Diabetes among non-obese Filipino Americans: Findings from a large population-based study

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2017

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ABSTRACT

OBJECTIVES: Filipino Americans form the second-largest Asian American and Pacific Islanders subgroup. Growing evidence suggests that Filipino Americans have higher rates of diabetes than non-Hispanic whites. The key objectives of this study are 1) to determine the prevalence of diabetes in non-obese Filipino Americans compared to non-obese non-Hispanic whites, and 2) to identify risk factors for diabetes in non-obese Filipino men and women.

METHODS: Secondary analysis of population-based data from combined waves (2007, 2009 and 2011) of the adult California Health Interview Survey (CHIS). The study sample was restricted to non-obese Filipino Americans (n = 1629) and non-Hispanic whites (n = 72 072).

RESULTS: Non-obese Filipino Americans had more than twice the odds of diabetes compared to non-Hispanic whites, even after correcting for several known risk factors (OR = 2.80, $p < 0.001$). For non-obese Filipino men, older age, poverty, cigarette smoking, and being overweight are associated with increased odds for diabetes, while older age was the only factor associated with diabetes among Filipina women.

DISCUSSION: Diabetes prevention approaches need to be targeted towards non-obese Filipino Americans, due to their high risk of diabetes.

KEY WORDS: Diabetes; Filipino Americans; non-obese; prevalence; risk factors; sex

La traduction du résumé se trouve à la fin de l'article.

Can J Public Health 2017;108(1):e36–e42
doi: 10.17269/CJPH.108.5761

Although the Asian American and Pacific Islanders (AAPI) population is the fastest growing non-Caucasian group in the United States, with a dramatic 43% increase between 2000 and 2010,[1] they remain under-represented in most epidemiological studies.[2] Moreover, studies including AAPI samples typically aggregate multiple ethnic groups under one large category,[2] despite the fact that there are substantial differences between the groups in terms of culture, language, lifestyle, habits and health practices. Aggregating such a diverse racial group in one category also masks the heterogeneity in disease prevalence and risk factors. Thus, it is important to take these differences into consideration when designing, implementing and evaluating studies on health risks and health conditions as well as when tailoring prevention and intervention approaches to target specific ethnic groups within the diverse AAPI population.

Filipinos are the second-largest AAPI subgroup, with about 3.4 million living in the US as of 2010.[3] Most Filipino immigrants come to the US seeking better employment or educational opportunities, and/or to reunite with family members,[4] as is the case for those who immigrate to Canada. One in every 50 Canadians is of Filipino descent.[5–7] With a population of approximately 660 000, Filipino Canadians are the fourth-largest non-Caucasian group in Canada.[5–7] Growing evidence suggests that there are discrepancies in health outcomes between Filipino Americans and their AAPI and white counterparts. In particular, the prevalence of cardiovascular disease (CVD) and cardiovascular risk factors is exceptionally high among Filipino Americans.[8] An estimated two in five Filipino Americans have hypertension.[9] In addition to cardiovascular disorders, Filipino Americans also have higher rates of obesity than other AAPI subgroups.[10] The prevalence of many of these chronic conditions rises with age and time since immigration, increasing the susceptibility of older Filipino adults to chronic diseases[11] as they age in the US.

Diabetes is another chronic disease that has been shown to be more prevalent among Filipino men (15.8%) than among the overall male population (6.1%) in the US.[7] Indeed, a large cross-sectional study showed that Filipino Americans had a higher overall prevalence of type 2 diabetes compared to their peers of the same sex from each of the following groups*: non-Hispanic whites, Chinese, South Asian, Japanese, Korean, Vietnamese and

* We are aware that within many of these groups, considerable variation in health status and health practices may exist. For example, South Asian Americans should be disaggregated into Indians, Pakistani, Afghanis, Sri Lankans, etc., but those data are not readily available, and hence, in this study, we had to rely on these larger groupings for comparison purposes.

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Acknowledgements: The lead author gratefully acknowledges support received from the Sandra Rotman Endowed Chair in Social Work at the University of Toronto. The authors thank Senyo Agbeyaka for his assistance in preparing the manuscript.

Conflict of Interest: None to declare.

