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Cancer Screening and Haitian Immigrants: The Primary Care Provider Factor

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Abstract

Background—Haitian immigrants, among the fastest growing immigrant communities in the United States, have low cancer screening rates. Several patient barriers have been identified and associated with low screening rates but little is known on provider barriers for cancer screening. To address this gap, we assessed the cancer screening practices, attitudes, and beliefs of primary care providers serving the Haitian community.

Methods—We surveyed a random sample of physicians serving first generation Haitian immigrants in New York City, identified through their zip codes of practice. Participants completed a questionnaire to assess their beliefs, attitudes and practices surrounding cancer screening, and their perceptions of patient barriers to screening.

Results—50 of 87 physicians (58%) consented to participate in the study. Cancer site-specific and overall cancer screening scores were created for breast, cervical, and colorectal cancer screening. 75% of providers followed breast cancer screening guidelines, 16% for cervical cancer, and 30% for colorectal cancer. None of the providers in the sample were following guidelines for all three cancer sites. Additionally, 97% reported recommending digital rectal exam and PSA annually to patients 50 years or older with no family history, and 100% to patients over 50 years old with family history.

Conclusions—The reported practices of providers serving the Haitian immigrant community in New York City are not fully consistent with practice guidelines. Efforts should be made to reinforce screening guideline knowledge in physicians serving the Haitian immigrant community, to increase the utilization of systems that increase cancer screening, and to implement strategies to overcome patient barriers.

Keywords

Haitian immigrants; Physicians practices; Cancer screening

Introduction

Despite recent improvements in cancer screening among the general population in the United States, Haitian immigrants are still affected by several barriers that limit their cancer screening rates. According to the U.S. Census Bureau [1], 540,000 immigrants from Haiti live in the United States. Haitian immigrants can be found in almost every state, but are concentrated in larger cities such as New York, Miami, Boston, Chicago, and Washington, DC [2] Haitians are among the fastest growing groups of immigrants in New York.

Cancer screening rates among this population remain low. Consedine et al. found that Haitian men reported significantly lower prostate cancer screening compared with U.S. born whites [3]. Haitian women have been found to be less likely to utilize breast cancer screening [4, 5], and have lower Papanicolaou (Pap) test screening rates than native-born Black and Latina peers [6], and a higher incidence of invasive cervical cancer than U.S.-born black women [7]. Regardless of ethnicity or socioeconomic status, increasing cancer screening results in early detection of many cancer types, lowers incidence of late stage cancer diagnosis, and improves cancer outcomes, considerably enhancing survival rates [8].

Haitian immigrants are affected by health care barriers shared by other underserved groups, compounded by immigrant-specific barriers such as language, documentation status, and insurance eligibility [9]. Previous work on underutilization of cancer screening tests among this population has focused on patient barriers to screening. Several studies have revealed that Haitian immigrants have limited knowledge about cancer prevention, detection, and treatment [9–11]. Although these patient barriers explain to some degree the lower rates of cancer screening among this population, the practices of providers caring for this population, and their knowledge and their attitudes toward cancer screening, could also play an important role.

The health belief model (HBM) [12] has been used extensively to explain why people do not participate in health-screening programs. There are six key concepts in the HBM (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy). There is evidence that provider recommendation for cancer screening is an effective factor influencing these six key concepts [12–14]. Another model used frequently in cancer prevention is the Stages of Change Model (SCM) [15, 16], which asserts that behavior change does not happen in one step. It rather involves progress through six stages of change: pre-contemplation, contemplation, preparation, action, maintenance, and termination. Several studies have found that provider recommendation for cancer screening is significantly associated with higher stages along the SCM model [17, 18]. To move patients along the stages of change, providers could address some of the many screening barriers described, educating patients and ameliorating the fear, worry and embarrassment. Haitian community members state they would most trust, and be more likely to listen to, cancer information from their physicians [9–11, 19].

Yet there is no literature on the cancer attitudes and practices of primary care providers serving the Haitian community, leaving a knowledge deficit on how to best respond to the under-enrollment of Haitians in cancer screening and early detection activities. This study addresses this gap by assessing the cancer screening practices, attitudes, and beliefs of providers serving the Haitian community to enable providers to more effectively move patients along the continuum of the stages of change model.

