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American Heart Association's Ideal Cardiovascular Health Metrics in Under-Represented Asian Americans

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Abstract

The American Heart Association's ideal cardiovascular health score is based on 7 cardiovascular health metrics to measure progress toward their Impact Goal of reducing cardiovascular disease by 20 % before 2020. This study applied this construct to assess cardiovascular health in a sample of Asian Americans. Convenience sampling methods were used to enroll self-identified Asian American's over the age of 18 years who were attending community health fairs across the greater Philadelphia and urban areas of New Jersey. The heart health metrics of tobacco use, body mass index, physical activity, diet, blood pressure, and glucose were measured. In the greater sample (N = 541), 82 % were female, the mean age was 65.1 (SD = 15.5) years, 45 % were Vietnamese, 38 % were Chinese and 17 % were Korean. Prevalence of ideal heart health for the metrics of tobacco use (95 %) was high. Only 19.4 % achieved ideal levels of physical activity, 35.1 % for BMI, 28.9 % for glucose and 66 % for blood pressure. Dietary intake was ideal for 20.7 % of the sample. More years since migration and Korean race trended toward having a higher prevalence of poor health in some metrics. Most Asian Americans are not achieving ideal cardiovascular health for several of the metrics evaluated, with those residing in the United States for more than 13 years and Korean Americans being higher-risk groups. Targeted community based intervention approaches to improving and monitoring heart health in Asian American, and Asian American subgroups, are needed.

Keywords

Cardiovascular health; Asian American; Migrant health; Ideal heart health; Korean American

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Conflict of interest The authors have no conflicts of interest to disclose.

Compliance with Ethical Standards

Ethical Standards 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.

Introduction

Almost 5 % of Asian and Pacific Islander (API) adults have coronary heart disease (CHD) while cardiovascular diseases (CVD) account for one-third of all deaths in this group [1]. Almost 20,000 API adults die each year from CVD and given that the Asian American population in the United States is expected to more than double by the year 2050 [2], the burden of CVD in API adults is expected to grow exponentially in the absence of more effective clinical and population interventions. The American Heart Association (AHA) has set a goal of improving the cardiovascular health of all Americans by 20 % by the year 2020 [3]. With this goal, the AHA has defined ideal cardiovascular health (CVH) as the simultaneous presence of four ideal health behaviors (nonsmoking, body mass index (BMI) < 25 kg/m^2, physical activity at goal level, diet consistent with current guideline recommendations) and three ideal health factors (untreated total cholesterol <200 mg/dL, untreated blood pressure <120/<80 mmHg, untreated fasting glucose <100 mg/dL) [3]. To date, the prevalence of these ideal heart health metrics in the Asian American population or subgroups has not been ascertained, thus progress toward achieving a CVH improvement of 20 % among Asian Americans is not clear.

Epidemiological evidence clearly points to Asian Americans having a different cardiovascular disease and risk factor profile as compared to Caucasian groups. For example, mortality from ischemic heart disease (IHD) among Asian groups is 1.5 times higher than the general population [4] while South Asian groups are 1.91 times more likely to have diabetes than whites [5]. Prevalence of CHD and stroke is considerably lower—2.9 and 1.8 %, respectively for Asian Americans as compared to whites (6.5 and 2.7 %) [6] yet, Asian Americans have a higher mortality and die earlier from stroke than whites [1]. In terms of CVD risk factors, fewer Asian Americans are current smokers (9.6 %) as compared to non-Hispanic Blacks (18.3 %) and Whites (19.4 %) [7]. Asian Americans are three times less likely to be overweight or obese than Whites [8], but weight gain may be disproportionately associated with increased risk of hypertension and diabetes in this group [9].