Mexican.[7] The major risk factors for type 2 diabetes in Filipino Americans were increasing age, being male, family history of diabetes, and obesity; and in Filipina women, older age, low income and a history of gestational diabetes.[6]

Several factors may explain the high rates of diabetes among Filipino Americans compared to other ethnic groups. A key issue is that Filipino Americans have a higher mean BMI in comparison to other Asian American subgroups.[12] Second, more than one third of Filipino Americans (38%) are physically inactive, which is a higher rate than that noted for Chinese Americans.[13,14] Obesity and physical inactivity do not, however, completely explain the higher prevalence of diabetes among Filipino Americans in comparison to non-Hispanic whites in the US. For example, one study which controlled for age, body size, fat distribution, percentage of body fat, smoking, alcohol consumption, and exercise still showed that Filipino American women had a sixfold greater risk of diabetes compared to white women.[5] Another factor placing Filipino Americans at risk is their traditional diet, one that is notably high in sodium and cholesterol.[15] According to recent research, ethno-specific food intake patterns are a stronger risk factor for diabetes than overall dietary patterns after adjusting for energy intake.[16]

The objectives of this study are: 1) to determine the prevalence of diabetes in non-obese Filipino Americans compared to non-obese non-Hispanic whites; and 2) to identify the odds of diabetes associated with the multiple risk factors for diabetes (i.e., sex, age, education level, poverty status, immigrant status, fruit and vegetable consumption, exercise, smoking, BMI) in non-obese Filipino men and women. This information could assist policy-makers and health care professionals to develop prevention and intervention approaches that may be particularly helpful to Filipino Americans, such as tailoring the BMI cut point for screening and developing sex-specific protocols for prevention.

RESEARCH DESIGN AND METHODS

Data source

Data were from the combined 2007, 2009 and 2011 waves of the adult California Health Interview Survey (CHIS). Using a multistage sampling design, CHIS collected survey data using random-digit-dialling (RDD) with landline and cellular samples for respondents to create a population-based representative sample of Californian adults. Interviews were conducted in five languages: English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese and Korean.

Sample

The total combined sample of the CHIS from all ethnic groups, e.g., non-Hispanic whites, Filipino Americans, African-Americans, etc., included 141 597 respondents over 18 years of age, with 51 048 from 2007, 47 614 from 2009, and 42 935 from 2011. In the combined sample, there were 1914 Filipino Americans and 92 703 non-Hispanic whites. Approximately one in 10 (9.5%) Filipino Americans and 6.7% of non-Hispanic whites had diabetes ($p = 0.04$). Over two thirds of Filipino Americans (70.2%) with diabetes are in the non-obese BMI range (i.e., BMI <30). This contrasted with 51.3% of non-Hispanic whites with diabetes falling within that same BMI range.

For this paper, the final study sample included 73 701 respondents with BMI less than or equal to 29.99 (hereafter referred to as "non-obese BMI"), of whom 1629 were Filipino Americans and 72 072 were non-Hispanic whites.

Data analyses

Chi-square analyses were used to compare non-obese Filipino Americans and non-Hispanic whites with respect to the prevalence of diabetes (Objective 1) and a range of socio-demographic characteristics and health behaviours ($n = 73\,701$). A multivariate logistic regression analysis of diabetes status was conducted to determine the odds of diabetes for non-obese Filipino Americans in comparison to non-Hispanic whites from California. Factors in the model included socio-demographic characteristics (ethnicity, sex, age, education level, poverty status, immigrant status) and health behaviours (fruit and vegetable consumption, exercise, smoking, overweight status).

In the Filipino subsample, chi-square tests were conducted on those with and without diabetes. Three logistic regression analyses of diabetes status were conducted: the first, among non-obese Filipino Americans of both sexes; the second, among non-obese Filipino men; and the third, among non-obese Filipina women (Objective 2). All three logistic regression analyses controlled for socio-demographic characteristics (sex, age, education level, poverty status, immigrant status) and health behaviours (fruit and vegetable consumption, exercise, smoking, overweight status). Likelihood ratio tests were conducted to examine statistical differences in odds ratios in logistic regression models across groups (i.e., male, female).[17]

Survey design weights using jackknife replication techniques were employed in the calculation of percentages, standard errors, and odds ratios (OR) to adjust for the probability of selection. A final household weight and 240 replicate weights were created from the 2007, 2009 and 2011 data, using procedures outlined on the CHIS website.[18] All analyses within this article were performed using Stata 13.[17] All sample sizes are provided in their unweighted form.

