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## Breast cancer screening among Chamorro women in California

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### Abstract

**Background**—This study evaluated breast cancer-related knowledge, attitudes and behaviors among Chamorros in San Diego, California and compared mammogram use between those affiliated with the military and others.

**Methods**—A survey was administered to 110 self-reported Chamorro women. Inclusion criteria included being self-reported Chamorro woman >40 years with no history of breast cancer. Approximately equal proportions of participants with (52%) and without (48%) military affiliation were recruited to test the assumption that use of mammography differed between the two groups. Descriptive statistics and bivariate analyses were conducted.

**Results**—Of the 110 respondents, 42% had at least some college education, 41% had household incomes of at least \$50,000, and 87% reported having health insurance. Approximately 93% reporting ever having a mammogram and 75% reported having it within the past 2 years. The difference between mammography use among women with and without military affiliation was not significant (85% vs 72%;  $p=0.11$ ). However, women with military insurance (95%) were more likely than others (74%) to have had a mammogram within that time frame ( $p = .05$ ). Other factors associated with higher mammography use included reporting better access to medical care ( $p = .03$ ), receiving a recommendation for mammography from a health care provider ( $p = .002$ ), and knowledge that cancer can be cured if detected early ( $p = .01$ ) and that women should get a mammogram yearly ( $p = .01$ ).

**Conclusion**—Chamorro women in San Diego have relatively high rates of mammography use. This finding may be due, in part, to the relatively high rates of health insurance coverage (particularly military insurance) among these women.

**Condensed Abstract**—Chamorros in San Diego, California have high rates of mammography use compared to other Pacific Islanders. Relatively high socioeconomic status and high rates of health insurance coverage may partially explain this finding.

### Keywords

breast cancer; cancer prevention and control; cancer screening; special populations; Chamorros

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## Introduction

Few published studies provide information on breast cancer screening practices with respect to Chamorros, the indigenous population of Guam. However, the Behavioral Risk Factor Surveillance System, initiated by the Centers for Disease Control, has tracked female cancer screening tests on Guam since 1991. This information indicates that mammography use has increased steadily with women over 50 years of age reporting the highest rate (80.9% within the previous two years) in 2003 (1). Elsewhere in this Supplement, Balajadia and colleagues (2) found that 83.3% of Chamorro women over the age of 50 years on Guam reported mammography use within the previous two years. These rates are higher than in other Pacific Islander populations. For example, only 59% of Native Hawaiians (3) and 16.9% of American Samoans (4) over the age of 40 years reported receiving mammograms within that time frame. However, little is known about breast cancer screening practices among Chamorro women who live on the U.S. mainland. This is an important research question because breast cancer is the leading cause of death for Chamorro women on Guam between the ages of 20 to 59 (5) and because immigration patterns to the U.S. mainland warrant attention to this question.

Since 1950 and the signing of the Guam Organic Act, which bestowed U.S. citizenship to residents of Guam, there has been a continuing migration of Chamorros and their families to the U.S. mainland, particularly to California and other western states (6). The migration has been stimulated by many factors including the depressed economy of Guam and a government sponsored attrition program that offered early retirement and buy-out options to employees.

In addition, a large number of Chamorros relocated to the San Diego area, with its numerous military facilities, due to military relocation and base closures. This city has been a desirable location because of the existing Chamorro population, nearby military installations, and proximity to international airports for return flights to Guam. Indeed, San Diego is home to the largest group of Chamorros on the mainland (4,875 of the 49,345 Chamorros living on the mainland) (7). An estimated 50% of Chamorros in San Diego are associated with the military as active duty, reserve, retired, spouse or dependent. Pertinent to the current study, the military provides excellent health insurance coverage and its medical centers and clinics conduct breast health seminars and monitors use of mammograms, factors that could encourage breast cancer screening.

Based on the relatively high rates of screening mammography and the strong affiliation with the military among Chamorros, our research group postulated that these factors could be connected. Therefore, the purpose of the present study is two fold: 1) to assess knowledge, attitudes, and breast cancer screening behaviors among Chamorro women in San Diego and 2) to determine whether affiliation with the military as well as knowledge, attitudes, and behaviors related to breast cancers were associated with the use of mammograms.

