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Risk Assessment and Prevention of Hypertension in Filipino Americans

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Abstract

Background—Despite that Filipino Americans represent an important target group for hypertension, health behaviors associated with hypertension in this population have not been well studied.

Methods—Two hundred Filipino Americans from eight community-based organizations completed the study. Information was collected to determine whether modifiable behavioral factors, as well as acculturation and demographic characteristics, were associated with hypertension status in Filipino Americans.

Results—Approximately 67% of Filipino Americans were hypertensive. Logistic regression analysis showed that adding salt, physical inactivity, and old age were significantly associated with hypertension status after controlling for other covariates.

Discussion—The present study confirmed a high rate of hypertension among Filipino Americans and demonstrates the association of hypertension status with behavioral factors. These findings highlight the need for targeted interventions to prevent and manage hypertension in this high-risk community by facilitating health behaviors, particularly, salt reduction and physical activity.

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Compliance with Ethical Standards

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Institutional Review Board

The Institutional Review Board at Temple University approved this study. All study procedures followed were in accordance with the ethical standards of the IRB and the Helsinki Declaration of 1975, as revised in 2000.

Informed Consent

Written informed consent was obtained for all study participants.

Keywords

hypertension; cardiovascular risk factors; physical activities; dietary behaviors; Filipino Americans

Introduction

Hypertension is the single largest risk factor for cardiovascular disease mortality, accounting for 45% of all cardiovascular disease deaths in the United States[1]. Community- and clinic-based studies on hypertension prevalence among different ethnic groups have demonstrated that Filipino Americans have higher rates of hypertension prevalence compared with other Asian American subgroups, as well as non-Hispanic whites (NHW)[2–4]. For example, a large-scale clinic-based study of various Asian American subgroups living in northern California[4] reported that Filipino Americans had hypertension rates of 59.9% for men and 53.2% for women, which is significantly higher than their NHW counterparts (46% for men and 39.6% for women). Similarly, a community-based survey study reported a hypertension prevalence of 53% among Filipino Americans in the New York City metropolitan area[5].

In addition to a high prevalence of hypertension, Filipino Americans are the only Asian American subgroup that have significantly lower control rates among treated hypertensive patients compared with NHWs[4], with only 38.4% of treated patients achieving blood pressure control[5]. A significant number of Filipino Americans (39%) are also in the pre-hypertension stage and have either a systolic blood pressure between 120 and less than 140 mmHg and/or a diastolic blood pressure between 80 and less than 90 mmHg[5].

Multilevel factors contribute to the high prevalence of hypertension in Filipino Americans, including health behaviors and lifestyles, as well as socio-demographic and acculturation characteristics. Among the demographic factors, male gender and older age have been reported as demographic risk factors for hypertension in Filipino Americans living in the Northeast United States[5,6]. Acculturation, as measured by the number of years living in the United States, has been also identified as a predictor of hypertension, as well as other chronic diseases[5,7].

With regard to behavioral and lifestyle factors, unhealthy diet, physical inactivity, and excessive alcohol consumption have been associated with hypertension[8]. Specifically, high salt consumption has been shown to be causally associated with hypertension in controlled clinical studies[8,9]. A high intake of fruits and vegetables, specifically 4–5 servings of each per day, has been seen as a protective factor and is recommended as a guideline for blood pressure reduction[10]. A high consumption of alcoholic beverages also has been linked with hypertension. Recommendations for hypertension prevention and management include no more than two alcoholic drinks per day for men and no more than one alcoholic drink for women[11]. Further, there is considerable evidence supporting an association between physical activity and hypertension with the favorable effects of exercise on blood pressure reduction[12]. In accordance with these studies, lifestyle modifications, including maintaining a healthy diet, limited alcohol consumption, salt reduction, and engagement in optimal exercise, have been recommended for the management and prevention of hypertension[13].

