ASIANS AND PACIFIC ISLANDERS AND THE GROWING CHILDHOOD OBESITY EPIDEMIC

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Objective: To investigate differences in childhood overweight and obesity prevalence among Asian/Pacific Islander (API) subgroups.

Design: Cross-sectional secondary data analysis.

Setting: California public school children participating in an annual state-mandated physical fitness testing program which included measured height and weight.

Participants: 5th, 7th and 9th grade students attending public schools in Los Angeles County (LAC) in 2006 and 2007 (n=670,352).

Main outcome measures: Overweight and obesity prevalence, where overweight is categorized between the 85th to <95th BMI-for-age percentile, and obese is defined at the 95th BMI-for-age percentile and above according to the Centers for Disease Control and Prevention Growth Charts.

Results: The overall prevalence of obesity among LAC students was 22.9%, and was 19.4% for overweight. For API students, the prevalence of obesity was markedly different between Asians and Pacific Islanders (PIs) (12.1% vs. 35.6%, P<0.01). Obesity also differed noticeably among ethnic subgroups, ranging from 8.4% to 17.5% among Asians, and from 17.2% to 48.6% among PIs. The prevalence of overweight students ranged from 12.8% to 17.3% among Asians and from 16.4% to 21.1% among PIs.

Conclusions: Childhood obesity and overweight prevalence in the API population varies widely among ethnic subgroups, strongly indicating a need for disaggregating data relating to APIs. Recognizing the heterogeneity of the API population will allow more effective prioritization of community intervention and outreach efforts within API communities and improve recognition and treatment by healthcare providers of API children who may be at higher risk for obesity. (*Ethn Dis*. 2010;20:129–135)

Key Words: Obesity, Childhood Obesity, Asians, Pacific Islanders, Ethnic Groups

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INTRODUCTION

Obesity has become a common condition in the United States, the effects of which are multiple, debilitating, and costly. The trend of obesity is a particularly concerning problem among children and adolescents, who have begun to demonstrate a variety of chronic conditions previously rare in this age group, such as type 2 diabetes, cardiovascular risk factors, and hypertension.[1–4] Moreover, being obese as a child increases the risk of being obese as an adult.[5,6] The early onset of these chronic conditions, coupled with the epidemic rise in childhood obesity, may lead to more severe or protracted deterioration of health during the adult years, including decreased life expectancy, more years lived with disability, decreased quality of life, and greatly increased healthcare costs.[7–9] Nationally, approximately 17.1% of children aged 2–19 were obese in 2003–04, a sharp increase from single digit percentages seen in the 1980s.[10]

Disparities in the prevalence of childhood obesity among some racial and ethnic groups have been widely reported, and have been observed among children as young as 4 years.[10,11] However, there is a paucity of information on childhood obesity rates among Asians and Pacific Islanders. Further, existing reports group Asians and Pacific Islanders into a single demographic entity, concealing disparities between subgroups.[12] This is of concern because the prevalence of obesity is significantly higher among Pacific Islanders compared to Asians,[13] and APIs are one of the most diverse and fastest growing demographic groups in the United States, with the population of API children projected to more than double by 2025.[14] In addition, while Asians, as a group, are often perceived as being at lower risk of obesity and obesity-related morbidity, recent studies have shown that Asians generally have a higher percentage of body fat than Whites of the same age, sex, and BMI and may be prone to more visceral adiposity.[15] Asian populations are at higher risk for type 2 diabetes, cardiovascular disease, and hypertension at a given body mass index (BMI) compared to other races and ethnicities with age and sex being accounted for.[16]

Aggregating all APIs into a single group may mask high overweight and obesity rates in some subgroups, leading to underrecognition of the problem in these subgroups. With the implementation of ethnic subgroupings for the Asian and Pacific Islander group by the California Department of Education's (CDE) Physical Fitness Testing Program, greater detail on student

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ethnic background has recently become available. This study focused on students in Los Angeles County, where the population of APIs is larger than that of any other state in the United States. Within Los Angeles County, APIs comprise 45 distinct ethnic groups speaking more than 28 languages.

The objective of this study was to estimate the prevalence of obesity and overweight among 5th, 7th and 9th grade Asian and Pacific Islander students, examining variation in prevalence among ethnic subgroups, namely, Chinese, Japanese, Korean, Vietnamese, Asian Indian, Cambodian, Laotian, Filipino, Samoan, Guamanian and Tahitian, in order to improve our understanding of childhood obesity among API children and better meet the needs of this diverse population.