## Methods

We conducted a self-administered survey among 110 self-reported Chamorro women in San Diego, California to achieve the study objectives. In preparation for the survey, we conducted two focus groups to determine knowledge and attitudes about cancers that might be unique to Chamorro women. Participants' responses were used as a supplement in developing culturally relevant questions for the survey. The University of California Irvine Human Subjects Review Committee approved the protocol for the study.

## Research Design and Sampling Strategy

Using the snowball sampling method (8), the participants were recruited through the Sons and Daughters of Guam Club (SDGC) as well as the Fiesta groups.. The SDGC participated in the

Pacific Islander Cancer Control Network (PICCN) (9) which provided support for this pilot research project. Inclusion criteria included being self-reported Chamorro female over the age of 40 years with no history of breast cancer. They were also asked whether they were associated with the military in order to recruit an even number of participants with and without military affiliation based on a priori assumption that access to breast cancer screening may differ between the two groups. Women who were interested in participating were invited to social gatherings where they completed the survey. Written informed consent was obtained prior to questionnaire administration.

### Survey Instrument

The survey instrument contained questions derived from the National Health Interview Survey (NHIS), the NHIS Cancer Control Supplement (10,11), and focus group results. The survey included knowledge, attitude and behavior questions specific to breast cancer, in addition to mammography utilization and demographic information. Each knowledge question was scored on a 5-point Likert-type scale where 1 = *Strongly disagree*, 2 = *Somewhat disagree*, 3 = *Somewhat agree*, 4 = *Strongly agree*, and 88 = *Don't Know*. The attitudinal questions measured important concepts in cancer control such as beliefs about the importance of early detection and prevention of cancer and fear of the disease. The attitudinal questions employed a 4-point Likert-type scale including "*Don't Know*".

Questions of cancer-related knowledge and attitudes were dichotomized (i.e., "Disagree" vs "Agree"; "Important" vs "Not Important"). The five-level outcome variable assessing most recent mammogram was dichotomized to "*Yes*" or "*No*" with respect to having had a mammogram in the past 2 years. The "*Don't know*" response was included in all bivariate analyses since in this context this response option likely reflects the true status of the respondents' knowledge or attitudes for those who actually have no knowledge or attitudes about a given issue (12).

### Statistical Analysis

Descriptive statistics were calculated for participants' socioeconomic variables, health status, access to medical care and breast cancer related knowledge, attitudes and screening behaviors. An initial analysis revealed that only minor differences in these variables existed between respondents with and without military affiliation. Therefore, we combined the responses for presentation in the results section, pointing out differences when they existed.

The bivariate associations between the aforementioned variables and the use of mammography within the past two years were examined using  $\chi^2$ . For predictor variables that have more than two levels, a series of post-hoc analyses of  $2 \times 2$  contingency tables were conducted to examine the source(s) of difference for all combinations of the levels. To guard against type I error inflation, we adapted Bonferroni correction by setting the significant level at  $\hat{\alpha} = \alpha/n$ , where  $n$  is the number of post-hoc analyses (13). Results for bivariate associations were based upon different sample sizes as varying number of respondents answered different survey items.

### Results

Table 1 presents the sociodemographic characteristics of 110 Chamorro females residing in San Diego County. By design, approximately half (50.9%) of the women had been affiliated with the military. Among those, most had affiliation through their spouses (37.5%), and very few were on active duty (7.1%). The majority of respondents (86.4%) were born in Guam. More than half of the women were less than 60 years old and had at least some college education (42.2%). The majority were married (55.5%) and not currently employed (55.6%). Over 87% reported that they had some form of health insurance.

The levels of access to medical care were notable (Table 2). Specifically, 91.7% indicated that they had a regular source of medical care, and 86.1% reported that they visited the place of their usual source of care less than a year ago. The most common site of usual source of care was a doctor's office.

Specific to participants' knowledge about cancer in general, about 85% reported that if cancer is detected early, the cure is likely (Table 3). Likewise, the large majority (83.3%) would undergo painful or unpleasant treatment if it would improve her chances of living longer. Of note, few respondents believed that cancer is caused by *taotaomonas* (spirits) (4.6%) or that a *suruhano* (traditional healer) can treat cancer (16.7%). However over one third (34.6%) believed that cancer is *Inaen Yu'us* (God given).

