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Predictors of Hypertension Among Filipino Immigrants in the Northeast US

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Abstract

Hypertension remains disproportionately high among Filipinos compared to other racial and ethnic minority populations, and little research on cardiovascular disease risk factors has been conducted among Filipino immigrants in the Northeastern part of the United States. To determine hypertension prevalence and risk factors among Filipino Americans in the New York City area, blood pressure and other clinical measurements were taken from a sample of Filipino Americans during 119 community health screenings conducted between 2006 and 2010. Additional socio-demographic and health-related characteristics were also collected via a cross-sectional survey. A total of 1,028 Filipino immigrants completed the survey and had clinical readings collected. Bivariate analyses and logistic regression were performed in order to predict and assess risk factors for hypertension among our sample. Fifty-three percent of individuals were hypertensive, and half of hypertensive individuals were uninsured. Logistic regression indicated that older age, male gender, living in the United States for over 5 years, a BMI greater than 23.0 kg/m^2, an elevated glucose reading, a family history of hypertension, and fair or poor self-reported health status were predictors of hypertension. There is a great need to develop more effective community-based interventions in the Filipino community to address cardiovascular health disparities.

Keywords

Hypertension; Blood pressure; Ethnicity; Filipino Americans; Health status

Introduction

Hypertension (HTN), a key risk factor for cardiovascular disease (CVD), remains a growing public health problem; approximately 31 % of US adults aged ≥18 have HTN [1]. Although recent information on the prevalence of HTN among Filipino Americans is slim, published research has found a higher prevalence of HTN among Filipino Americans when compared to other Asian ethnic groups [2–5]. The majority of studies that have recently examined blood pressure measurements among Filipinos have focused on metabolic syndrome among Asian groups overall or compared to the Caucasian population; all have found Filipino Americans to have higher rates of high blood pressure (a reading of 130/85 or current blood pressure medication) when compared to the other Asian groups, as well as Caucasians and non-Hispanic whites. These high blood pressure rates ranged from 59.9 to 79.2 % [6–9]. Additionally, a formative study undertaken in Daly City, CA found that 35 % of Filipinos surveyed had HTN by self-report [10].

It is likely that Filipinos are at increased risk for HTN due to a number of possible risk factors, including low levels of HDL cholesterol, high rates of smoking and physical inactivity, and high body mass index (BMI) [4, 11–14]. Other risk factors for Filipino

Americans include older age, family history, stress, alcohol, sodium in the diet, and chronic conditions such as high cholesterol and diabetes [15]. Studies have also shown poor disease management among Filipinos to be due to low medication adherence, a lack of culturally- and linguistically-appropriate screening and educational materials, limited knowledge of health care systems, and lack of health insurance [6, 16–18].

The burden of HTN among Filipino immigrants in the United States (US) warrants attention given their rapid population expansion in recent years. Between 1990 and 2000 the US Filipino population increased by 32 %, and between 2000 and 2010 it increased by 38 % [19]. According to estimates from the 2010 Census, over 2.5 million Filipino immigrants are living in the US, making Filipinos the third largest Asian ethnic group in the US [20]. New York (NY) and New Jersey (NJ) have the 4th and 5th largest populations of Filipino Americans in the US [19], yet no published research studies have examined the health needs and status of Filipino immigrants in this geographical area [21–23].

Compared to Filipinos living on the West Coast, Filipinos in NY and NJ are more often recent immigrants and have less established networks and support agencies compared to those living on the Pacific Coast [24]. Climate differences and minimal access to exercise facilities may contribute to lower levels of physical activity, especially during the winter months [25].

Filipino Americans living in NY and NJ may demonstrate unique rates of HTN and associated risk factors. In addition, little research has been conducted in the past 20 years documenting rates of HTN among the Filipino American population. The purpose of this study is to determine the prevalence of HTN among a community sample of Filipino immigrants living in the New York City (NYC) area. We describe demographic characteristics, acculturation, healthcare, and clinical risk factors in this sample, and examine how they may influence HTN rates. This study will provide an overview of Filipinos living in NYC and the surrounding area, and contribute to the limited number of studies on cardiovascular health.