Table 1. Age, sex, grade level, ethnicity, weight category, height, weight and BMI for 5th, 7th and 9th grade Los Angeles County public school students (*n*=670,352), 2006–2007

Characteristics	Mean	SD	n	(%)
Age (years)	12.4	1.8		
Girls			329,246	49.1
Boys			341,106	50.9
Grade 5			235,559	35.1
Grade 7			224,485	33.5
Grade 9			210,294	31.4
Race/Ethnicity				
Hispanic or Latino			418,991	62.5
African American (Non-Hispanic)			63,562	9.5
White (Non-Hispanic)			109,737	16.4
American Indian/Alaskan Native			1,954	0.3
Asian			70,471	10.5
Chinese			19,478	2.9
Japanese			3,882	0.6
Korean			11,287	1.7
Filipino			16,191	2.4
Vietnamese			4,681	0.7
Asian Indian			3,072	0.5
Laotian			262	< 0.1
Cambodian			2,052	0.3
Other Asian			9,566	1.4
Pacific Islander			2,767	0.4
Native Hawaiian			312	0.1
Guamanian			128	< 0.1
Samoan			983	0.2
Tahitian			54	< 0.1
Other Pacific Islander			1,290	0.2
Decline to State			2,870	0.4
Height (cm)	156.0	11.9		
Weight (kg)	54.8	16.7		
BMI (kg/m^2)	22.2	5.1		
Underweight			16,488	2.5
Healthy weight			370,260	55.2
Overweight			130,013	19.4
Obese			153,591	22.9

METHODS

Study Design

We used secondary data from the CDE's Physical Fitness Test (PFT) for the 2006 and 2007 school years. The test is administered every spring by all California public schools to 5th, 7th and 9th grade students,[17] using a tool called the FITNESSGRAM®[18] which was developed by The Cooper Institute to measure aerobic capacity, body composition and muscular strength, endurance and flexibility. PFT data for 2006 (n=396,780) and 2007 (n=388,934) were aggregated, comprising approximately 94% of 5th, 7th, and 9th grade students enrolled in Los Angeles County public schools. Combining the two consecutive school years was considered reasonable since they represent distinct student groups (very few students are held back a grade).

Relevant Data

Students were classified as underweight, healthy weight, overweight, or obese, using their BMI percentiles. BMI was calculated from measured height and weight, and sex- and age-specific BMI percentiles were estimated according to the Centers for Disease Control and Prevention (CDC) Growth Charts (2000).[19] Underweight and healthy weight were defined as any child with a sex- and age- specific BMI less than the 5th percentile, or from the 5th to <85th percentile, respectively. Overweight and obesity were defined as any child with a sex- and age-specific BMI from the 85th to <95th percentile, or 95th percentile and above, respectively.[20]

Other relevant data included ethnicity and grade level. Ethnicity was determined by student self-identification or by instructor identification; students were categorized as Chinese, Japanese, Korean, Vietnamese, Asian Indian, Laotian, Cambodian, other Asian, Native Hawaiian, Guamanian, Samoan, Tahitian, other Pacific Islander, or Filipino. Records with missing values or BMI values that were identified as biologically implausible, using an algorithm based on

