observed on BSE. Age was a predictor of mammography and CBE, with a significant proportion of those >50 years responding affirmatively. Age was not a factor in BSE. A significantly higher proportion of currently married women reported mammography and CBE, but a significantly lower proportion reported BSE.

Table 4 shows the results of the multiple logistic regression analysis. Significant predictors of a mammogram in the past year were age, education, marital status, and health insurance; of a CBE in the past year were age, education, and marital status; of BSE at least monthly was marital status. Being Jewish was associated with a mammogram and CBE in the past year but did not attain significance (P=.06 and .08, respectively).

Attitudes and Beliefs About Screening

When asked if mammograms were effective in detecting breast cancer, 97.5% of respondents responded affirmatively. A significantly higher proportion of college-educated women and Caucasian women responded affirmatively. Ninety-five percent of respondents believed that a CBE is effective. A slightly lower proportion (91.5%) of respondents previously diagnosed with breast cancer reported that a CBE is effective; this approached but did not attain statistical significance (P=.078).

A total of 82.4% responded that they were confident of finding a lump during BSE. A significantly higher proportion (84%) of college-educated women responded in the affirmative when compared with non-college-educated women (78.4%). A lower proportion (79.4%) of respondents previously diagnosed with breast cancer were confident of finding a lump upon BSE, but this finding did not attain statistical significance (data not shown).

Impact of Attitudes on Screening Behaviors

A significantly higher proportion of those believing mammograms to be effective reported having a mammogram

Table 4. Multivariate analysis of predictors of breast cancer screening

Screening Behavior and Demographic Characteristic	Odds Ratio	95% CI	*P* value
Mammogram in previous year			
Insurance	3.02	1.24–7.37	.015
Age ≥50 years	1.61	1.16–2.21	.004
At least some college	1.41	1.02–1.95	.035
Jewish religion	1.44	.98–2.11	.062
Currently married	1.41	1.01–1.97	.045
Clinical breast exam in previous year			
Insurance	2.70	1.17–6.19	.02
At least some college	1.67	1.20–2.31	.002
Jewish religion	1.44	.96–2.14	.08
Currently married	1.53	1.09–2.14	.014
Breast self-exam weekly or monthly			
Age ≥50 years	1.25	.93–1.67	.082
Currently married	.69	.49–.98	.039

CI=confidence interval.

in the past year than those responding in the negative (82.6% and 65.6%, respectively), *P*=.01. A higher proportion of respondents who stated that a CBE is effective in detecting breast cancer reported a CBE in the past year than those who did not believe CBE to be effective (84.0% and 77.3%, respectively), *P*=.14. A higher proportion of those confident that they could find a lump reported doing BSE at least monthly when compared with those not sure they could find a lump (72.3% and 65.0%, respectively), *P*=.08 (data not shown).

DISCUSSION

Breast cancer is the most common cancer in women in the United States and is second only to lung cancer in mortality. Although one woman in eight will develop breast cancer during her lifetime, trends relating to incidence and mortality in New York State are encouraging. The risk of invasive breast cancer among New York women rose by almost 15% from 1984 to 1998, but the proportion of cases diagnosed at an early stage during this same period has increased substantially among both Caucasians and African Americans. As a result of earlier diagnosis, mortality from breast cancer in New York women has been declining steadily since 1989, with an average annual rate of decline of 1.7% between 1984 and 1998.

Insurance status was a significant predictor of a mammogram or a CBE within the past year. Although a significantly higher proportion of insured women reported having had a mammogram within the previous year and a CBE within the previous year, uninsured women were likelier (73.9%) to perform BSEs at least monthly than were insured women (69.6%). This may reflect awareness of screening benefits and concern on the part of uninsured women to protect their health in the absence of a paid provider. Self-reports of BSEs, however, have not been shown to be reliable measures of actual practices.[11]

Smaller differences in adherence to screening recommendations were observed for education level, race, and marital status. For mammography and CBE, lower adherence was found for those with less than college education, non-Caucasians, and women who were not currently married. In each of these cases, the proportion of women who had the procedures in each comparison differed by no more than about seven percentage points.

Little population-based research has been conducted on breast cancer screening at the county level. Our study

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confirms the findings of a population-based study of breast cancer incidence and mammography at the county level that used Medicare claims; this study found that counties with higher rates of mammography also had higher age-adjusted incidence rates.[12] A recent church-based study of older Samoan women in Los Angeles County examining the role of formal and informal health communication networks found that interpersonal networks have been influential in mammography use.[13]

Factors Associated with Noncompliance

Prior research has shown that adherence to mammography screening guidelines depends on several factors. Data from the National Health Interview Survey has shown that continuity of care was found to increase adherence to screening across all racial and ethnic groups; lack of health insurance and smoking status were associated with decreased likelihood of adherence.[14] High body mass index (BMI) and previous negative mammography experiences involving technicians were associated with women missing the next routine screening (interval adherence) in a study of New Hampshire women; nonadhering women reported less communication with the technologist than adhering women.[15]

Among African American women, one study found that negative attitudes about mammography, such as embar-

rassment or belief that it is unnecessary, caused symptom-free women to miss referrals for low-cost or free mammograms, even when a clinician mentioned screening guidelines.[16] This study found that source of care is another predictor: referrals by a nurse practitioner or physician's assistant resulted in 70% fewer missed appointments than with a physician referral. This finding may be due to differences in communication styles, trust, and rapport. Fatalism was found to be more of a predictor of adherence to breast cancer screening among African American women than among Caucasian women.[17]

