

Original Research

Breast cancer characteristics of Vietnamese women in the Greater San Francisco Bay Area

ABSTRACT ● **Objectives** To examine breast cancer characteristics of women of Vietnamese ancestry living in the San Francisco Bay Area in comparison with those of other racial or ethnic groups in the same area. ● **Design** Data were obtained from the population-based Greater Bay Area Cancer Registry, part of the Surveillance, Epidemiology, and End Results program. We included breast cancer cases diagnosed from 1988 to 1999 and compared the age at diagnosis, stage and histologic grade at diagnosis, estrogen- and progesterone-receptor status, and surgery types across racial or ethnic groups. We also modeled the effect of patient and clinical characteristics and hospital and physician on the racial or ethnic variations in surgery type. ● **Results** Vietnamese women were younger at diagnosis than other racial or ethnic subgroups (mean age, 51.0 years), with 49.6% of the diagnoses occurring in patients younger than 50. They were also significantly more likely to have received mastectomy for their in situ and localized tumors (61.1% having mastectomy) than women of other racial or ethnic groups. The increased likelihood of having mastectomy among Vietnamese women was not affected greatly by age, year of diagnosis, tumor stage, histologic grade, or physician, but was partly attributable to the hospital of diagnosis. ● **Conclusions** The effects of a lower mean age at diagnosis and the reasons for an unexpectedly higher percentage of mastectomies in this Asian subgroup should be further explored.

In the United States, there are documented racial or ethnic differences in breast cancer incidence, mortality, and survival.¹ Despite that its incidence and mortality rates are lower than in other racial or ethnic groups, breast cancer is the most common malignant disease and the second leading cause of cancer mortality among Asian American women as a group.¹ Although reports have been published on the epidemiologic characteristics of breast cancer in Asian subgroups, including Chinese, Japanese, and Filipinos,²⁻⁵ reports on the descriptive epidemiology of breast cancer in Vietnamese women are limited, despite that Vietnamese are the most rapidly growing Asian and Pacific Islander subgroup.^{6,7} General cancer patterns have been reported for Vietnamese immigrants in Los Angeles County⁸ and in other parts of the world,⁹⁻¹¹ but none of these publications are specific to breast cancer.

The metropolitan San Francisco Bay Area in California has the second largest Vietnamese population concentration outside of Vietnam.⁶ In this article, we describe breast cancer patient and tumor characteristics among Vietnamese women living in this area.

PATIENTS AND METHODS

Cancer incidence data were obtained from the population-based Greater Bay Area Cancer Registry, part of the national Surveillance, Epidemiology, and End Results (SEER) program. The Greater Bay Area Cancer Registry comprises the San Francisco-Oakland and San Jose-Monterey registries and covers the counties of San Francisco, Alameda, Contra Costa, Marin, San Mateo, Santa Clara, Monterey, San Benito, and Santa Cruz.

Summary points

- The Vietnamese population is one of the most rapidly growing groups in the United States, particularly in the Greater San Francisco Bay Area, a region that has one of the largest concentrations of Vietnamese outside of Vietnam
- Vietnamese women diagnosed with breast cancer tend to be younger than women in other racial or ethnic groups, with half of the diagnoses occurring in women younger than 50
- Vietnamese women were significantly more likely to have received mastectomy for their in situ and localized tumors than women of other racial or ethnic groups; this trend was partly attributable to the hospital of diagnosis

Subjects selected for this analysis were Vietnamese, non-Hispanic white, Hispanic white, black, Chinese, Japanese, and Filipino women living in the registry's catchment area when diagnosed with a malignant breast tumor during the period January 1, 1988, through December 31, 1999. Race and Hispanic ethnicity in the cancer registry database are obtained from medical records or death certificates.