Despite the fact that Filipino Americans represent an important target group for hypertension with the disproportionate rates of prevalence, the modifiable health behaviors have not been well studied in this population. Based on available data, Filipino Americans reported consuming a high amount of salt, engaging in low levels of physical activity, being a current or former smoker, and consuming moderate amounts of alcohol[3,6,7,14]. However, little is known about how these factors relate to hypertension among Filipino Americans. To our knowledge, there is only one study that has examined the factors associated with hypertension in Filipino immigrants[5]. The study results showed that older age, male gender, living in the United States for more than 5 years, a BMI greater than 23, elevated glucose, a family history of hypertension, and poor self-reported health status were the predictors of hypertension. Although the study included physical activity, it did not examine the impact of other behavioral factors, such as dietary and drinking behaviors. Thus, more studies are required to examine whether modifiable behavioral factors, as well as socio-demographic factors, are associated with hypertension status in this population.

The purpose of the present study was to identify the factors associated with hypertension status among Filipino Americans. To achieve the goal, we compared individuals who are hypertensive and non-hypertensive with regard to more specified and comprehensive components of behavioral factors, including diet, drinking behaviors, and physical activity, as well as acculturation and demographic characteristics. Increased knowledge on the characteristics of Filipino Americans with hypertension will be beneficial in determining the optimal management of hypertension and in guiding interventions to prevent cardiovascular disease and other complications of uncontrolled hypertension.

Methods

Participants and Study Setting

Two hundred (n = 200) self-identifying Filipino Americans aged 18 years or older residing in the Pennsylvania and New Jersey region participated in the study. Study participants were recruited from eight Filipino community-based organizations in the study region. Prior to the recruitment, a community profile was created, highlighting where the Filipino American population was concentrated in Pennsylvania and New Jersey, as well as prominent Filipino American community organizations established in these areas. A participatory research approach was used for the collaboration between the Center for Asian Health, Temple University and community-based organizations in the recruitment, consent of participants and data collection methods. Community-based organizations involved in this study serve important social functions and represent a feasible and effective milieu for reaching the targeted population of Filipino Americans.

Data Collection Procedures

The study was approved by Temple University Institutional Review Board. For data collection, training on study aims and guidelines for administration of the research instrument were provided to research staff and community organization leaders who were involved in the data collection. All measures in English were translated, back-translated and pre-tested in native language to ensure the scientific and cultural appropriateness of the

instrument for community participants. Although both English and native language versions of instruments were available, most participants preferred to use an English version. It took participants 15–20 minutes to complete the questionnaires.

Measures

Demographics—Information on gender, age, marital status, educational level, employment status, household income, and health insurance status was collected for each participant.

Hypertension Status—Hypertension status was measured with a self-report question drawn from the CDC's Behavioral Risk Factor Surveillance system (BRFSS): "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?" Respondents who answered "Yes" were classified as hypertensive; those who answered "No" were categorized as non-hypertensive, and those who answered "Borderline high or pre-hypertensive" were considered as pre-hypertensive. Participants were informed about the definition of high blood pressure (SBP ≥ 140 and DBP ≥ 90 mmHg), pre-hypertension (140 > SBP ≥ 120 and 90 > DBP ≥ 80 mmHg), and no hypertension (SBP < 120 mmHg and DBP < 80mmHg) before they responded to the question.

Acculturation—Acculturation was assessed with six questions. Participants were asked about whether they were born in the United States, the number of years they have lived in the United States, their English proficiency (speaking and reading), language spoken at home, and food preference. The variable, years living in the United States was divided into three categories: less than 20 years, 20–30 years, and 31 years or above. English proficiency was assessed by 4-point Likert scale responses (ranging from "not at all," "not very well," "well," to "very well") to the two items asking about fluency in speaking and reading English. Respondents who reported both speaking and reading English "very well" were classified as having very high proficiency. Respondents who reported "well" for either item were categorized into high proficiency. Those who responded "not at all" or "not very well" to either item were considered to have low proficiency.

