

# Breast and Cervical Cancer Screening Among South Asian Women in New York City

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The purpose of this paper is to document the breast and cervical cancer screening practices of a community sample of South Asian women living in the New York City area. A convenience sample of 98 women was engaged in face-to-face interviews regarding their socio-demographic characteristics and cancer screening utilization. Sixty-seven percent of women had ever had a Pap test; 54% had one in the last 3 years. Seventy percent of women over 40 had ever had a mammogram; 56% had one in the last 2 years. Sixty-six percent of women had knowledge of breast self-exam (BSE); 34% of women ever practiced BSE. Multiple logistic regression analysis indicated that insurance status was a significant predictor of ever having a Pap test or mammogram, receiving timely Pap tests, and ever practicing BSE. Education was a significant predictor of ever having a Pap test and having knowledge of BSE. Marital status was a predictor of receiving timely Pap tests, and having spent more time in the U.S. was a predictor of ever practicing BSE. The study concludes that increased educational efforts must be developed targeting immigrant South Asian women of low socioeconomic status with limited access to healthcare.

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**KEY WORDS:** South Asian; cancer screening; access to healthcare; underserved immigrants.

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## INTRODUCTION

In 2004, 226,510 women in the United States were diagnosed with either breast or cervical cancer. In 2004, an estimated 40,580 women died of breast cancer and 3000 from cervical cancer, a highly preventable disease (1). The burden of these cancers are particularly troubling in ethnic minority communities such as Asian American Pacific Islanders (AAPI) for whom cancer is the number one cause of death (2). Although rates of breast and cervical cancers among

AAPIs are lower overall than the U.S. White population, the aggregated nature of data collected on the AAPI population mask significant subgroup differences in incidence rates (3).

Research on breast and cervical cancer among AAPIs is particularly important given their large population growth during the last decade. The 2000 Census indicates that there are close to 12 million Asian Americans in the United States, up from 6.9 million in 1990, a 72% increase in population growth (4).<sup>6</sup> The rapid growth of Asian Americans during the 1990s was especially concentrated in urban areas such as New York City. As the fastest growing racial group in the city, the number of Asian Americans increased from 512,719 in 1990 to 872,222 in 2000, representing a growth rate of over 53%. The South Asian community in New York City,

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<sup>6</sup>The 2000 Census collected data on AAPIs separately. Reported numbers of AAPIs reflect the number of individuals who indicated their race as Asian alone or Asian in combination with another race.

comprised of individuals from India, Bangladesh, Pakistan, Sri Lanka, Nepal, Bhutan, and parts of the Caribbean, has experienced the largest growth of any Asian subpopulation, increasing by over 89% to 216,179 individuals in 2000. The New York City area is now home to the largest South Asian population in the United States (5).

Currently, there is no published data on breast or cervical cancer rates among South Asians living in New York City. However, studies from India, the largest and most populous country in the South Asian region, have indicated that breast and cervical cancers are the most frequently diagnosed malignancies in women (6). The majority of research reports regarding cancer incidence among immigrant South Asians have been conducted in England (7), where studies have noted higher rates of cancer after migration to the United Kingdom compared with rates in their native countries. This pattern is consistent with findings for South Asians living in the United States (8). Available disaggregated data from the state of California indicate that South Asians experience the third highest 5-year annual age-adjusted breast cancer incidence rate of any AAPI subgroup, at 72.9/100,000 (9).

National and regional studies of AAPI communities have reported low rates of breast and cervical cancer screening for the overall AAPI community and in particular AAPI subpopulations (3, 10–30). Specifically, studies of South Asian immigrants have indicated low rates of breast and cervical cancer screening. For example, surveys of South Asian women in Canada and England have revealed low rates of Papanicolaou (Pap) testing, mammography, breast self-exam (BSE), and clinical breast exams (31–36). Data from the National Health Interview Survey (NHIS) in the United States indicate that rates of never having a mammogram (68%) and never having a Pap test (26%) among Asian Indian women are higher than the overall AAPI rates (30 and 21%, respectively) (27). Findings from the 2001 California Health Interview Survey (CHIS) indicate that 70% of South Asian women age 40 and over reported receiving a mammogram within the last 2 years, compared to 76% of all other racial/ethnic groups. The same study found that 71% of South Asian women in California reported receiving a Pap test within the last 3 years, compared to 86% of all other racial/ethnic groups (37). While some studies in the U.S. have shown that Asian Indian women have rates of breast screenings that are higher than the general population (38), studies of particular

subgroups, such as a study of Asian Islamic women, have revealed lower rates of mammography and clinical breast exams (39). Furthermore, the only national study of Pap test screening rates of South Asian women in the United States revealed that despite the high socioeconomic status of the sample, 73% of this population had ever been tested compared to the national average of 83% (40).