Tumor stage at diagnosis was defined as in situ, local, regional, distant, or unknown stage and was classified as follows: *in situ tumors* have not penetrated the basement membrane; *localized tumors* are confined within the breast tissue; *regional tumors* have penetrated through the tissue or involve regional lymph nodes; *distant tumors* have metastasized to distant organs, bones, or lymph nodes; and

Scarlett S Lin
Northern California
Cancer Center
32960 Alvarado-Niles
Rd, Ste 600
Union City, CA 94587
and
Division of
Epidemiology
Department of Health
Research and Policy
Stanford University
School of Medicine
Stanford, CA
John C Phan
Albert Y Lin
Department of Medicine
Santa Clara Valley
Medical Center
San Jose, CA
and
Stanford University
School of Medicine
Stanford, CA

Correspondence to:
Ms Lin
slin@nccc.org

Competing interests:
None declared

West J Med
2002;176:87-91

unstaged are nondistant tumors with insufficient data for classifying as organ-confined or not. Information on the age of the patient, tumor characteristics at diagnosis, and surgical treatment was collected by abstractors directly from patients' pathology and medical records and transmitted to the registry. The data recorded in the cancer registry include information collected for a given tumor 4 months after diagnosis.

Average annual age-adjusted incidence rates were computed using the direct method of standardization for cases diagnosed during the period 1988 to 1992.¹² We used 1990 US census denominator data specific for each of the racial or ethnic groups. We restricted the dates of diagnosis to these 5 years because whereas population estimates for specific Asian and Pacific Islander subgroups are now available from the US census for the year 2000, cancer data are available only for diagnoses occurring through 1999. All incidence rates are reported per 100,000 population and are adjusted to the 1970 US standard population.

Unconditional logistic regression was used to compute odds ratios (OR) and 95% confidence intervals associated with having a mastectomy compared with having no surgery or lumpectomy, controlling for other demographic and clinical characteristics. All analyses were performed using statistical software (Statistical Analysis Software, version 6.12; SAS Institute, Inc, Cary, NC).

RESULTS

Among Vietnamese women, the average annual age-adjusted incidence during the period 1988 to 1992 was 34.8 per 100,000 for in situ and invasive breast cancer combined, compared with higher rates among women in the other racial or ethnic groups (from 81.6 to 146.4 per 100,000 for Asians [Chinese, Japanese, Filipinos] and non-Hispanic whites, respectively) (table 1). The number of Vietnamese breast cancer cases was too small for a meaningful age-specific analysis of rates.

For cases diagnosed between 1988 and 1999, Vietnamese women were younger than other racial or ethnic groups at the time of diagnosis (table 2). Vietnamese

women were more likely than non-Hispanic whites to be diagnosed with poorly or undifferentiated tumors and to have negative estrogen- and progesterone-receptor status. Vietnamese women were also more likely to receive mastectomy for their tumors, regardless of the stage, than other racial or ethnic groups.

Table 3 shows the relative odds associated with having mastectomy compared with non-Hispanic whites as a reference group. Vietnamese were almost 80% more likely than non-Hispanic whites to have a mastectomy; this OR increased to 2.0 after adjusting for age and year of diagnosis. Adjustment for stage and histologic grade at diagnosis also did not affect the OR for Vietnamese, although adjusting for attending physician and hospital of diagnosis decreased the OR about 40%. Most of the decrease in the magnitude of the OR was attributable to the hospital of diagnosis. Similar results were seen when the analysis was restricted to in situ and local stage disease (data not shown).

DISCUSSION

In our examination of breast cancer patient and tumor characteristics among US Vietnamese women compared with other racial or ethnic groups, we found a notably younger age distribution of Vietnamese breast cancer patients, which reflects the younger immigrant cohort compared with the general US population and with the other three large Asian subgroups, Chinese, Japanese, and Filipinos. This striking finding parallels that of a recent study that found a similarly young age distribution among Mexican women in Mexico.¹³ Like the Mexican breast cancer cohort, half of the Vietnamese patients in our study presented with breast cancer at an age younger than 50. The effect of a considerably younger age at diagnosis needs to be further researched and taken into consideration in clinical practice.