The majority of the Chamorro women agreed that aging (52.9%), diet high in fat (65.4%), and having a blood relative with breast cancer (68.5%) increased a woman's risk of getting breast cancer (Table 4). Furthermore, most of the women agreed that using birth control pills (37.4%) and being exposed to medical x-ray (47.2%) increased a woman's risk of getting breast cancer. In contrast, the majority of Chamorro women disagreed that giving birth to first child after age 30 (25.0%) or starting menses before age 12 (14.6%) were related to increased risk of breast cancer. Approximately one third (34.9%) of respondents believed that trauma to the breast increased the risk of breast cancer.

Table 5 presents the results regarding breast cancer screening knowledge and behaviors. The prevalence rate for mammogram use (i.e., ever having a mammogram) was 92.7% and the rate for having the most recent mammogram within the past two years was 75.9%. Of those 50 years and older ( $N = 76$ ), 79% reported having had the most recent mammogram within the past two years. The large majority believed that a mammogram could detect breast cancer in its early stages (93.1%) and that a mammogram is very accurate or somewhat accurate in finding a lump (89.6%).

In the bivariate analysis, the difference between the rates of mammography use among women with and without affiliation with the military was not statistically significant (84.6% vs 71.7%;  $p = 0.11$ ). On the other hand, women who had military insurance (94.7%) were more likely than others (74.4%) to have a mammography within that time frame ( $p = .05$ ). None of the other sociodemographic characteristics were associated with mammogram use. Likewise, knowledge about risk factors for breast cancer was not correlated with the outcome variable.

However, several other important factors were shown to correlate with mammography utilization. General access to medical care was significantly related to the likelihood of having had a mammogram within the past two years ( $p = .03$ ). Post-hoc analyses showed that Chamorro women who rated general access to medical care as good (81.5%) or very good/excellent (79.7%) were significantly more likely to have had a mammogram than were those who reported access to medical care as poor/fair (25.0%) ( $p = .02$  and  $p = .01$ , respectively). Furthermore, the use of mammogram differed between Chamorro women who indicated that they visited their regular source of care less than one year ago, 1 – 2 years ago, 2 – 3 years ago or more than 3 years ago ( $p < .001$ ). Post-hoc analyses showed that those who visited the source of care within the past year (83.0%) were more likely to have had a mammogram than were those who visited the source 2 – 3 years ago (25.0%) or more than 3 years ago (0%) ( $p = .004$  and  $p < .001$ , respectively). In addition, women whose doctors or nurses recommended a mammogram (83.3%) were significantly more likely to have had a mammogram within the past two years than were those whose doctors or nurses did not recommend it (46.2%) ( $p = .002$ ).

Participants' perception of the likelihood that cancer can be cured if detected early was also related to mammogram use. Post-hoc analyses showed that women who reported that cancer

was likely to be cured if detected early were more likely to have had a mammogram within the past two years than were those who reported that cancer was unlikely to be cured if detected early ( $p = .01$ ). Finally, participants' perception of the frequency that a woman should get a screening mammogram was related to the mammogram use ( $p = .01$ ). Specifically, compared to women who reported that they did not know how frequently they should have a screening mammogram (42.9%), those who reported that they should have one annually (88.2%) were more likely to have had the test ( $p = .002$ ).

## Discussion

Compared with other Pacific Islanders (4,14,15) and certain Asian populations, the screening rates within this self-selected San Diego cohort of Chamorros exceeded those of others. Approximately 76% of the Chamorro women age 40 and older reported having received a mammogram within the preceding two years. This figure is higher than the 70% listed as one of the health objectives by the *Healthy People 2010* (16). However, additional studies and interventions to promote the utilization of mammograms are necessary to meet the recommendation by the NCI that every woman age 40 and older should receive a mammogram at least every 1 – 2 years.

We did not determine why Chamorros in this study had better rates of mammography use than other Pacific Islander populations. However, the participants had relatively high socioeconomic status with 42.2% having at least some college education and 51.7% having a household income of at least \$50,000. Moreover, 87.3% reported some form of health insurance and 96.4% perceived at least good access to medical care. These findings are consistent with previous studies (15,17) and may, in part, explain the relatively large proportion of Chamorro women who are up to date on breast cancer screening (18).

