Self-Report and Primary Care Medical Record Documentation of Mammography and Pap Smear Utilization among Low-Income Women

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Purpose: To determine whether self-report of mammography and Pap smear utilization was accurate and to determine whether racial/ethnic differences existed.

Methods: Face-to-face surveys were administered to 314 consecutively selected women over 40 attending two low-income inner-city family practice sites. Medical records were reviewed for documentation of mammography and Pap smear utilization. Level of agreement between self-report and chart review was reported. Sensitivity, specificity, positive predictive value and negative predictive value were calculated.

Main Findings: Puerto Rican women had lower income levels and were less educated than African-American and non-Latina white women. Self-report of mammograms and Pap smears were higher than medical record documentation. Level of agreement was higher for more recent tests. Negative predictive values for mammography were high (75–95.5%). Lower sensitivity, specificity, positive predictive value and negative predictive value for mammography were seen among Puerto Rican women compared to African-American and non-Latina white women.

Conclusions: High negative predictive values suggest that asking women about mammography use may be an inexpensive, easy intervention in the primary care setting to increase screening among women currently not being screened by increasing conversations between patients and providers to address personal barriers to screening.

Key words: mammography ■ Pap smear ■ African Americans ■ Puerto Ricans ■ validity

INTRODUCTION

Regular screening for breast and cervical cancer reduces cancer morbidity and mortality through early detection and treatment.[1-4] Yet, many women are not receiving these screening tests in accordance with recommended guidelines.[5] For example, poor, uneducated women are less likely to receive mammography and Pap smears compared to women of greater socioeconomic status.[6,7] Similarly, Latinas are less likely to receive screening in accordance with recommended guidelines than non-Latinas.[6] Minority women continue to have lower incidence rates but higher mortality rates compared to white women.[7]

Primary care offices provide an opportunity to incorporate timely and consistent delivery of preventive services, particularly among low-income minority women.[8] For example, continuity of care offered through primary care offices has been shown to increase cancer screening.[9,10] However, the use of preventive services remains difficult to monitor and maintain in the context of complex healthcare systems, busy primary care offices and competing healthcare demands. Many preventive services are implemented by specialists and are not recorded in the primary care medical record. Due to competing demands, particularly among high-risk populations, preventive care may not be offered at any given visit.[11] Patients may experience acute healthcare needs that take priority, may have cultural beliefs regarding screening that are not addressed or may not follow provider recommendations for screening. Provider beliefs and attitudes may also present a bias in the delivery of preventive services.

Various interventions have been implemented to improve cancer screening rates in the primary care setting. These include personalized letters to patients and prompts to providers.[12-15] These interventions may not be effective in all practices due to cost and staffing constraints. Can patient self-report provide adequate information to make screening decisions? In general, studies have found a range of agreement (49–74%) between self-report and chart review for Pap smear and

mammography.[16,17] Agreement increases with the recentness of the test.[18] However, self-report has been shown to overestimate actual receipt of preventive services.[19-21] These studies have been conducted in the community setting and have included women both with and without access to primary care health services. Few community studies include a large number of both African-American and Latina women.[10,16,18,19,21]

This study adds to the literature by reporting the use of mammography and Pap smears among low-income African-American, Latina and non-Hispanic white women seen in two primary care settings. Specifically, two research questions were addressed: 1) Were self-report of mammography and Pap smear utilization accurate? and 2) Were there racial/ethnic differences in the validity of self-report of mammography and Pap smear utilization? It is hypothesized

that recall of screening exams would be lower among Puerto Rican women than African-American and non-Latina white women due to cultural acceptance of the exams by the women and their male partners.

