



## Research Article

# Assessing Overweight/Obesity, Dietary Habits, and Physical Activity in Hispanic College Students

Ulku S. Karabulut\*, Zasha Romero, Philip Conatser, Murat Karabulut

Department of Health and Human Performance, University of Texas at Rio Grande Valley, Brownsville, TX, USA

## Article Information

### History:

Received: December 2, 2017

Accepted: February 21, 2018

Published: March 12, 2018

### Keywords:

Diet

Hispanic college students

Obesity

Physical activity

## ABSTRACT

**Objectives:** This study examined the overweight, obesity, dietary habits, and physical activity among Hispanic college students.

**Methods:** Eighty seven (n=87, age= 24.03 ± 5.69) Hispanic college students participated in the study. Descriptive and anthropometric measurements including resting heart rate (RHR), resting blood pressure (RBP), height, weight, body mass index (BMI), circumference measurements [waist at narrowest point (Xiphoid), and hip at widest point (Hip)], body composition (BC) were collected. Subjects completed the Dietary Screener Questionnaire (DSQ). PA was estimated via Godin's (2011) Leisure-Time Exercise Questionnaire.

**Results:** The mean BMI was 27.29±6.20 kg/m<sup>2</sup>, in the overweight range. The mean WC for males was 90.86±13.23 and for females was 82.35±14.61. Independent t-test showed that males had significantly higher values in height (p<0.01), weight (p<0.01), WC (p<0.01), and PA (p<0.01) compared to females. DSQ data indicated that participants consumed fruits, green leafy or lettuce salad, and milk less than recommended amount. It also showed high intake of sugary food.

**Conclusions:** Hispanic young adults are in a poorest condition regarding the level of obesity as opposed to White and African American counterparts. This may be due to the decrease in PA. Diet behavior; less consumption of dairy, fruits and vegetable but frequent consumption of high sugary might be related to obesity in Hispanic young adults.

## INTRODUCTION

The years between 18 and 24 are generally considered transitional years during which college-students experience weight gain and decline in physical activity (PA) [1-3]. The high rates of overweight/obesity and lack of PA have been shown to contribute towards increasing risk of various chronic diseases including metabolic syndrome (MetS), type 2 diabetes (T2D), and coronary heart diseases (CHD) [4-5]. Thus, the increasing rates of overweight/obesity and physical inactivity are very likely positioning this young sec-

tor of the population at a greater risk of developing chronic disease. In fact, CHD was reported as the second leading cause of all natural deaths in young adults, ages 18-24, in the United States [6].

In the last decade, the obesity rates among the 18-29-year-old population with some college education, increased dramatically [7-8]. The National College Health Assessment surveyed more than 80,000 US college students and found 30% of them overweight or obese based on self-reported height and weight [9]. According to the Behavioral Risk Factor Surveillance, 43 % of 18 – 24 year olds reported engaging insufficient amounts or no PA, and 78% indicated consuming less than five servings of fruits and vegetables per day [10]. Strongly correlated to obesity and physical inactivity, 34% of US adults 20 years and older have reported having MetS [11].

Despite the growing evidence on increasing overweight

\*Correspondence: Ulku Karabulut, Department of Health and Human Performance, University of Texas Rio Grande Valley, One West University Blvd, Brownsville, TX USA 78520.  
E-mail address: ulku.karabulut@utrgv.edu

/obesity, physical inactivity, and risk of developing chronic diseases, college students were still reported as an understudied population [12-13]. Moreover, most of the research studies involving college students were limited by Caucasian or White population samples [12-16]. Evidence shows that various chronic diseases or related risk factors differ between races and ethnicities [17]. Specifically, overweight/obesity, dyslipidemia, and T2D were reported higher among the Hispanic population [11].

To our knowledge, no study has examined overweight/obesity rates, dietary choices, and PA level among Hispanic young adults. Therefore, understanding details about health-related variables and dietary habits will be valuable to determine the prevalence of several health issues among young Hispanic adults compared to other races. Therefore, the primary purpose of this study was to assess the rate of overweight/obesity, dietary habits, and PA among Hispanic college students.