Measures

Identification of individuals with BMI <30

Individuals were asked in the CHIS survey, "How tall are you without shoes?" to determine height, and "How much do you weigh without shoes?" to determine weight. BMI was then calculated by dividing weight in kilograms by the square of height in metres.

Identification of individuals with diabetes

The question regarding diabetes was found in the CHIS survey as "Other than during pregnancy, has a doctor ever told you that you have diabetes or sugar diabetes?"

Demographic characteristics

The following demographic variables were examined: 1) Filipino vs. non-Hispanic white ethnicity; 2) sex; 3) age (18 and over); 4) attainment of post-secondary degree; 5) poverty (0%–99% of Federal Poverty Level versus 100% or more – this variable takes into account household income in the context of household composition); and 6) immigrant status (foreign-born or not).

Identification of health-related variables

For fruit and vegetable intake, respondents were asked, "During the past month, how many times did you eat fruit? Do not count juices," and "During the past month, how many times did you eat vegetables like green salad, green beans, or potatoes? Do not include fried potatoes." Responses to these two questions were used to calculate daily fruit and vegetable intake. Three categories were created for "0 to 1," "more than 1, less than 5," and "5 or more" servings of fruits or vegetables per day.

For cigarette smoking, respondents were asked, "Altogether, have you smoked at least 100 or more cigarettes in your entire lifetime?" (coded never vs. ever).

Due to changes in questions between the waves, we created a new variable "moderate physical activity", which was defined as follows: From the 2007 dataset, the variable was constructed from the question, "During the last 7 days, did you do any moderate physical activities in your free time for at least 10 minutes?" From the 2009 and 2011 datasets, we used the question, "Sometimes you may walk for fun, relaxation, exercise, or to walk the dog. During the past 7 days, did you walk for at least 10 minutes for any of these reasons?" (coded yes vs. no).

BMI was coded into two categories to control for differences in body weight profiles, as BMI less than 25, and BMI of 25–29.99.

RESULTS

As shown in Table 1, among Californians aged 50 years and over with non-obese BMI, the prevalence of diabetes was almost twice as high for Filipino Americans compared to non-Hispanic whites (7.6% vs. 4.3%; $p < 0.01$). The demographic profiles of Filipino Americans and non-Hispanic whites were fairly similar in this sample, except that Filipino Americans, on average, were younger, with a higher proportion of females, ate less fruits and vegetables, smoked less, and exercised less compared to their non-Hispanic white counterparts. The percentage of foreign-born persons was also substantially higher in the Filipino subsample (67.5%) than among non-Hispanic whites (10.0%).

The adjusted odds ratio (OR) of diabetes for Filipino Americans compared to non-Hispanic whites was 2.80 when controlling for demographics (see Table 2). Males had 39% higher odds of diabetes in this non-obese BMI group. Each decade increase in age was associated with a 66% increase in the odds of diabetes. Those without a college degree had a 32% increase in the odds of diabetes. Living in poverty was associated with a 66% increase in odds of diabetes. Those with a BMI from 25 to 29.99 were more than twice as likely to have diabetes, compared to those with a BMI of 24.99 or less. Fruit and vegetable consumption, smoking history, level of physical activity and immigrant status had no statistically significant effect on the odds of diabetes for Filipino Americans and non-Hispanic whites with non-obese BMI.