Given the lower screening rates in these communities, it is important to determine barriers to screening in order to increase frequency of the use of such services. Studies conducted among other AAPI groups have reported a variety of socio-demographic, access to care, and cultural belief factors that may influence cancer screening among women. Factors related to healthcare, including insurance status, having a usual source of care, receiving a doctor's recommendation for screening, and going for regular checkups, have most consistently been found to predict cancer screening behavior (14, 15, 22, 23, 25, 27, 30, 41). Various socio-demographic characteristics, such as years lived in the U.S., low English language proficiency, marital status, low income levels, and low educational attainment have been associated with mammogram and Pap testing in studies of AAPI women (30). Finally, studies assessing the role of cultural beliefs, attitudes, and knowledge and their relationship to screening rates have found that correct knowledge of screenings is positively associated with higher rates of breast and cervical screening among AAPI populations (14, 15, 17, 23, 25, 42). Although there exists a paucity of studies on the barriers to cancer screening for South Asian immigrants, the few studies that have been conducted report similar findings. Most of these studies have identified the lack of knowledge regarding screenings and/or the cultural beliefs regarding the efficacy of screening as reasons for lower rates of use (31–33, 38, 39). Others have identified acculturation, education, marital status, and income as factors associated with low rates of Pap testing and receiving clinical breast exams (33–35, 40).

The purpose of this study is to assess the cervical and breast cancer screening practices of a community sample of South Asian women in New York City. The study seeks to determine the rates of Pap, mammography, and breast self-exam testing among this population. Second, we will describe demographic, acculturation, and healthcare factors that influence the screening rates. This study will contribute to the small but growing number of studies on U.S. South Asian immigrants' health. Because we focus on a

community-based sample of South Asians in an urban area, it will provide much needed information on the cancer screening behavior of this often overlooked population.

## METHODS

### Study Sample

The goal of our project was to conduct a survey in the local South Asian community to gather data on the health behaviors and practices of this understudied group. The target population for the survey was underserved South Asian individuals aged 18 and over. We purposefully targeted individuals attending health fairs, cultural events, religious institutions, and senior centers in the borough of Queens, which is home to the largest South Asian community in New York City. Discussions with community leaders revealed that South Asians who have low access to healthcare often go to these venues in order to receive care. The results from our study were to be used for future planned interventions to be developed in collaboration with community institutions that host the health fairs and cultural events. One hundred and seventy-four individuals completed the survey; of these, 98 were women.

### Survey Instrument

The questionnaire was developed in English to measure demographic characteristics, access to healthcare factors, acculturation characteristics, cancer screening knowledge and utilization, and beliefs and attitudes regarding cancer screenings. The survey instrument was translated and back-translated into Bengali, Hindi, Urdu, and Gujarati by professional translators. The survey, included questions from the Behavioral Risk Factor Surveillance Survey and the National Health Interview Survey, was pilot tested with 30 individuals of South Asian heritage and modified accordingly. The pilot was conducted with individuals attending community events ( $n = 17$ ) as well as by phone with randomly selected individuals in the New York City area who had a common South Asian surname ( $n = 13$ ).

### Data Collection Procedure

Survey participants were interviewed by trained, bilingual students in the respondents' language of

choice. Individuals were approached as they waited in line to receive services or acquire educational information. Verbal consent was received from the respondent before initiating the survey, and no personal identifiers were collected. Approximately 72% of the surveys were conducted in English, and the remainder completed in South Asian languages, including Hindi, Bengali, Gujarati, and Urdu.

### Data Analysis

Six screening behaviors were used as dependent variables, including ever receipt of a Pap test, receipt of a Pap test within the last 3 years, ever receipt of a mammogram, receipt of a mammogram within the last 2 years, knowledge of BSE and ever practice of BSE. BSE, although not part of official National Cancer Institute (NCI) guidelines, was included in order to assess the women's knowledge and practice of self-care. All of the women in our sample were asked about their use of the Pap test and their knowledge and practice of BSE. Only women age 40 years and older were asked about their use of mammography screening. Independent variables included demographic characteristics (age, marital status, education level, employment status, and family income); healthcare factors (insurance status, having a regular source of care, experiencing a barrier to care, undergoing routine checkups, and having a doctor that speaks a common language with the respondent); and acculturation factors (length of residence in the U.S. and English language fluency). The use of screening services was examined using bivariate analysis. Statistical tests of significance were assessed using Chi-square analysis. Multiple logistic regression analyses determined significant factors associated with the use of cancer screening services. Independent variables were further examined based upon significance ( $p < 0.10$ ) in the bivariate analysis. We selected  $p < 0.10$  rather than  $p < 0.05$  because a variable may have borderline significance ( $0.05 < p < 0.10$ ) in bivariate analysis but becomes significant ( $p < 0.05$ ) in multivariate analysis (43). Age was controlled for in all models. The role of subgroup ethnicity, such as Indian, Bangladeshi, or Pakistani heritage, was not assessed in any of the bivariate or logistic models due to the relatively small number of non-Indian South Asians. Employment status and income level were not included in any of the logistic regression models due to the high percentage

of missing data. The “best-fit” models included age and independent factors that were significant at the  $p < 0.05$  level. Data were analyzed using the SAS 9.0 software package.