Health Behaviors—Current smoking behavior was measured with the question, "How often do you smoke cigarettes?" Responses were coded for every day, some days, and not at all. Current drinking behaviors were measured with question asking about the number of consumed drinks equivalent to a 12-ounce beer, a 5-ounce glass of wine, or one shot of liquor on an average day when consuming alcoholic beverages. Based on the guideline [11], alcohol consumption was divided into high level (more than 2 drinks per day for men, more than 1 drink per day for women) and low level (2 drinks or less per day for men, 1 drink or less per day for women). Questions regarding diet were drawn from the BRFSS and included items regarding fruit, vegetables, sweets, and salt. Based on the American Heart Association recommendation[15] of 4–5 servings of fruits and vegetables per day, the responses were categorized into two groups: those who had 4–5 servings per day, and those who had fewer than 4 servings. Salt and sweet consumption were assessed by questions asking about frequency of behaviors in the previous week (e.g., "Over the past week, how often did you add salt to your food?") with six answer choices. For the analysis, the responses for salt

addition were grouped into three categories (never, often, and every meal) based on the United States Department of Health and Human Services' Dietary Guidelines for Americans[16] that recommends not adding additional salt to food. The responses for sweet consumption were grouped into two categories (5 or fewer servings per week, and more than 5 servings per week) based on the American Heart Association recommendation of consuming 5 or fewer servings of sweets per week. Physical activity was assessed by two items assessing the number of minutes of moderate to vigorous physical activity in a typical week, and the number of days per week of moderate to vigorous physical activity for at least 30 minutes as part of daily routine. The responses were coded into two categories based on the 2008 physical activity guidelines for Americans[17]: 150 or more minutes per week of moderate to vigorous physical activity, and less than 150 minutes of moderate to vigorous physical activity.

Statistical Analysis

Descriptive analyses were run to describe demographic variables of interest. A series of Chi-square tests and ANOVA with post hoc analyses were conducted to compare the hypertensive and non-hypertensive groups for categorical and continuous independent variables. Because only 10 participants were identified as pre-hypertensive, they were combined with a hypertensive group. To determine variables associated with hypertension status, logistic regression analysis was used, with a hypertension status as the dependent variable in the model. Demographics and acculturation variables that were significant in the bivariate analyses were entered in steps 1, 2, and 3 to examine their predictive values controlling for the other variables. The variables that showed significant bivariate association with hypertension at $p < 0.05$ level were included in logistic regression analyses as predictors.

Results

Participant Demographics

As shown in Table 1, the sample consisted of 118 women (59.0%) and 82 men (41.0%). Participants were mainly older, with 42.1% being 45–65 years old, 35.3% above 65 years old, and the remaining 12.1% and 10.5% between 31–45 years old and less than or equal to 30 years old, respectively. A majority of participants were married (69.9%), were currently employed (60.0%), had obtained a university or graduate degree (87.8%), and earned an annual household income of more than $40,000 (72.0%). Regarding health insurance, only 7 participants (3.6%) reported having no health insurance. Approximately 40% had Medicare or Medicaid and half of the participants had employer-sponsored (including spouse's employer) health insurance.

Hypertension and Health Behavioral Characteristics

Among the 200 participants, 133 (66.5%) reported they were told by a doctor that they were hypertensive. Despite that the majority (86.3%) of the sample was not born in the United States, participants were overall highly acculturated. Half of participants had been living in the United States for equal to or more than 31 years (46.9%). The majority of the

participants reported a high or very high level of English proficiency (98.5%), and mainly spoke English at home (63.9%).

Overall smoking rates were low, with 91.5% of the sample being non-smokers. Low levels of alcohol consumption were reported by most participants (84.5%). Less than a half of participants (42%) reported drinking alcoholic beverages. With regard to dietary behaviors, only 1 participant reported meeting the AHA recommendations of having 4–5 servings of fruits and vegetables per day. About 75% participants reported adding salt to food; the majority of participants reported adding salt to their meal 1–7 times per week (58.8%) or at every meal (15.6%). However, 68.5% of participants met the recommended healthy pattern of sweet consumptions (5 or fewer servings per week). In terms of physical activity, three-quarters (76.1%) obtained less than 150 minutes of moderate to vigorous physical activity per week. Only 24.5% of participants met the recommended guidelines of at least 150 minutes of moderate physical activity per week.