A limitation of much of the epidemiological examinations of CVD in Asian Americans to date has been the failure to consider subgroups (e.g., Asian Indian, Chinese, Filipino, Korean, Japanese and Vietnamese) among this diverse population, thus less is known about variation in CVD disease and risk factor prevalence between these groups [10]. In the small number of studies that have considered Asian American subgroups, data do show distinct variation. For example, the adjusted odds of coronary heart disease is higher for Filipino adults and Asian Indian men, but lower for Chinese adults than Caucasians [11], while National Health Interview Survey data show a high prevalence of hypertension among Japanese and Filipinos. Clearly, sub-group heterogeneity in CVD disease and risk factor prevalence exists in the Asian American population and remains to be more clearly elucidated [12–14].

Together these lines of work converge with repeated calls from the American Heart Association [13] and other health organizations to address cardiovascular disease, and in particular the heterogeneity in cardiovascular health behaviors and risk factors across Asian

American subgroups. To this end, it is the purpose of this paper to report the prevalence of cardiovascular health for the AHA defined metrics of tobacco use, dietary intake, physical activity, body mass index, blood pressure and glucose levels in an urban sample of Vietnamese, Korean and Chinese Asian Americans. Variation in the prevalence of the cardiovascular health metrics by age, sex, years since migration and English language proficiency will also be explored. Data from this descriptive analysis will be the first to quantify the status of heart health in a heterogeneous sample of underrepresented Asian Americans using the AHA metrics.

Methods

Study Design and Participants

Study participants were recruited from community-based gatherings, health fairs and other health educational workshops held by Center for Asian Health and Asian Community Health Coalitions' 18 member organizations that serve Chinese, Korean and Vietnamese communities in the greater Philadelphia and New Jersey regions. Community-based organizations involved in this study serve important social functions and represent a feasible and effective milieu for reaching the targeted Asian-American subgroups. Self-identifying Asian Americans who aged 18 years and older were invited to participate in the study.

Data Collection Procedures

Data collection was carried out in 2013 and 2014. Prior to data collection, training on study aims, recruitment strategies, and guidelines for administration of the research instrument and accuracy were introduced to all data collection staff. All measures in English were translated, back-translated and pretested in native language to ensure the scientific and cultural appropriateness of the instrument for community participants. English and native language versions were both provided and bilingual assistance was available at all sites.

Participants completed the survey in their own native language or English. The self-report survey took approximately 5–10 min to complete. The physiologic heart health metrics of blood pressure, non-fasting glucose levels, body weight and height were assessed in a sub-sample.

Study Measures

Consistent with the AHA definition [3], the cardiovascular health metrics of tobacco use, BMI, physical activity, dietary intake, blood pressure and glucose. For each of these heart health metrics, the prevalence of ideal, intermediate and poor health status were calculated as follows:

(1) Current smoking—Participants were classified as current or smokers from a single survey item; "Have you smoked a cigarette or used any form of tobacco in the last month?". Responses coded for "Yes" and "No". Non-smokers were classified as ideal, while current smokers were considered as poor health.

(2) Body mass index—BMI was calculated as measured weight (kilograms) divided by the square of measured height (meters). BMI was classified as ideal

(<22.9 kg/m^2), intermediate (23–26.9 kg/m^2) or poor (≥27 kg/m^2) using thresholds for Chinese adults [15].

(3) Physical Activity—The International Physical Activity Questionnaire Short Form (IPAQ-SF) was used to assess minutes of moderate and vigorous activity in a typical week. The IPAQ-SF has acceptable psychometric properties (reliability correlation = .8; criterion validity correlation = .3) [16]. Participants with ≥150 min/week moderate or ≥75 min/week vigorous or ≥150 min/week moderate + vigorous activity were considered to have ideal health. Intermediate health was classified as accruing 1–149 min/week moderate or 1–74 min/week vigorous or 1–149 min/week moderate + vigorous activity. Poor health was defined as 0 min/week of moderate or vigorous activity.

(4) Healthful Diet was defined based on meeting thresholds for fruit and vegetable (≥4.5 cups/day of fruits and vegetables), fish (≥3.5 oz servings/week of fish), whole grains (≥three 10z servings a day), sugar sweetened beverage (<4 glasses a week) and sodium (<1500 mg/day) consumption. A count of the number of healthful diet criteria was generated for this metric.

