

KNOWLEDGE, BELIEFS, ATTITUDES, AND CANCER SCREENING AMONG INNER-CITY AFRICAN-AMERICAN WOMEN

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Three hundred twenty-one inner-city African-American women were interviewed to determine their knowledge, attitudes, and beliefs regarding cancer and cancer screening, and their cancer screening histories. The women were recruited from a variety of sources in Atlanta and were interviewed in their homes by trained lay health workers. Half of the subjects had an annual household income of <\$15,000. About half had received a Pap smear and clinical breast examination within the year preceding the interviews. For women >35 years old, 35% had received a mammogram within the recommended interval. Younger women and women with higher incomes were more likely than older women and those with lower incomes to have received a Pap test and clinical breast examination within the preceding year, but income was not significantly associated with mammography histories. In general, women who were more knowledgeable about cancer and its prevention were more likely to have been appropriately screened. However, various attitudes and beliefs regarding cancer generally were not associated with screening histories. We conclude that cancer screening programs for inner-city minority women should focus on improving knowledge levels among older women rather than attempting to alter attitudes and beliefs. (*J Natl Med Assoc.* 1997;89:405-411.)

Key words: inner-city women ♦ Papanicolaou test
♦ clinical breast examination ♦ mammography

Cervical and breast cancer mortality rates are higher in black women than in white women in the United States.^{1,2} Freeman³ has suggested that at least

half of the difference in survival among disadvantaged populations compared with those of higher socioeconomic status is attributable to late detection of these cancers.

A substantial body of literature documents the relationship of socioeconomic factors to cancer screening. In general, more affluent and highly educated persons are more likely to have been screened for cancer than those with less financial resources and education, particularly in regard to mammography.^{4,7} However, less is known of the relationship between a person's knowledge, attitudes, and beliefs regarding cancer and cancer screening and the likelihood that the individual actually will obtain screening tests.⁸⁻¹⁶ Still less is known of these relationships in low-income minority individuals, even though this is the group most at risk of death from cancer.^{3,14-17} We

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hypothesized that even among low-income individuals, there is an association between cancer screening practice and knowledge, attitudes, and beliefs.

This article reports the results of a survey of cancer-related knowledge, attitudes, and beliefs among inner-city African-American women in Atlanta, Georgia. The survey also obtained socioeconomic and demographic information. It was conducted to obtain baseline data on a cohort of women on whom we subsequently tested an educational intervention designed to increase the frequency with which they obtained screening for breast and cervical cancer.¹⁷

METHODS

The study design, study populations, and data collection procedures have been described previously.¹⁷ Briefly, from March 1989 through February 1990, a total of 321 black inner-city women, ≥ 18 years, with no history of cancer, breast surgery, hysterectomy, or other severe illness were interviewed. Participants were recruited from a variety of sources: an inner-city community health center (17.1%), referrals from a community organization concerned with black women's health issues (29.9%), residents of public and senior citizen housing projects (30.8%), and individuals identified in inner-city business settings (22.1%). The sample of women recruited to participate was a demographically diverse inner-city cohort; approximately half of the women had a household income of $< \$15,000$ in 1989.

The face-to-face interviews were conducted in the subjects' homes by trained health workers. Each interview required completion of a questionnaire that sought information on:

- the subject's cancer risk factors,
- history of breast and cervical cancer screening, socioeconomic and educational status,
- knowledge of cancer, cancer screening, and cancer risk factors, and
- attitudes and beliefs toward cancer, cancer prevention, and cancer screening.

Specific "knowledge" items included questions regarding cancer screening tests, their cost, and their recommended frequency; causes of cancer; and efficacy of cancer treatment. "Attitude and belief" items included queries regarding the subjects' feelings about the seriousness of cancer as a health problem, their propensity to worry about or talk about cancer, their opinion of the value of check-ups and cancer treatment, their perceived likelihood of getting can-

cer, and their attitudes toward health professionals.