Methods

Study Sample

We created an inventory of primary care physicians (primary care, family medicine, and internal medicine specialties) throughout New York City who serve the Haitian community, based on zip code of practice combined with data from the U.S. Census Bureau on Haitian zip codes of residence. Physicians were identified by using the Association of Haitian Physician Abroad membership list, community based organization networks' physician lists, and New York State Medical Association lists. Three hundred and fifty physicians were entered into an Excel database to obtain a random sample of 50 respondents. The sample size in this descriptive study was calculated using a 95% confidence interval and proportions of the different outcomes (rates of cancer screening) ranging from 0.10 to 0.90.

Survey Instrument

A 50 question survey in English was developed to assess attitudes and referral practices for breast, cervical, colorectal, and prostate cancer screening. Questions were developed to reflect the American Cancer Society and National Cancer Institute guidelines in place as of July 2003. The survey was piloted on a sample of 25 providers and then revised by the authors.

Cancer site-specific and overall cancer screening scores were created from the survey questions for each physician, based on the American Cancer Society and the National Cancer Institute cancer screening guidelines, utilizing responses for breast, cervical, and colorectal cancer screening to compare their reported practices with the current cancer screening guidelines.

Data Collection

Beginning August 2003, the final survey was mailed to the randomly selected providers, accompanied by an introduction letter. A follow-up telephone call was made several days later to ensure that the survey had been received. If the provider requested, a research assistant administered the survey in person. All participants who completed the survey received a \$40 incentive. The data were entered into an Access database and exported to SPSS version 12 for statistical analysis. This study was approved by the New York University School of Medicine Institutional Review Board.

Results

Study Sample

Fifty providers (58%) completed the survey, 32 declined (89% cited time as the reason for refusal), and 5 were dropped after completing the survey because their practice was primarily in gynecology or oncology. Ninety one percent (91%) of the final sample was male, similar to the percentage that refused or was dropped from the study. We found no statistical difference in the demographic characteristics or responses between the 31 physicians that self-administered the survey and the 19 physicians for whom the research assistant administered the survey.

The mean respondent age was 53.7 years (range: 34–66 years). Of the 45 physicians born in Haiti, the mean time since moving to the United States was 28.8 years (range: 8–42 years). Seventy six percent (76%) described their ability to speak English as very well and 22% as well. Eighty two percent (82%) described their ability to speak Creole as very well and 10% as well. The mean time since graduation from medical school for all the providers was 26.9 years (range 6–44 years). Sixty percent (60%) describe their practice as general internal

medicine and 40% as family medicine. Other characteristics are summarized in Table 1. These variables showed no association with their cancer screening practices described below.

Survey Reliability

Internal consistency was assessed for each section of the survey (cancer site) using Cronbach's alpha. For questions related to breast cancer, Cronbach's alpha was 0.81, for cervical cancer questions Cronbach's alpha was 0.78, for questions related to colorectal cancer Cronbach's alpha was 0.91 and for prostate cancer Cronbach's alpha was 0.82.

Cancer Site-specific Practices

Regarding breast cancer screening (mammography, clinical breast exam), 84% of providers reported that they refer for mammography, or perform clinical breast exam on, their eligible asymptomatic female patients at some point in their patients' lives. Sixty percent (60%) of all providers reported referring their patients 40–49 years with no family history for mammography annually. Eighty six percent (86%) reported referring in this age range annually if there is a family history of breast cancer. Eighty two percent (82%) and 88% of providers stated that they refer their patients 50 years or older for mammography annually, without and with a family history, respectively. Seventy eight percent (78%) of providers reported performing clinical breast exam annually on their patients 40 years or older.

In the case of cervical cancer screening, 26% of providers stated that they start recommending the Pap test at age 21 even if the patient is not sexually active. Sixty five percent (65%) start recommending the Pap test to their asymptomatic female patients regardless of age, if the patient has had sexual intercourse within the past 3 years. Only 16% of providers reported both the aforementioned correct practices. Eight percent (8%) of providers only start recommending Pap testing for asymptomatic patients when they get pregnant for the first time.