## METHODS

### Subjects

Following IRB approval by the university's institutional review board (IRB # 2017-058-03), announcements were made in various undergraduate classes and flyers were posted at busy locations across campus. Hispanic college students between the ages 18 and 45 years were recruited for this study. Participating students were informed about the voluntary nature of the study and that they could withdraw at any time. A total of eighty-seven subjects (n=87, age=24.03 ± 5.69), 42 females and 45 males volunteered for this study and completed all required anthropometric measurements and assessments.

### Study design

Each subject read and signed the informed consent prior to participation in this study. Subjects visited the Exercise Physiology lab for anthropometric and descriptive measurements including age, ethnicity, gender, program/major, and

year in school, height, weight, resting heart rate (RHR), resting blood pressure (RBP), body composition (BC) (TAN-ITA), and two circumference measurements [waist at narrowest point (Xiphoid) (WC), and hip at widest point (Hip) (HC), alternated and taken twice] (Body composition is defined as the relative proportions of fat and lean mass in the body). Then, each subject completed a Dietary Screener Questionnaire (DSQ) [18]. DSQ contains questions about food that subjects ate or drank, it records dietary intake for the past 30 days. PA level was predicted via Godin's [19] Leisure-Time Exercise Questionnaire and total leisure activity score was calculated to quantify PA.

### Statistical Analysis

SPSS software version 24.0 (SPSS, Chicago, IL) was used for the analysis. Demographics were calculated using means and frequencies. Independent t-test) was used to examine the difference between genders for anthropometric measurements. Significance was set at  $p \leq 0.01$  for all tests.

## RESULTS

Participant demographics along with differences in the anthropometric measurements between males and females participating in the study are shown in Table 1. All participating subjects were Hispanic with a mean age of 24.03 years. Approximately, 51.7 % were males (n= 45) and 49.4 % were females (n=42). The mean BMI was in the overweight range (27.29±6.20 kg/m<sup>2</sup>), male mean BMI (27.77±5.81 kg/m<sup>2</sup>) was slightly higher than female mean BMI (26.78±6.62 kg/m<sup>2</sup>). Approximately 40.2 % (n=87) of the participants were in the normal BMI range. 5.7% were in extremely obese range, 22.9% (n=87) were obese, and 28.7%, (n=87) were in the overweight range. The remaining 2.29% (n=87) were underweight. Independent sample t-test showed that males had significantly higher values in height ( $p<0.01$ ), weight ( $p<0.01$ ), WC ( $p<0.01$ ), and PA ( $p<0.01$ ) compared to females.

**Table 1. Anthropometric measurements**

Characteristics	Total (n=87)	Female (n=42)	Male (n=45)
	Mean ± SD	Mean ± SD	Mean ± SD
Age (years)	24.03 ± 5.69	24.52 ± 6.67	23.58 ± 4.63
Weight (kg)	78.18 ± 23.86	68.96 ± 16.46	86.78 ± 26.52*
BMI	27.29 ± 6.20	26.78 ± 6.62	27.77 ± 5.81
SBP	120.44 ± 13.45	114.57 ± 10.92	125.91 ± 13.37
DBP	70.05 ± 9.04	71.12 ± 8.42	69.04 ± 9.57
RHR	74.84 ± 12.79	77.55 ± 9.96	72.31 ± 14.63
WC (cm)	86.75 ± 14.48	82.35 ± 14.61	90.86 ± 13.23*
HC (cm)	104.29 ± 11.52	106.02 ± 12.43	102.68 ± 10.49*
BC	24.09 ± 10.45	30.42 ± 9.02	18.18 ± 7.99

BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure, RHR, resting heart rate; WC, waist circumference; HC, Hip circumference; BC, Body composition.

Note: Sample sizes varied due to missing data for some measurements.

\* $P<0.001$

**Survey Measures**

Subjects completed the Dietary Screener Questionnaire (DSQ), developed by the National Cancer Institute of NIH. DSQ assesses the consumption frequency of key food items or groups but it does not estimate individual caloric intake specifically. It simply allows tracking major food group (e.g., fruit, milk, sugar sweetened beverages, high fat foods) consumption in one month.