Subjects were classified according to whether they had received a Pap test or clinical breast examination within 1 year prior to the interview. For mammography, the sample was classified according to the 1990 guidelines of the American Cancer Society: a baseline mammogram if age 35 to 39 years, a mammogram every 3 years if age 40 to 49 years, and an annual mammogram if ≥ 50 years.^{18,19} Contingency tables were used to describe bivariate relationships between screening status, socioeconomic, demographic, knowledge, attitudinal, and behavioral items.

Both knowledge and attitude/belief questions were examined individually. "Knowledge scores" that represented the number of correct answers to 15 questions about cervical cancer and 25 questions about breast cancer and "attitude scores" that represented the number of "positive" attitudes or beliefs on 18 cancer screening related questions also were calculated.

Proportions of factors associated with screening use or underuse were calculated according to American Cancer Society guidelines. Odds ratios (OR) were calculated after adjusting the age of women using logistic regression.²⁰ The differences between stratum-specific odds ratios also were examined.

RESULTS

Sociodemographic Status and Screening Practices

Of the 321 study subjects, 48% had annual household incomes $< \$15,000$, 32% had not graduated from high school, 16% were unemployed, and 28% were enrolled in Medicaid. Most (87%) of the subjects were > 34 years. Only 51% of the women had received a Pap test within 1 year prior to the interview, and only 55% had received a clinical breast examination. For women ≥ 35 years, only 35% reported having received a mammogram according to 1990 American Cancer Society guidelines. The Table shows that women ≥ 60 years were less likely to have had a Pap smear (but not breast cancer screening) within the last year than women aged 35 to 44 years (OR=0.4; $P < .01$).

The Table also shows the percentage of women screened and age-adjusted odds ratios of being screened within recommended time periods by selected social and age-related characteristics. Those who had not received a Pap test or clinical breast

Table. Percent Screened and Age-Adjusted Odds Ratios (OR) of Being Screened Within Recommended Time Periods* by Selected Social and Demographic Characteristics

Factor	No.	Pap Smear		Breast Exam		Mammography	
		%	OR	%	OR	%	OR
Age (years)							
<35	43	53.5	0.8	53.5	0.8	NA	
35 to 44	145†	57.9	1.0	58.6	1.0	34.5	1.0
45 to 59	75	49.3	0.7	54.7	0.8	32.0	0.9
≥60	58	34.5	0.4‡	50.0	0.7	39.7	1.2
Education							
<12 years	104	41.3	0.6	51.0	0.8	39.2	1.2
12 years	90†	58.9	1.0	57.8	1.0	32.9	1.0
≥13 years	127	53.5	0.7	57.5	1.0	32.3	1.0
Family income							
≤\$15,000	154	48.1	0.4‡	53.9	0.3‡	35.7	0.7
\$25,000	47	40.4	0.2§	40.4	0.2§	35.7	0.8
>\$25,000	49†	71.4	1.0	79.6	1.0	41.0	1.0
Unknown	71	50.7	0.5	52.1	0.3‡	29.0	0.6
Married/live as married							
Yes	103†	57.3	1.0	61.2	1.0	30.8	1.0
No	218	48.2	0.8	52.7	0.7	36.9	1.2
Employed							
Yes	164†	55.5	1.0	55.5	1.0	35.3	1.0
No¶	126	44.4	0.9	55.6	1.0	38.5	1.1
Student/housewife	31	54.8	1.2	54.8	0.9	16.0	0.4
Insurance							
Yes	163†	53.4	1.0	57.1	1.0	32.6	1.0
No	158	48.7	0.9	53.8	0.9	37.1	1.1
Medicaid							
Yes	89	50.6	0.8	53.9	1.0	40.0	1.2
No	232†	51.3	1.0	56.0	1.0	32.8	1.0

*Pap smear or clinical breast examination: within 1 year; mammogram: receive a baseline if age 35 to 39 years, within 3 years if age 40 to 49 years, & within 1 year if age >49 years.

†Reference group.

‡ $P \leq .01$.

§ $P \leq .001$.

|| $P \leq .05$.