Concerning colorectal cancer screening, for their patients 50 years or older, asymptomatic, and with no family history of colorectal cancer, 89% of providers reported recommending fecal occult blood test (FOBT) annually, 72% reported performing digital rectal exam for colorectal cancer screening, 60% reported recommending sigmoidoscopy for screening (5% reported recommending it annually), 38% reported recommending colonoscopy every 5 years, and 43% every 10 years. There were no differences for these practices by patient gender.

For prostate cancer screening, 82% reported recommending prostate-specific antigen (PSA) to their patients 45–50 years old with no family history of prostate cancer. Sixty four percent (64%) stated that they recommend digital rectal exam (DRE) annually for the same group of patients. Ninety five percent (95%) reported recommending digital rectal exam and PSA annually to patients 45–50 years old with family history of prostate cancer. Ninety seven percent (97%) recommend DRE and PSA to patients 50 years or older with no family history, and 100% for patients over 50 years old with a family history of prostate cancer.

Scores were created for each physician, based on a comparison with the current cancer screening guidelines. There were 8 questions on breast cancer screening, 6 on cervical cancer screening and 6 on colorectal cancer screening. One point was given for each correct answer. There was no penalty for overutilization of screening services. For breast cancer, the mean score was 75% correct, for cervical cancer the mean score was 16%, and for colorectal cancer the mean score was 30% correct. None of the providers in the sample were following guidelines for all three cancer sites.

A comparison between the standard practice guidelines and the reported practices of providers in the study is shown in Table 2.

Providers' Beliefs

Providers' beliefs about their cancer screening practices were also assessed (Table 3). Seventy six percent (76%) of the providers were satisfied with the rate of cancer screening in their Haitian patients. Ninety percent (90%) of providers responded that they know how to effectively counsel their patients for cancer screening. Eighty two percent (82%) of the physicians surveyed reported attending a physician education workshop on cancer screening in the past 10 years, 70% in the past 2 years, and 54% in the past year. 84% responded that they are aware of their patients' cultural issues regarding cancer screening. Thirty six percent (36%) responded that they have adequate cancer screening written information in their patients' primary language and 40% thought that these materials were difficult to obtain. We found no association between these results, the providers' sociodemographic variables, and their reported screening practices.

Cancer Screening Systems

When asked about current systems used in their practices to increase or maintain cancer screening rates, 66% responded that they use medical record checklists and flow charts. Only 22% of those who did not use record checklists and flow charts thought such a system would be practical to implement. When asked about using chart stickers or tags as a reminder for cancer screening, 30% reported using this method (alone or in combination with others). Only 20% had a computer-generated reminder in use. Of those who do not, 52% thought that it would be a helpful cancer screening reminder system. Data on providers' perceptions on useful methods to increase cancer screening are shown in Table 4.

Providers' Perceptions of Patients' Cancer Screening Barriers

Providers were also queried about their perceptions of their patients' cancer screening barriers (Table 5). For mammography, the biggest perceived barrier was pain and discomfort (58%), for DRE and Pap testing, it was embarrassment (48% and 36%, respectively), for colonoscopy, it was patients' beliefs that the test is unnecessary (38%) and for FOBT it was embarrassment (10%). Unclear national guidelines were rarely perceived as a patient barrier.

Discussion

Cancer is significantly more treatable if caught early. Haitians, among other immigrant groups, have a high rate of late cancer diagnoses, imperiling their chances for cure [10, 11]. Hence, their providers need to ensure that they are doing all that is possible to facilitate appropriate screening for their patients. This first study on cancer screening practices among providers serving Haitian immigrants in New York City reveals important gaps in provider screening practices and in the utilization of systems to facilitate improved practices. Our findings suggest the possibility that cancer screening rates among the Haitian population could be improved by addressing the shortfalls identified in this study. These include monitoring practices according to the cancer screening guideline, the development and utilization of practice cancer screening reminders, and continuing medical education.