The analysis restricted to only non-obese Filipinos (see Table 3) revealed that age, cigarette smoking, and having a BMI of 25–29.99 were the only factors significantly associated with increased odds of

Table 1. Descriptive characteristic of non-obese Filipino American and non-Hispanic whites cohorts (n = 73 701)

	Non-Hispanic white (n = 72 072)	Filipino (n = 1629)	p-value
Diabetes			
Without diabetes	95.7%	92.4%	0.004
With diabetes	4.3%	7.6%	
Socio-demographics			
Sex			
Male	47.8%	43.4%	0.047
Female	52.2%	56.6%	
Age			
Mean (SD)	48.6 (27.8)	43.1 (27.6)	<0.0001
Socio-economic status			
Education			
No post-secondary degree	46.9%	42.0%	0.056
Post-secondary degree	53.1%	58.0%	
Poverty level			
Not in poverty	93.7%	92.2%	0.335
In poverty	6.3%	7.8%	
Health variables			
Daily fruit and vegetable intake			
0 or 1	41.4%	46.8%	0.018
1–4	52.8%	49.1%	
5 or more	5.8%	4.1%	
Lifetime smoking			
Less than 100 cigarettes	56.2%	69.6%	<0.001
100 or more cigarettes	43.8%	30.4%	
Exercise			
Less than moderate exercise	26.9%	31.5%	0.041
Moderate exercise	73.1%	68.5%	
Body mass index (BMI)			
BMI <25 (ref.)	56.4%	60.4%	0.069
BMI ≥25, <30 (overweight)	43.6%	39.6%	

Table 2. Logistic regression analysis of diabetes among non-obese non-Hispanic white Americans and Filipino Americans (n = 73 701)

	Complete model OR (95% CI)	p-value
Ethnicity		
Non-Hispanic white (ref.)	1.00	<0.001
Filipino	2.80 (1.61, 4.88)	
Socio-demographics		
Sex		
Female (ref.)	1.00	<0.001
Male	1.39 (1.19, 1.62)	
Age (by decade)*	1.66 (1.60, 1.74)	<0.001
Socio-economic status		
Education		
Post-secondary degree (ref.)	1.00	<0.001
No post-secondary degree	1.32 (1.14, 1.52)	
Poverty level		
Not in poverty (ref.)	1.00	0.019
In poverty	1.66 (1.09, 2.52)	
Health variables		
Daily fruit and vegetable intake		
0 or 1	1.22 (0.93, 1.61)	0.151
1–4	1.15 (0.85, 1.54)	0.361
5 or more (ref.)	1.00	
Lifetime smoking		
Less than 100 cigarettes (ref.)	1.00	0.072
100 or more cigarettes	1.16 (0.99, 1.35)	
Immigrant status		
US-born (ref.)	1.00	0.902
Born abroad	0.74 (0.34, 1.60)	
Exercise		
Less than moderate exercise (ref.)	1.00	0.140
Moderate exercise	1.28 (0.63, 2.62)	
Body mass index (BMI)		
BMI <25 (ref.)	1.00	<0.001
BMI ≥25, <30 (overweight)	2.90 (1.44, 5.83)	

* Age was divided by 10, and can be interpreted as odds for diabetes by decade.

Table 3. Logistic regression of diabetes among Filipino respondents only (n = 1629)

	Complete model OR (95% CI) (n = 1629)	p-value	Males OR (95% CI) (n = 609)	p-value	Females OR (95% CI)	p-value
Socio-demographics						
Sex						
Female (ref.)	1.00	0.773	–		–	
Male	1.09 (0.60, 1.99)		–		–	
Age (by decade)*	1.76 (1.53, 2.03)	<0.001	2.02 (1.53, 2.68)	<0.001	1.57 (1.24, 1.98)	<0.001
Socio-economic status						
Education						
Post-secondary degree (ref.)	1.00	0.839	1.00	0.734	1.00	0.654
No post-secondary degree	0.94 (0.53, 1.67)		1.15 (0.50, 2.65)		0.80 (0.29, 2.16)	
Poverty level						
Not in poverty (ref.)	1.00	0.006	1.00	0.001	1.00	0.831
In poverty	3.66 (1.46, 9.21)		6.60 (2.12, 20.6)		1.13 (0.35, 3.64)	
Health variables						
Daily fruit and vegetable intake						
0 or 1	0.88 (0.23, 3.41)	0.850	0.19 (0.02, 1.98)	0.165	1.52 (0.38, 6.03)	0.548
1–4	0.69 (0.17, 2.82)	0.600	0.22 (0.02, 2.46)	0.217	1.25 (0.28, 5.60)	0.770
5 or more (ref.)	1.00		1.00		1.00	
Lifetime smoking						
Less than 100 cigarettes (ref.)	1.00	0.044	1.00	0.001	1.00	0.263
100 or more cigarettes	1.76 (1.02, 3.06)		4.27 (1.85, 9.86)		0.49 (0.14, 1.70)	
Immigrant status						
US-born (ref.)	1.00	0.441	1.00	0.326	1.00	0.878
Born abroad	0.74 (0.34, 1.60)		0.61 (0.22, 1.65)		1.21 (0.26, 4.87)	
Exercise						
Less than moderate exercise (ref.)	1.00	0.499	1.00	0.276	1.00	0.775
Moderate exercise	1.28 (0.63, 2.62)		1.63 (0.68, 3.91)		0.86 (0.30, 2.44)	
Body mass index (BMI)						
BMI <25 (ref.)	1.00	0.003	1.00	0.005	1.00	0.070
BMI ≥25, <30 (overweight)	2.90 (1.44, 5.83)		4.19 (1.53, 11.47)		2.44 (0.93, 6.42)	