## RESULTS

The socio-demographic characteristics (including healthcare and acculturation factors) of the sample are summarized in Table I. The average age of women was 46 years (range 18–80; SD = 15.3) and the sample was almost entirely an immigrant population (98%). In terms of subgroup ethnicity, approximately 74% self-identified as Indian, 13% identified as Bangladeshi, and 5% identified as Pakistani. Approximately three-quarters of our sample were married, and the levels of educational attainment and employment were high. Among those women who provided information on income, about 40% reported an annual family income of less than \$25,000. One-third of the women were unable or refused to disclose their family income level. In terms of level of acculturation, the women in our sample had resided in the U.S. for an average of 11 years (range 2 months–33 years; SD = 9), and 63% of the women reported having high English language proficiency. (High English language proficiency was assigned to those women who responded that they spoke English “well” or “fluently like a native.”) Fifty percent of our sample reported they had no health insurance and experienced other barriers in accessing basic healthcare.

Tables II and III summarize the rates of screening of Pap testing and mammography. Two-thirds (67%) of the women had ever had a Pap test and 54% received one in the last 3 years. Approximately two-thirds of our sample were age 40 years and older. Among this sample ( $n = 64$ ), 70% of women had ever received a mammogram but only 56% had a mammogram within the last 2 years. The rates of knowledge of BSE mirrored the rates of Pap and mammography testing; 66% of the women in our sample indicated that they had been taught how to conduct BSE, although only 34% of women reported ever performing a self-exam. Bivariate correlations were used to assess the relation between Pap testing and demographic, healthcare, and acculturation factors (Table II). Demographic factors found to be significantly associated with ever receiving a Pap test included having had some high school or college education, being employed, and having an annual

**Table I.** Socio-demographic and Access to Healthcare Characteristics of Sample ( $N = 98$ )

Characteristics	<i>N</i>	%
Demographic factors		
Age (years)		
18–39	34	34.7
40–49	21	21.4
50–64	25	25.5
≥65	18	18.4
Ethnicity		
Indian	72	73.5
Bangladeshi	13	13.3
Pakistani	5	5.1
Other	8	8.2
Marital status		
Not married	26	26.5
Married	72	73.5
Education		
≤High school	30	31.6
>High school	65	68.4
Missing	3	
Employment		
Not employed	32	40.5
Employed	47	59.5
Missing	19	
Income		
≤\$25K	32	39.5
>\$25K	34	42.0
Don't know	15	18.5
Missing	17	
Access to healthcare factors		
Insurance status		
Uninsured	48	50.0
Insured	48	50.0
Missing	2	
Usual source of care		
No	32	33.3
Yes	64	66.7
Missing	2	
Have physician that speaks common language		
No	25	26.9
Yes	68	71.2
Missing	5	
Routine checkup		
>2 years or never	27	28.7
≤2 years	67	71.2
Missing	4	
Experienced barrier to care in last year		
Yes	25	26.9
No	68	73.1
Missing	5	
Acculturation factors		
Years lived in the U.S.		
<5	20	20.4
5–10	27	27.6
10–20	26	26.5
≥20	25	25.5
English language proficiency		
Low (so-so/poorly/not at all)	36	37.1
High (fluently like a native/well)	61	62.9
Missing	1	

**Table II.** Rates and Bivariate Analysis of Pap Test Receipt Among South Asian American Women (*N* = 98, Women ≥18 years old)