METHODS

The study population included women 40 years of age and older who were established patients for at least one year (according to their medical record) attending two family practice health centers located in poor urban areas of Buffalo, NY. One health center served predominantly an African-American population and the other served a predominantly Puerto Rican population based on established practice demographics. Both sites provided a full spectrum of family practice, including gynecologic and obstetric care. The majority of mammograms were ordered by the primary care

Table 1. Patient Demographic Characteristics by Racial/Ethnic Group					
Demographics	Total N=314, %	Non-Latina White N=79, %	African-American N=114, %	Puerto Rican N=121, %	P Value
Age					NS
40-49	42.4	41.8	40.4	44.6	
50-69	48.4	46.8	53.5	44.6	
70+	9.2	11.4	6.1	10.7	
Place of Care					<0.001
Clinic 1	44.6	19.0	6.1	97.5	
Clinic 2	55.4	81.0	93.9	2.5	
Employment Status					NS
Employed	24.8	25.3	27.2	22.3	
Unemployed	75.2	74.7	72.8	77.7	
Income					0.013
<$10,000 per year	75.7	74.0	67.9	84.9	
≥$10,000 per year	24.3	26.0	32.1	15.1	
	Total N=326, %	Non-Latina White N=80, %	African-American N=118, %	Puerto Rican N=128, %	P Value
Marital Status					0.01
Married/cohabitating	27.2	19.2	22.1	37.2	
Single/never married	17.9	17.9	25.7	10.7	
Divorced/separated	34.9	43.6	31.9	32.2	
Widowed	19.9	19.2	20.4	19.8	
Education					<0.001
Eighth grade or less	29.7	16.5	10.6	56.2	
Some high school	16.9	13.9	19.5	16.5	
Comp. high school	27.2	36.7	33.6	14.9	
Some college/more	26.2	32.9	36.3	12.4	
Insurance Coverage					<0.001
None	8.4	16.5	7.1	4.2	
Governmental	63.4	63.3	58.9	67.8	
Medicaid/MCO	13.3	5.1	9.8	22.0	
MCO/private	14.9	15.2	24.1	5.9	

office but were completed at off-site locations.

Women presenting for either acute or preventive healthcare were consecutively asked to participate at each site. Five-hundred-ten women presented to the clinics. Forty-five women were ineligible due to mental deficiencies, speaking a language other than English or Spanish and/or past cancer diagnosis. Forty-one women, unable to be contacted at their visit due to visits occurring at the same time or readiness to be seen by their doctor, were unable to be contacted after their visit and were considered lost to follow-up. Eighty-one women refused to participate. Three-hundred-forty-three women completed interviews. These analyses were restricted to include data on 332 women that completed an interview and had a medical record available for review. Medical records were unavailable for 11 women. Women were asked to identify their race and ethnicity as separate questions. Women with an unknown race or self-identified "other" race, such as American Indian or Asian, were excluded from the analyses (N=18). Women who identified themselves as Hispanic were asked to report their country of origin. Only three women reported a country of origin other than Puerto Rico. Race and ethnicity variables were then combined to establish our final definition of race/ethnicity. In sum, analyses for this study were conducted on 314 women, self-identified as Puerto Rican, African-American or non-Latina white, who completed the face-to-face interview and had a medical record available for review for a response rate of 68%. In total, 79 non-Latina white women, 114 African-American women and 121 Puerto Rican women were included in this analysis. Eighty-six percent of the women received their gynecologic care from the family practice office.

A face-to-face survey was administered in the language preferred by the patient (English or Spanish). The survey was translated to Spanish and then back-translated to English to ensure accuracy of translation.[22] Thirty-one percent of the surveys were administered in Spanish. This survey assessed screening practices and basic demographics. Demographic data reported was based on self-report from the face-to-face interview. Variables included age, employment status, household income level, marital status and education level. Place of care was also included to account for potential differences in site practices. All demographics were reported as categorical data. Demographics were compared across racial/ethnic groups. Chi-squared analyses were used to compare demographic characteristics across racial/ethnic groups. Percentages and p values based on chi-squared analyses were reported.

The analyses reported here focus on a series of questions that assessed screening habits[23,24] from the face-to-face interview. Questions from the survey included:

"Have you ever had a Pap/mammogram?" (Yes/No)

"When was your last Pap/mammogram?" (≤1 year ago/1–2 years ago/>2 years ago/≤1 year ago/1–3 years ago/>3 years ago)

"Did you have more than one Pap/mammogram?" (Yes/No), and

"When was your Pap smear/mammogram before the last one?" (≤1 year ago/1–2 years ago />2 years ago/≤1 year ago/1–3 years ago />3 years ago).