Despite endorsements by the National Institutes of Health, the use of breast-conserving surgery for early-stage breast cancer in the United States continues to show a marked geographic variation.^{14,15} A recent analysis of California Cancer Registry data showed an increasing trend in the use of breast-conserving surgery for early-stage breast cancer and that younger women were significantly more likely to undergo breast-conserving surgery.¹⁶ In our data, relatively younger Vietnamese women with early breast cancer were nevertheless more likely to undergo mastectomy. Our finding is consistent with the observation made by Morris and colleagues, who found that the odds of undergoing breast-conserving surgery among Asian and Pacific Islander women in California were substantially lower than the odds among white and black women.¹⁶ Despite initial lower costs, Barlow and colleagues showed that mastectomies were slightly more expensive than breast-conserving surgery over 5 years¹⁵;

Table 1 5-year counts, average annual age-adjusted incidence rates (per 100,000 population), and 95% confidence intervals (CI) for female breast cancer by race or ethnicity among residents of the Greater San Francisco Bay Area, 1988–1992

Race or ethnicity	In situ plus invasive breast cancer		Invasive breast cancer	
	Patients, no.	Rate (95% CI)	Patients, no.	Rate (95% CI)
Vietnamese	49	34.8 (24.9-46.4)	41	28.7 (19.8-39.2)
Non-Hispanic white	16,349	146.4 (144.1-148.8)	14,108	125.3 (123.1-127.4)
Hispanic white	1,571	100.2 (95.2-105.4)	1,395	89.1 (84.3-93.9)
Black	1,404	116.0 (109.9-122.3)	1,220	100.6 (94.9-106.4)
Chinese, Japanese, and Filipino	1,481	81.6 (77.5-85.9)	1,250	69.0 (65.2-73.0)

Table 2 Distribution of patient and tumor characteristics (percentage) at diagnosis by race or ethnicity among women in the Greater San Francisco Bay Area diagnosed with breast cancer, 1988-1999

Characteristic	Vietnamese (N = 280), %	Non-Hispanic white (N = 41,979), %	Hispanic white (N = 4,395), %	Black (N = 3,516), %	Chinese, Japanese, Filipino (N = 4,627), %
Age, yr					
Mean (SD)	51.0 (11.9)	62.1 (14.1)	57.3 (14.1)	58.4 (14.5)	56.9 (13.6)
<50	49.6	22.5	32.9	31.6	35.1
50-59	27.5	22.3	23.7	21.9	22.9
60-69	13.2	22.6	22.0	21.0	21.5
≥70	9.6	33.6	21.4	25.5	20.5
Stage at diagnosis					
In situ	17.1	15.3	13.5	14.9	19.7
Localized	50.7	55.8	50.1	47.4	50.4
Regional	26.4	24.1	30.9	30.1	25.2
Distant	3.6	3.4	4.2	5.7	3.4
Unknown	2.1	1.5	1.4	1.9	1.3
Histologic grade at diagnosis					
Well differentiated	11.1	13.1	9.4	7.9	11.3
Moderately differentiated	29.6	28.8	26.4	23.8	30.0
Poorly or undifferentiated	30.7	23.6	30.8	35.4	27.7
Unknown	28.6	34.6	33.5	32.9	31.0
Estrogen-receptor status*					
	N = 236	N = 30,802	N = 3,321	N = 2,495	N = 3,584
Test not performed	19.1	19.7	17.3	18.5	22.6
Positive	55.5	64.0	59.0	50.7	58.1
Negative	25.0	16.1	23.4	30.8	19.0
Borderline or indetermined	0.4	0.3	0.3	0	0.3
Progesterone-receptor status*					
	N = 235	N = 30,450	N = 3,280	N = 2,741	N = 3,546
Test not performed	19.2	20.2	17.8	18.9	23.0
Positive	48.1	54.8	51.9	43.1	51.8
Negative	32.8	24.7	30.0	37.8	24.8
Borderline or undetermined	0	0.4	0.4	0.2	0.5
Surgery†					
None	1.8	3.5	3.9	6.3	3.6
Lumpectomy	34.3	45.9	41.9	47.1	39.6
Mastectomy	63.6	50.3	53.7	46.2	56.4
Type unknown	0.4	0.3	0.6	0.5	0.5
Surgery†‡					
None	0	0.9	1.0	1.1	0.8
Lumpectomy	39.0	53.4	51.5	58.5	47.4
Mastectomy	61.1	45.6	47.4	40.3	51.7
Type unknown	0	0.1	0.1	0.1	0.2