The Godin’s [19] Leisure-Time Exercise Questionnaire assessment tool was used to predict subjects’ engagement in light, moderate, and vigorous PA during a typical 7-day period. A sum of time spent on strenuous, moderate, mild/light exercise is calculated based on responses provided to questions such as “During a typical 7-day period (a week),

how many times on average do you participate in the following types of exercise for more than 15 minutes during your free time: strenuous exercise (heart beats rapidly)?; Moderate exercise (not exhausting)?; Mild/Light exercise (minimal effort)?”. Participants’ DSQ survey responses and PA are shown in Table 2 and Table 3.

**DISCUSSION**

It is well documented that college years are marked by weight gain, unhealthy eating behaviors, and decrease in PA levels. Evidence also shows that overweight/obesity and related chronic diseases, for example T2D, are more prevalent among the Hispanic population [11]. There are relatively few

**Table 2.** Dietary questionnaire responses

Characteristics		Percentage (%)	Info from # of subjects
Income before taxes	Less than \$50,000	51%	83
During the past month how often you often did you Eat/drink			
Hot or cold cereal	2-3 times or less last month	64%	82
Have any milk	2-3 times or less last month	40%	81
Regular soda or pop	2 times per week or more	35%	83
100% pure fruit juice	2 times per week or more	27%	81
Coffee or tea with sugar or honey	2 times per week or more	41%	81
Sweetened fruit drinks, sports or energy drink	2 times per week or more	34%	80
Fruit (fresh, frozen or canned)	3-4 times per week or less	73%	80
Green leafy or lettuce salad	2 times per week or less	70%	80
Fried potatoes	2 times per week or more	36%	83
Other kinds of potatoes	2 times per week or more	30%	82
Beans (not green beans)	2 times per week or more	38%	82
Brown rice or cooked whole grains	2 times per week or more	25%	83
Other vegetables	2-3 times or less last month	34%	82
Salsa	2 times per week or more	42%	83
Pizza	1 time per week or more	23%	81
Tomato sauce	1 time per week or more	19%	81
Cheese	1 time per week or more	73%	81
Red meat	2 times per week or more	54%	81
Processed meat	2 times per week or more	43%	81
Whole grain bread	2-3 times or less last month	41%	83
Chocolate or candy	1 time per week or more	61%	83
Doughnuts or sweet rolls	1 time per week or more	29%	83
Cookies, cakes, pie, brownies	1 time per week or more	36%	83
Ice cream, frozen desert	1 time per week or more	25%	83
Popcorn	1 time per week or more	11%	83

Note: Sample sizes varied due to missing data for some responses.

**Table 3.** Physical activity

Characteristics	Total (n=80)	Female (n=41)	Male (n=39)
Active	65.0%	25.0%	40.0%
Moderately Active	17.5%	10.0%	7.5%
Inactive	17.5%	15.0%	2.5%

Active: 24 units or more, Moderately Active: 14-23 units, Inactive: Less than 14

Note: Sample sizes varied due to missing data for some responses.

similar studies conducted with college students, to the best of our knowledge; this is the first study with a Hispanic population.

In the current study, the findings indicated that more than half of the participants' BMI were within overweight and obese range (the combined overweight and obesity rate was 51%). Mean BMI for females was 26.78 kg/m<sup>2</sup> and for males 27.77 kg/m<sup>2</sup>. Conversely, Morrel et al. [20] examined a young adult predominantly White population at three land-grant universities and reported mean BMI for females at 24.5 kg/m<sup>2</sup> and males 23.8 kg/m<sup>2</sup>. In another study [21], African American college students' mean BMI ranges were reported at 27.8 kg/m<sup>2</sup> for females and 25.7 kg/m<sup>2</sup> for males. Overall, Hispanic young adult males have the highest mean BMI compared to its Caucasian and African American counterparts. Hispanic females, on the other hand, have the second highest average BMI following African American females. However, the difference is only by one point.

The mean WC for males and females were 90.86 and 82.35 respectively. The findings of the current study corroborate what has been reported previously regarding the prevalence of overweight and obesity among the Hispanic adult population [11] and also among non-Hispanic college students [12-15]. Mean WC for predominantly

White young adult males and females were 81.9 and 81.3 respectively. For African American males and females, WC measurement reported as 81.2 and 81.7. Hispanic young adults, both males and females, have the highest WC measurements compared to White and African American young adults.