Bivariate: Comparison of Hypertension and Non-Hypertension

The variables that were significantly different between the hypertensive and non–hypertensive participants in unadjusted analyses are presented in table 2. Among the demographic variables, age (χ^2 (3) = 53.85, p <.001), marital status (χ^2 (2) =34.85, p <.001), education level (χ^2 (2) = 10.33, p = .006), and income level (χ^2 (2) =11.83, p =.003) were significantly different among the groups. In terms of acculturation-related variables, United States-born status (χ^2 (1) = 37.82, p <.001), language spoken at home (χ^2 (1) = 4.47, p = .034) and years living in the United States (χ^2 (2) = 7.98, p = .019) were significantly different between the hypertensive and non-hypertensive groups. With regard to behavioral factors, salt addition to food (χ^2 (2) = 7.50, p = .024) and physical activity level (χ^2 (1) = 4.51, p = .034) were significantly different among the two groups.

In summary, participants with hypertension were typically older and married with higher education and income, and had been living in the United States for more than 31 years. They were also physically inactive and tend to add salt to their foods.

Multivariate Analysis: Prediction of Hypertension Status

The demographic, acculturation, and behavioral variables with independent associations to hypertension status at the <0.05 level in the bivariate analyses were used as predictors in the logistic regression analysis. Table 3 shows the results of the regression models for non-hypertension. Among the demographic variables in Model 1, older age (compared to 30 years or less) significantly predicted hypertension (OR=45.55, 95% CI: 2.03–1022.60, p = 0.016 for 31–45 years, OR=88.26, 95% CI: 5.38–1777.38, p = 0.003 for 46–65 years, and OR=202.43, 95% CI: 9.54–4294.06, p = 0.001). When acculturation variables were entered in Model 2, older age remained significant (see table 3 for OR and 95% CI for each age group compared to 30 years or less) and “years living in the US” was marginally significant in predicting hypertension (OR=3.73, 95% CI: 0.90–15.40, p = 0.06). In Model 3, when controlling for all the demographic, acculturation, and behavioral factors, older age (see table 3), adding salt to meal (OR= 7.79, 95% CI: 1.46–41.66, p = 0.016 for adding salt to every meal, and OR=6.14, 95% CI: 2.05–18.44, p = 0.001 for adding salt 1–7 times per

week, compared to never adding salt), and obtaining 150 minutes of moderate to vigorous activity per week (OR= 0.29, 95% CI: 0.10–0.86, $p = 0.026$) were significantly associated with hypertension. The model 3 explained 39% of the variance in hypertension (Cox & Snell $R^2 = 0.39$).

Discussion

This community-based study investigated whether health-related behaviors, as well as socio-demographic characteristics were associated with hypertension status among Filipino Americans. The prevalence of hypertension and pre-hypertension in our sample was 66.5%, which is slightly higher than the previous study conducted in the New York City area that reported a 53% hypertension prevalence[5]. These rates are significantly higher than the rates of hypertension prevalence among other ethnic groups, ranging from 25.2% (among all Asian Americans) to 38.6% (among non-Hispanic blacks)[18,19], highlighting the need to address the issues associated with hypertension prevention and management in this population.

With regard to the health behaviors associated with hypertension in Filipino Americans, salt reduction was found to be a significant predictor of hypertension status after adjusting for other covariates. Compared to Filipino Americans who never add salt, those who add salt to every meal or 1–7 times per week had a 6–8 higher odds of being hypertensive. These findings are consistent with the previous studies[8,9] demonstrating that increased salt intake is a major risk factor for hypertension, whereas reduced salt consumption is beneficial in preventing hypertension and facilitating hypertension control. Given that a reduced salt intake can lower blood pressure in hypertensive, as well as non-hypertensive individuals[8], it is important to encourage Filipino Americans to change their dietary pattern to reduce the prevalence of hypertension and to facilitate appropriate management of blood pressure.