(5) Resting blood pressure was measured using Omron IntelliSense Blood Pressure Monitor, Model HEM-907XL. Ideal blood pressure was classified as <120/80 mmHg, intermediate as 120–139/80–88 mm Hg and poor as ≥140/90 mmHg. For analysis, intermediate and poor groups were combined.

(6) Glucose levels were measured using Bayer Contour blood glucose monitoring machine which needs 0.3-to 1.5-μL drop of capillary blood from fingertip with a test strip to get the results. The measurement results are typically displayed as plasma glucose equivalents according to the IFCC recommendation. Ideal glucose levels were classified as <100 mg/dL, intermediate levels were 100–125 mg/dL and poor was ≥126 mg/dL.

The demographic variables of age, sex, ethnic identity (Korean, Chinese, Vietnamese), years residing in the United States and English proficiency were also measured. Years residing in the United States was collected as a continuous value in response to the question: “How many years have you lived in the US?” and for analytic purposes categorized into tertiles (lowest, middle and upper tertile). English proficiency was collected as a 4-point likert scale response (ranged from not at all, not very well, well to very well) to the single item: item “How well do you speak English?”. For analysis, the not at all and not very well likert options were collapsed to represent low proficiency and the well and very well items combined to reflect high proficiency.

Statistical Methods

The prevalence (%) of ideal, intermediate and poor heart health was generated for all heart health metrics. Prevalence of 0, 1, 2, 3, 4 health diet components was also generated. Prevalence of heart health metrics by sex, race, age, years since migration and English proficiency were calculated and group differences estimated using Fisher’s exact tests. Data analysis was conducted using STATA 14.1.

Results

Sample Sizes and Demographic Characteristics

The obtained sample size for each of the heart health metrics is as follows: healthful diet (n = 541); tobacco use (n = 519); physical activity (n = 335); BMI (n = 94); glucose levels (n = 90); and blood pressure (n = 73). In the largest sample (N = 541), the mean age was 65.1 years (SD = 15.5) and 82 % were female. In terms of racial composition, 45 % self-reported being Vietnamese, 38 % Chinese and 17 % Korean.

Prevalence of Heart Health Metrics

Overall, 95 % of the sample were non-smokers and 5 % reported smoking at least one cigarette in the last 30 days (Table 1; smoking history was not available for coding intermediate category of former smoker). Approximately one-third (35 %) had a BMI that was categorized as ideal for Asian groups (≤22.9 kg/m^2), 48 % had an intermediate BMI (i.e., were overweight) and 17 % had a poor BMI (i.e., were obese).

In terms of physical activity, one in five (19.4 %) achieved the ideal, recommended status, of at least 150 min of moderate activity or at least 75 min of vigorous activity per week. Almost three-quarters of the sample (72.2 %) had a physical activity level that met the criteria for intermediate heart health while 8.4 % reported no moderate or vigorous activity and so were classified as poor for physical activity.

Twenty percent of the sample achieved four healthy diet components, 35.3 % achieved three, 30.5 % achieved two, 11.0 % achieved one while 2.6 % achieved 0 healthy diet components. Thirty-four percent of the sample had moderate and poor blood pressure reading (120 to ≥140/80 to ≥90 mmHg) and sixty-six percent of the sample achieved an ideal blood pressure reading (<120/80 mmHg). However, only 28.9 % achieved an ideal plasma glucose reading. Almost half the sample (48.9 %) had poor glucose level and 22.2 % had a moderate glucose level.

Variation in Cardiovascular Health Metrics by Sex, Age and Race

Significant sex differences in the heart health metric of tobacco use was seen where a greater proportion of males reported being a current smoker as compared to females (12.0 vs. 3.5 %, respectively; Fisher's exact test $p = 0.002$). No other heart health metrics varied by sex (Table 1).

In terms of age, while no significant differences in heart health metrics across the different age categories were observed, a trend for older Asian Americans to achieve the maximum four healthy diet components was observed. Specifically, only 8.6 % of 18–39 year olds achieved the four health diet components as compared to 25.6 % 40–59 year olds and 21.8 % of those aged 60 and above (Fisher's exact test $p = 0.068$).