A number of factors were associated with mammography use within our study population. There was a statistically insignificant trend toward increased mammography use by those affiliated with the military. However, having military insurance at the time of the interview was significantly associated with mammography use. The difference in the utilization of mammography between those who had and those who had no military insurance could not be due to the mammogram coverage because both military insurance and non-military insurance cover mammography use. One possible explanation is that military health providers may be more proactive in soliciting their insured individuals to have mammograms (e.g., mailing brochures about the benefits of mammogram). Future targeted research should empirically investigate this possibility.

Not surprisingly, those whose doctors or nurses recommended mammograms were more likely to have had a mammogram than were those whose doctors or nurses did not recommend it. Furthermore, Chamorro women who possessed knowledge of how often a woman should get a mammogram were more likely to have had one as compared to those who did not have any knowledge of the frequency. On the other hand, none of the sociodemographic characteristics were associated with mammogram use. Taken together, these results suggest that although socioeconomic status may increase Chamorro women's access to mammography services, it may not be sufficient to ensure the actual use of mammogram.

Furthermore, knowledge about the risk factors of breast cancer was not related to the likelihood of getting a mammogram. This may suggest that while possessing knowledge about the risk factors may modify individuals' health behaviors that are more directly linked to the chance of getting breast cancer, this knowledge may not affect one's utilization of mammography. For example, knowing that diet in high fat increases the risk of breast cancer may motivate individuals to change eating behaviors (e.g., consuming food that is low in fat).

Tanjasiri and Sablan-Santos (18) conducted the only other study to date of Chamorro women on the U.S. mainland to examine breast cancer risk, knowledge, and screening behaviors. That study, conducted in Los Angeles and Orange County, CA, found that 25% of the 227 Chamorro women surveyed reported a screening mammogram within the past year and 63% of women over age 50 years reported having mammography within the past two years. Of note, over 92.4% of the women had some form of health insurance, slightly higher than the 87.3% rate in our study. In a bivariate analysis, having health insurance, older age, greater income, being married, and use of traditional healers were associated with higher screening rates in Tanjasiri and Sablan-Santos' study.

There are several limitations to the present study. First, results obtained from this self-selected sample cannot be generalized to other Chamorro women, although trends in the data may well represent the San Diego Chamorro perspective. Second, biases inherent in the cross-sectional self-report design are subject to reporting error. Future longitudinal studies should examine the trend in mammogram utilization and explore predictors of compliance and noncompliance in this underrepresented population.

In conclusion while there remains room for improvement, Chamorro women in San Diego have relatively high rates of breast cancer screening with mammography. This finding may be due, in part, to relatively high rates of health insurance coverage (particularly military insurance) and good access to medical care among Chamorros compared with other Pacific Islander populations. Based upon our results, educational efforts should be targeted toward assuring that all women know that breast cancer can be cured if detected early and that screening mammograms are recommended for women 40 years of age and older. The Pacific Islander Cancer Control Network has begun to address these issues through publication of culturally appropriate breast cancer educational brochures and by focusing on breast health through Chamorro community based organizations, health fairs, and other venues (10).

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**Table 1**Sociodemographic characteristics (*N* = 110)

Variable		<i>n</i> (%)	<i>Total</i> *
Place of birth	Guam	95 (86.4)	110
	U.S. Mainland	12 (10.9)	
	Other	3 (2.7)	
Age (yrs)	< 50	32 (29.4)	109
	50 – 59	30 (27.5)	
	≥60	47 (43.1)	
Education	Less than high school	21 (19.3)	109
	High school graduate	42 (38.5)	
	Some college +	46 (42.2)	
Household income	< \$25K	22 (25.2)	87
	\$25K – \$49,999	20 (23.0)	
	≥\$50K	45 (51.7)	
Ever been affiliated with military	Yes	56 (50.9)	110
	Active duty	4 (7.1)	
	Reserve/Active duty	2 (3.6)	
	Served in the military	3 (5.4)	
	Spouse served in the military	21 (37.5)	
	Dependent	12 (21.4)	
	Did not list type of affiliation	14 (25.0)	
	No	54 (49.1)	
Employment status	Currently employed	48 (44.4)	108
	Not employed	60 (55.6)	
Marital Status	Married/Common Law	61 (55.5)	110
	Separated/Divorced/Widowed	45 (40.9)	
	Never married	4 (3.6)	
Any language spoken other than English	Yes	71 (66.4)	107
	No	36 (33.6)	
In general what language do you read and speak?	Only Chamorro	0 (0.0)	109
	Chamorro better than English	8 (7.3)	
	Both equally	43 (39.1)	
	English better than Chamorro	26 (23.6)	
	Only English	32 (29.1)	
Any form of health insurance	Yes	96 (87.3)	110
	No	14 (12.7)	
Type of health insurance	Government sponsored program	11 (10.0)	110
	Military (CHAMPUS, VA, Tricare)	15 (13.6)	
	Private insurance	32 (29.1)	
	More than one kind	38 (34.5)	
	No insurance	14 (12.7)	