The responses to questions regarding the timing of Pap/mammograms were dichotomized as being up-to-date and not-up-to-date based on age and the 1998 American Cancer Society guidelines.[25] All women who received Pap smears within the past three years were considered up-to-date. For mammography, women 50 and older who received a mammogram within the past year were up-to-date, and women 40 to 49 were up-to-date if they received a mammogram within the past two years.

Dates and results of mammograms and Pap smears were recorded directly from laboratory reports found in the primary care record for up to five years past by trained medical students. Data collected from medical records was dichotomized as up-to-date or not up-to-date. If information was not available in the chart for mammography and/or Pap smears, it was assumed that the women never received the test.

Positive self-report and positive medical record documentation of being up-to-date with screening were reported for Pap smears and mammography use. The percent agreement between these two sources also was reported. Sensitivity, specificity, positive predictive value and negative predictive value were reported for each comparison to identify the ability of self-report to accurately reflect behavior as measured against medical record documentation. Sensitivity reflects the probability of chart documentation of screening among women who reported being screened. Specificity refers to the probability of no chart documentation of screening among women that reported not being screened. Positive predictive value reflects the probability of women that reported screening that did have chart documentation of screening. Negative predictive value is the probability of women that reported not being screened that did not have documentation of screening in their medical record. All analyses were stratified by racial/ethnic group.

The Institutional Review Board of the School of Medicine and Biomedical Sciences, State University of New York granted human subjects approval for

this study. All participants signed an informed consent for a verbal interview and access to their medical records prior to their participation.

RESULTS

All demographic data was self-reported and is shown in Table 1. Forty-two percent of the population were 40–49, 48% were 50–69, and 9% were over 70 years of age. Although all three racial/ethnic groups were represented at both clinics, 98% of Puerto Rican women presented at clinic 1, 94% of African-American women presented to clinic 2, and 81% of non-Latinas presented to clinic 2. Twenty-five percent of the women were currently employed, and 76% had household incomes less than $10,000 per year. Eighty-five percent of Puerto Rican women had a household income less than $10,000 compared to 74% of non-Latinas and 68% of African-American women (p=0.01). According to self-report, 37% of Puerto Rican women were married or living with someone at the time of the interview compared to 22% of African-American women and 19% of non-Latinas (p=0.01). Interestingly, over half (56%) of the Puerto Rican women received less than an eighth-grade education compared to 17% of non-Latinas and 11% of African-American women (p≤0.001). Based on self-report, non-Latinas were more likely to be uninsured compared to African-American women and Puerto Rican women, i.e., 16.5%, 7.1%, and 4.2%, respectively (p≤0.001).

As shown in Table 2, women reported high rates of Pap smear utilization. High rates were also documented in the medical record. However, self-report of receiving a Pap smear within recommended guidelines was consistently higher than medical record documentation. There was a high level of agreement between self-report and medical record documentation for receipt of Pap smear according to recommended guidelines. These results were consistent across racial/ethnic groups. The sensitivity of

Table 2. Percent Agreement between Self-Report and Medical Record Review in Documenting Pap Smear Utilization by Racial/Ethnic Group

	Self Report N (%)	Chart Review n (%)	Percent Agreement n (%)	Sensitivity %	Specificity %	Positive Predictive Value %	Negative Predictive Value %
Total							
Ever had Pap	299 (98.4)	268 (88.2)	265 (87.1)	98.5	2.7	88.3	20.0
More than one Pap	253 (96.6)	167 (63.7)	168 (64.1)	97.6	5.3	64.4	55.6
Last Pap within three years	241 (96.0)	232 (92.4)	228 (90.8)	97.0	15.8	93.4	30.0
Pap before last within three years	145 (90.6)	142 (88.8)	135 (84.4)	92.3	22.2	90.3	26.7
Non-Hispanic White							
Ever had Pap	74 (98.7)	61 (81.3)	62 (82.6)	100	7.1	82.4	100
More than one Pap	60 (100)	34 (56.7)	34 (56.7)	100	0	56.7	0
Last Pap within three years	57 (95)	53 (88.3)	52 (86.7)	96.2	14.3	89.5	33.3
Pap before last within three years	29 (85.3)	26 (76.5)	27 (79.4)	92.3	37.5	82.8	60.0
African American							
Ever had Pap	112 (100)	100 (89.3)	100 (89.3)	100	0	89.2	0
More than one Pap	95 (95.0)	60 (60.0)	59 (59)	95.0	5.0	60.0	40.0
Last Pap within three years	92 (96.8)	91 (95.8)	88 (92.6)	96.7	0	95.7	0
Pap before last within three years	56 (98.2)	53 (93.0)	52 (91.2)	98.1	0	92.9	0
Puerto Rican							
Ever had Pap	113 (96.6)	107 (91.5)	103 (88.0)	96.3	0	91.2	0
More than one Pap	98 (96.1)	73 (71.6)	75 (73.5)	98.6	10.3	73.5	75.0
Last Pap within three years	92 (95.8)	88 (91.7)	88 (91.7)	97.7	25.0	93.5	50.0
Pap before last within three years	60 (87.0)	63 (91.3)	56 (81.4)	87.3	16.7	91.7	11.1