¶Retired, disabled, too ill to work, on welfare, etc.

examination within the last year were more likely to be poor. More than 70% of women with an annual income >\$25,000 had received a Pap smear within the past year compared with 40% of those with incomes in the \$15,000 to \$25,000 range (OR=0.2; $P < .001$) and 48% of those with incomes <\$15,000 annually (OR=0.4; $P < 0.01$).

For clinical breast examinations, the comparable figures were about 80% for women with incomes >\$25,000 per year, 40% for women with annual incomes in the \$15,000 to \$25,000 range (OR=0.2; $P < .001$) and 54% for women with incomes <\$15,000 (OR=0.3; $P < .01$). Income was not related

to the likelihood of having received a timely mammogram. While more than 70% of the upper-income group had received a Pap smear or clinical breast examination within the past year, only 41% (of those >35 years) had received a timely mammogram. Educational attainment was not significantly associated with screening history, nor was unemployment, marital status, or insurance coverage, including Medicaid.

Knowledge

The mean cervical cancer knowledge score was 9.5 with 71% of respondents able to provide correct

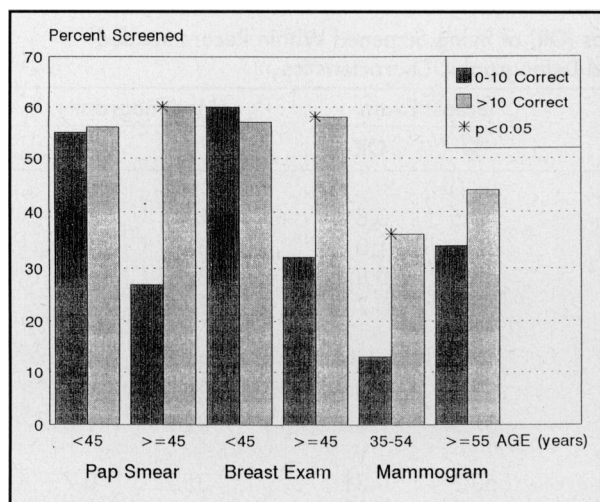


Figure. Percent of adequately screened participants by the number of correct answers to the knowledge questions on cervical or breast cancer by age and type of screening examination.

answers to ≥ 11 of the 15 questions. For breast cancer knowledge, the mean was 14 with 83% able to answer ≥ 11 questions correctly. An examination of relationships between screening history and knowledge variables within various age strata indicated that screening was associated with knowledge level primarily among older women (Figure). Among women who were ≥ 45 years and had a knowledge score > 10 , about 60% had received a Pap test within the past year. This was also true with respect to breast examinations. However, among women in this age group with a knowledge score < 10 , only about 27% had received a Pap test and only 32% had received a breast examination. These differences were statistically significant. For women < 45 years, the differences were much smaller.

To evaluate the interaction effect of women's age and breast cancer knowledge on their mammography history, women < 35 years were excluded (guidelines for cancer screening do not call for women < 35 years to have a mammogram) and the rest of the women into age groups of 35 to 54 years and ≥ 55 years were stratified. Among the younger group, only a few women (13%) with low knowledge scores were up to date with respect to mammography; however, the screening rate was 37% for those with high scores. Among older women, 44% of those in the high breast cancer knowledge score group and 34% in the low score group were up-to-date with respect to mammography. The associations between breast cancer

knowledge and mammographic schedules were significant for the younger group, but not significant for the older group.

Several specific knowledge items distinguished between women who had been screened recently and those who had not. For instance, those screened within the past year were more likely to know that "there is a test for cervical cancer," to identify the cervical cancer test as a "Pap test," to disagree with several of the myths about the test, and to know that "Pap tests can catch cervical cancer early." Undergoing a Pap smear within the past year was strongly associated with a cervical cancer knowledge score of ≥ 10 ; about 76% of women with recent Pap smears scored at least this high compared with 59% among those with no recent Pap smear (OR=1.8, $P < .05$).

Similarly, the overall knowledge score for breast cancer was significantly associated with a history of adequate breast cancer screening, including both mammography and clinical breast examination. Nearly 88% of women who received a clinical breast examination within the past year had a knowledge score > 10 compared with 80% of those who had not; for mammography, the comparable figures were 83% and 71%. However, the magnitudes of difference were not very large, and there were few significant associations between individual breast cancer knowledge items and breast cancer screening.