Ethnic subgroup differences in the heart health metrics of tobacco use, physical activity and dietary intake were observed such that a greater proportion of Koreans qualified as having the poor status (Table 2). Ten percent of Koreans as compared to 5.4 % of Vietnamese and 2 % of Chinese sampled reported being current smokers (Fisher's exact test $p = 0.011$).

Twelve percent of Koreans as compared to 8.3 % of Vietnamese and 6.5 % of Chinese had poor levels of physical activity (Fisher's exact test $p = 0.002$). Eleven percent of Korean as compared to 0.4 % of Vietnamese participants reported having 0 healthy diet components (Fisher's exact test $p < 0.001$). Thirty-four percent of Koreans had poor blood pressure levels (Table 3).

Variation in Cardiovascular Health Metrics by Years Since Migration and English Proficiency

No significant variation in years since migration and English proficiency in the prevalence of ideal, intermediate and poor status for each of the heart health metrics was observed. However, more years since migration did approach statistically significant differences for tobacco use and physical activity levels. For example, current smoking was higher in the middle (14–23 years since arriving in the United States) and upper tertiles (26–66 years since arriving in the United States) (6.4 and 6.6 %, respectively) as compared to the lowest tertile (0.5–13 years since arriving in the United States; 2.1 %) (Fisher's exact test $p = 0.075$). Similarly, 12 % of the upper tertile for years since migration group reported poor levels of physical activity as compared to 5.6 % of the lowest tertile group (Fisher's exact test $p = 0.068$).

Discussion

Cardiovascular disease remains as the third leading cause of death both globally and in the United States [17, 18]. Given that Asian Americans represent the fastest growing population in the United States [2], and that the cardiovascular disease and risk behavior profile differs for this group as compared to Caucasians and African Americans [1], elucidating the prevalence of cardiovascular health metrics in Asian American, and Asian American subgroups, represents an important step toward defining heart health status in this understudied and underrepresented population [13]. With that, the main findings from this analysis are that the metric of tobacco use presented the most basis for optimism with 95 % of the sample achieving the ideal status (i.e., non-smokers). Of concern, however, is that only 19.4 % achieved ideal status for physical activity, 28.9 % for glucose levels, 35 % for body mass index while 20.7 % achieved 4 healthy diet components. These data are some of the first to define the status of heart health in an Asian American population, and as such identify priorities for preventive clinical and community interventions in this group.

The low prevalence of tobacco use as well as the relatively high proportion of Asian Americans meeting all four of the health diet components measured in this study presents some optimism for the state of heart health in this group. Nationally, approximately one in ten Asian Americans report current smoking (9.6 %) with rates higher in men (15.1 %) than women (4.8 %) [7]. The prevalence of tobacco use in the current study was lower than these national rates with 5 % of the total sample, 12.0 % of men and 3.5 % of women reporting current smoking. National USA data suggest that only between 0.2 and 2.6 % achieve four health diet components and only 1.6 % in Chinese samples, [19] thus that 20.7 % of the current sample reported meeting this threshold is encouraging.

In contrast to the encouraging status for tobacco use and dietary intake metrics, only 19.4 % of the study sample met physical activity recommendations and one-third were hypertensive or pre-hypertensive. By comparison, 49.2 % of American adults (residing in the US) [20], and 82.4 % of adults residing in China [21] reported achieving ideal status for physical activity. Thus, that only one in five of the current sample reported meeting the threshold for ideal in this criteria suggests that inadequate physical activity is a priority criteria for this Asian American population. With regard to blood pressure, approximately one-third of the current sample were hypertensive or pre-hypertensive (had a measured blood pressure of ≥120/80 mm Hg or higher), these rates are higher than those reported in other studies of Asian-American samples [22] suggesting that blood pressure management and control is also important.