Methods

Recruitment

The data presented are drawn from the recruitment phase of a feasibility intervention funded by the National Institutes of Health National Institute on Minority Health and Health Disparities entitled Project AsPIRE (Asian American Partnership in Research and Empowerment). The goal of Project AsPIRE is to utilize a community-based participatory research approach to implement a community health worker (CHW) intervention aimed at improving HTN management among Filipinos in the NYC area. Filipino Americans were recruited from Queens, NY and Jersey City, NJ where two of the largest Filipino populations in NY and NJ reside.

Recruitment was conducted between August 2006 and May 2010. In order to increase representativeness of the target communities living in NY and NJ, geographic information systems (GIS) mapping techniques were used to strategically sample in zip codes with large

Filipino enclaves. Participants were also recruited from a variety of traditional and non-traditional sites frequented by Filipinos, as recommended by community partners. Although our sample is considered a convenience sample, the literature has shown that venue-based sampling strategies are useful for reaching hard-to-reach populations [26–28]. Invitations to collaborate on the project were mailed to these group sites and follow-up was performed by phone or in-person by community partners with relationships to these groups. As a result, 119 community-based health screenings were organized at 17 faith-based organizations (FBOs), 10 community-based organizations (CBOs), 10 local businesses, 3 government groups, 3 apartment complexes, 2 schools, and 3 local parks. Screening forms were administered that obtained personal information of individuals, including name and date of birth; therefore, duplicate individuals were not re-entered into the database after the first entry.

Data Collection and Study Sample

As individuals registered for health screenings, trained bilingual staff explained the screening and obtained informed consent for participation. An interviewer administered a screening survey to each participant, and a CHW or licensed clinical nurse obtained clinical measurements. Finally, each participant completed an exit interview whereby trained staff provided basic health education related to the participants' risk factors; a physician referral, if needed; an explanation of the participant's clinical readings; and an invitation to enroll in Project AsPIRE. Blood pressure measurements were obtained for a total of 1,028 Filipino immigrant adults aged 18 and older living in NY or NJ. This study was approved by the New York University School of Medicine Institutional Review Board.

Measures

The dependent variable used in analysis was HTN, defined as a systolic blood pressure (SBP) measurement of 140 mmHg or greater, a diastolic blood pressure (DBP) measurement of 90 mmHg or greater, and/or a self-reported current antihypertensive medication use. Blood pressure was measured using Omron HEM-712C automatic blood pressure monitors with participants in a seated position. Three measures were taken, and the mean of the second and third measures was used for both SBP and DBP.

Independent variables used in analysis included socio-demographics (age, gender, state of residence), time in the US, language spoken, health insurance status, self-rated health status, family history of HTN, physical activity, and clinical measurements (glucose, cholesterol, BMI). BMI was calculated using weight and height; two variables were created using World Health Organization (WHO) guidelines. The first BMI variable uses the general WHO guidelines and a second BMI variable uses Asian guidelines; the risk of having at least one risk factor for CVD is higher at lower BMIs in Asian populations [29]. Glucose was measured using a Control glucometer. Definitions and categories of the dependent and independent variables are further explained in Table 1.

Statistical Analysis

Descriptive analyses were run across the entire sample, and bivariate analyses were run by HTN status; percents across independent variables for HTN and non-HTN groups are given

(column percents). Chi square tests identified significant differences across HTN and non-HTN groups for all independent categorical variables. Multivariable logistic regression attained a predictive model for HTN among study participants, while taking all associated variables into account. Variables with significance of $p < 0.05$ were included in the regression model, along with any variables not found to be significant in bivariate analyses but with theoretical significance in past studies. Three models were run; the first included socio-demographic variables, the second added health-related variables, and the third added health outcome variables. Odds ratios (ORs), 95 % Confidence Intervals (CIs), and *p* values adjusting for the effects of predictors in each model were derived. Analyses were conducted using SPSS 19.0 (SPSS Inc. Chicago, IL).