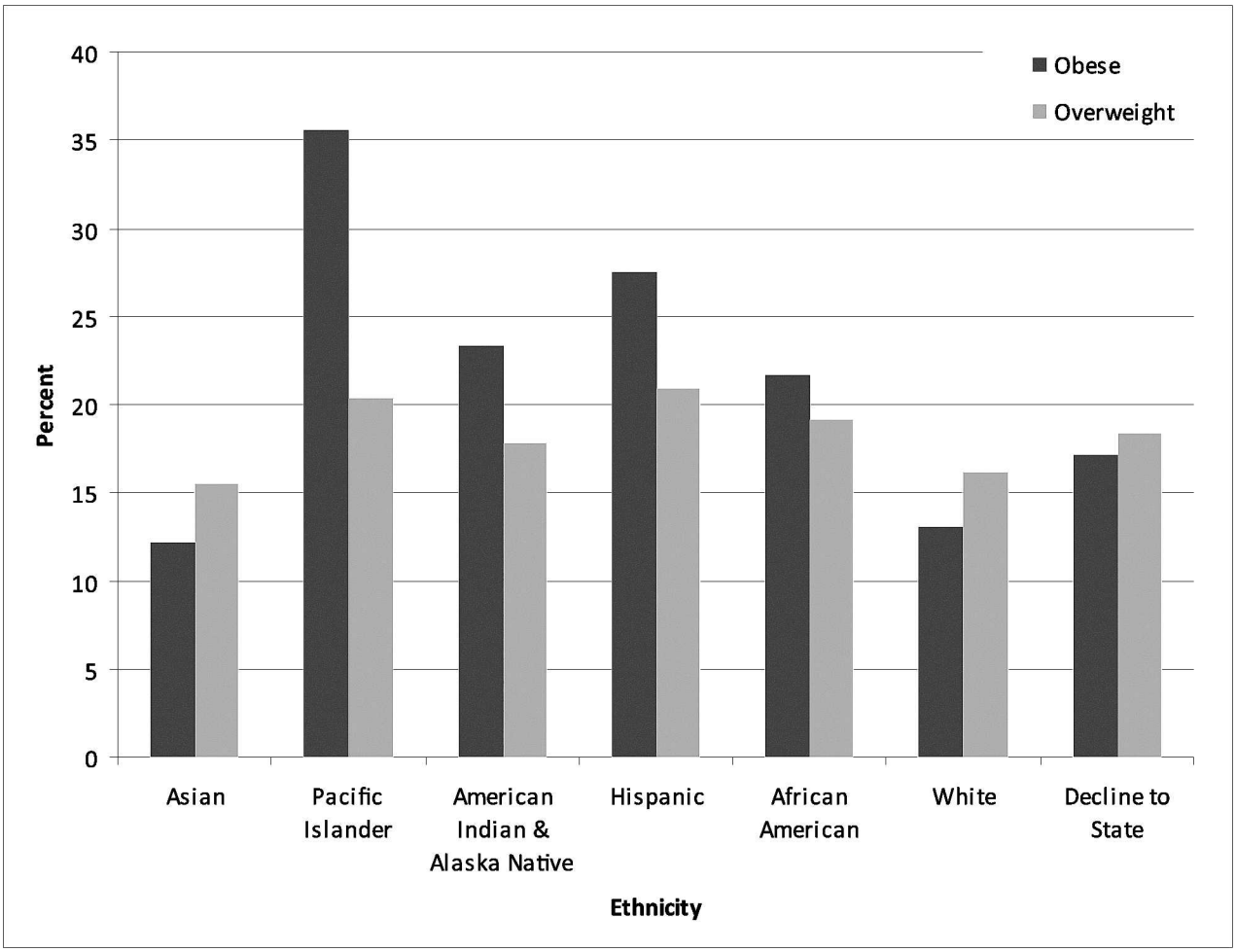

Fig 1. Prevalence of obesity and overweight among aggregated Asian and Pacific Islander 5th, 7th, and 9th grade students as compared with American Indian & Alaska Native, Hispanic, African American, White and declined to state (*n*=670,352), Los Angeles County, 2006–2007

World Health Organization recommended exclusion ranges, were omitted from the analysis.[21]

Data Analysis

Data were analyzed using the statistical software, SAS (version 9.1.3 SAS Institute, Inc, Cary, NC). Relevant characteristics of the students were summarized using means and standard deviations for continuous variables and frequency distributions for categorical variables. Differences in prevalence of obesity among API ethnic subgroups were assessed using the χ^2 test for heterogeneity.

RESULTS

Of 670,352 students included in the analysis, 49% were girls. The students ranged in age from 9–17 years, with a mean age of 12.4. The majority of students were Hispanic (62.5%), while APIs comprised 10.9%. The mean height and weight of the students were 156 cm and 54.8 kg, respectively, with a mean BMI of 22.2 kg/m^2. (Table 1)

The prevalence of obesity among all 5th, 7th, and 9th grade students was 22.9%, while the prevalence of overweight was 19.4%. Obesity prevalence was higher in boys (26.3%) than in girls (19.4%). Moreover, a higher percentage of 5th grade students were obese (26.6%) and overweight (19.9%) compared to their older counterparts in the 7th (22.6% obese, 19.6% overweight) and 9th grades (19.1% obese, 18.6% overweight). Overall, more than 2 in 5 students (42.3%) were classified as overweight or obese.