\* The totals indicate the number of respondents who answered the question for each variable.

Some percentages may not total to 100% due to rounding errors.



**Table 2**Health status and access to medical care (*N* = 110)

Variable	<i>n</i> (%) <sup>*</sup>
Health status	109
Poor	3 (2.7)
Fair	19 (17.4)
Good	37 (33.9)
Very good	34 (31.2)
Excellent	16 (14.7)
General access to medical care	110
Excellent	50 (45.5)
Very good	27 (24.5)
Good	29 (26.4)
Fair	2 (1.8)
Poor	2 (1.8)
Have a usual source of medical care	109
Yes	100 (91.7)
No	9 (8.3)
Type of usual source of care	109
Doctor's office	66 (60.5)
Hospital emergency room	7 (6.4)
Hospital outpatient clinic	10 (9.2)
Health center	3 (2.7)
Health Maintenance Organization	18 (16.5)
Other	5 (4.6)
Last time visited usual source of care	108
Less than one year ago	93 (86.1)
1–2 years ago	7 (6.5)
2–3 years ago	5 (4.6)
More than 3 years ago	3 (2.8)

\* The totals indicate the number of respondents who answered the question for each variable.

Some percentages may not total to 100% due to rounding errors.

**Table 3**Knowledge and attitudes about cancer in general ( $N = 110$ )

Variable	<i>n</i> (%) <sup>*</sup>
If cancer was detected early, how likely can it be cured	109
Likely	93 (85.3)
Not likely	2 (1.8)
Don't know	14 (12.8)
I would rather not know if I had cancer	110
Agree	16 (14.5)
Disagree	90 (81.8)
Don't know	4 (3.6)
Cancer is caused by <i>taotaomonas</i> (spirits)	109
Agree	5 (4.6)
Disagree	92 (84.4)
Don't know	12 (11.0)
Getting cancer is <i>Nina'in Yu'us</i> (God given)	107
Agree	37 (34.6)
Disagree	61 (57.0)
Don't know	9 (8.4)
One can get cancer because of past deeds	106
Agree	11 (10.4)
Disagree	89 (84.0)
Don't know	6 (5.6)
At my age I do not need to worry about cancer	108
Agree	11 (10.2)
Disagree	92 (85.2)
Don't know	5 (4.6)
Cancer is spread through the air	108
Agree	17 (15.7)
Disagree	79 (73.1)
Don't know	12 (11.1)
A <i>suruhano</i> (traditional healer) can treat cancer	108
Agree	18 (16.7)
Disagree	69 (63.9)
Don't know	21 (19.4)
My faith in God will cure my cancer	104
Agree	61 (58.6)
Disagree	36 (34.6)
Don't know	7 (6.7)
Cancer is brought to the Chamorro by foreigners	110
Agree	10 (9.1)
Disagree	89 (80.9)
Don't know	11 (10.0)
My faith in God will help me not get cancer	109
Agree	40 (36.7)
Disagree	62 (56.9)
Don't know	7 (6.4)
People get cancer because they neglect their health	107
Agree	50 (46.7)
Disagree	53 (49.5)
Don't know	4 (3.7)
God gives power to medical doctors to treat cancer	108
Agree	55 (50.9)
Disagree	44 (40.7)
Don't know	9 (8.3)
I would undergo painful or unpleasant treatment if it would improve my chances of living longer	108
Agree	90 (83.3)
Disagree	15 (13.9)
Don't know	3 (2.8)
Cancer is caused by environmental factors	107
Agree	68 (63.5)
Disagree	20 (18.7)
Don't know	19 (17.7)

Variable	<i>n</i> (%) <sup>*</sup>
Cancer is caused by smoking	110
Agree	84 (76.4)
Disagree	19 (17.3)
Don't know	7 (6.4)
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Cancer is caused by diet	110
Agree	68 (61.8)
Disagree	30 (27.3)
Don't know	12 (10.9)

\* The totals indicate the number of respondents who answered the question for each variable.