Among the other health behaviors, physical inactivity was also associated with hypertension status. Specifically, for Filipino Americans who are physically active, the odds of being hypertensive are 70% less than those who are inactive. This finding supports the results of previous studies reporting that the risk for hypertension decreased with increasing levels of physical activity[20]. Notably, however, the New York City metropolitan study with Filipino Americans[5] reported that individuals exercising regularly were more likely to have hypertension compare to those who did not exercise. One of the potential explanations about these seemingly contradictory results is that participants in the New York City study may have been more motivated than our sample to change their exercise habits after being told they have high blood pressure. Another, probably more important explanation involves the variation of assessment tools used in two studies to measure physical activity levels. The New York City study measured physical activity as the regularity or frequency of activity (number of days of activity per week), whereas this study assessed active versus inactive status based on the guideline, which combines the duration or intensity with regularity of activity. As a review on the effect of physical activity on hypertension suggested[11] more studies are required to clarify the role of physical activity in hypertension development and management in terms of the duration, frequency, intensity, and the modalities or types of exercise.

In addition to behavioral factors, older age was significantly associated with hypertension. Our findings suggest that Filipino Americans who are older than 65 are more than 100 time likely to be hypertensive compared to those who are 30 years or younger. Age has been a consistent demographic predictor of hypertension in the general United States population [22], and its association with hypertension was confirmed among Filipino Americans in the present study. Aging is associated with decrease or loss of various biological functioning, which contribute to hypertension and cardiac vulnerability. However, certain type of vulnerability including a decline in the ability of the kidneys to excrete salt loads which result in higher blood pressure levels [23] may be related with health behavior such as salt consumption. Indeed, reduced dietary salt intake appears to be effective in reducing blood pressure of older hypertensive individuals [24]. Although the effect of physical activity is less clear in the older subjects [24], lifestyle modification including both salt reduction and physical activity is worth considering for prevention and management of hypertension among older Filipino Americans.

Although not significant, it is noteworthy that years living in the United States approached significance, showing the tendency to distinguish the hypertensive from non-hypertensive group. Specifically, compared to Filipino Americans who lived in the United States for less than 20 years, those who lived between 20 and 30 years in the United States were more likely to be hypertensive controlling for age. Although only a few studies have examined the relationship between acculturation and hypertension[5,7], the number of years living in the US has generally been an indicator for the risk of developing chronic diseases, including cardiovascular disease[25]. For example, among Chinese immigrants who moved to the US, recent immigrants reported a healthier diet and more physical activity compared with those who have resided in the US for more than 10 years[26]. Interestingly, however, Filipino Americans who lived in the US more than 30 years were not significantly different in their hypertension status compared with those who lived less than 20 years. This would be because the group of participants who lived in the US more than 30 years included younger Filipino Americans who were born in the US. Therefore, when adjusted by age, the duration of living in US was not a significant predictor of hypertension status. Because acculturation is complicated process including multidimensional aspects, more studies are required to determine the relationship between acculturation and hypertension, as well as the mechanism of the link between them.

This study is one of the first conducted among Filipino Americans that stratified socio-behavioral characteristics based on hypertension status. This study's results indicate the prominent role of modifiable dietary and exercise behaviors on hypertension risk, indicating meaningful clinical and research implications. In addition, this study used community-based participatory research, which enables the study findings to be applicable to general Filipino populations. However, there were several limitations in this study. First, our study was cross-sectional in nature and used self-report data for both the outcome and independent predictors, in which information was collected concurrently. Thus, it cannot be determined whether behaviors, including smoking, alcohol intake, physical activity, and diet, preceded the development of hypertension or were changed after participants were diagnosed with hypertension. Secondly, current levels of blood pressure were not directly measured and participants were asked if they had ever been told that they had high blood pressure. Hence,

it is not clear whether the condition is under control or not. Thirdly, no anthropometric measurements, such as BMI and waist-to-hip ratio were collected in our study and are known to be important risk factors associated with the development of cardiovascular disease.