* Age was divided by 10, and can be interpreted as odds for diabetes by decade.

diabetes. No other variables in the analysis were significantly associated with higher odds of diabetes.

Analyses conducted for the Filipino-only sample found that sex and poverty had a significant interaction (OR = 6.14, $p < 0.05$; analyses not shown). Results in separate subgroup analyses for Filipino men and women revealed differences in predictors for diabetes by sex. For Filipina women (see Table 3), age was the only significant predictor for increased rates of diabetes. For Filipino men (see Table 3), age, living in poverty, cigarette smoking, and having a higher BMI (25–29.99) was associated with increased odds for diabetes. We conducted likelihood-ratio tests to determine which factors were significantly different predictors of diabetes between Filipino men and Filipino women. Only poverty level ($p = 0.046$) and ever smoking ($p = 0.001$) were statistically significantly different by sex with respect to the outcome of diabetes.

DISCUSSION

In this representative community sample of non-obese Californians, the prevalence of diabetes among Filipino Americans was approximately three times higher than that of non-Hispanic whites. Other studies which have examined ethnic difference in diabetes across the whole BMI spectrum have found that Filipino Americans have higher rates than non-Hispanic whites. These findings are consistent across population-based studies[6,7,19] and clinical research.[20,21] The prevalence of diabetes among the mixed sex sample of non-obese Filipino-Americans and non-Hispanic whites in our study (7.6% vs. 4.3% respectively) was substantially lower than that found in another population-based study which included respondents across the whole BMI spectrum (men: 15.8% vs. 6.1%; women: 9.4% vs. 4.9% respectively).[7] We attribute the lower prevalence in the current analyses of the non-obese in these groups to the strong association between obesity and the development of type 2 diabetes. The high prevalence of diabetes in this non-obese sample of Filipino Americans lends support to the recently proposed recommendation to lower the BMI cutpoint for diabetes screening in the US for AAPI populations, including Filipino Americans, to 23 kg/m^2.[22] Such a strategy could substantially improve rates of primary prevention for those at risk who are notified of their pre-diabetic status in time to make appropriate lifestyle changes before they develop full-blown diabetes.[22] The lower cutpoint for screening could also help in secondary prevention efforts such that those who learn they have diabetes may be able to either prevent or reduce complications associated with diabetes through early intervention.[22]

Logistic regression analyses confirmed that non-obese Filipino Americans had significantly higher odds of diabetes than non-Hispanic whites even when many of the known risk factors for diabetes were taken into account (i.e., age, sex, education, poverty status, fruits and vegetable consumption, immigrant status, exercise, overweight status, and smoking). It appears then that there must be other relevant factors influencing the higher prevalence of diabetes among non-obese Filipino Americans in comparison to non-Hispanic whites.