Results

Sample Characteristics and Bivariate Results

Table 2 summarizes the socio-demographic characteristics and CVD risk factors among the study sample, overall and by HTN status. Approximately 69 % were women, and mean age was 51.9. Twenty-eight percent had lived in the US for greater than 15 years, and 96 % reported speaking English. Over half of individuals did not have health insurance. In total, 53 % of individuals were shown to have HTN, and 39 % had pre-HTN. Nearly 75 % of the sample was overweight or obese by Asian WHO guidelines, and 64 % had a family history of HTN.

Socio-demographic factors significantly associated with HTN included older age, male gender, NJ residence, and longer time in the US. Individuals with HTN were significantly more likely to have lived in the US for more than 15 years compared to individuals without HTN. Other factors significantly associated with HTN included a lower self-rated health status, family history of HTN, having health insurance, increased physical activity, higher BMI, and a glucose reading denoting increased risk for diabetes. Individuals with HTN were more likely to be overweight or obese when using both BMI definitions. Fifty-one percent of hypertensive individuals had stage 1 HTN and 27 % had stage 2 HTN; among individuals without HTN, 62 % were found to have pre-HTN.

Multivariable Results

Three logistic regression models are presented in Table 3. The first model includes age, gender, time in the US, and state of residence; age, gender, and time in the US were significant. Males were 2.0 times more likely to have HTN compared to females ($p < 0.001$), and individuals older than 65 were 16.7 times more likely to have HTN compared to individuals ages 18–45 ($p < 0.001$). Additionally, individuals who had lived in the US for longer than 15 years were 1.6 times more likely to have HTN compared to individuals who had lived in the US for 5 or fewer years ($p < 0.05$).

Model 2 adjusted for insurance, BMI, and glucose in addition to the variables in model 1. Age, gender, and time in the US remained significant, and Asian BMI and glucose were found to be significant. Obese individuals were 3.0 times more likely to have HTN compared to underweight/normal weight individuals ($p < 0.001$), and individuals at risk for

diabetes were 1.9 times more likely to have HTN compared to individuals not at risk for diabetes.

Model 3 adjusted for self-rated health status, family history of HTN, and physical activity in addition to the variables in model 2. Age, gender, time in the US, BMI, and glucose remained significant, and family history of HTN, self-rated health status, and physical activity were also significant. Individuals self-rating their health as fair or poor were 2.0 times more likely to have HTN compared to individuals self-rating their health as excellent or very good (p <0.01); and individuals with a family history of HTN were 2.1 times more likely to have HTN compared to individuals without a family history of HTN (p <0.01). Additionally, individuals exercising 4–7 times a week were 1.7 times more likely to have HTN compared to individuals who did not exercise (p <0.05).

Discussion

Using cross-sectional survey data of a large group of Filipino Americans in the NYC metropolitan area, we observed a 53 % prevalence of HTN. To our knowledge, this is the first study examining HTN prevalence and predictors among Filipino immigrants in the NYC area. Additionally, much of the literature on HTN rates among Filipino Americans is outdated [3–5, 16] or includes diabetic blood pressure categories [6–9]. NHANES data from 2005 to 2008 found that 31 % of the US adult population had HTN [1], much lower than our rate. We also see a higher rate than that of non-Hispanic blacks (38.6 %) and non-Hispanic whites (32.3 %) [1]. Additionally, the 2010 NYC Community Health Survey found 28.6 % of individuals to self-report ever being diagnosed with HTN, 36.9 % among black non-Hispanics, 31.9 % among Hispanics, and 25.2 % among aggregated Asian Americans [30].

Factors that we found to be associated with HTN included male gender, older age, longer time lived in the US, higher BMI, higher blood glucose, worse self-rated health, family history of HTN, and exercising more regularly. The latter three factors are likely associated with knowing an outcome of HTN, and were only included in the final model for this reason. Our finding that BMI is a predictor of HTN contrasts with a study by Bell et. al which showed there was not a strong association between BMI and HTN among Filipino women who had a higher prevalence of HTN at every level of BMI [31]. In fact, we found that when using the Asian definition of BMI, obese individuals were 2.9 times more likely to have HTN than individuals with a normal BMI, while adjusting for all other factors. Time in the US as a predictor of HTN is consistent with other studies, and this could be attributed to Filipino immigrants undergoing significant changes in availability of foods and activity patterns compared to that of their home country [32, 33]. In dela Cruz's qualitative study examining Filipino HTN beliefs and practices in California, participants noted that their change in dietary intake upon coming to the US was due to factors such as the affordability and abundance of meat and junk foods compared to their experience in the Philippines [33]. Such sentiments were reiterated in a community health needs assessment conducted in the NYC Filipino community, and respondents noted that adaptation to the American lifestyle involved purchasing non-fresh vegetables and canned processed foods, and leading sedentary lifestyles [24].