Data from the current study showed that 65 % were either overweight or obese (using thresholds for Asian–American groups). While this prevalence is high, it does converge with national data showing that 68.5 % of Americans meet the criteria for poor BMI as defined by being overweight or obese [23]. However, national data also show that 33.8 % of Chinese adults meet the threshold for overweight or obesity [21]. Thus, it would seem that Asian Americans in the current sample have a BMI status that is more in line with the national data, and as such is a basis for concern.

Almost three-quarters of the current sample (71 %) had a random glucose level that qualified them as having intermediate or poor glucose levels as defined by the AHA. While only a sub-sample completed the glucose testing in this study (N = 90), this prevalence is still considerably higher that the 31.2–42.9 % of a national American sample [19] and the 40 % of a national Chinese sample [21] that achieved this classification for glucose levels.

Another important finding in the current study is that Asian Americans of Korean origin and those who have resided in the US for longer showed some signs of being more vulnerable to poor status on some of the heart health metrics. For example, a higher proportion of Korean participants reported being current smokers, and having poor levels of physical activity. In terms of years since migration, participants in the middle and upper tertiles had a higher prevalence of poor blood pressure and trended toward having a higher prevalence of current smoking and poor physical activity levels. While these findings are descriptive they do converge with an extensive literature suggesting that time since migration is negatively associated with health status [24, 25]. Data suggest that compared to other Asian American groups, Koreans have the lowest rate of employer sponsored health insurance and the lowest access to health care resources [26], as such they may be particularly vulnerable to poor health behaviors and outcomes, such as overweight and hypertension.

These data present several clinical and population considerations for cardiovascular health in Asian Americans and Asian American subgroups. These data suggest that poor heart health is highly prevalent for BMI, hypertension, physical activity, and glucose levels in this sample of Asian Americans; as such, systematic and targeted approaches to addressing these critical metrics in this population are warranted. Systematic approaches that consider factors including access to health care, literacy and language [27, 28] are needed to address metrics

such as BMI, physical activity, hypertension, and glucose that are complex and multi-factorial.

In terms of developing targeted approaches to improving cardiovascular health, these data converge with previous work demonstrating that Asian Americans are a heterogeneous population [11, 14]. Specifically, given the findings that longer time since migration trended toward higher prevalence for some of the cardiovascular health metrics (blood pressure, tobacco use, physical activity), these constructs could, hypothetically, be used to inform predictive, personalized, preemptive, and participatory approaches to improving cardiovascular health in this population [29].

While the data from this study do provide a first snapshot of the prevalence of heart health metrics in a sample of Asian Americans, they should be interpreted with consideration of the fact that convenience sampling was used in this study. Further, cholesterol levels were not assessed, and the sample size for some of the metrics (e.g., blood pressure) was relatively smaller. The variation in sample size across the different metrics also precluded the calculation of a summary heart score for the sample. Further, since only Asian American's were included in this study, direct comparisons of the prevalence of cardiovascular health metrics with other racial groups was not possible. Despite these limitations, this study convincingly indicates that poor dietary intake, physical inactivity, hypertension and overweight status are cardiovascular priorities for Asian American groups, and that Korean Americans and those Asian Americans who have been in the US longer, may be particularly high-risk populations. Systematic and targeted prevention approaches to monitoring and improving these heart health metrics in Asian Americans are needed if the 20 % improvements in heart health by 2020 are to be realized.

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Table 1

Prevalence of ideal, intermediate, and poor heart health metrics, overall and by sex [N (%)]