Among APIs, the prevalence of obesity was 13.0%. Among Asians only, the prevalence of obesity was 12.1% (Figure 1). In comparison, the prevalence of obesity among Pacific Islanders was three times higher, at 35.6%. Upon further disaggregating the Asian group,

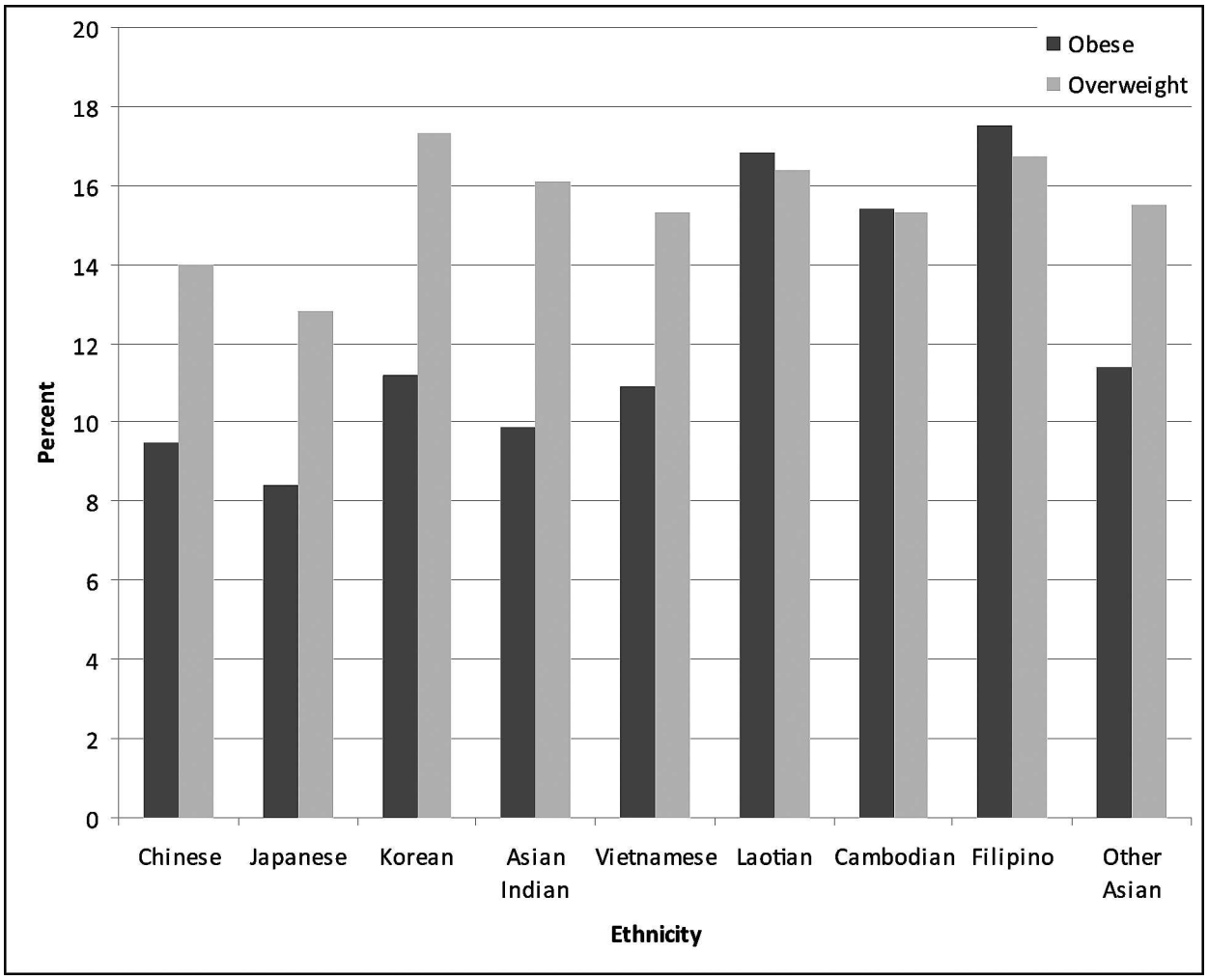

Fig 2. Prevalence of obesity and overweight among disaggregated/ethnic Asian subgroup 5th, 7th and 9th grade students (*n*=54,280), Los Angeles County, 2006–2007

Overall, more than 2 in 5 students (42.3%) were classified as overweight or obese.

Filipinos, Laotians and Cambodians were identified as having the highest prevalence of obesity, at 17.5%, 16.8% and 15.4%, respectively (Figure 2). The lowest prevalence was seen among Chinese (9.5%) and Japanese (8.4%). After disaggregating Pacific Islanders into ethnic subgroups, 48.6% of Samoans were found to be obese, followed by 27.8% of Tahitians, 22.1% of Native Hawaiians, 17.2% of Guamanians, and 31.1% of other Pacific Islanders (Figure 3). Heterogeneity among API subgroups was found ($P<.01$).