Besides the adoption of unhealthy dietary behaviors that often couples acculturation, stress has also been shown to be a HTN risk factor increasing with length of stay, and Filipino individuals have associated immigration and discrimination stressors with health problems [34]. While our study did not assess stress, we did find an association between poorer self-rated health and HTN. It is likely that poorer self-rated health could be a result of an individual's HTN awareness; a study in Canada found that change in self-rated health coincides with self-reported physical and mental health, social support, and performance of health-related behaviors [35]. As such, interventions such as CHW interventions which increase social support may improve self-rated health status, and thus HTN over time for this population.

Several limitations should be noted. First, participants were not randomly selected to participate in the study; rather a purposive sampling was used whereby participants attending health screenings were recruited, and approximately 60 % of individuals with HTN also self-reported a diagnosis. It is likely that the health screenings were attended by individuals who knew their HTN status or who had other health issues, as well as by uninsured individuals; our uninsured sample is much larger than numbers given by the 2011 American Community Survey, an uninsured rate of 11.6 % for Filipinos living in New York City and 11.3 % for Filipinos nationwide [36]. It is possible that this could lead to a lack of generalizability to the larger Filipino population in terms of some health and insurance characteristics. However, venue-based sampling helped us reach many Filipino immigrants whom we would likely not have captured if limited to random sampling strategies such as phone lists; many Filipinos have Spanish surnames, and telephone sampling often fails to reach individuals working long hours. Lee et al. [37] concluded that differences between participants based on sampling strategies were not remarkable, and by utilizing careful site selection, convenience sampling in Asian American communities provides representative data. Other studies have also found that convenience-based sampling strategies can be effective [27, 28].

Finally, our independent variables were cross-sectional and restricted to what was included on the screening tool. Other studies have found high waist-to-hip ratio, alcohol consumption, poverty, poor education, and lack of social support to be predictors of HTN [2, 3, 32, 34]. These variables were not assessed during the recruitment phase of our study, but are included in future Project AsPIRE evaluation tools in order to provide a more complete assessment of HTN risk factors.

This study results confirm that there are high rates of HTN among Filipino Americans and highlight the need for targeted interventions in this at risk community. A systematic review of clinically-oriented studies in communities of color that addressed cardiovascular conditions found that among 62 interventions occurring from 1995 to 2007, 59 focused on African Americans, 10 focused on Hispanics, and 6 focused on Native Americans, while only 5 focused on Asian Americans [38]. Although Filipinos have the highest rates of HTN among Asian Americans and Pacific Islanders, we are aware of only one existing intervention implemented to address CVD among Filipinos, which assessed the effectiveness of a psycho-educational intervention to reduce diabetes among Filipinos and other racial/ethnic groups in Washington State [39].

Given the prevalence of CVD and related risk factors among this group, interventions should be implemented in areas with large concentrations of Filipinos. Results from this study highlight the magnitude at which Filipino immigrants experience a preventable chronic disease–findings which can potentially inform policy makers and funders to increase resources for addressing these disparities. Our findings also suggest a call to improve clinical care for this population by providing culturally-relevant information and health programs to prevent and control HTN. Provisions in the Patient Protection and affordable care act (ACA) calls for the integration of CHWs in the healthcare system, given ACA's push for prevention and care coordination to help patients manage chronic disease [40]. CHW studies have yielded positive findings regarding (a) the feasibility of using CHWs to help individuals manage HTN and (b) the impact of CHW interventions on reducing SBP and DBP [41]. Future research should assess the efficacy of a CHW model to improve HTN status for Filipinos through health coaching, social support, and linkages to the healthcare system.

