REPRODUCIBILITY OF SELF-REPORTED PAP TEST UTILIZATION IN MIDDLE-AGED AFRICAN-AMERICAN WOMEN

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Both clinicians who perform Pap tests and prescribe re-screens and public health officials, who periodically evaluate the success of Pap test screening programs, often depend on women to self-report their most recent Pap test. However, reliability of self-reported Pap test utilization is putatively low, and even lower in African-American women compared to Whites. Between 2001 and 2002, Pap test screening histories were obtained from 144 African-American women, aged 45 to 64 years at two in-person interviews conducted three to six weeks apart. Reproducibility of self-reported Pap test was substantial (kappa=0.64; 95% confidence interval: .46-.82), with the highest agreement among women with greater income and educational attainment, and those who were younger. This level of reproducibility is likely sufficient both to evaluate the population coverage of public health screening programs and for prescribing re-screens among younger African-American women and those of higher income and education. Not using self-reports to base clinic decisions may still be prudent among those with less education. (*Ethn Dis.* 2004;15:84–89)

Key Words: African American, Cancer Screening, Cervical Cancer, Reproducibility, Women

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INTRODUCTION

In African-American women, the incidence of invasive cervical cancer is highest in the 40- to 65-year age group, and this risk rises with increasing age; in White women, cervical cancer risk decreases precipitously from age 35.[1] A similar racial disparity is observed with mortality. Unlike White women, disease-specific mortality among African-American women increases with increasing age and is highest in women 60–75 years old. Racial differences in incidence have been attributed to a higher prevalence of known risk factors including parity, cigarette smoking, and earlier age at first coitus.[2–7] Differences in mortality may stem in part from differences in the population screening coverage for precursor lesions and aggressiveness of treatment. Several studies have shown that countries with the lowest cervical cancer mortality are those where screening coverage is nearly complete and the screening frequency is regular.[8]

Reasons underlying low screening coverage among African Americans have been an active topic of debate for some time, as have interventions targeting African-American women to improve adherence to screening recommendations. Evaluating interventions has been complicated, in part, by women inaccurately reporting when they had their last Pap test. In clinic settings, women's own report is often the only source for clinicians who prescribe and provide Pap tests. Several studies[9–14] suggest that self-report of Pap test utilization is less accurate than self-report of other medical tests such as mammography, particularly among African Americans. Self-reported Pap test utilization is reproducible if the responses are closely similar or identical each time the question is asked.[15] The accuracy of self-reported tests have been shown to be related to barriers to patient care, including education, annual household income, women's knowledge of cervical cancer risk factors, and benefits of screening.[10,12,16]

Low reproducibility of self-reported Pap test utilization may lead to over prescription of Pap test re-screens by clinicians at sizable costs, since self-reports cannot be used to base clinic decisions. It also raises concerns about the accuracy of reports that suggest improvements in Pap test utilization at county, state, or national level. In the absence of electronic medical record systems, generally no standardized Pap test entries appear in paper medical records, and few individuals maintain the same healthcare providing facility over a lifetime. Thus, the certitude of medical records cannot be fully determined. In the absence of a gold standard to assess validity, reproducibility has often been the only way to assess some exposures or an intervention.[19–21] As part of a study investigating patterns of cervical cancer screening among African-American women in Durham County, we assessed the reproducibility of self-reported Pap test utilization. We also investigated the effect of factors previously reported to influence reproducibility, on reproducibility of self-reported Pap test utilization.

METHODS

Study Participants

Eligible participants were African-American women, aged 45 to 64 years,

Racial differences in incidence have been attributed to a higher prevalence of known risk factors including parity, cigarette smoking, and earlier age at first coitus.[2–7]

living in Durham County, NC. Lay health advisors working on other university projects recruited participants from six church congregations and five community sub-divisions during a six-month period (September 2001–March 2002) by using flyers distributed at congregation or community sponsored events. Of the 172 women who met eligibility criteria, 144 were successfully recruited. Study participants were interviewed in-person by a trained interviewer using a standardized questionnaire. Between three and six weeks after the first interview, women were re-contacted at home, and the same in-person interview was administered, although the median number of weeks was four. To reduce inter-observer variability, only one interviewer administered the questionnaire at baseline and at follow-up. However, relying on a single interviewer increased lag time between the interviews. For each completed interview, participants received $10 as compensation for their time. This study was approved by the institutional review boards at North Carolina Central University and Duke University Medical Center.