reporting Pap smear use was high (92–99%), whereas the specificity was low (2.7–22.2%). The positive predictive value was high except for reporting more than one Pap smear. Negative predictive values were moderate, ranging from 20–56%. Sensitivity, specificity and positive predicative values were similar across racial/ethnic groups. However, negative predictive values were inconsistent across groups.

As shown in Table 3, positive self-report of mammography use was high for each category (93% for "ever had a mammogram," 93% for "had a mammogram within recommended guidelines", 87% for "had more than one mammogram" and 91% for "had a previous mammogram within recommended guidelines of the last one"). Self-report of mammography use was consistently higher than medical record documentation of use. Agreement between self-report and documentation in the medical record was 73% for "ever had a mammogram," 65% for "last mammogram within the recommended guidelines," 68% for "had more than one mammogram" and 47% for "mammogram prior to the last, within recommended guidelines." Agreement was higher for more recent screening. These findings were consistent across racial/ethnic groups. However, chart documentation of "mammogram prior to the last, within recommended guidelines" was higher for non-Latinas (52%) and African-American women (48%) than Latinas (35%). Similarly, agreement between self-report and chart documentation of a "mammogram prior to last within recommended guidelines" was higher for non-Latinas (59%) and African-American women (52%) than Puerto Rican women (35%).

Self-report of mammography use had high sensitivity (95–100%) and low specificity (9–26%). Positive predictive values were moderate (44.5–71.6%) and negative predictive values were high (75–95.5%). Sensitivity of self-report for mammography use was high across all racial/ethnic groups (88–100%). Specificity was low across all racial/ethnic groups except for self-report of "had more than one mammogram" among Puerto Rican women (32%). Positive predictive value of self-report for mammography use was moderate-to-high across racial/ethnic groups. The negative predictive values were consistently high across racial/ethnic groups except for "previous mammogram from the last within recommended guidelines" which was 100% for non-Latinas and African-American women but only 50% among Puerto Rican women.

DISCUSSION

This study identified high rates of self-reported breast and cervical cancer screening among poor, African-American, Puerto Rican women and non-Hispanic white women living in the inner-city with access to primary care. This shows that primary care truly can have a positive impact on the receipt of preventive health services among minority, low-income women. The screening rates found in this study were compared to national averages.[6] Receipt of a Pap smear in the past three years according to self-report (96%) and chart review (92%) exceeds the Healthy People 2010 goal of 90%.[6] Self report of mammography in this study (91%) exceeds the Health People 2010 goal of 70% of women over 40 receiving a mammogram within the preceding two years.[6] However, chart documentation of mammography (57%) is below the 2010 goal. This study used 1997 American Cancer Society Guidelines[7] to assess appropriateness of screening. We did not assess the guidelines that the patients' physicians inherently followed if any. Self-report of receipt of mammography and Pap smear was consistently higher than medical record documentation of screening. Self-report misrepresented actual screening practices as identified by high sensitivity rates and low specificity rates. However, high negative predictive values suggested that asking women about their recent mammography use may be an inexpensive, easy intervention to increase screening among women currently not being screened by encouraging dialog between patient and provider about reasons for not being screened and/or other means of obtaining screens.