The prevalence of overweight students among APIs was 15.7% overall. Among Asians, the overweight prevalence was 15.5%, while it was 20.3% among PIs (Figure 1). Among the disaggregated Asian group, the overweight prevalence was highest in Koreans (17.3%) and lowest in Japanese (12.8%) (Figure 2). Among the disaggregated Pacific Islander group, the prevalence of overweight was highest in Guamanians (21.1%) and lowest in Native Hawaiians (16.4%) (Figure 3).

DISCUSSION

Obesity is a significant and underrecognized problem among APIs, and reporting of data in aggregated form has contributed to masking high obesity prevalence among many API subgroups, most particularly among Pacific Islander subgroups. The underrecognition of obesity as a significant health condition among APIs may be perpetuated in part by continuing perceptions of an Asian

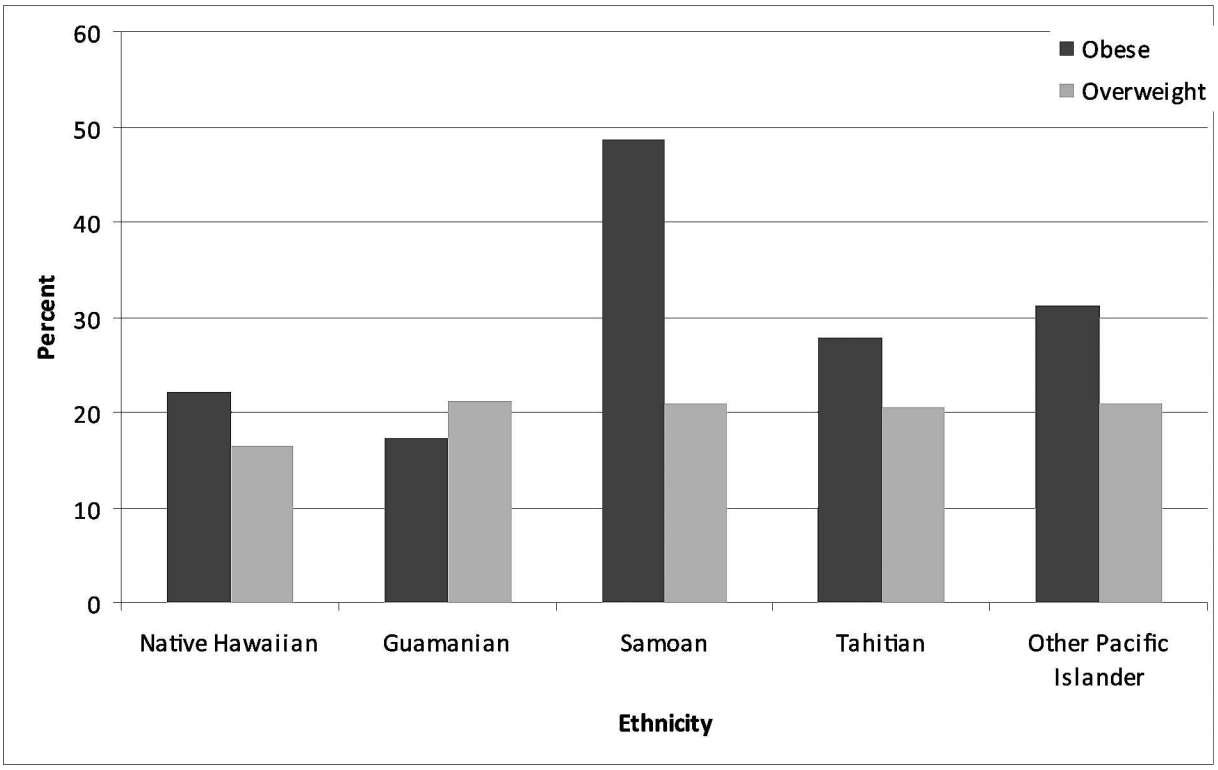

Fig 3. Prevalence of obesity and overweight among disaggregated/ethnic Pacific Islander subgroup 5th, 7th and 9th grade students (*n*=2,767), Los Angeles County, 2006–2007