In summary, the present study confirms high rates of hypertension among Filipino Americans and demonstrates the association of hypertension status with behavioral factors such as adding salt to food. The findings highlight the need for targeted interventions to prevent and manage hypertension in this high-risk community. In particular, the main findings of the present study suggest that intervention approaches to prevent and manage hypertension among Filipino Americans should focus on dietary behaviors, including community wide salt reduction efforts. This healthy dietary behavior can be emphasized and reinforced in primary care practice setting. Health care providers can play an important role in educating patients on how to reduce sodium intake.

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Table 1

Distribution of Demographic, Acculturation, Health Behaviors and Healthcare Variables in the Filipino Community (N = 200)

Variable		n (%)
Demographic		
Age (years)	<= 30	23 (12.1)
	31–45	20 (10.5)
	46–65	80 (42.1)
	>= 66	67 (35.3)
Gender	Male	82 (41.0)
	Female	118 (59.0)
Marital status	Married	137 (69.9)
	Never married	40 (20.4)
	Currently single	19 (9.7)
Level of education	High school or below	24 (12.3)
	University (college, associate)	97 (49.2)
	Graduate (master's, doctorate)	76 (38.6)
Employment status	Employed	120 (60.0)
	Not currently employed	80 (40.0)
Annual household income	Less than $19,999	23 (11.9)
	$20,000–$40,000	31 (16.1)
	Above $40,000	139 (72.0)
Health insurance	Yes	188 (96.4)
	No	7 (3.6)
Acculturation		
Years living in the US	<= 19	54 (27.8)
	20–30	49 (25.3)
	>= 31	91 (46.9)
Born in the US	Yes	27 (13.7)
	No	171 (86.4)
English proficiency	Low	3 (1.5)
	High	82 (41.0)
	Very high	115 (57.5)
Language spoken at home	English	108 (63.9)
	Filipino	61 (36.1)
Health behaviors		
Addition of salt to food	Every meal	31 (15.6)
	1–7 times per week	117 (58.8)
	Never	51 (25.6)
Level of alcohol consumption	Low	169 (84.5)
	High	31 (15.5)

Variable		n (%)
Exercise (minutes per week)	Less than 150 minutes	150 (76.1)
	150 minutes or more	47 (23.9)
Current smoking status	Every day	6 (3.0)
	Some days	11 (5.5)
	Not at all	182 (91.5)
Serving of fruit for a week	4–5 servings per day	1 (0.5)
	Less than 4 servings per day	192 (99.5)
Serving of vegetables per week	4–5 servings per day	1 (0.5)
	Less than 4 servings per day	192 (96.0)
Sweets consumed	5 or less per week	137 (68.5)
	More than 5 per week	62 (31.0)

Table 2

Comparison of Hypertension Status in Different Health Related Factors

Categorical variables	HTN (n = 133) n (%)	No HTN (n = 67) n (%)	*P*
Age			<0.001
<= 30	1 (4.4)	22 (95.6)	
31–45	10 (50.0)	10 (50.0)	
46–65	58 (72.5)	22 (27.5)	
>= 66	57 (85.1)	10 (14.9)	
Marital status			< 0.001
Married	106 (77.4)	31 (22.6)	
Never married	11 (27.5)	29 (72.5)	
Currently single (widowed/divorced)	13 (68.4)	6 (31.6)	
Annual household income			0.003
0–$19,999	9 (39.1)	14 (60.9)	
$20,000–$40,000	17 (54.8)	14 (45.2)	
>$40,000	101 (72.7)	38 (27.3)	
Education level			0.006
High school or below	9 (37.5)	15 (62.5)	
University (college, associate)	68 (70.1)	29 (29.9)	
Graduate (masters, doctorate)	54 (71.1)	22 (28.9)	
Language spoken at home			0.034
English	64 (59.3)	44 (40.7)	
Filipino	46 (75.4)	15 (24.6)	
Born in US			<0.001
Yes	4 (14.8)	23 (85.2)	
No	128 (74.9)	43 (25.2)	
Years living in the US			0.019
<= 19	28 (51.8)	26 (48.2)	
20–30	33 (67.3)	16 (32.7)	
>= 31	68 (74.7)	23 (25.3)	
Addition of salt to food			0.024
Every meal	21 (67.7)	10 (32.3)	
1–7 times per week	85 (72.7)	32 (27.3)	
Never	26 (51.0)	25 (49.0)	
Exercise (minutes per week)			0.034
<150 minutes	105 (70.0)	45 (30.0)	
150 minutes or more	25 (53.2)	22 (46.8)	