According to Godin scale score, it was estimated that 65% of the participants were physically active. However, female PA level was considerably lower than male PA level. Only 25% females were in the active category as opposed to 40% of males. Similarly, 15% of females were in the sedentary category but only 2.5% of males were identified as such. Many of the research studies did not measure and reported PA levels among non-Hispanic college students.

Previous studies reported that college students do not meet recommendations for major food groups; daily intake of fruits and vegetables were well below recommendations in both men and women and the consumption of dairy servings per day is approximately half of the recommended amount [22-25]. Several studies have demonstrated that low intakes of fruits, vegetables, and dairy products are associated with increased body weight, BMI, and waist circumference [23-25], which can result in risk of obesity. This could be one of the responsible factors for high rates of overweight and obesity among college-aged Hispanic population.

USDA Dietary Guidelines 2015–2020 recommends daily consumption of two and a half cups of vegetables, two cups of fruits, and three cup of dairy for adults. Moreover, guidelines suggest limiting calories from added sugars and saturated fat for all age groups. However, DSQ survey results revealed that only 34% of the participants said that they consumed fruits-fresh, frozen or canned- 3-4 times per week or less in the past month. Not only fruit, but also

green leafy or salad consumption was below recommended amount. Green leafy or lettuce salad consumption reported as two times per week or less in a month for the majority of study participants (73%). Similarly, milk consumption was well below the suggested amount, only 40% reported having milk 2-3 times or less in the past month.

On the contrary, one time per week or more, 61% of students reported eating chocolate or candy, 36% of them eating cookies, cakes, pie, brownies, 29% of them having doughnuts. These findings corroborated with previously published research studies in college students. Overall, DSQ survey results in the current study revealed inadequate intake of fruits and vegetables as well as dairy, however, high sugary food consumption was rampant among Hispanic college students.

### **Strengths and Limitations**

To our knowledge, no study has investigated overweight/obesity rates, dietary choices, and PA level among Hispanic young adults. Therefore, investigating health-related variables and dietary habits in detail will be help in determining the prevalence of several health issues among young Hispanic adults compared to other races.

This study has several limitations. This study investigated eating habits of young Hispanic students via one time DSQ survey and reported diet choices of participants for the past month. Further studies should examine Hispanic students' lifestyle choices more in detail and examine the relationship among the obesity, HC, WC, PA, and diet. Furthermore, this study is limited by PA measurement. Further studies should utilize more objective measures to examine PA, such as the accelerometers.

### **CONCLUSIONS**

The findings of this study suggested that being overweight and obese for Hispanics young adults may be due to a decrease in PA throughout their college career. Moreover, food consumption data also revealed an important insight regarding their preference on key food group consumption: frequent consumption of high sugary food groups rather than dairy, fruits and vegetables. The findings of the current study also provide important information, because evidence suggests that Hispanic population is in the worst condition regarding the level of obesity compared to White and African American counterparts, which was highlighted by the BMI and WC measurements.

### **Conflicts of interest**

The authors declare no conflict of interest.

### **REFERENCES**

1. Racette SB, Deusinger SS, Strube MJ, Highstein GR, Deusinger RH. Changes in weight and health behaviors from freshman through senior year of college. *J Nutr Educ Behav.* 2008; 40(1): 39-42.