The Pap guidelines specify that every woman should have a Pap test starting within 3 years of onset of sexual activity, or at age 21, whichever is earlier [20, 21]. However, the guidelines were not adequately followed by the study subjects, especially considering the high incidence of invasive cervical cancer among Haitians [6]. These data impel interventions that specifically target community physician cervical cancer knowledge and referral behavior.

Colorectal cancer screening behavior also needs improvement. Screening for colorectal cancer in the United States, despite the availability of effective testing methods, remains underutilized [22]. However, 38% of providers recommend colonoscopy every 5 years to their patients (instead of every 10 years). According to the Centers for Disease Control [22], colorectal cancer screening is particularly low among immigrants, especially among those who have immigrated within the past 10 years. Culturally competent interventions should be developed and investigated to increase adherence to the colorectal cancer screening guidelines, and immigrant-serving physicians should be enlisted to increase screening [23].

Prostate cancer screening guidelines are still controversial with no agreement among providers for their implementation. Men at high risk include those of African descent and those whose relatives have had prostate cancer. Dunn et al. found that providers often do not discuss cancer screening tests with their patients, especially controversial ones, such as prostate cancer screening. Some patients may, thereby, be inappropriately denied the opportunity to choose whether to be screened for prostate cancer [23]. However, the providers in this study report high levels of prostate cancer screening. Providers should be encouraged to continue to discuss screening for prostate cancer with their Haitian patients due to this population's potentially high risk.

The cancer screening scores revealed that provider practices regarding cancer screening are not uniform across all cancers, and do not adhere to guidelines. The provider practices represent one of the rate limiting factors for cancer screening among this population. Despite the gaps revealed in this study, providers report a high level of satisfaction with their screening rates. They do not perceive the guidelines to be unclear, even though the results indicated that they are often not being completely followed.

Providers' knowledge and utilization of systems that can support cancer screening guidelines implementation varied widely. Similar findings were obtained in a study of the general population of primary care clinicians [24]. While this study demonstrates practices that are inconsistent with guidelines, it also demonstrates provider receptivity for intervention. Checklist and flowcharts were the most often used systems, and a large majority of the providers in the study thought that a computerized reminder would be practical to increase cancer screening rates. Studies of computerized reminders have shown that screening rates can be increased up to 40% by the use of these systems [25, 26]. Ninety six percent (96%) of the providers surveyed thought that educational workshops are highly useful to stay current with the latest guidelines. While attendance at providers' educational workshops was high in the 10 years prior to this study, this percentage was reported at only 50% in the year prior to the study. It is essential to increase the attendance of providers at educational workshops, and to forge linkages with academic centers, to enable providers to stay current with cancer screening guidelines and to provide them with information on systems-based practice improvements to enhance cancer screening. Incentives to facilitate such system implementation should be considered. Finally, the providers identified a need for translated cancer educational materials. A wide distribution of such materials should be a priority to help aid providers in moving non-English speaking patients along the Stages of Change continuum.

We identify limitations to our study. The sample of providers included was obtained randomly from a list of providers identified from Haitian physicians' organizations or community based organization networks' physician lists, omitting providers not associated with these institutions. It is likely that some of the results are underestimated due to the response rate; the lack of survey anonymity may have made it more likely for those adhering to screening guidelines to respond. Non-responders may not have responded due to lack of

knowledge or lack of adherence with screening guidelines. Additionally, self-report is likely to have led to an overestimation of correct practices.

This study reveals for the first time the practices and attitudes toward cancer screening among providers serving the Haitian community in New York City. Our results indicate that cancer screening rates can likely be improved by targeting the providers, increasing their awareness of the proposed guidelines, their current practices and the use of any or better systems to increase cancer screening rates.