For categorical variables, each superscript letter denotes a subset of hypertension status categories whose column proportions differ significantly from each other at the 0.05 level.

Table 3

Logistic Regression of Predictors of Hypertension Status

Variables	Model 1 OR (95% CI)	*P*	Model 2 OR (95% CI)	*P*	Model 3 OR (95% CI)	*P*
Age						
<= 30 (ref.)	1		1		1	
31–45	45.55 (2.03–1022.60)	0.016	44.54 (1.50–1318.38)	0.028	45.22 (1.16–1763.01)	0.041
46–65	88.26 (5.38–1777.38)	0.003	85.62 (2.68–2736.54)	0.012	74.41 (1.74–3177.70)	0.024
>= 66	202.43 (9.54–4294.06)	0.001	122.61 (3.57–4206.28)	0.008	111.40 (2.42–5129.65)	0.016
Marital status						
Married	2.01 (0.59–6.81)	ns	2.48 (0.65–9.42)	ns	1.88 (0.45–7.90)	ns
Never married	0.78 (0.17–3.53)	ns	1.02 (0.19–5.38)	ns	0.61 (0.92–3.99)	ns
Currently single (widowed/divorced) (ref.)	1		1		1	
Annual household income						
0–$19,999 (ref.)	1		1		1	
$20,000–$40,000	0.28 (0.03–3.03)	ns	0.48 (0.39–5.91)	ns	0.70 (0.50–9.82)	ns
>$40,000	0.37 (0.37–3.70)	ns	0.35 (0.03–3.99)	ns	0.47 (0.34–6.43)	ns
Education level						
High school or below	2.72 (0.28–26.76)	ns	2.40 (0.20–28.23)	ns	2.68 (0.17–41.46)	ns
University (college, associate)	1.39 (0.64–3.04)	ns	1.61 (0.65–3.98)	ns	1.70 (0.63–4.59)	ns
Graduate (masters, doctorate) (ref.)	1		1		1	
Language spoken at home						
Filipino			1.91 (0.75–4.87)	ns	2.26 (0.78–6.51)	ns
English (ref.)			1		1	
Born in the US						
Yes			0.69 (0.98–4.85)	ns	0.77 (0.09–6.25)	ns
No (ref.)			1		1	
Years living in the US						
<= 19 (ref.)			1		1	
20–30			3.73 (0.90–15.40)	(0.06)	4.37 (0.91–21.06)	(0.066)
>= 31			1.73 (0.56–5.38)	ns	2.03 (0.61–6.79)	ns
Adding salt to meals						

Variables	Model 1 OR (95% CI)	*P*	Model 2 OR (95% CI)	*P*	Model 3 OR (95% CI)	*P*
Every meal					7.79 (1.46–41.66)	0.016
1–7 times per week					6.14 (2.05–18.44)	0.001
Never (ref.)					1	
Physical activity level						
<150 minutes (ref.)					1	
>=150 minutes per week					0.29 (0.10–0.86)	0.026
Cox & Snell R^2	**0.29**		**0.33**		**0.39**	

*OR = odds ratio, CI = confidence interval