Specificity was moderate-to-low, suggesting that women who are not up-to-date, according to medical record documentation, will report that they are up-to-date. The negative predictive values were low for Pap smear utilization, perhaps due to the extremely high number of women reporting that they were screened. Given the fact that a woman may receive a pelvic exam for multiple indications without receiving a Pap smear, it is not surprising that more women reported getting a Pap smear than documented in the charts.[26] From the perspective of a patient, she may not be able to tell if a Pap smear is taken or not when receiving a pelvic exam. Negative predictive values were high for mammography, indicating that women who report they are not up-to-date on screening, most likely are not, as supported by medical record documentation. Although this percentage of women was small, it is a group that is easily and inexpensively targeted for intervention. It is simple to ask, and follow-up would be manageable. Given physical and emotional reactions often associated with mammograms, such as fear discomfort, pain and embarrassment, it is not surprising that it can be recalled more accurately.

Similar to other studies, this study found higher levels of agreement and higher positive predictive values among more recent tests.[19] As previously documented in the literature, self-report of recommended screening was consistently higher than medical record documentation.[20,27-33] This may reflect overestimates of self-report or poor record keeping within the healthcare system. In this study, medical record

documentation referred to documentation of results in the primary care medical record. Laboratory reports from outside gynecologists or from outside labs may not have been incorporated into the primary care chart. Some studies have begun to use billing data, laboratory results[27,28] or have reviewed records of the provider that performed the tests[19] for additional accuracy. Women were not asked about other avenues by which screening tests could be obtained, such as outreach clinics or health fairs. More accurate record keeping would result if a provider simply asks about screening, since it would confirm other sources of screening.

The primary care offices participating in this study provided gynecologic care for 86% of women in this sample. Pap smears were received in-office and mammography required the use of outside health services. This study found more accuracy in self-report for Pap smears than mammography. Other studies found that recall accuracy of Pap smears was less than recall accuracy of mammography.[19,31] Since many other studies were conducted outside of the primary care office, this discrepancy may be a product of our sample being engaged in a primary care setting where women receive most of their gynecologic care. There was no way to differentiate between women that did not receive care and women that received care outside of the primary care office. Therefore, we were unable to determine if there was a racial/ethnic differential in communicating lab results to the primary care practice. Since this information is unavailable and it is assumed that if the results were not in the chart that the woman was not screened, the results documented here may underestimate the accuracy of a woman's recall.

Charting the referral, delivery and follow-up of preventive services may vary among different office systems.[34] For example, some offices incorporate reminder systems or have staff to assist with preventive medicine. Some offices have access to an electronic medical record. This study did not assess site

Table 3. Percent Agreement between Self-Report and Medical Record Review in Documenting Mammography by Racial/Ethnic Group (N=314)

	Self Report N (%)	Chart Review n (%)	Percent Agreement n (%)	Sensitivity %	Specificity %	Positive Predictive Value %	Negative Predictive Value %
Total							
Ever had mammogram (mam)	292 (93.0)	210 (66.9)	230 (73.3)	99.5	20.2	71.6	95.5
More than one mam	181 (86.6)	128 (61.2)	142 (67.9)	94.5	25.9	66.9	75.0
Last mam within guidelines	164 (91.1)	103 (57.2)	117 (65.0)	99.0	19.5	62.2	93.8
Mam before last within guidelines	110 (93.2)	51 (43.2)	55 (46.6)	96.1	9.0	44.5	75.0
Non-Hispanic White							
Ever had mam	74 (93.7)	47 (59.5)	52 (65.8)	100	15.6	63.5	100
More than one mam	45 (95.7)	27 (57.4)	29 (61.7)	100	10.0	60.0	100
Last mam within guidelines	41 (91.1)	25 (55.6)	29 (64.5)	100	20.0	61.0	100
Mam before last within guidelines	25 (92.6)	14 (51.9)	16 (59.3)	100	15.4	56.0	100
African American							
Ever had mam	106 (93.0)	77 (67.5)	85 (74.5)	100	21.6	72.6	100
More than one mam	65 (84.4)	47 (61.0)	53 (68.8)	93.6	30	67.7	75.0
Last mam within guidelines	59 (90.8)	40 (61.5)	46 (70.7)	100	24	67.8	100
Mam before last within guidelines	40 (95.2)	20 (47.6)	22 (52.4)	100	9.1	50.0	100
Puerto Rican							
Ever had mam	112 (92.6)	86 (71.1)	93 (76.8)	98.8	22.9	75.9	88.9
More than one mam	71 (83.5)	54 (63.5)	60 (70.6)	92.6	32.3	70.4	71.4
Last mam within guidelines	64 (91.4)	38 (54.3)	42 (60.0)	97.4	15.6	57.8	83.3
Mam before last within guidelines	45 (91.8)	17 (34.7)	17 (34.7)	88.2	6.3	33.3	50.0