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References

1. U.S. Census Bureau. [Accessed November, 2006] U.S. Census Bureau; Foreign-born population of the United States current population survey. Available at: www.census.gov
2. Stepick, A. *Pride against prejudice: Haitians in the United States*. Boston: Allyn and Bacon; 1998.
3. Consedine NS, Morgenstern AH, Kudadjie-Gyamfi E, Magai C, Neugut AI. Prostate cancer screening behavior in men from seven ethnic groups: the fear factor. *Cancer Epidemiol Biomarkers Prev*. 2006; 15(2):228–237. [PubMed: 16492909]
4. Brown WM, Consedine NS, Magai C. Time spent in the United States and breast cancer screening behaviors among ethnically diverse immigrant women: evidence for acculturation? *J Immigr Minor Health*. 2006; 8(4):347–358. [PubMed: 16645898]
5. Magai C, Consedine N, Conway F, Neugut A, Culver C. Diversity matters: unique populations of women and breast cancer screening. *Cancer*. 2004; 100(11):2300–2307. [PubMed: 15160332]
6. Green EH, et al. Pap smear rates among Haitian immigrant women in eastern Massachusetts. *Public Health Rep*. 2005; 120(2):133–139. [PubMed: 15842114]
7. Fruchter RG, et al. Cervix and breast cancer incidence in immigrant Caribbean women. *Am J Public Health*. 1990; 80(6):722–724. [PubMed: 2343960]
8. Gornick ME, et al. Associations of race, education, and patterns of preventive service use with stage of cancer at time of diagnosis. *Health Serv Res*. 2004; 39(5):1403–1427. [PubMed: 15333115]
9. Gany F, et al. Attitudes, knowledge, and health-seeking behaviors of five immigrant minority communities in the prevention and screening of cancer: a focus group approach. *Ethn Health*. 2006; 11(1):19–39. [PubMed: 16338753]
10. Kleier JA. Prostate cancer in black men of African-Caribbean descent. *J Cult Divers*. 2003; 10(2):56–61. [PubMed: 14508926]
11. O'Malley AS, et al. Are we getting the message out to all? Health information sources and ethnicity. *Am J Prev Med*. 1999; 17(3):198–202. [PubMed: 10987635]
12. Strecher, VJ.; Rosenstock, IM. The health belief model. In: Glanz, K.; Lewis, FM.; Rimer, BK., editors. *Health behavior, health education: theory, research, and practice*. 2nd ed.. San Francisco, CA: Jossey-Bass Inc Publishers; 1997. p. 41-59.
13. Finney Rutten LJ, Nelson DE, Meissner HI. Examination of population-wide trends in barriers to cancer screening from a diffusion of innovation perspective (1987–2000). *Prev Med*. 2003; 38(3):258–268. [PubMed: 14766107]
14. Nadel MR, Blackman DK, Shapiro JA, Seeff LC. Are people being screened for colorectal cancer as recommended? Results from the National Health Interview Survey. *Prev Med*. 2002; 35(3):199–206. [PubMed: 12202061]

15. Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *Am J Health Promot.* 1997; 12(1):38–48. [PubMed: 10170434]
16. Prochaska JO, DiClemente CC. Stages of change in the modification of problem behaviors. *Prog Behav Modif.* 1992; 28:183–218. [PubMed: 1620663]
17. Costanza ME, Luckmann R, Stoddard AM, Avrunin JS, White MJ, Stark JR, Clemow L, Rosal MC. Applying a stage model of behavior change to colon cancer screening. *Prev Med.* 2005; 41(3–4):707–719. [PubMed: 16171854]
18. Prochaska JO, Velicer WF, Redding C, Rossi JS, Goldstein M, DePue J, Greene GW, Rossi SR, Sun X, Fava JL, Laforge R, Rakowski W, Plummer BA. Stage-based expert systems to guide a population of primary care patients to quit smoking, eat healthier, prevent skin cancer, and receive regular mammograms. *Prev Med.* 2005; 41(2):406–416. [PubMed: 15896835]
19. Magnus M. Prostate cancer knowledge among multiethnic black men. *J Natl Med Assoc.* 2004; 96(5):650–656. [PubMed: 15160980]
20. American Cancer Society. *Cancer Facts & Figures 2006.* Atlanta, GA: American Cancer Society; 2006.
21. Smith RA, et al. American Cancer Society guidelines for the early detection of cancer, 2006. *CA Cancer J Clin.* 2006; 56:11–25. [PubMed: 16449183]
22. Center for Disease Control. *Colorectal cancer: the importance of prevention and early detection. Web 2004/2005 fact Sheet 2005.*
23. Dunn AS, et al. Physician-patient discussions of controversial cancer screening tests. *Am J Prev Med.* 2001; 20:130–134. [PubMed: 11165455]
24. Zapka JG, et al. Breast and cervical cancer screening: clinicians' views on health plan guidelines and implementation efforts. *J Natl Cancer Institute. Monographs.* 2005; (35):46–54.
25. Kupets R, Covens A. Strategies for the implementation of cervical and breast cancer screening of women by primary care physicians. *Gynecol Oncol.* 2001; 83(2):186–197. [PubMed: 11606071]
26. Schmittiel J, et al. The use of patient and physician reminders for preventive services: results from a National Study of Physician Organizations. *Prev Med.* 2004; 39(5):1000–1006. [PubMed: 15475035]