	Distribution in sample ( <i>n</i> )	Ever received Pap smear (%)	<i>p</i> -Value	Distribution in sample ( <i>n</i> )	Received Pap smear ≤3 years (%)	<i>p</i> -Value
<b>Received screening</b>						
Yes	62	66.7		49	54.4	
No	31	33.3		41	45.6	
Missing	5			8		
<b>Demographic factors</b>						
<b>Age (years)</b>						
<50	55	38.7		55	34.4	0.1
≥50	43	28.0		43	20.0	
<b>Marital status</b>						
Not married	26	16.1		26	10.0	0.05
Married	72	50.5		72	44.4	
<b>Education</b>						
≤High school	30	15.4	0.007	30	11.4	0.02
>High school	65	50.6		65	42.1	
Missing	3			3		
<b>Employment</b>						
Not employed	32	32.5	0.02	32	28.0	0.07
Employed	47	33.8		47	25.3	
Missing	19			19		
<b>Income</b>						
≤\$25K	32	25.0	0.04	32	19.5	0.009
>\$25K	34	33.6		34	31.2	
Don't know	15	7.5		15	3.9	
Missing	17			17		
<b>Access to healthcare factors</b>						
<b>Insurance status</b>						
Uninsured	48	23.9	0.0002	48	19.1	0.002
Insured	48	43.5		48	36.0	
Missing	2			2		
<b>Usual source of care</b>						
No	32	18.5	0.07	32	13.5	0.04
Yes	64	48.9		64	41.6	
Missing	2			2		
<b>Have physician that speaks common language</b>						
No	25	14.6	0.07	25	12.8	
Yes	68	51.7		68	43.0	
Missing	5			5		
<b>Routine checkup</b>						
>2 years	27	15.4	0.09	27	12.5	
≤2 years	67	51.7		67	42.1	
Missing	4			4		
<b>Experienced barrier to care in last year</b>						
Yes	25	16.9		25	14.0	
No	68	52.8		68	43.0	
Missing	5			5		
<b>Acculturation factors</b>						
<b>Years lived in the U.S.</b>						
<10	51	28.0	0.02	51	22.2	0.06
≥10	47	38.7		47	32.2	
<b>English language proficiency</b>						
Low	36	18.5	0.006	36	15.7	0.07
High	61	48.9		61	39.3	
Missing	1			1		

**Table III.** Rates and Bivariate Analysis of Mammogram Receipt Among South Asian American Women ( $N = 64$ , Women  $\geq 40$  years old)

	Distribution in sample ( $n$ )	Ever received mammogram ( $n$ )	$p$ -Value	Distribution in sample ( $n$ )	Received mammogram $\leq 2$ years (%)	$p$ -Value
<b>Received screening</b>						
Yes	44	69.8		24	55.8	
No	19	30.2		19	44.2	
Missing	1			21		
<b>Demographic factors</b>						
Age (years)						
<50	21	22.2		21	9.3	
$\geq 50$	43	47.6		43	34.9	
Marital status						
Not married	17	20.6		17	11.6	
Married	47	49.2		47	35.6	
Education						
<High school	24	27.4		24	18.6	
>High school	39	41.9		39	25.6	
Missing	1			1		
Employment						
Not employed	20	43.4		20	8.1	
Employed	34	26.4		34	35.1	
Missing	10			10		
Income						
<\$25K	23	27.8	0.1	23	21.6	
>\$25K	21	35.2		21	13.5	
Don't know	10	13		10	16.2	
Missing	10			10		
<b>Access to healthcare factors</b>						
Insurance status						
Uninsured	35	30.2	0.009	35	18.6	0.06
Insured	29	39.7		29	25.6	
Usual source of care						
No	24	25.4		24	14.0	
Yes	40	44.4		40	30.2	
Have physician that speaks common language						
No	15	16.7		15	7.1	
Yes	46	53.3		46	38.1	
Missing	3			3		
Routine checkup						
>2 years	15	16.4		15	11.9	
<2 years	47	54.1		47	33.3	
Missing	2			2		
Experienced barrier to care in last year						
Yes	15	15.3		15	9.8	
No	45	54.2		45	34.2	
Missing	4			4		
<b>Acculturation factors</b>						
Years lived in the U.S.						
<10	29	27.0	0.07	29	16.3	0.09
>10	35	42.9		35	27.9	
English language proficiency						
Low	26	23.8		26	16.3	
High	38	46.0		38	27.9	

family income of over \$25,000 ( $p < 0.01$ ,  $p < 0.02$ , and  $p < 0.04$ , respectively). Ever having a Pap test was significantly correlated with having health insurance ( $p < 0.01$ ). Other healthcare variables that were marginally associated with ever receiving a Pap test include having a physician that speaks a common language with the respondent ( $p < 0.07$ ), having a usual source of care ( $p < 0.07$ ), and receiving a routine checkup within the last 2 years ( $p < 0.09$ ). Women who had high English language proficiency were more likely to ever have received a Pap test ( $p < 0.01$ ), as were women who had been in the U.S. for 10 years or more ( $p < 0.02$ ). In assessing factors that influenced receipt of Pap tests in a timely manner ( $\leq 3$  years, according to NCI guidelines), we found that all demographic factors produced a significant association. Healthcare access factors associated with receiving a Pap test in the last 3 years included being insured ( $p < 0.01$ ) and having a usual source of care ( $p < 0.04$ ). Both of the acculturation factors that were assessed produced significant associations with timely receipt of the Pap test.