There are several important limitations of the study to keep in mind when interpreting results. The CHIS only had self-reports of a medical diagnosis. Future studies would benefit from blood samples and/or chart reviews. Although interviews in Tagalog or

other Filipino languages were not available for the CHIS, it is unlikely that this limitation seriously biased the sample. Filipino-Americans are one of the immigrant groups most fluent in English due to universal free public education in the Philippines including English language from the first grade and English as one of the official languages of instruction in the upper year classes.[23] Seventy percent of Filipino Americans speak English "very well".[4]

Although beyond the capacity of the current study to investigate due to data limitations, potential promising areas to explore in future research include ethnic variations in abdominal obesity, dietary patterns (particularly white rice consumption), birth weight, hypertension and shortage of sleep. Filipina women have been found to have higher levels of visceral adipose tissue compared to whites and African-Americans, despite having similar BMI and waist circumferences.[20] Abdominal obesity, also known as central obesity, is known to induce insulin resistance. However, this factor alone is unlikely to fully explain the markedly higher odds of diabetes among Filipino Americans in comparison to whites. Findings from one study indicated that the odds of diabetes for Filipina women were still found to be higher than for white women after adjustment for visceral adipose tissue.[20]

In another study, researchers found that dietary patterns specific to ethnic groups had a strong positive association with diabetes prevalence, but that this relationship was attenuated to non-significance after adjusting for energy intake.[16] However, a qualitative study exploring the influence of cultural values and traditions among Filipino Americans with diabetes highlighted the social and symbolic significance of rice consumption,[24] which has particular cultural resonance. These results suggest that Filipino Americans with diabetes may perceive reduced rice intake as a rejection of Filipino culture.[24] Substantial rice consumption and potential difficulty in reducing rice intake may in fact contribute to the elevated risk of diabetes in Filipino Americans, given that high consumption of white rice has been strongly associated with an increased risk of type 2 diabetes.[25]

Among non-obese Filipino Americans, we found that older age, poverty, being overweight (BMI from 25 to 29.99) as opposed to normal weight (BMI <25), and cigarette smoking were associated with higher odds of diabetes. Each of these factors is a well-known contributor to diabetes in the general population as well.[22,26–28] The association between poverty and diabetes is consistent with previous findings that report socio-economic disadvantage as a key contributor to the high prevalence of diabetes among Filipino Americans.[29] Poverty in childhood is associated with poverty during adulthood.[30] Unfortunately, we only have data on adult poverty, which we found to triple the odds of diabetes (OR = 3.66). The strong link between poverty and diabetes can possibly be explained by the idea of a "thrifty phenotype".[31] According to this ideology, under-nutrition due to poverty during fetal and early post-natal stages of development might result in impaired development of endocrine production in the pancreas, and this in turn may increase the risk of developing diabetes in older age.[31] In keeping with this hypothesis, approximately 18% of babies born in Ontario, Canada to mothers born in the Philippines are small for gestational age in comparison to 10% of children born to mothers who were themselves born in Canada.[32] Babies who are small for gestational age are at much greater risk for developing type 2 diabetes in adulthood.[33] Hypertension may also play a role in the high odds of diabetes among Filipino Americans. The prevalence of hypertension is very high among Filipino Americans[34] and Filipino Canadians,[35] possibly influenced by high salt consumption in traditional foods such as fish sauce. Higher blood pressure increases the risk of new onset diabetes.[36]

Although older age, being overweight, poverty and smoking were associated with higher odds of diabetes in the overall Filipino population, the risk factors were different between men and women, suggesting the presence of unique sex-specific factors. Older age was a common risk factor between the two groups, as expected. However, being overweight, living in poverty and smoking were significant risk factors only for Filipino men. Among Filipina women, although those who were in the overweight category had elevated odds of diabetes, this failed to reach statistical significance ($p = 0.07$), a finding that perhaps was due to inadequate power. According to the 2001 California Health Interview survey, the prevalence of smoking among Filipino American men (24%) was higher than that among non-Hispanic white, Hispanic, and black men, while the prevalence of smoking among Filipina women (11%) was among the lowest of any ethnic group.[28] High prevalence of smoking in Filipino men may increase their odds of diabetes, as smoking is associated with high insulin resistance and low insulin secretion.[4,28]

Filipina female immigrants are disproportionately working in the health care field, particularly as nurses, and they are more likely than Filipino men to be in professional jobs in this sector.[29] We hypothesize that Filipina women may therefore be more knowledgeable about health risks, and more likely to maintain a healthy lifestyle compared to Filipino men, which might explain the differences between the sexes in the study results.