Attitudes and Beliefs

With respect to attitudes and beliefs, the summary "attitude score" was not associated with the subjects' history on any of the three cancer screening tests. Of five attitude/belief items on the questionnaire related to breast cancer and breast cancer screening, none were associated with the interval since the last mammogram and only one was associated with clinical breast examination. Of three such items related to cervical cancer and cervical cancer screening, none were related to the interval since the last Pap smear. Of 10 such items related to cancer or health care generally, only one was related to the interval since the last Pap smear or mammogram; four were associated with the interval since the last clinical breast examination. There was no association between the attitude/belief summary score and any of the three screening modalities. However, the perceived importance of cancer as a serious health problem was significantly associated with all three screening tests.

There was an association with some of the individual items: women were more likely to have had a Pap test and clinical breast examination within the past year if they thought their physicians "were interested in them" and "their friends would not think a check-up was silly when one felt fine." Women who sometimes did breast self-examinations were more likely to obtain a clinical breast examination than those who did not do self-examinations. None of the attitude- and belief-related items were significantly associated with receipt of a mammogram on schedule. Almost all women thought general physical check-ups were worthwhile. However, thinking that cancer was "the most serious health problem" was associated with having breast examinations and mammography but not Pap tests within guidelines. (Detailed data presenting the associations between specific knowledge and attitude/belief items and screening experience are available from the authors on request.)

DISCUSSION

This study used a convenience sample and therefore may not represent the general population. Subjects were, however, low-income inner-city African-American women who were willing to consider participation in a health education program. Their knowledge, behaviors, and attitudes are those of women who are most likely to be reached by health promotion interventions. In the real world, persons reached by health promotion programs usually constitute a convenience sample.

Most studies conducted previously on factors associated with cancer screening behavior were on a single type of cancer such as cervical cancer or breast cancer and were conducted on predominantly white populations.²¹⁻³³ Fewer studies reported on inner-city or black women until recent years, and these dealt mostly with demographic factors.^{9-17,27,28} In general, women who are older, nonwhite, unmarried, and have lower income and educational levels are less likely to receive adequate screening tests.^{4,5}

Several previous studies report on the association between cancer knowledge and cancer screening. Mamon et al⁹ studied 416 inner-city women and analyzed data on 290 women with intact uteri for their screening histories. They found that those who had been inadequately screened for cervical cancer had less knowledge of the risk factors for cervical cancer than did women with an adequate screening history. McCance et al⁸ studied 101 women ≥ 50 years

recruited from a university hospital and a Mormon church. They found that knowledge was correlated with having obtained mammography and a professional breast examination in the past year. Mandelblatt et al¹⁵ studied elderly women attending Harlem Hospital Clinic and found that knowledge and perceived benefit of early detection have a strong association with mammogram and Pap use.

We also found higher knowledge scores associated with more recent screening among women in our sample. The screening data were retrospective since screening history was assessed. Consequently, the cause-and-effect relationship is ambiguous; it is possible for either screening to predict knowledge or for knowledge to predict screening. Knowledge can be acquired from previous screening experience and can influence succeeding practices. On the other hand, there was little association between screening histories and attitudes or beliefs.

Age was a predictor of a recent Pap smear, but not of breast cancer screening. Younger women were more likely than older women to have received a Pap smear within the past year, a finding that may be related to the frequency with which young women receive family planning and other reproductive health services. Alternatively, this finding may be related to some of the other differences between the younger and the older women in our sample. The younger women tended to be better educated, to be employed, to have a higher income, and to have more knowledge of cancer prevention. Among these characteristics, however, only employment status was statistically associated with a history of a recent Pap test in women < 45 years. Whatever the reason for the association of younger age with more regular Pap screening, it means that the likelihood of having received a recent Pap smear is roughly inversely proportional to the risk of cervical cancer, since older women are at higher risk.