Bivariate results of predictors of mammography use revealed some similarities as well as differences to the use of Pap tests (Table III). Income shared a borderline correspondence to ever having had a mammography ( $p < 0.1$ ). In terms of healthcare access, insurance proved to be strongly associated with ever having a mammogram ( $p < 0.01$ ) and was marginally associated with receiving a mammogram in a timely manner ( $\leq 2$  years for women aged 40 and over according to NCI guidelines) ( $p < 0.06$ ). Finally, similar to the Pap test findings, women who lived in the U.S. for 10 or more years had a marginally increased likelihood of ever receiving a mammogram ( $p < 0.07$ ) and receiving a mammogram within the last 2 years ( $p < 0.09$ ).

Rates of breast self-exams varied considerably according to a range of factors. Income levels were marginally associated with knowledge and practice of BSE ( $p < 0.07$  and  $p < 0.1$ , respectively). Similarly, rates of knowledge and practice of BSE were lower for women who had less than high school education ( $p < 0.01$  and  $p < 0.02$ , respectively). Examining healthcare access, insurance status was again associated with knowledge and practice of BSE ( $p < 0.03$  and  $p < 0.01$ , respectively). In terms of acculturation factors, both years lived in the U.S. and English language proficiency were associated with having knowledge of BSE ( $p < 0.01$  and  $p < 0.1$ , respectively). Women who resided in the U.S. for 10 years or more were also more likely to practice BSE ( $p < 0.05$ ).

Results from the final multiple logistic regression models are displayed in Table IV. In terms of demographic predictors, years of education were associated with ever having had a Pap test (OR = 3.9, 1.2–12.3) and with having been shown how to conduct BSE (OR = 5.4, 1.8–16.8). Marital status was significantly associated with the timely receipt of Pap screening (OR = 3.2, 1.1–9.5). In looking at healthcare factors, having insurance emerged as consistently associated with all screening practices. Women who were insured were 6.4 times more likely to have had a Pap test and 3.7 times more likely to receive the test within the last 3 years than women who were uninsured. Similarly, women who were insured were 4.9 times more likely to have ever received a mammogram and 3.8 times more likely to ever practice BSE. Finally, in terms of acculturation, women who had lived 10 years or more in the United States were 4.8 times more likely to have knowledge of BSE. There were no significant predictors associated with recommended frequency of mammography.

**Table IV.** Relationship Between Selected Variables and Cancer Screenings by South Asian American Women

Variables	Ever had Pap test <sup>a</sup>		Pap test $\leq 3$ year <sup>b</sup>		Ever had mammogram <sup>c</sup>		Have been shown BSE <sup>d</sup>		Ever practice BSE <sup>c</sup>	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Marital status			3.2	1.1–9.5						
Education	3.9	1.2–12.3					5.4	1.8–16.8		
Insurance status	6.4	2.3–18.3	3.7	1.3–10.5	4.9	1.4–17.2			3.8	1.4–10.4
Years lived in the U.S.							4.8	1.7–13.5		

<sup>a</sup>Adjusted for age, education, and insurance status.

<sup>b</sup>Adjusted for age, education, marital status, usual source of healthcare, and insurance status.

<sup>c</sup>Adjusted for age.

<sup>d</sup>Adjusted for age, education, and years lived in the U.S.

## DISCUSSION

The findings from our study provide important information on the screening practices of a sample of South Asian women in a densely urban, immigrant city. Our findings are based on a convenience sample in which the reported screening rates are lower than national reports from the general population and are lower than other AAPI populations. Data from the 2000 NHIS indicate that 83% of the white population and 71% of the AAPI population had received a Pap test within the last 3 years (44). Our study found that 54% of South Asian women had received a timely Pap test. Similarly, national White and AAPI rates of mammography are higher than the rates found among women in our sample. While 71% of White women and 59% of AAPI women have received a mammogram in the last 2 years, 56% of South Asian women in our sample had reported the recommended frequency (44). Our findings also indicate lower rates of timely Pap testing (54%) compared to rates reported in the CHIS (71%) and Chaudhry *et al.*'s (73%) studies cited earlier (37, 40).

In addition, our study reports lower rates of screening among South Asian women compared to other minority groups in New York City. For example, the 2002 New York City Community Health Survey conducted by the New York City Department of Health and Mental Hygiene reported that rates of Pap testing within the last 3 years range from 68% for Asian American women to 85% for Black women, both higher than the rate of timely Pap screening of South Asian women in our sample. Similarly, the rates of receiving a mammogram within the last 2 years ranged from 74% for Asian American women to 80% for Hispanic women in New York City (45). Again, these rates are higher than the rates of timely mammography experienced by South Asian women in our sample (56%).