In summary, the findings from this study suggest that the prevalence of diabetes among non-obese Filipino Americans is approximately three times higher than that among non-Hispanic whites. To our knowledge, the current study has, to date, been the only large-scale population-based examination of the prevalence of diabetes among a non-obese subgroup of Filipino Americans. The identified risk factors varied by sex, with cultural, socio-economic and lifestyle factors possibly accounting for such variation in the prevalence of diabetes. The study's results also suggest that older Filipino American men, especially those living in poverty, are at high risk of developing diabetes, an important finding that requires attention from policy-makers and health care professionals to develop appropriate prevention and intervention approaches. Our findings also highlight the urgent need to target non-obese Filipino Americans for prevention efforts, because preventive approaches with lifestyle intervention have been shown to be effective in preventing and/or postponing the onset of diabetes in high-risk non-obese populations.[37] As previously discussed, lowering the BMI cut point for diabetes screening for Filipino Americans has great potential for both primary and secondary prevention of diabetes and its related health complications. In order to promote health and prevent the development of diabetes among Filipino Americans, the focus should be on culturally appropriate recommendations regarding lifestyle modifications. For example, promoting the consumption of brown rice rather than white rice is a simple yet very promising intervention for the Filipino population. Large prospective studies suggest that substituting a

mere 50 g of white rice with brown rice per day lowers the risk of diabetes by 16%.[36] Promoting awareness of the link between insufficient sleep and diabetes onset is also a potential strategy of particular salience to the Filipino American population. One third of Asian Americans sleep less than 7 hours per night, which is significantly higher than the proportion of non-Hispanic whites who report insufficient sleep.[38] A recent meta-analysis concluded that for every hour shorter of average sleep duration, below 7 hours nightly, the risk of type 2 diabetes increased by 9%.[39]

Future research is needed to further explore these associations among non-obese Filipino Americans using prospective cohort studies. Investigations should also be conducted in Canada, where very little public health research has focused on the rapidly growing population of Filipino Canadians, despite preliminary evidence suggesting a number of health risks for diabetes.[37] These research endeavours should include the collection of more detailed information regarding ethnic variations in central obesity, dietary patterns (particularly white rice consumption), insufficient sleep, birth weight, and hypertension, among other risk factors for diabetes that may disproportionately disadvantage the Filipino population in North America.

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Received: June 30, 2016
Accepted: November 24, 2016

RÉSUMÉ

OBJECTIFS : Les Américains d'origine philippine forment le deuxième sous-groupe en importance des Américains d'origine asiatique et des Polynésiens. De plus en plus d'éléments indiquent que les Américains d'origine philippine ont des taux de diabète supérieurs à ceux des Blancs non hispaniques. Les principaux objectifs de notre étude étaient : 1) de déterminer la prévalence du diabète chez les Américains d'origine philippine non obèses comparativement aux Blancs non hispaniques non obèses, et 2) de cerner les facteurs de risque de diabète chez les Philippins non obèses des deux sexes.

MÉTHODE : Analyse secondaire des données populationnelles des cycles combinés (2007, 2009 et 2011) de l'enquête California Health Interview Survey (CHIS). L'échantillon de l'étude était limité aux Américains d'origine philippine non obèses (n = 1629) et aux Blancs non hispaniques (n = 72 072).

RÉSULTATS : Les Américains d'origine philippine non obèses présentaient une probabilité de diabète plus de deux fois supérieure à celle des Blancs non hispaniques, même après avoir tenu compte de plusieurs facteurs de risque connus (RC = 2,80, $p < 0{,}001$). Chez les hommes philippins non obèses, l'âge plus avancé, la pauvreté, l'usage de la cigarette et le surpoids étaient associés à une probabilité accrue de diabète, tandis que l'âge plus avancé était le seul facteur associé au diabète chez les femmes philippines.

DISCUSSION : Les stratégies de prévention du diabète doivent cibler les Américains d'origine philippine non obèses en raison de leur risque élevé de diabète.

MOTS CLÉS : diabète; Américains d'origine philippine; non obèse; prévalence; facteurs de risque; sexe