Heart health metric	Total	Sex		Fisher's exact test
		Male	Female	
Age in years (M, SD)	56.1 (15.5)	61.5 (13.9)	54.9 (15.6)	
Tobacco use				
Ideal (non-smoker)	498 (95.0)	81 (88.0)	415 (96.5)	
Poor (current smoker)	26 (5.0)	11 (12.0)	15 (3.5)	0.002
Body mass index (BMI)				
Ideal (≤22.9 kg/m^2)	33 (35.1)	9 (24.3)	24 (42.1)	
Intermediate (23–26.9 kg/m^2)	45 (47.9)	21 (56.8)	24 (42.1)	
Poor (≥27 kg/m^2)	16 (17.0)	7 (18.9)	9 (16.0)	0.225
Physical activity				
Ideal (≥75 min/week vigorous, ≥150 min/week moderate, or equivalent combination)	65 (19.4)	13 (20.0)	52 (19.5)	
Intermediate (1–74 min/week vigorous, 1–149 min/week moderate, or equivalent combination)	242 (72.2)	44 (67.7)	195 (73.0)	
Poor (no moderate and vigorous activity)	28 (8.4)	8 (12.3)	20 (7.5)	0.402
Diet				
4 Healthy components	112 (20.7)	18 (18.6)	94 (21.4)	
3 Healthy components	191 (35.3)	33 (34.0)	156 (35.5)	
2 Healthy components	165 (30.5)	38 (39.2)	126 (28.6)	
1 Healthy component	59 (11.0)	6 (6.2)	53 (12.1)	
0 Healthy component	14 (2.6)	2 (2.1)	11 (2.5)	0.223
Blood pressure				
Ideal (<120/80 mm Hg)	48 (65.8)	19 (73.1)	29 (61.7)	
Moderate (120–139/80–88 mm Hg) and poor (≥140/90 mm Hg)	25 (34.2)	7 (26.9)	18 (38.3)	0.236
Random plasma glucose				
Ideal	26 (28.9)	11 (31.4)	15 (27.3)	
Moderate	20 (22.2)	9 (25.7)	11 (20.0)	
Poor	44 (48.9)	15 (42.9)	29 (52.7)	0.665

Table 2

Prevalence of ideal, intermediate, and poor heart health metrics, by age and race category [N (%)]

Characteristic	Age			Fishers exact test	Race			Fishers exact test
	18–39	40–59	60+		Chinese	Korean	Vietnamese	
Tobacco use								
Ideal (non-smoker)	87 (96.7)	176 (94.1)	230 (95.0)		192 (98.0)	78 (90.0)	228 (94.6)	
Poor (current smoker)	3 (3.3)	11 (5.9)	12 (5.0)	0.717	4 (2.0)	9 (10.0)	13 (5.4)	0.011
Body mass index (BMI)								
Ideal (ideal ≤22.9 kg/m^2)	2 (50.0)	12 (42.9)	19 (30.6)		3 (75.0)	30 (33.3)	N/O	
Intermediate (23–26.9 kg/m^2)	1 (25.0)	12 (42.9)	32 (51.6)		0 (0)	45 (50.0)	N/O	
Poor (≥27 kg/m^2)	87 (96.7)	4 (14.3)	11 (17.7)	0.643	1 [25]	15 (16.7)	N/O	0.078
Physical activity								
Ideal (≥75 min/week vigorous, ≥150 min/week moderate, or equivalent combination)	8 (12.9)	26 (22.2)	31 (20.0)		19 (17.8)	22 (37.3)	24 (14.2)	
Intermediate (1–74 min/week vigorous, 1–149 min/week moderate, or equivalent combination)	48 (77.4)	80 (68.4)	113 (72.9)		81 (75.7)	30 (50.9)	131 (77.5)	
Poor (no moderate and vigorous activity)	6 (9.7)	11 (9.4)	11 (7.1)	0.557	7 (6.5)	7 (11.9)	14 (8.3)	0.002
Diet								
4 Healthy components	8 (8.6)	50 (25.6)	54 (21.8)		48 (23.7)	23 (25.0)	41(16.7)	
3 Healthy components	38 (40.9)	64 (32.8)	86 (34.7)		59 (29.1)	38 (41.3)	94 (38.2)	
2 Healthy components	32 (34.4)	55 (28.2)	78 (31.5)		67 (33.0)	21 (22.8)	77 (31.3)	
1 Healthy component	11 (11.8)	22 (11.3)	25 (10.1)		23 (11.3)	7 (7.6)	29 (11.8)	
0 Healthy component	4 (4.3)	4 (2.1)	5 (2.0)	0.068	6 (3.0)	3 (3.1)	5 (2.0)	0.156
Blood pressure								
Ideal (<120/80 mm Hg)	1 (100)	9 (40.9)	38 (76.0)		N/O	48 (65.8)	N/O	
Moderate (120–139/80–88 mm Hg) and poor (≥140/90 mm Hg)	0 (0)	13 (59.1)	12 (24.0)	0.006	N/O	17 (23.3)	N/O	N/A
Random plasma glucose								
Ideal	1 (33.3)	4(15.4)	21 (34.4)		N/O	26 (28.9)	N/O	
Moderate	1 (33.3)	6 (23.1)	13 (21.3)		N/O	20 (22.2)	N/O	
Poor	1 (33.3)	16 (61.5)	27 (44.3)	0.308	N/O	44 (48.9)	N/O	N/A