Some may not total to 100% due to rounding errors.

**Table 4**Knowledge and Attitudes about Breast Cancer Risk Factors ( $N = 110$ )

Variable	<i>n</i> (%) <sup>*</sup>
Getting older increases risk of getting breast cancer <sup>+</sup>	106
Agree	55 (52.9)
Disagree	36 (34.6)
Don't know	13 (12.3)
Diet high in fat increases risk of getting breast cancer <sup>+</sup>	107
Agree	70 (65.4)
Disagree	20 (18.7)
Don't know	17 (15.9)
Giving birth to the first child after age 30 increases risk of getting breast cancer <sup>+</sup>	104
Agree	26 (25.0)
Disagree	56 (53.8)
Don't know	22 (21.1)
Having a blood relative with breast cancer increases risk of getting breast cancer <sup>+</sup>	108
Agree	74 (68.5)
Disagree	25 (23.1)
Don't know	9 (8.3)
Using birth control pills increases risk of getting breast cancer <sup>+</sup>	107
Agree	40 (37.4)
Disagree	36 (33.6)
Don't know	31 (29.0)
Being exposed to medical X-rays increases risk of getting breast cancer <sup>+</sup>	106
Agree	50 (47.2)
Disagree	35 (33.0)
Don't know	21 (19.8)
Starting menstruation before age 12 increases risk of getting breast cancer <sup>+</sup>	103
Agree	15 (14.6)
Disagree	54 (52.4)
Don't know	34 (33.0)
Trauma to breast increases risk of getting breast cancer <sup>#</sup>	106
Agree	37 (34.9)
Disagree	37 (34.9)
Don't know	32 (20.2)
Active/excessive sexual stimulation of breast <sup>#</sup>	106
Agree	16 (15.1)
Disagree	63 (59.4)
Don't know	27 (25.5)

\* The totals indicate the number of respondents who answered the question for each variable.

Some percentages may not total to 100% due to rounding errors.

<sup>+</sup> Accepted as a risk factor by the biomedical community

<sup>#</sup> Not accepted as a risk factor by the biomedical community

**Table 5**Knowledge and behaviors regarding breast cancer screening (*n* = 110)

Variable	<i>n</i> (%) <sup>*</sup>
Ever heard of mammogram	110
Yes	108 (98.2)
No	2 (1.8)
Ever had mammogram	110
Yes	102 (92.7)
No	8 (7.3)
Most recent mammogram	108
Within the last 12 months	61 (56.5)
1–2 years ago	21 (19.4)
2–5 years ago	13 (12.0)
5 or more years ago	5 (4.6)
Never	8 (7.4)
Who made the decision of having mammogram	98
On my own	36 (36.7)
Doctor's order	28 (28.6)
Both me and my doctor	34 (34.7)
How frequently should a woman without symptoms have mammogram?	109
Every 6 months	6 (5.5)
Every year	68 (62.4)
Every 2–3 years	20 (18.3)
Every 3 years or more	6 (5.5)
Don't know	8 (7.4)
The age doctors recommend a woman should start having mammogram	107
20 – 30	16 (14.9)
31 – 40	58 (54.2)
41 – 50	8 (7.5)
When she starts having periods	4 (3.7)
After giving birth	1 (0.9)
Don't know	20 (18.7)
A mammogram can detect breast cancer in its early stages	102
Agree	95 (93.1)
Disagree	7 (6.9)
How accurate is a mammogram in finding breast cancer	106
Very accurate	43 (40.6)
Somewhat accurate	52 (49.0)
Not accurate	3 (2.8)
Don't know	8 (7.5)

\* The totals indicate the number of respondents who answered the question for each variable.

Some percentages may not total to 100% due to rounding errors.