characteristics that may impact a woman's recall of screening. Provider biases towards screening were not assessed. For example, the specific guideline a provider adheres to was unknown.

This practice-based study used self-reported data from poor women residing in inner-city communities who used primary healthcare services. Although this makes the study unique, it limits the generalizability of the findings. This sample also allows for large samples of minority patients. These health centers were located in similar areas within the city of Buffalo. However, Puerto Rican women were more likely than African-American women to have a total household income <$10,000 and to have less than an eighth-grade education. Puerto Rican women were also more likely to be married or living with a partner. Despite these socioeconomic and social differences, there were no consistent patterns apparent in racial/ethnic differences in accuracy of self-report of Pap smear use compared to medical record documentation.

Non-Latina white women were more likely to be uninsured compared to African-American and Puerto Rican women. Puerto Rican women had lower incomes than African-American and non-Latina white women. Medicaid is accessible in New York State for low-income women, particularly with children. This may explain the racial/ethnic difference in insurance status found in this sample.

A lack of racial/ethnic effect among low-income women was consistent with other findings reported in the literature.[21,35] However, sensitivity, specificity, positive predictive value and negative predictive value for history of mammography use was lower among Puerto Rican women than non-Latinas and African-American women. In this study, findings for Puerto Rican women may be attributed to cultural or linguistic barriers to screening. For example, some women may not fully understand the screening tests because of language barriers and may have difficulty dealing with a system that is exclusively English-based if they are monolingual. Even women that speak English may have difficulty understanding the complexity of screening tests.

Although this study represented Puerto Rican, non-Latina white and African-American women, the numbers were not large enough to assess confounding and interaction effects that may be present. For example, racial/ethnic differences may be attributed to education level or income level differences rather than race.

This study represented screening practices of women, particularly African Americans and Puerto Rican women, within the primary healthcare system limiting the generalizability of findings to all low-income women. However, findings provide insight for providers serving low-income minority women in similar clinical settings. We did not have access to screen-

ing that may have been obtained at other sites and did not follow-up with labs or referrals on completed tests that were not documented in the primary care record. Since women in this study had access to primary care, the results may not be generalizable to other minority, low-income communities with more access barriers to primary care. Self-reported data infers the potential for overreporting positive behavior. However, there is no reason to assume that variation of overreporting would exist among racial/ethnic groups.

In summary, self-report of most recent mammogram may be useful in the primary care setting to identify women who have not received mammography within recommended guidelines, especially among minority women. Although we assume screening is regularly discussed in current practice, preventive services may be overridden by acute care needs. Simply asking a woman when she was last screened is a cost- and time-efficient way to identify a small target group that may be amenable to provider recommendation for screening. Asking women about their screening rather than relying on medical record information will stimulate a conversation that will improve the delivery of preventive services in the primary care setting. This conversation provides an opportunity to learn if women are receiving their cancer screening from sources outside of the office or to openly discuss fears or concerns that may be hindering a woman from receiving mammography or Pap smears.

The ultimate goal of regular breast and cervical cancer screening for eligible women will contribute to a reduction of early deaths from these two important causes of death. Future studies warrant the evaluation of an intervention, such as the incorporation of asking about screening into the collection of vital statistics on screening outcomes. Larger studies conducted in practice based research networks would allow for the comparison of site and provider information as well as assessing the effects of income, education and race/ethnicity. A complement of qualitative studies will increase the understanding of women's understanding of screening and their related needs.

ACKNOWLEDGEMENTS

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