Our finding that positive beliefs about the effectiveness of screening—in particular, perceived benefits and perceived self-efficacy—is associated with increased rates of screening confirms the findings of previous research. Women's attitudes and beliefs toward screening as predictors of screening behaviors have been widely studied.[18–20] Many investigators have used the Health Belief Model (HBM) or variants as the theoretical framework for studying screening behaviors. This model incorporates the constructs of perceived susceptibility, perceived seriousness, perceived benefits, and perceived barriers to predict preventive health behaviors. Champion formulated a survey instrument based on the HBM to study BSE[21,22] and mammography.[22]

A limitation of the HBM is that it does not take environmental factors into account and is not quantifiable.[23] We included questions on insurance coverage, which is an example of an environmental factor. Transportation and waiting times are other examples of environmental factors that we did not consider.

Limitations

Cross-Sectional Design

All responses were collected during the summer of 2002. The survey provides no information on how responses may have changed over time or how they may change in the future. For example, this survey preceded the findings from the Women's Health Initiative that estrogen and progestin use is associated with a 24% increase in the risk for breast cancer.[24] We did not ask for length of residence in the county, which would have been helpful.

Survey Sampling Process

The survey used random-digit-dialing (RDD) as the method of selecting respondents. Because of the wide high proportion of households with phones (>95% in the United States), RDD is considered an efficient and relatively inexpensive compared with other methods for community sampling.[25] A limitation of RDD is that it can influence population estimates. Individuals of lower socioeconomic status and minorities may be undersampled, since households without telephones will be missed. Also, among households with multiple eligible persons, telephone sampling may not identify all eligible persons.[26] Another limitation relating to sampling process deals with the small number of respondents in certain subgroups within the population. The small number of responses in certain ethnic groups, while not necessarily affecting the accuracy of the estimate, will affect the variability of the estimate. The degree of imprecision in an estimate can be assessed by using 95% CIs. Follow-up studies targeting specific subgroups are needed in order to obtain more precise estimates of compliance in these groups.

Potential for Bias in the Sample

Our sample may be biased because uninsured women were underrepresented (2.7%) in our telephone survey. While no countywide data are available for women specifically over the age of 40, the US Census Bureau estimates that 12.5% of females of all ages in Rockland County had no insurance in 2001, and 15.4% of all Rockland residents–male and female–under the age of 65 had no insurance. In the 2002 BRFSS survey for New York State, the sample size of the uninsured population was 7.5%, which is three times the proportion of uninsured in our sample. We were not able to characterize nonrespondents to determine if they differed from respondents.

Affluent women may have had the time to participate in the survey more than less affluent women who may lack insurance. Only 3.8% of survey respondents reported less than a high school diploma, in contrast with 11% of Rockland County residents age ≥25 years (male and female) with less than a high school diploma.

Self-Reported Information

We were not able to confirm screening behaviors from medical records. Several studies have examined the accuracy of self-report of screening behaviors. Fulton-Kehoe and colleagues[27] compared self-reports with medical records from a local health maintenance organization (HMO) and found that 85.9% reported a mammogram within the last year compared to 76.9% documented in the medical records. Barratt and colleagues[28] assessed the reliability and validity of self-reported mammograms in Australia and found that 91.3% reported the mammogram date accurately to within 12 months of the recorded date. A study conducted in one North Carolina county comparing self-reported mammography found that self-reports are more accurate regarding whether a woman had a mammogram than when she had it.[29] Recently, Caplan et al[30] examined the accuracy of self-reports of mammography among women age 50–80 years participating in a large HMO. Comparing the proportion receiving a mammogram within the previous two years, participants tended to overreport compliance compared with medical record documentation by 8.2% (80.7% vs 72.5%). Although sensitivity

was high, ≈93.8%, the specificity was low, 53.6%. Two main reasons exist for low specificity in reporting. First, women may feel pressure to provide the interviewer with a socially desirable response. This type of reporting bias is especially pertinent in the current survey, in view of the degree of media attention on breast cancer rates in Rockland County. Second, respondents frequently underestimate the time interval since the previous mammogram. This process, known as ''telescoping,'' will exaggerate compliance for those questions where individuals are considered compliant if they perform a behavior within a specified time period. In our survey of Rockland County women, some proportion of overreporting or telescoping likely took place. However, even if overreporting to the degree identified in the study by Caplan and colleagues has occurred, the level of screening in our survey sample still exceeds that of New York State.

High rates of mammography and CBEs in this population may explain the increased incidence rates of breast cancer. Since our survey did not include questions on: 1) whether the mammography was routine or 2) the stage at diagnosis, we cannot determine how much breast cancer incidence in Rockland County is attributable to screening. Our response rate of 79% compares very favorable with federal government practice: the General Accounting Office has attained an 80% response rate[31] and the National Immunization Survey response rate has also been ≈80%.[32]

CONCLUSION

Although the percentage of Rockland County women who have had a mammogram and a CBE in the past year is likely to exceed the percent in New York State and the United States as a whole, this does not apply to certain subgroups in the County. Our findings will enable the county health department to target populations whose behaviors and attitudes toward breast cancer screening can benefit from health education programs.

ACKNOWLEDGMENTS

We acknowledge the generous support of New York State Senator Thomas Morahan and Rockland County Executive C. Scott Vanderhoff in facilitating this project. We also would like to thank Ms. Kathy Henry of the Rockland County Department of Health for her contributions and suggestions to the project.

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