Table 1

Sample characteristics

		<i>N</i>
Country of birth	Haiti	45 (90%)
	United States	2(4%)
	Others	3(6%)
Primary language	Haitian-Creole	27(54%)
	English	21(42%)
	French	2(4%)
English proficiency	Very well	38(76%)
	Well	11(22%)
	Not well	1(2%)
Country where graduated from medical school	United States	9(18%)
	Other	41(82%)
Years practicing medicine in New York	5–10	7(14%)
	11–15	10(20%)
	16–20	12(24%)
	More than 20	21(42%)

Table 2

Comparison between standard cancer screening guidelines and reported practices of providers in the study

Cancer screening standard practice guidelines (American Cancer Society and National Cancer Institute)		Cancer screening reported practices of providers in the study
Breast cancer	Mammography starting at age 40 for “at average risk”	60% follow guidelines for patients 40–49 years old. 82% follow guidelines for patients 50 years or older
	Clinical breast exam (CBE) should be part of a periodic health exam, yearly for women 40 years and older	78% reported following guidelines on their patients 40 years or older
Cervical cancer	All women should begin cervical cancer screening about 3 years after they begin having vaginal intercourse, but no later than when they are 21 years old. Screening should be done every year with the regular Pap test	16% of providers reported following the guidelines in their practice
Colorectal cancer	1. Yearly fecal occult blood test (FOBT) and 2. Colonoscopy every 10 years or 3. Sigmoidoscopy every 5 years or 4. Double-contrast barium enema every 5 years	89% of providers reported recommending fecal occult blood test (FOBT) annually. 60% reported recommending sigmoidoscopy for screening 43% reported recommending colonoscopy every 10 years

Table 3

Providers' attitudes toward cancer screening

	Agree/strongly agree (%)	Disagree/strongly disagree (%)
Know how to effectively counsel patients for cancer screening	90	6
Demand to see increasing number of patients limits cancer screening	28	68
Not comfortable performing the test	18	70
Reimbursement is low	28	48
Aware of cultural issues regarding cancer screening	84	6
Do not have time to perform/refer for cancer screening	6	88
Lack of cancer screening written information in patients' language	56	36
I am satisfied with the rate of cancer screening in my patients	76	10

Table 4

Useful method to increase cancer screening

Method to increase cancer screening	Useful (%)	Not useful (%)
In-office physician cancer screening reminder	90	10
Provider workshops	96	4
Educational materials in the patients languages	98	2
Patient reminder	60	40
Professional interpreter	75	25
Cultural competency training	85	15

Table 5

Providers' perceptions of patient barriers to screening

Screening test	Perceived as barrier				National guidelines not clear (%)
	Cost/lack of insurance (%)	Pain/discomfort (%)	Patient think is unnecessary (%)	Embarrassment (%)	
Mammography	16	58	40	22	4
PAP test ^a	4	20	28	36	2
PSA ^b	10	2	6	-	2
DRE ^c	-	36	28	48	2
FOBT ^d	2	4	8	10	4
Colonoscopy	26	29	38	30	6

^a Papanicolaou test^b Prostate-specific antigen^c Digital rectal exam^d Fecal occult blood test