Table 3

Prevalence of ideal, intermediate, and poor heart health metrics, by years since migration and English proficiency [N, (%)]

Characteristic	Years since migration			Fishers exact test	English proficiency		Fishers exact test
	Lowest tertile (0.5–13 years)	Middle tertile (14–23 years)	Upper tertile (24–66 years)		Low	High	
Tobacco use							
Ideal (non-smoker)	184 (97.9)	162 (93.6)	142 (93.4)		330 (94.8)	99 (97.1)	
Poor (current smoker)	4 (2.1)	11 (6.4)	10 (6.6)	0.075	18 (5.2)	3 (2.9)	0.259
Body mass index (BMI)							
Ideal (ideal ≤22.9 kg/m^2)	6 (35.3)	9 (37.5)	18 (34.0)		12 (27.3)	2 (50.0)	
Intermediate (23–26.9 kg/m^2)	7 (41.2)	10 (42.7)	28 (52.8)		24 (54.6)	2 (50.0)	
Poor (≥27 kg/m^2)	4 (23.5)	5 (20.8)	7 (13.2)	0.748	8 (18.2)	0 (0)	0.626
Physical activity							
Ideal (≥75 min/week vigorous, ≥150 min/week moderate, or equivalent combination)	14 (13.0)	26 (22.6)	25 (23.2)		41 (18.6)	9 (12.0)	
Intermediate (1–74 min/week vigorous, 1–149 min/week moderate, or equivalent combination)	88 (81.5)	80 (69.6)	70 (64.8)		165 (74.7)	56 (74.7)	
Poor (no moderate and vigorous activity)	6 (5.6)	9 (7.8)	13 (12.0)	0.068	15 (6.8)	10 (13.3)	0.133
Diet							
4 Healthy components	31 (16.1)	40 (22.2)	39 (24.8)		71 (19.8)	23 (21.9)	
3 Healthy components	61 (31.6)	67 (37.2)	59 (37.6)		118 (32.9)	42 (40.00)	
2 Healthy components	71 (36.8)	49 (27.2)	41 (26.1)		118 (32.9)	29 (27.6)	
1 Healthy component	26 (13.5)	18 (10.0)	14 (8.9)		44 (12.3)	7 (6.7)	
0 Healthy component	4 (2.1)	6 (3.3)	4 (2.6)	0.188	8 (2.2)	4 (3.8)	0.248
Blood pressure							
Ideal (<120/80 mmHg)	6 (75.0)	12 (60.0)	30 (66.7)		21 (61.8)	1 (33.3)	
Moderate (120–139/80–88 mm Hg) and poor (≥140/90 mm Hg)	2 (25.0)	8 (40.0)	15 (33.3)	0.815	13 (38.2)	2 (66.7)	0.356
Random plasma glucose							
Ideal	5 (35.7)	5 (20.8)	16 (30.8)		10 (25.0)	0	
Moderate	3 (21.4)	8 (33.3)	9 (17.3)		11 (27.5)	2 (50.0)	
Poor	6 (42.9)	11 (45.8)	27 (51.9)	0.561	19 (47.5)	2 (50.0)	0.672