Our bivariate analyses revealed the role of a variety of demographic, access to care, and acculturation variables in relation to cancer screening practices. Most notably, women who resided a longer time in the U.S. and had health insurance were more likely to utilize these tests. Other variables such as education were associated with Pap test screenings and BSEs, and being married increased utilization of Pap testing. It is important to note the strong association that insurance status had with all cancer screenings after adjusting for other factors. The lack of insurance is a consistent barrier for South Asian women in accessing preventive health services. The

additional association between Pap testing and demographic factors such as education and marital status suggest that outreach efforts are not reaching particular segments of the South Asian community. Although the New York State funded Centers for Disease Control & Prevention Program, Queens Healthy Living Partnership provides free mammograms and Pap screenings for low-income women in Queens, our findings indicate that the needs of some South Asian women are not being met. Further, our results suggest that South Asian women who have low educational status and have been in the U.S. for less than 10 years are also not being taught how to conduct breast self-exams. Although breast self-exams cannot replace recommended mammography and clinical breast exam, this is another important area for intervention.

The differences between our findings and other published studies of AAPI and South Asian communities demonstrates that this study captured a unique demographic. Due to our targeted sampling of underserved immigrants utilizing a face-to-face interview methodology, we were able to document the low screening rates among a subpopulation of South Asians that are often masked in larger, randomized, telephone-based surveys. The majority of the studies conducted have collected data from South Asians of relatively high socioeconomic status (34, 40). This is due both to methodological reasons (i.e., studies are often conducted in English) as well as misconceptions regarding the demographic make-up of South Asian communities. South Asian populations are often subject to the model minority myth due to the fact that historically, large segments of the immigrant community have been well-educated professionals. The post 1980s wave of immigration, however, was composed of a larger number of lower income individuals in non-professional positions (46). Furthermore, statistics that document the high socioeconomic status of South Asians are often misleading and may not reveal the true nature of these families. For example, the 2000 Census indicates the median household income of Asian Indians in New York City is \$45,155, exceeding the overall city median of \$38,293. However, the average Asian Indian per capita income was \$18,473, less than the \$22,402 citywide per capita income (47). Second, while many studies of screening utilization have examined the role of demographic predictors, knowledge and cultural beliefs, and acculturation, the majority of studies on South Asian women's cancer screening practices have neglected to investigate



the role of access to healthcare. This is most likely due to the fact that the majority of studies conducted in South Asian communities have focused on higher income segments of the population who tend to have health insurance and regular access to care.

### Study Strengths and Limitations

This study has several limitations. First, as the goal of the study was to understand the cancer screening practices of underserved South Asians in New York City, a convenience community sample was used. Therefore, the findings are not generalizable to South Asian women residing in other geographic areas or the larger South Asian community in New York City. Second, the outcomes were measured by self-report and subject to recall and desirability bias. However, these biases may overestimate the frequency of utilization of services making the reported screening behavior disparities more pronounced. Third, the small study size did not allow for more complex statistical analysis and may account for some of the insignificant findings from the logistical regression analyses. Finally, although our sample did include individuals from various countries in South Asia, the sample sizes of immigrants from individual countries was not large enough to assess the potential effect of country of origin/subgroup ethnicity on receipt of services.

A major strength of this study is its contribution to the literature on cancer screening among South Asian women in New York City. First, though South Asians are the third largest AAPI ethnic group nationally and the second largest and fastest growing AAPI group in New York City, they have remained severely understudied. As immigration from Asia in general and South Asia in particular continues to grow in the coming decades, it will be increasingly important to focus our research and health promotion efforts in these communities. Second, to our knowledge, this study is the first and only published study on South Asian cancer screening rates in New York City, where the largest South Asian community in the U.S. resides. Our findings emphasize the importance of community-level, targeted studies of underserved communities. Data from previous studies using large-scale data collection techniques may mask the disparities faced by immigrants living in densely urban areas such as New York City. Like other AAPI ethnic groups, South Asians often fall prey to the model minority myth, whereby aggregate data, which indi-

cates positive health status and practices, may belie the diversity of the group. South Asians living in New York City tend to be newly arrived to the U.S., possess lower levels of education and income, and are often linguistically isolated. Such factors have a direct impact on access to healthcare and preventive measures such as breast and cervical cancer screening. Thus, our study provides a unique contribution to the literature on South Asians and cancer screening practices.

### CONCLUSIONS

The rates of screening among South Asian women in our sample fall well below the Healthy People 2010 objectives for Pap testing and mammography (48). In order to ameliorate these rates, our study points to several potential areas of intervention among South Asians in New York City. First, the importance of healthcare access, especially the role of insurance, was highlighted in our findings. Such findings support the benefits of government sponsored-low-income healthcare options such as Medicaid, Child Health Plus, and Family Health Plus (New York State-sponsored health insurance options). More importantly, however, our findings indicate that efforts to increase access to healthcare may be particularly important in emerging immigrant populations.