*Estrogen- and progesterone-receptor information was not collected in the cancer registry until 1990.

†Most extensive type of surgery performed during first course of surgery, recorded up to 4 months after diagnosis.

‡In patients with in situ and localized tumor.

thus, cost should not be a factor in deciding the mode of surgical treatment. We found that the increased likelihood of having mastectomy among Vietnamese women persisted even after adjusting for tumor characteristics and physician, although adjusting for the hospital of diagnosis accounted for some of the racial or ethnic variations in mastectomy use.

Besides clinical characteristics, socioeconomic and cultural factors may be associated with the choice of treatment. Indeed, several researchers have found that lower socioeconomic status is associated with increased odds of having mastectomy,¹⁷⁻¹⁹ although this effect was not found in all studies.²⁰ Physician characteristics, such as sex¹⁷ and year of training,^{21,22} and extent of communi-

cation between physician and patient¹⁷ were also found to be associated with use of breast-conserving treatment. Unfortunately, detailed information regarding patients' socioeconomic status, cultural factors, and physician characteristics is not available in our dataset, thus limiting our ability to examine these associations further.

Because it has been established that breast-conserving surgery and mastectomy are equally effective in the treatment of early-stage breast cancer, much research has focused on quality of life following the various treatment modalities. Studies consistently show that although there are no differences in fear or concern of recurrence after either type of surgery, there appears to be a more favorable outcome in body image for breast-conserving surgery over

Table 3 Odds ratios associated with having mastectomy, relative to having no surgery or lumpectomy, Greater San Francisco Bay Area, 1988-1999

Covariates included in models	Non-Hispanic white*	Odds ratio (95% confidence interval)			
		Vietnamese	Hispanic white	Black	Chinese, Japanese, Filipino
Model 1: none	1.00	1.77 (1.38-2.25)	1.17 (1.10-1.25)	0.87 (0.81-0.93)	1.31 (1.23-1.39)
Model 2: age, year of diagnosis	1.00	2.00 (1.56-2.56)	1.20 (1.13-1.28)	0.85 (0.79-0.91)	1.39 (1.30-1.47)
Model 3: age, year of diagnosis, stage, grade	1.00	2.08 (1.61-2.68)	1.11 (1.04-1.19)	0.78 (0.72-0.84)	1.42 (1.33-1.51)
Model 4: age, year of diagnosis, stage, grade, attending physician, hospital of diagnosis	1.00	1.61 (1.23-2.10)	1.07 (1.00-1.14)	0.79 (0.73-0.85)	1.39 (1.31-1.49)

*Referent.

mastectomy.²³ To our knowledge, however, no studies have been done of quality of life after breast cancer treatment among Vietnamese women. Additional studies should focus not only on identifying the cultural and clinician-associated factors related to the higher prevalence of mastectomy among Vietnamese women, but also the physical and psychosocial effects of mastectomy and breast-conserving surgery in this population.