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Table 1

Description of study variables and definitions

Variables	Definitions
Dependent variables	
Hypertension	SBP ≥140 mmHg or DBP ≥90 mmHg or subjects on antihypertensive medication[a]
Independent variables	
Age	Continuous AND 18–45, 46–55, 56–65, 66+ years old
Gender	Male or female
Time in US	Continuous AND ≤5, 6–15, >15 years
Language spoken	Yes (Speaks English) or No (does not speak English)
State of residence	New York or New Jersey
Health insurance status	Yes (has health insurance) or no (has no health insurance)
Self-rated health status	Excellent/very good, good, or fair/poor
Family history of HTN	Yes (reported to have at least 1 immediate family member [i.e., mother, father, or siblings] with a history of HTN[a]), No (reported no immediate family members has history of HTN)
Physical activity	Does not exercise, exercises 1–3 days a week, or exercises 4–7 days a week
BMI	Underweight/normal weight (BMI <25 kg/m^2), overweight (BMI 25.0–29.99 kg/m^2), obese (BMI ≥30.0 kg/m^2)[b]
BMI Asian	Underweight/normal weight (BMI <23 kg/m^2), overweight (BMI 23.0–27.49 kg/m^2), obese (BMI ≥27.5)[b]
HTN stages	Normal (SBP <120 mmHg and DBP <80 mmHg), prehypertension (120 mmHg ≤ SBP <140 mmHg and/or 80 mmHg ≤ DBP<90 mmHg), stage I HTN (140 mmHg ≤ SBP<160 mmHg or 90 mmHg ≤ DBP<100 mmHg), stage II HTN (SBP ≥160 mmHg or DBP ≥100 mmHg)[a]
Glucose	Normal (glucose reading <140 mg/dl if fasting 2 h or more, <180 mg/dl if not fasting 2 h), At risk (glucose reading ≥140 mg/dl if fasting 2 h or more, ≥180 mg/dl if not fasting 2 h)[c]
Cholesterol	Normal (serum cholesterol<200 mg/dl), borderline high (serum cholesterol 200–239 mg/dl), or high (serum cholesterol ≥240 mg/dl)[d]

SBP systolic blood pressure, *DBP* diastolic blood pressure, *BMI* body mass index

[a] Guidelines published by the JNC7

[b] Guidelines published by the WHO

[c] Guidelines published by the American Diabetes Association and American Association of Clinical Endocrinologists

[d] Guidelines published by the American Heart Association

Table 2

Socio-demographic characteristics and CVD risk factors among Filipino immigrants, overall and by HTN status

	All individuals (n = 1,028)		Hypertensive (n = 546)		Non-hypertensive (n = 482)		*p* value
	N	Col %	N	Row %	N	Row %	
Age, mean (SD) n = 1,019	51.9 (13.7)		57.5 (12.3)		45.6 (12.5)		<0.001
Age groups							<0.001
18–45	320	31.1	85	26.6	235	73.4	
46–55	289	28.1	140	48.4	149	51.6	
56–65	260	25.3	185	71.2	75	28.8	
66+	159	15.5	136	85.5	23	14.5	
Gender							0.015
Male	322	31.5	189	58.7	133	41.3	
Female	699	68.5	353	50.5	346	49.5	
Time in US	11.8 (9.9)		14.0 (10.6)		9.2 (8.2)		<0.001
Time in US, categories							<0.001
≤5 years	291	28.3	120	41.2	171	58.8	
6–15 years	332	32.3	171	51.5	161	48.5	
≥15 years	291	28.3	204	70.1	87	29.9	
Not specified	114	11.1	51	44.7	63	55.3	
Language spoken							0.240
Yes-Speaks english	976	95.9	514	52.7	462	47.3	
No-Does not speak english	42	4.1	26	61.9	16	38.1	
State of residence							<0.001
New York	617	60.0	297	48.1	51.9	51.9	
New Jersey	411	40.0	249	60.6	39.4	39.4	
Health insurance status							<0.001
Yes	456	45.1	271	59.4	185	40.6	
No	555	54.9	264	47.6	291	52.4	
Self-rated health status							<0.001
Excellent/very good	263	26.0	110	41.8	153	58.2	
Good	503	49.8	271	53.9	232	46.1	