Short of such longer term policy changes, however, our findings also indicate that outreach to increase cancer screening is needed for South Asian women who are of lower socioeconomic status and recently immigrated, especially in regards to Pap testing and breast self-examinations. It would be important for such efforts to reach out to South Asian women in a culturally appropriate manner by respecting and addressing the religious, ethnic, and language diversity that exists within this unique community. As many of the same demographic and acculturation factors were found to be associated with the various cancer screenings in our study, outreach programs should consider “bundling” their efforts such that women who are targeted for Pap testing are also taught how to conduct breast self-examination and provided with mammography services if appropriate. The implementation of such targeted efforts is especially relevant for two reasons. First, Pap testing has implications not only for cervical cancer, but also for a range of sexually transmitted diseases. Second, combined screening and education

on breast self-exam is a simple, inexpensive method for women to monitor their own well-being. The implementation of such preventive efforts will be an important step in addressing the health needs of South Asian immigrants in New York City.

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## REFERENCES

- American Cancer Society: Cancer Facts and Figures 2004. Atlanta: American Cancer Society; 2004
- Chen MS Jr, Koh HK: The need for cancer prevention and control among Asian Americans and Pacific islanders. *Asian Am Pac Isl J Health* 1997; 5(1):3-6
- Miller BA, Kolonel LN, Bernstein L, *et al.*: Racial/ethnic patterns of cancer in the United States 1988-1992. Bethesda, MD: National Cancer Institute; 1996
- Barnes J, Bennett CE: The Asian population: 2000, in Census 2000 Brief. Washington, DC: US Census Bureau; 2002: 1-11
- 2000 US Census: Current Population Survey. US Bureau of the Census; 2000.
- Parkin DM, Muir CS: Cancer incidence in five continents. Comparability and quality of data. *IARC Sci Publ* 1992; 120:45-173
- Winter H, Cheng KK, Cummins C, *et al.*: Cancer incidence in the South Asian population of England (1990-1992). *Br J Cancer* 1999; 79(3-4):645-654
- Blesch KS, Davis F, Kamath SK: A comparison of breast and colon cancer incidence rates among native Asian Indians, US immigrant Asian Indians, and Whites. *J Am Diet Assoc* 1999; 99(10):1275-1277
- Kwon S: Cancer statistics for California's Asian Americans. Proceedings of the 5th AANCART Asian American Cancer Control Academy. CA: Sacramento; 2004
- Sarna L, Tae YS, Kim YH, *et al.*: Cancer screening among Korean Americans. *Cancer Pract* 2001; 9(3):134-140
- McDonald CJ: Cancer statistics, 1999: Challenges in minority populations. *CA Cancer J Clin* 1999; 49(1):6-7
- Tu SP, Yasui Y, Kuniyuki A, *et al.*: Breast cancer screening among Cambodian American women. *Cancer Detect Prev* 2000; 24(6):549-563
- Tu SP, Yasui Y, Kuniyuki AA, *et al.*: Mammography screening among Chinese-American women. *Cancer* 2003; 97(5):1293-1302
- Yu ES, Kim KK, Chen EH, *et al.*: Breast and cervical cancer screening among Chinese American women. *Cancer Pract* 2001; 9(2):81-91
- Yu MY, Hong OS, Seetoo AD: Uncovering factors contributing to under-utilization of breast cancer screening by Chinese and Korean women living in the United States. *Ethn Dis* 2003; 13(2):213-219
- Bird JA, McPhee SJ, Ha NT, *et al.*: Opening pathways to cancer screening for Vietnamese-American women: Lay health workers hold a key. *Prev Med* 1998; 27(6):821-829
- Tanjasiri SP, Sablan-Santos L: Breast cancer screening among Chamorro women in southern California. *J Womens Health Gen Based Med* 2001; 10(5):479-485
- Tanjasiri SP, Kagawa-Singer M, Foo MA, *et al.*: Breast cancer screening among Hmong women in California. *J Cancer Educ* 2001; 16(1):50-54
- Taylor VM, Jackson JC, Schwartz SM, *et al.*: Cervical cancer among Asian American women: A neglected public health problem? *Asian Am Pac Isl J Health* 1996; 4(4):327-342
- Kim K, Yu ES, Chen EH, *et al.*: Breast cancer screening knowledge and practices among Korean American women. *Asian Am Pac Isl J Health* 1998; 6(2):263-275
- Ko CM, Sadler GR, Ryuji L, *et al.*: Filipina American women's breast cancer knowledge, attitudes, and screening behaviors. *BMC Public Health* 2003; 3(1):27
- Maxwell AE, Bastani R, Warda US: Demographic predictors of cancer screening among Filipino and Korean immigrants in the United States. *Am J Prev Med* 2000; 18(1):62-68
- Maxwell AE, Bastani R, Warda US: Mammography utilization and related attitudes among Korean-American women. *Women Health* 1998; 27(3):89-107
- May DS, Lee NC, Richardson LC, *et al.*: Mammography and breast cancer detection by race and Hispanic ethnicity: Results from a national program (United States). *Cancer Causes Control* 2000; 11(8):697-705
- Juon HS, Seung-Lee C, Klassen AC: Predictors of regular Pap smears among Korean-American women. *Prev Med* 2003; 37(6 Pt 1):585-592
- Juon HS, Choi Y, Kim MT: Cancer screening behaviors among Korean-American women. *Cancer Detect Prev* 2000; 24(6):589-601
- Kagawa-Singer M, Pourat N: Asian American and Pacific Islander breast and cervical carcinoma screening rates and healthy people 2000 objectives. *Cancer* 2000; 89(3):696-705
- Han Y, Williams RD, Harrison RA: Breast cancer screening knowledge, attitudes, and practices among Korean American women. *Oncol Nurs Forum* 2000; 27(10): 1585-1591
- Glanz K, Croyle RT, Chollette VY, *et al.*: Cancer-related health disparities in women. *Am J Public Health* 2003; 93(2):292-298
- Coughlin SS, Uhler RJ: Breast and cervical cancer screening practices among Asian and Pacific Islander women in the United States, 1994-1997. *Cancer Epidemiol Biomarkers Prev* 2000; 9(6):597-603