Data Collection

Each interview lasted 35–40 minutes. Respondents answered ~80 questions, mostly with dichotomous responses solicited, related to screening, cervical cancer risk factors, and access to care. Prior to being asked about Pap test utilization, an interviewer described the Pap test and its use in early detection. Having had a Pap test was a positive response to the question "Have you had a pap smear test in the last three years." The questionnaire also included information on socio-demographic factors previously found to influence the accuracy of self-reported Pap test utilization, such as age, educational attainment, and annual income. Access to care indicators included having a usual site of care and ability to pay for the visit. Responses to indicators related to knowledge of risk factors of cervical cancer, such as cigarette smoking and gravidity, was also solicited, as was information on risk perception and knowledge of benefits of screening. Data were entered and verified in EPIINFO version 6.4 (Centers for Disease Control and Prevention, Atlanta, Ga, USA).

Statistical Analyses

The proportion of "yes" responses to the Pap test question was calculated for the first and second questionnaires. Using Cohen's kappa coefficients, we estimated agreement between the first and second questionnaires.[17] Agreement was estimated overall, as well as among persons of lower and higher socioeconomic status, younger and older age, lower and higher educational attainment, and those with and without a usual site of care. Qualitative descriptions of agreement based on kappa coefficients were adapted from Landis and Koch.[18] Agreement was considered almost perfect when kappa coefficients were 0.81 to 1.00; substantial if they were 0.61 to 0.80; moderate if they were 0.41 to 0.60; fair if they were 0.21 to 0.40; and slight if they were 0.01 to 0.20. All statistical analyses were conducted using SAS, version 8 (SAS, Cary, NC USA).

RESULTS

One hundred and forty-four women completed questionnaires 1 and 2. Prev-alence of Pap test utilization in the three years preceding the interview was 83% in both questionnaires. Table 1 shows the characteristics of study participants by self-reported screening status. All but one participant had health insurance coverage, with 35% covered by public health insurance (Medicare or Medicaid), 56% covered by employers, and 8% covered by other sources. As shown in Table 1, just over half of the women were 45–60 years, most (68%) were unmarried, 83% had not completed high school, and 58% had an annual income below $20,000. Most (86%) had a usual source of care, and 92% reported being able to pay for clinic visits. Less than half of the participants reported exposure to known risk factors, including cigarette smoking, oral contraceptive use, a previous abnormal Pap test result, a high number of lifetime sexual partners, and regular douching. Most participants had accurate knowledge of cervical cancer risk factors, although their risk perceptions were low compared to the prevalence of risk factors.

Table 2 shows the reproducibility and proportion of self-reported Pap tests overall, as well as in risk-specific population subgroups. Overall, the coefficient of agreement between the first and second questionnaire was substantial (kappa=0.64; 95% confidence interval [CI]: .46–.82). Agreement among women reporting annual incomes >$20,000 was higher (kappa=0.78; 95% CI: .49–1.0), than for women with annual incomes <$20,000 (kappa=0.58; 95% CI: .36–.80). Agreement was also substantial among women <60 years of age (kappa=0.74; 95% CI: .51–.98) whereas it was moderate in those >60 years (kappa=0.55; 95% CI: .28–.81). Among those with a high school education or higher, agreement was also substantial (kappa=0.79; 95% CI: .60–.98), while it was fair in women without a high school education (kappa=0.44; 95% CI: .13–.74). Paradoxically, although the prevalence of adherence to recommended Pap test intervals of three

years was high (86% and 88% for time 1 and time 2), among women with a usual site of care, agreement was fair (kappa=0.51; 95% CI: .27–.75). Among women without a usual site of care, the prevalence of Pap test screening adherence was lower, although the agreement was high.

DISCUSSION

In this study, we estimated the prevalence of adequate cervical cancer screening and evaluated reproducibility of self-reported Pap test utilization in the three years preceding the interview, in a relatively large sample of African-American women living in Durham County, NC. Overall, the prevalence was high (83%) and similar to that reported for the state of NC overall for this age group.[1] We also found that self-reported Pap test utilization among African-American women is substantially reproducible (kappa=0.64), although considerable variation was seen among subgroups of women. Whereas reproducibility was substantial among women <60 years and those with a higher household income, it was moderate to fair among older women and those of lower household income. Similar to North Carolina estimates, 86%–88% of women reported having had a Pap test in the three years preceding the interview, but unexpectedly, reproducibility was lower (kappa=0.51) among women with a usual source of care than among women without a usual source of care.