Breast cancer incidence rates vary widely among different racial or ethnic populations in the United States.¹ Studies of Chinese, Japanese, and Filipino women suggest that not only are breast cancer incidence rates higher among those who migrate than those who do not,³ but also the breast cancer risk increases over several generations and approaches that for US whites.² In concordance with national SEER data, our data show that the incidence rate for Vietnamese women in the Greater San Francisco Bay Area was relatively low compared with that for other racial and ethnic groups³; however, given that a large proportion of Vietnamese are first-generation immigrants, their cancer experience may reflect influences associated with their country of origin to a greater degree than that of other Asian subgroups. Updated incidence rates using 2000 census data and contemporaneous cancer data would indicate whether rates among Vietnamese have indeed increased.

Our results may be affected by racial or ethnic misclassification because information on race and ethnicity in the cancer registry may not always be based on self-report. Indeed, Swallen and colleagues showed that in the Greater Bay Area Cancer Registry, about 20% of cancer patients who were classified as Vietnamese were probably Chinese instead. However, misclassification occurred more often for men than for women, and whereas incidence rates adjusted for misclassification were 15% lower among men, they were only 3% lower among women.²⁴ Nevertheless, studies of Asian migrants continue to provide valuable clues for identifying breast cancer etiologic factors. Studying Vietnamese migrants specifically not only will provide insight into risk factors that are unique to

the culture and lifestyle of Vietnamese, but also will allow us to design culturally sensitive prevention and early-detection strategies in this rapidly growing US population.^{25,26}

The Institute of Medicine recently released a request for US cancer data on minority groups, particularly disaggregated Asian and Pacific Islander subgroups.²⁷ Our findings highlight the importance of reporting and interpreting cancer statistics for these specific groups. In addition, they show that reporting disaggregated health data for specific racial or ethnic populations can produce more meaningful study results and statistics that can be applicable in public health and clinical settings.

Acknowledgment: Cancer incidence data were collected by the Northern California Cancer Center under contract N01-CN-65107 with the National Cancer Institute, National Institutes of Health, and with support of the California Cancer Registry, a project of the Cancer Surveillance Section, California Department of Health Services, under subcontract 050M-8701/8-S1522 with the Public Health Institute. The content of this article does not necessarily reflect the views or policies of the US Department of Health and Human Services or the California Department of Health Services, nor does mention of trade names, commercial products, or organizations imply endorsement by the US government or state of California.

References

- 1 Miller BA, Kolonel LN, Bernstein L, et al, eds. *Racial/Ethnic Patterns of Cancer in the United States 1988-1992*. Bethesda, MD: National Cancer Institute; 1996. NIH publication 96-4104.
- 2 Ziegler RG, Hoover RN, Pike MC, et al. Migration patterns and breast cancer risk in Asian-American women. *J Natl Cancer Inst* 1993;85:1819-1827.
- 3 Prehn A, Lin S, Clarke C, et al, eds. *Cancer Incidence in Chinese, Japanese, and Filipinos in the US and Asia, 1988-1992*. Union City: Northern California Cancer Center; 1999.
- 4 Glaser SL, Satariano ER, Leung RW, Prehn AW, Cady CM, West DW, eds. *Cancer Incidence by Race/Ethnicity in the San Francisco Bay Area: Twenty Years of Cancer Reporting, 1973-1992*. Union City: Northern California Cancer Center; 1995.
- 5 Hsu JL, Glaser SL, West DW. Racial/ethnic differences in breast cancer survival among San Francisco Bay Area women. *J Natl Cancer Inst* 1997;89:1311-1312.
- 6 *Our Ten Years of Growth: a Demographic Analysis on Asian and Pacific*