	All individuals (n = 1,028)		Hypertensive (n = 546)		Non-hypertensive (n = 482)		*p* value
	N	Col %	N	Row %	N	Row %	
Fair/poor	244	24.2	155	63.5	89	36.5	
Family history of HTN							0.001
Yes	636	64.4	364	57.2	272	42.8	
No/don't know	352	35.6	164	46.6	188	53.4	
Physical activity							0.010
Does not exercise	202	20.0	91	45.0	111	55.0	
Exercises 1–3 times a week	394	39.0	205	52.0	189	48.0	
Exercises 4–7 times a week	415	41.0	240	57.8	175	42.2	
BMI							<0.001
Underweight/normal	471	48.4	196	41.6	275	58.4	
Overweight	405	41.6	250	61.7	155	38.3	
Obese	97	10.0	68	70.1	29	29.9	
BMI Asian							<0.001
Underweight/normal	248	25.5	88	35.5	160	64.5	
Overweight	497	51.1	286	57.5	211	42.5	
Obese	228	23.4	140	61.4	88	38.6	
Glucose							<0.001
Normal	870	91.3	450	51.7	420	48.3	
At risk	83	8.7	65	78.3	18	21.7	
Cholesterol							0.514
Normal	631	69.8	330	52.3	301	47.7	
Borderline high	168	18.6	94	56.0	74	44.0	
High	105	11.6	60	57.1	45	42.9	
Hypertension stage (Col %)							n/a
Normal	200	19.5	18	3.3	182	37.8	
Pre-hypertensive	404	39.3	104	19.0	300	62.2	
Stage 1 hypertension	279	27.1	279	51.1	0	0.0	
Stage 2 hypertension	145	14.1	145	26.6	0	0.0	

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Table 3

Adjusted model, independent predictors of hypertension among Filipino immigrants

	Model 1			Model 2			Model 3		
	OR	**95 % CI**	***p* value**	**OR**	**95 % CI**	***p* value**	**OR**	**95 % CI**	***p* value**
Age groups (18–45)									
46–55	2.9	2.1–4.2	<0.001	2.9	1.9–4.3	<0.001	2.7	1.8–4.2	<0.001
56–65	7.2	4.9–10.7	<0.001	7.1	4.6–11.0	<0.001	7.5	4.7–12.0	<0.001
66+	16.7	9.6–29.1	<0.001	17.3	9.5–31.6	<0.001	19.6	10.3–37.3	<0.001
Gender (female)									
Male	2.0	1.4–2.7	<0.001	1.7	1.2–2.3	0.005	1.9	1.3–2.7	0.001
Time in US (≤5 years)									
6–15 years	1.4	1.0–2.1	0.039	1.6	1.1–2.3	0.021	1.6	1.1–2.4	0.027
>15 years	1.6	1.1–2.4	0.013	1.6	1.0–2.5	0.069	1.5	0.9–2.5	0.113
Not specified	0.8	0.5–2.4	0.797	0.9	0.5–1.5	0.569	1.0	0.6–1.8	0.939
State of residence (NY)									
New Jersey	1.2	0.9–1.6	0.241	1.1	0.8–1.6	0.503	1.1	0.8–1.6	0.468
Health insurance status (yes)									
No				1.0	0.7–1.5	0.843	1.1	0.7–1.6	0.683
Asian BMI (underweight/normal)									
Overweight (23–27.49)				2.3	1.6–3.3	<0.001	2.3	1.6–3.5	<0.001
Obese (≥27.5)				3.0	1.9–4.8	<0.001	2.9	1.8–4.7	<0.001
Glucose (normal)									
At Risk				1.9	1.1–3.5	0.033	2.1	1.1–3.9	0.024
Self-rated health status (excellent/very good)									
Good							1.4	0.9–2.1	0.103
Fair/poor							2.0	1.2–3.2	0.007
Family history of HTN (no/don’t know)									
Yes							2.1	1.5–3.0	<0.001
Physical activity (does not exercise)									
1–3 times a week							1.6	1.0–2.4	0.050
4–7 times a week							1.7	1.1–2.7	0.016

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Reference groups in parentheses