Income also predicted screening histories. Overall, upper-income ($> \$25,000$ per year) women were significantly more likely to have received a Pap smear and a breast examination within the past year than were lower-income women. There was a similar tendency for mammography, but this was not statistically significant. However, our study findings differed from others in the literature^{4,6,9,14,22} in that health insurance and Medicaid coverage were not associated with screening.

This study has several important implications for cancer screening programs. Perhaps most important

among them is the fact that while greater cancer-related knowledge seems to lead to more regular screening, "positive" attitudes and beliefs have less impact. This suggests that community or individual health education designed to provide factual information is more likely to improve screening rates than programs designed to improve attitudes about cancer and cancer screening. At the same time, it is probable that improvement in knowledge will lead to improvement in attitude. Moreover, since older and poorer women are less likely to be adequately screened for cervical cancer (based on bivariate analysis), educational interventions should be especially targeted toward this group.

Our study also suggests that just as screening in young women is linked to commonly used health services, a strategy for increasing screening in older women might be to link such screening to services for chronic diseases such as diabetes, hypertension, and heart disease, which often bring older women to clinics. In this connection, it is important to note that among women who had ever received a clinical breast examination, 77% stated that they had gotten the examination as part of a routine physical examination.

While this study has an important strength in being one of the few to examine the relationships between knowledge, beliefs, and attitudes and cancer screening among inner-city black women, its limitations should be kept in mind as well. The main concern is that the study group was a convenience sample. However, since approximately half of the interview participants had family incomes of <\$15,000 and all lived in inner-city neighborhoods, it is clear that we were reaching a low-income inner-city population. The cancer screening rates in our group were similar to rates found in 1987 population surveys.^{5,29}

CONCLUSION

Interventions that increase knowledge of cancer risk and cancer screening among older black inner-city women are a high priority, as are interventions that link cancer screening with health care for chronic illness among older black women. This study has demonstrated that low income represents a barrier to screening. However, knowledge can overcome some income-related barriers to obtaining screening and other health services.

Further research is needed to determine how best to offer educational programs to inner-city minority women, especially the elderly, and how to

change patterns of health care at institutions serving them. This study helps to demonstrate the importance of tailoring health promotion interventions to the specific population at risk and to the specific outcome desired.

Literature Cited

1. National Cancer Institute, Division of Cancer Prevention and Control. *Cancer Statistics Review 1973-1988*. Bethesda, Md: US Dept of Health and Human Services; 1991. USDHHS NIH publication 91-2789.
2. National Cancer Institute Division of Cancer Prevention and Control. *Cancer Among Blacks and Other Minorities: Statistical Profiles*. Bethesda, Md: US Dept of Health and Human Services; 1986. USDHHS NIH publication 86-2785.
3. Freeman HP. Cancer in the socioeconomically disadvantaged. *CA Cancer J Clin*. 1989;39:266-288.
4. Calle EE, Flanders WD, Thun MJ, Martin LM. Demographic predictors of mammography and Pap smear screening in US women. *Am J Public Health*. 1993;83:53-60.
5. Anda RF, Sienko DG, Remington PL, Gentry EM, Marks JS. Screening mammography for women 50 years of age and older: practices and trend. *Am J Prev Med*. 1990;6:123-129.
6. Urban N, Anderson GL, Peacock S. Mammography screening: how important is cost as a barrier to use. *Am J Public Health*. 1994;84:50-55.
7. Breen N, Kessler L. Changes in the use of screening mammography: evidence from the 1987 and 1990 National Health Interview Surveys. *Am J Public Health*. 1994;4:62-67.
8. McCance KL, Mooney KH, Smith KR, Field R. Validity and reliability of a breast cancer knowledge test. *Am J Prev Med*. 1990;6:93-98.
9. Mamon JA, Shediac MC, Crosby CB, Sanders B, Matanoski GM, Celentano DD. Inner-city women at risk for cervical cancer: behavioral and utilization factors related to inadequate screening. *Prev Med*. 1990;19:363-376.
10. Glockner SM, Holden MG, Hilton SVW, Norcross WA. Women's attitudes toward screening mammography. *Am J Prev Med*. 1992;8:68-77.
11. Costanza ME. The extent of breast cancer screening in older women. *Cancer*. 1994;74:2046-2050.
12. Urban N, Anderson GL, Peacock S. Mammography screening: how important is cost as a barrier to use? *Am J Public Health*. 1994;84:50-55.
13. Bostick RM, Sprafka JM, Virnig BA, Potter JD. Knowledge, attitudes, and personal practices regarding prevention and early detection of cancer. *Prev Med*. 1993;22:65-85.
14. Mandelblatt J, Traxler M, Lakin P, Kanetsky P, Kao R, Harlem Study Team. Targetting breast and cervical cancer screening to elderly poor black women: who will participate? *Prev Med*. 1993;22:20-33.
15. Mandelblatt J, Traxler M, Lakin P, Kanetsky P, Kao R, Harlem Study Team. Mammography and Papanicolaou smear use by elderly poor black women. *J Am Geriatr Soc*. 1992;40:1001-1007.
16. Kuhns-Hastings J, Brakey MR, Marshall IA. Effectiveness of a comprehensive breast cancer-screening class for women residing in rural areas. *Appl Nurse Res*. 1993;6:71-99.
17. Sung JFC, Coates RJ, Williams JE, Liff JM, Greenberg RS, McGrady GA, et al. Morehouse's avoidable cancer mortality