Reasons for this finding are unclear, although computation of the kappa coefficient may have been influenced by the small number of women who reported no usual source of care (N=18). A perfect coefficient of agreement (kappa=1.00) among those with no usual source of care may therefore have been by chance. We found no correlation between household income or education and having usual source of care, which suggests that these socioeconomic indi-cators are unlikely to have influenced reproducibility. Future studies should be large enough to allow for such stratification by potential confounding effect of usual source of care and past pelvic exams. Nonetheless, our findings suggest that among younger African-American women (<60 years of age), and those with higher income, healthcare providers can prescribe Pap test re-screens on the basis of women's self-reported Pap test history, reducing costs. However, re-screening despite self-reports of recent Pap tests might be pru-

Table 1. Characteristics of study participants (N=144)

Characteristic	Total (%)
Socio-demographic characteristics	
Age	
40–59 years	78 (55)
60–65 years	65 (45)
Marital status	
Not married	96 (68)
Married	45 (32)
Annual household income	
<$20,000	83 (58)
≥$20,000	60 (42)
Highest grade completed	
Less than high school	114 (83)
High school or higher	23 (17)
Access to care	
Have you a usual primary care provider or usual source of care?	
Yes	113 (86)
No	18 (14)
I cannot afford the co-payment during a visit	
Yes	11 (8)
No	129 (92)
History of exposure to known cervical cancer risk factors	
Smoked 100 cigarettes or more in a lifetime	
Yes	56 (39)
No	87 (61)
A history of oral contraceptive use	
Yes	73 (51)
No	67 (47)
Had a previously abnormal Pap test result	
Yes	33 (24)
No	106 (76)
Do you douche regularly?	
Yes	63 (49)
No	66 (51)
Risk perception and knowledge about cervical cancer	
Do you think you are at risk for cervical cancer?	
Yes	38 (29)
No	94 (71)
Does tobacco use increase cervical cancer risk?	
Yes	77 (61)
No	50 (39)
Does having many children increase cervical cancer risk?	
Yes	46 (37)
No	78 (63)

Table 2. Reproducibility of Pap test utilization among middle-aged African-American women

Characteristic	Prevalence	Kappa (95% CI)
Pap test in the last three years		
Questionnaire 1	83%	0.64 (0.46–0.82)
Questionnaire 2	83%	
Pap test in the last three years in women with income <$20,000/year		
Questionnaire 1	79%	0.58 (0.36–0.80)
Questionnaire 2	78%	
Pap test in the last three years in women with income ≥$20,000/year		
Questionnaire 1	90%	0.78 (0.49–1.0)
Questionnaire 2	93%	
Pap test in the last three years in women age <60		
Questionnaire 1	88%	0.74 (0.51–0.98)
Questionnaire 2	88%	
Pap test in the last three years in women aged ≥60		
Questionnaire 1	79%	0.55 (0.28–0.81)
Questionnaire 2	80%	
Pap test in the last three years in women with a high school education or less		
Questionnaire 1	76%	0.44 (0.13–0.74)
Questionnaire 2	78%	
Pap test in the last three years in women with more than a high school education		
Questionnaire 1	88%	0.79 (0.60–0.98)
Questionnaire 2	88%	
Pap test in last three years in women with a usual source of care		
Questionnaire 1	86%	0.51 (0.27–0.75)
Questionnaire 2	88%	
Pap test in last three years in women without a usual source of care		
Questionnaire 1	72%	1.0
Questionnaire 2	72%	
Pap test in the last three years in women who could afford the co-payment during a clinic visit		
Questionnaire 1	86%	0.74 (0.26–1.20)
Questionnaire 2	86%	
Pap test in the last three years in women who could not afford the co-payment during a clinic visit		
Questionnaire 1	86%	0.64 (0.43–0.84)
Questionnaire 2	88%	

Overall, the prevalence was high (83%) and similar to that reported for the state of NC overall for this age group.[1]

from a tumor registry.[13] Slight agreement has also been reported.[10,14] In our study, although educational level was low, the coefficient of agreement was substantial. The coefficients of agreement among studies, with a few exceptions, appeared to improve over time during the 12-year period, but varied little among ethnic groups, which suggests these findings are generalizable to other ethnic groups.

Reasons for high reproducibility of self reported Pap test utilization in this study, compared to previous studies, may be posited. Because the kappa coefficient is mathematically affected by the prevalence, and assuming the prevalence of Pap test screening has increased over time following mass educational campaigns in 1990s, the high prevalence of screening in this population may explain the substantial agreement. However, the substantial coefficient of agreement observed in this study could not be wholly attributed to increases in prevalence of Pap test screening alone. The substantial agreement found in this study, despite a lower educational level, may also be due, in part, to time-dependent improvements in the understanding of cancer screening, perhaps attributable to public health education, fewer financial barriers to care, and more frequent discussions of cervical cancer screening during clinical encounters. Although women were not specifically asked about Pap test-related discussions they may have had with their healthcare providers, a large proportion of women reported having a usual source of care (86%). Al-

dent among older, lower income African-American women.