- Islander Americans*. San Francisco, CA: Asian & Pacific Islander Center for Census Information and Services; 1992.
- 7 New National Demographic Profile Shows Increasing Diversity of Asian Americans. New York: Asian American Federation Census Information Center; May 15, 2001.
 - 8 Ross RK, Bernstein L, Hartnett NM, Boone JR. Cancer patterns among Vietnamese immigrants in Los Angeles County. *Br J Cancer* 1991;64:185-186.
 - 9 Swerdlow AJ. Mortality and cancer incidence in Vietnamese refugees in England and Wales: a follow-up study. *Int J Epidemiol* 1991;20:13-19.
 - 10 Bouchardy C, Parkin PM, Khlal M. Cancer mortality among Chinese and South-East Asian migrants in France. *Int J Cancer* 1994;58:638-643.
 - 11 Grulich AE, McCredie M, Coates M. Cancer incidence in Asian migrants to New South Wales, Australia. *Br J Cancer* 1995;71:400-408.
 - 12 Breslow NE, Day NE. *Statistical Methods in Cancer Research—Vol 2: The Design and Analysis of Cohort Studies*. Lyon, France: International Agency for Research on Cancer; 1987.
 - 13 Rodriguez-Cuevas S, Macias CG, Franceschi D, Labastida S. Breast carcinoma presents a decade earlier in Mexican women than in women in the United States or European countries. *Cancer* 2001;91:863-868.
 - 14 Nattinger AB, Gottlieb MS, Veum J, Yahnke D, Goodwin JS. Geographic variation in the use of breast-conserving treatment for breast cancer. *N Engl J Med* 1992;326:1102-1107.
 - 15 Barlow WE, Taplin SH, Yoshida CK, Buist DS, Seger D, Brown M. Cost comparison of mastectomy versus breast-conserving therapy for early-stage breast cancer. *J Natl Cancer Inst* 2001;93:447-455.
 - 16 Morris CR, Cohen R, Schlag R, Wright WE. Increasing trends in the use of breast-conserving surgery in California. *Am J Public Health* 2000;90:281-284.
 - 17 Cyran EM, Crane LA, Palmer L. Physician sex and other factors associated with type of breast cancer surgery in older women. *Arch Surg* 2001;136:185-191.
 - 18 Norredam M, Groenvold M, Petersen JH, Krasnik A. Effect of social class on tumour size at diagnosis and surgical treatment in Danish women with breast cancer. *Soc Sci Med* 1998;47:1659-1663.
 - 19 Michalski TA, Nattinger AB. The influence of black race and socioeconomic status on the use of breast-conserving surgery for Medicare beneficiaries. *Cancer* 1997;79:314-319.
 - 20 Polednak AP. Predictors of breast-conserving surgery in Connecticut, 1990-1992. *Ann Surg Oncol* 1997;4:259-263.
 - 21 Jubelirer SJ, Harpold R, Miller S, Keener B, Slemper C. An analysis of factors determining the use of breast conserving surgery for treating early-stage breast cancer. *W V Med J* 2001;97:144-147.
 - 22 Kotwall C, Covington D, Churchill, Brinker C, Weintritt D, Maxwell JG. Breast conservation surgery for breast cancer at a regional medical center. *Am J Surg* 1998;176:510-514.
 - 23 Kiebert GM, de Haes JC, van de Velde CJ. The impact of breast-conserving treatment and mastectomy on the quality of life of early-stage breast cancer patients: a review. *J Clin Oncol* 1991;9:1059-1070.
 - 24 Swallen KC, Glaser SL, Stewart SL, West DW, Jenkins CN, McPhee SJ. Accuracy of racial classification of Vietnamese patients in a population-based cancer registry. *Ethn Dis* 1998;8:218-227.
 - 25 McPhee SJ, Bird JA, Davis T, Ha NT, Jenkins CN, Le B. Barriers to breast and cervical cancer screening among Vietnamese-American women. *Am J Prev Med* 1997;13:205-213.
 - 26 Nguyen T, Vo Ph, McPhee SJ, Jenkins CN. Promoting early detection of breast cancer among Vietnamese-American women. *Cancer* 2001;91(suppl 1):S267-S273.
 - 27 Agnew B. NCI asked to increase focus on minorities. *Science* 1999;283:615-616.