model minority, which lend to the view that APIs uniformly experience better health than other racial or ethnic groups and are able to consistently obtain good medical care.[22] Furthermore, although obesity prevalence appears lower among some Asian ethnic subgroups relative to other races and ethnicities, studies have shown that Asians experience increased morbidity, as well as higher all-cause and obesity-related mortality at lower BMIs compared to other groups.[13,23,24] This may be in part because Asians appear to have higher visceral fat and lower hip muscle mass, leading to an increased waist-hip ratio; waist-hip-ratio is associated with a higher prevalence of insulin resistance, type 2 diabetes, and other chronic conditions.[16,25] Overweight, along with obese, API children and adolescents may be at increased risk for the aforementioned conditions when considering that APIs experience metabolic disorders at lower BMIs than their Caucasian counterparts. Deurenberg et al assessed the discrepancy between BMI and percent body fat and found that BMI's among Chinese, Indonesians and Thais were lower by 1.9, 3.2 and 2.9 kg/m^2, respectively, compared to their Caucasian counterparts for the same percentage of fat, after accounting for age and sex.[26] These and other studies have fueled debate about the need for country- or ethnicity-specific BMI cut-offs, particularly among Asian populations.[13,16,24]

Culture, language, beliefs, and lifestyles distinguish race and ethnic groups. These ethnic elements also have major influences on diet, physical activity, and obesity. Attitudes and behaviors specific to these ethnic subgroups are important components to the epidemic of childhood obesity. For example, Pacific Islander women may be more likely than women of other ethnic groups to accept their bodies regardless of size. One study found that large Samoan women felt more attractive and stronger than their identical weight Australian counterparts.[27] In other cultures, consumption of meat is associated with wealth and prosperity,[28] and high socioeconomic status may be positively or negatively associated with childhood obesity depending on cultural factors and degree of acculturation.[29] Beyond dietary and physical activity modifications, special consideration must be given to prevalent attitudes and behaviors unique to specific cultures in which body size and body image have different implications or connotations in relation to health.

The main strength of our study was use of a large, unique dataset that provides measured height and weight at an ethnic subgroup level for children and adolescents on an annual and mandatory basis. However, there were several limitations to our study. First, while use of mandatory testing data may help minimize selection bias, there is still potential bias due to nonparticipa-

tion among students who could not or opted not to participate in the physical fitness testing. This may have been due to several factors including, but not limited to, absence, medical excuse, or disability, which may be more common among overweight, obese and underweight students. However, student participation rates in fitness testing over the past several years have consistently been over 90%. Second, little information was available on the level of training provided to the persons performing the height and weight measurements and the variability due to measurement error or measurement bias, though recent efforts have been undertaken to improve and standardize the level of training. Third, the dataset did not have information available on biracial or multiracial individuals, which comprise a growing percentage of students. Finally, BMI can only serve, at best, as a proxy for body fatness, since it does not sufficiently account for the variation in percent body fat and lean muscle mass, bone density, or fat distribution.

Educational, political, institutional and governmental entities should recognize the growing epidemic of childhood obesity in the ethnic subgroups revealed in this analysis. Over 100 different dialects and 45 ethnicities are represented in the API ethnic group, and this cultural diversity, combined with the high variability in observed obesity and overweight prevalence, emphasize the necessity of tailored interventions and should prompt closer monitoring of higher risk groups as well as stimulate further research into the root causes of these differences. As the US API population is expected to double by 2025[14], public health and healthcare providers need to anticipate the increasing prevalence of obesity and related chronic conditions that may arise in this stereotypically healthy API population at lower BMIs than previously considered. As Ghosh points out, the term API is a political construct rather than a cultural or biological term, and this is evidenced by the diversity of diseases and disease burden experienced within the different subpopulations.[22] As policies and interventions are developed for this rapidly growing group, more data and research relating to the many different API subpopulations will be needed to provide a basis for evidence-based prevention and treatment strategies. We hope that this study will promote increased awareness of the need for disaggregated racial/ethnic data and spur further action toward developing and applying ethnically appropriate interventions and obesity prevention strategies to improve health outcomes in these communities and in clinical settings.

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Acquisition of data: Kwan, Shih
Data analysis and interpretation: Shabbir, Kwan, Wang, Shih, Simon
Manuscript draft: Shabbir, Kwan, Wang, Shih
Statistical expertise: Shabbir, Shih
Acquisition of funding:
Administrative, technical, or material assistance: Shabbir, Kwan, Simon
Supervision: Kwan, Shih, Simon