To our knowledge, this study is the first to report a relatively high reproducibility of self-reported Pap test utilization among African-American women living in a predominantly socio-economically distressed locale. Table 3 summarizes studies where reproducibility of Pap test utilization was evaluated in the last decade. An early study among African-American women in rural North Carolina[9] compared medical records and self-reported Pap test in the three years preceding the interview and

found moderate agreement. Moderate agreement between medical records and self-reports was also reported in other studies conducted among orthopedic and surgical predominantly White patients,[11] at an ambulatory care site comprising African-American and White patients,[17] and among Hispanic women.[16] Others found fair agreement between self-reported Pap test utilization and medical records among women recruited from a low-income health clinic with African-American patients, Whites, and Native Americans[12,22] and African-American cervical cancer cases recruited

Table 3. Summary of agreement of self reports for Pap test utilization from previous studies

Study	Population	Kappa	Prevalence of Pap Screening	Number of Participants
Sawyer (1989)	Rural county	0.48	67%	98
Michielutte (1991)	STD clinic visitors	0.15	29%	303
Fruchter et al (1992)	Ambulatory care site in low income community	0.46	72%	138
McKenna (1992)	Population based tumor registry	0.34	96%	105
Johnson et al (1995)	Native American Pascua Yaqui Tribe	.121 at baseline .462 after education program	69.6% baseline 81.9% after education program	215 at baseline 175 after education program
Suarez et al (1995)	Low income Mexican-American in United States-Mexico border	.47	69%	450
Paskette (1996)	Urban low income	0.15	97%	441
MacGovern (1998)	Orthopedic and surgical patients	0.52	39%	477
Pizarro (2002)	Inner city, low income	0.29	61%	162
Hoyo et al (current study)	Urban African-American	0.64	83%	144

though not targeting the same women, in the last 10 years, several projects have been aimed at increasing knowledge about cervical cancer screening in North Carolina.[9–10,23] Therefore, kappa coefficients obtained in this study may reflect an improvement in African-American women's understanding of what constitutes a Pap test.

The possibility that substantial agreement in our study may also be due to design cannot be excluded. While agreement in some studies was assessed between self-reported Pap test utilization and medical records, in another study[21] agreement was assessed between self-reported Pap test utilization at two different times. Also in a study where a second questionnaire was used to assess reproducibility,[21] a moderate coefficient of agreement was obtained. Although this contention is supported by the expected direction and the degree of agreement in women with lower socioeconomic status and access to care as seen in Table 2, direct comparison among studies is limited by differences in design, populations studied, and measurements.

This study has several limitations. No gold standard exists against which the true screening status could be assessed, therefore validity could not be

directly assessed. However, in both clinical practice and public health surveys, Pap test record keeping is not standardized or universally accessible and both clinicians and evaluators of public health education programs must often rely on the woman's self-report.

Another limitation of this study is that agreement based on querying women two times, three to six weeks apart, may overestimate agreement, particularly if the source of poor agreement is a confusion over what constitute a Pap test vs other pelvic exam. This limitation may be of concern since low reproducibility has been related to the time since the Pap test was conducted[11] and may also be related to the interval between the two queries. Recent studies suggest reproducibility may be low when other pelvic examinations have been conducted during the reference period.[10,12] However, no significant differences in reproducibility were noted when we compared reproducibility among women who were interviewed three to four weeks after the first interview to the reproducibility of self reports among women for whom the lag time between interviews was longer (data not shown). The numbers in the sub-analyses were, however, small. Women included in this study may have

had frequent pelvic examinations that they mistook for Pap tests. Unfortunately, among women who reported having had a Pap test in the preceding three years, the estimated date of the tests was not collected; hence the reference period is not known. Despite these limitations, our data suggest that reproducibility of self-reported Pap tests may have improved among African-American women.

CONCLUSION

African-American women's self-reports of adherence to Pap test recommendations are likely more accurate than was previously assumed. This may be due to time-dependent diffusion of public health education information among low-income populations to improve knowledge about cervical cancer screening despite low socioeconomic status in these populations. These findings may also be a function of a high prevalence of Pap test screening in this population. This study suggests that among higher education and higher income women, self-reported Pap test utilization is adequately reliable for assessing the effectiveness of public health education interventions and for basing

clinical decisions to prescribe re-screening in middle-aged African Americans. However, among women with less than a high school education, it is prudent to continue to assume no previous Pap tests were done.

AUTHOR CONTRIBUTIONS
Design and concept of study: Hoyo, Ostbye
Acquisition of data: Hoyo
Data analysis and interpretation: Hoyo, Ostbye, Yarnall, Chowdhary
Manuscript draft: Hoyo, Ostbye, Skinner, Yarnall, Chowdhary
Statistical expertise: Hoyo, Ostbye
Acquisition of funding: Hoyo
Administrative, technical, or material assistance: Hoyo, Skinner, Chowdhary
Supervision: Ostbye

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