31. Bottorff JL, Balneaves LG, Sent L, *et al.*: Cervical cancer screening in ethnocultural groups: Case studies in women-centered care. *Women Health* 2001; 33(3-4):29-46
32. Bottorff JL, Johnson JL, Bhagat R, *et al.*: Beliefs related to breast health practices: The perceptions of South Asian women living in Canada. *Soc Sci Med* 1998; 47(12):2075-2085
33. Choudhry UK, Srivastava R, Fitch MI: Breast cancer detection practices of South Asian women: Knowledge, attitudes, and beliefs. *Oncol Nurs Forum* 1998; 25(10):1693-1701
34. Gupta A, Kumar A, Stewart DE: Cervical cancer screening among South Asian women in Canada: The role of education and acculturation. *Health Care Women Int* 2002; 23(2):123-134
35. Ahmad F, Stewart DE: Predictors of clinical breast examination among South Asian immigrant women. *J Immigr Health* 2004; 6(3):119-126
36. Sutton GC, Storer A, Rowe K: Cancer screening coverage of South Asian women in Wakefield. *J Med Screen* 2001; 8(4):183-186
37. Ponce NA, Gatchell M, Brown ER: Cancer screening rates among Asian ethnic groups. *Fact Sheet UCLA Cent Health Policy Res* 2003; (FS2003-10):1-2
38. Sadler GR, Dhanjal SK, Shah NB, *et al.*: Asian Indian women: Knowledge, attitudes and behaviors toward breast cancer early detection. *Public Health Nurs* 2001; 18(5):357-363
39. Rashidi A, Rajaram SS: Middle Eastern Asian Islamic women and breast self-examination. Needs assessment. *Cancer Nurs* 2000; 23(1):64-70
40. Chaudhry S, Fink A, Gelberg L, *et al.*: Utilization of Papanicolaou smears by South Asian women living in the United States. *J Gen Intern Med* 2003; 18(5):377-384
41. Taylor VM, Schwartz SM, Jackson JC, *et al.*: Cervical cancer screening among Cambodian-American women. *Cancer Epidemiol Biomarkers Prev* 1999; 8(6):541-546
42. Taylor VM, Jackson JC, Schwartz SM, *et al.*: Cervical cancer control in a Cambodian American population. *Asian Am Pac Isl J Health* 1998; 6(2):368-377
43. Taylor VM, Yasui Y, Burke N, *et al.*: Pap testing adherence among Vietnamese American women. *Cancer Epidemiol Biomarkers Prev* 2004; 13(4):613-619
44. Swan J, Breen N, Coates RJ, *et al.*: Progress in cancer screening practices in the United States: Results from the 2000 National Health Interview Survey. *Cancer* 2003; 97(6):1528-1540
45. Thorpe LE, Mostashari F, Feldman G, *et al.*: Cancer screening in New York City: We can do much better. *NYC Vital Signs* 2003; 2(2):1-4
46. Prashad V: *The Karma of Brown Folk*. Minneapolis: University of Minnesota; 2000
47. 2000 US Census: Data derived from an analysis by the Asian American Federation Census Information Center. 2003, Asian American Federation of NY: New York City
48. *Healthy People 2010: Understanding and Improving Health*. Washington, DC: US Department of Health and Human Services; 2000