2. Vella-Zarb RA, Elgar FJ. The ‘freshman 5’: a meta-analysis of weight gain in the freshman year of college. *J Am Coll Health*. 2009; 58:161-166.
3. Doerksen SE, Umstattd MR, McAuley E. Social cognitive determinants of moderate and vigorous physical activity in college freshmen. *J Appl Soc Psychol*, 2009; 39(5): 1201-1213.
4. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, Nieman DC, Swain DP. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc*. 2007; 39(8): 1423-1434.
5. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN. Physical activity and public health: updated recommendations for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc*. 2011; 43(7):1334-1359.
6. Minino AM, Heron MP, Murphy SL, Kochanek KD: Deaths: final data for 2004. *Natl Vital Stat Rep*. 2007; 55:1-119.
7. Mokdad AH, Serdula MK, Dietz WH, Bowman BA, Marks JS, Koplan JP. The spread of obesity epidemic in the United States, 1991–1998. *JAMA*. 1999; 282(16): 1519-1522.
8. Mokdad AH, Ford ES, Bowman BA, Vinicor F, Bales VS, Marks JS. Prevalence of obesity, diabetes, and obesity-related health risk factors. *JAMA*. 2003; 289(1):76-79.
9. American College Health Association. American College Health Association National College Health Assessment Spring 2006 Reference Group data report (Abridged). *J Am Coll Health*. 2007; 55:195-206.
10. McCracken M, Jiles R, Blanck HM. Health behaviors of the young adult U.S. population: Behavioral Risk Factor Surveillance System, 2003. *Prev Chronic Dis*. 2007; 4:A25.
11. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2011 update: a report from the American Heart Association. *Circulation*. 2011; 123:e18-e209.
12. Huang TT, Kempf AM, Strother ML, et al. Overweight and components of the metabolic syndrome in college students. *Diabetes Care*. 2004; 27:3000-3001.
13. Burke JD, Reilly RA, Morrell JS, Lofgren IE. The University of New Hampshire’s Young Adult Health Risk Screening Initiative. *J Am Diet Assoc*. 2009; 109:1751-1758.
14. Huang TT, Shimel A, Lee RE, Delancey W, Strother ML. Metabolic risks among college students: prevalence and gender differences. *Metab Syndr Relat Disord*. 2007; 5:365-372.
15. Dalleck LC, Kjelland EM. The prevalence of metabolic syndrome and metabolic syndrome risk factors in college-aged students. *Am J Hlth Prom*. 2012; 27(1): 37-42.
16. Fernandes J, Lofgren IE. Prevalence of metabolic syndrome and individual criteria in college students. *J Am Coll Health*. 2011; 59:313-321.
17. Wang Y, Beydoun MA. The obesity epidemic in the United States—gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiol Rev*. 2007; 29(1): 6-28.
18. National Cancer Institute. Dietary Screener Questionnaire in the NHANES 2009-10. [http://appliedresearch.cancer.gov/nhanes/dietscreen/dsq\\_english.pdf](http://appliedresearch.cancer.gov/nhanes/dietscreen/dsq_english.pdf) (Accessed February 3, 2017)
19. Godin G, Shephard RJ. A Simple method to assess exercise behavior in the community *Can J Appl Sport Sci*. 1985; 10(3):141-146.
20. Morrell JS, Byrd-Bredbenner C, Quick V, Olfert M, Dent A, Carey GB. Metabolic syndrome: Comparison of prevalence in young adults at 3 Land-Grant universities. *J Am Coll Health*. 2014, 62(1):1-9.
21. Tope AM, Rogers, PF. Metabolic syndrome among students attending a historically black college: prevalence and gender differences. *Diabetol Metab Syndr*. 2013; 5(1):2.
22. Lowry R, Galuska DA, Fulton JE, Wechsler H, Kann L, Collins JL. Physical activity, food choice, and weight management goals and practices among U.S. college students. *Am J Prev Med*. 2000; 18(1):18-27.
23. Brunt A, Rhee Y, Zhonog L. Differences in dietary patterns among college students according to body mass index. *J Am Coll Health*. 2008; 56(6): 629-634.
24. Strong KA, Parks SL, Anderson E, Winett R, Davy BM. Weight gain prevention: identifying theory-based targets for health behavior change in young adults. *J Am Diet Assoc*. 2008; 108(10):1708-1715.
25. Poddar KH, Hosig KW, Nickols-Richardson SM, Anderson ES, Herbert WG, Duncan SE. Low-fat dairy intake and body weight and composition changes in college students. *J Am Diet Assoc*. 2009; 109(8):1433-1438.
26. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 – 2020 Dietary Guidelines for Americans. 8th Edition. 2015; <https://health.gov/dietaryguidelines/2015/guidelines/> (Accessed February 3, 2017)
27. Green JS, Grant M, Hill KL, et al. Heart disease risk perception in college men and women. *J Am Coll Health*. 2003; 51:207-211.
28. Mooney LA, Franks AM. Evaluation of community health screening participants’ knowledge of cardiovascular risk factors. *J Am Pharm Assoc*. 2009; 49(4): 529-537.