project-study design and subjects. *Public Health Rep.* 1992;107:381-388.

18. Update January 1992: the American Cancer Society guidelines for the cancer-related checkup. *CA Cancer J Clin.* 1992;42:45-47.

19. US Dept of Health and Human Services. *Healthy People 2000.* Washington, DC: US Government Printing Office; 1991. DHHS publication (PHS) 91-50212.

20. Kleinbaum DG, Kupper LL, Morgenstern H. *Epidemiologic Research—Principles and Quantitative Methods.* Belmont, Calif: Lifetime Learning Publications; 1982.

21. Evans AM, Love RR, Meyerovitz BE, Loventhal H, Nerenz DV. Factors associated with active participation in a cancer prevention clinic. *Prev Med.* 1985;14:358-371.

22. Peters RK, Bear MB, Thomas D. Barriers to screening for cancer of the cervix. *Prev Med.* 1989;18:133-146.

23. Reeder S, Berkamovic E, Marcus AC. Breast cancer detection behavior among urban women. *Public Health Rep.* 1980;95:276-281.

24. MacLean U, Sinfield D, Klein S, Harnden B. Women who decline breast screening. *J Epidemiol Community Health.* 1984;38:278-283.

25. Kruse J, Phillips DM. Factors influencing women's decision to undergo mammography. *Obst Gynecol.* 1987;70:744-748.

26. Rimer BK, Trock B, Eugstrom PF, Lerman C, King E. Why do some women get regular mammograms? *Am J Prev Med.* 1991; 7:69-74.

27. Whitman S, Ansell D, Lacey L, Chen EH, Ebie N, Dell J, et al. Patterns of breast and cervical cancer screening at three public health centers in an inner city urban area. *Am J Public Health.* 1991;81:1651-1653.

28. Mandelblatt J, Traxler M, Lakin P, Kanetsky P, Thomas L, Chauhan P, et al. Breast and cervical screening of poor, elderly, black women: clinical results and implications. *Am J Prev Med.* 1993;9:133-138.

29. Provisional estimates from the National Health Interviews Survey Supplement on Cancer Control - United States, January-March 1987. *MMWR.* 1988;37:417-419.

30. Shapiro S. The call for change in breast cancer screening guidelines. *Am J Public Health.* 1994;84:10-11.

31. Harris R. Breast cancer among women in their forties: toward a reasonable research agenda. *J Natl Cancer Inst.* 1994;86:410-412. Editorial.

32. Koplans DB. Efficacy of screening mammography for women in their forties. *J Natl Cancer Inst.* 1994;86:1721. Correspondence.

33. Vogel VG. Screening younger women at risk for breast cancer. *Monogr Natl Cancer Inst.* 1994;16:55-60.



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