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The differential prevalence of obesity and related behaviors in two vs. four-year colleges.

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Abstract

The objective of this study was to determine whether obesity prevalence and weight-related behaviors (e.g., diet, physical activity) differ among students enrolled in two-year community/technical colleges and those attending four-year colleges/universities. This information could inform the development of intervention strategies. Through an existing surveillance system of Minnesota post-secondary education institutions, survey data were collected from 16,539 students from 27 campuses (14 two-year college campuses, 13 four-year college/university campuses; 2007-2008), including self-reported physical activity, media use, dietary patterns, weight control behaviors, height and weight. Unadjusted analyses indicated that students enrolled in two-year colleges, particularly females, had a higher prevalence of overweight/obesity, lower levels of physical activity, more television viewing, higher intakes of soda, fast food, and diet pills compared to students attending four-year colleges ($p < 0.05$). Females attending four-year colleges were more likely to engage in certain unhealthy weight control behaviors (taking diet pills, binge eating, self-induced vomiting) compared to females attending two-year institutions. Among male students there were fewer differences between two-year and four-year colleges. Controlling for sociodemographic factors (e.g., race/ethnicity, age), most disparities in prevalence estimates remained, though many were attenuated. Overall, few young adults engage in weight-related behaviors consistent with national recommendations. Two-year college students may represent a particularly at-risk group. Disparities between two- and four-year college students exist beyond the sociodemographic differences in these populations. Effective weight-related interventions are needed for young adults, particularly females attending two-year colleges and all males attending post-secondary institutions.

INTRODUCTION

Young adulthood is a unique developmental period and a time for excess weight gain(1). During the transition to adulthood, independence and autonomy increases, and long-term diet and physical activity patterns may be established. (See Nelson et al(1) for a recent review of this literature.) Historically, however, young adult research has largely focused on students attending traditional four-year colleges(1). Little research is available to quantify weight-related characteristics among young adults in other settings, such AS two-year

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DISCLOSURE

The authors have no conflicts to declare.

community and technical colleges. These institutions represent more racially diverse and economically disadvantaged groups than other post-secondary institutions(2, 3), and thus may be an important setting for intervention.

Overall, effective young adult health promotion strategies are needed. To inform obesity-related intervention and policy efforts in post-secondary settings, a better understanding of weight-related behaviors in these settings is needed. Therefore, the objective of this study was to examine differences in the prevalence of overweight/obesity and weight-related behaviors (e.g., diet, physical activity) among students attending two-year versus four-year post-secondary institutions, using data drawn from a large state-wide surveillance system.

METHODS

Data were collected in 2007 and 2008. The University of Minnesota's Boynton Health Service developed a sampling frame including 27 Minnesota college/university campuses (14 two-year college campuses, 13 four-year campuses). These included all campuses surveyed in 2007, and those surveyed in 2008 not included in 2007. Study protocols were approved by the University of Minnesota Institutional Review Board.

Random samples of students, including undergraduate and graduate students (where applicable), were drawn from institutional enrollment lists. Students received multiple invitations to participate via postcards and emails. Participants were offered small monetary incentives and opportunities to win several large prizes. Full study details are available elsewhere(4, 5). Overall, 16,656 students completed surveys (overall response rate: 37.1%; 2-year colleges: 30.4%, 4-year colleges: 40.7%).

Measures

Gender, age, race/ethnicity, relationship status, number of dependent children, weekly hours worked for pay, credit card debt, living situation and health insurance coverage were self-reported. Student status was defined as currently enrolled in a two-year community/technical college or four-year college.

Body mass index (BMI)—BMI (kg/m^2) was calculated using self-reported height and weight. Cut-points of 25 and $30\text{kg}/\text{m}^2$ defined overweight and obesity, respectively(6). To identify outliers, we examined the log-transformed BMI distribution. Values $<25^{\text{th}}$ percentile minus three times the interquartile range, and $>75^{\text{th}}$ percentile plus three times the interquartile range, were examined; some values were biologically implausible and excluded ($n=68$) (7).

Physical activity and media—Participants reported the weekly frequency of vigorous- and moderate-intensity physical activity, strengthening exercises, television viewing and video/computer gaming(8).

Dietary intake—Diet-related items included adapted YRBSS survey items (e.g., fruit/vegetable, soda, diet soda consumption) (9). Participants reported past week breakfast frequency(8). Two questions assessed usual frequency of eating at fast food and other restaurants.

Weight control—Participants reported currently trying to lose weight, and past year frequency of engaging in unhealthy behaviors (e.g., using laxatives, diet pills)(10).

Analyses

Cross-sectional, gender-stratified mixed-effects regression analyses were conducted to assess associations between two-year versus four-year college enrollment and weight-related behaviors. Schools were specified as the nested random effect in the model(11, 12).

Participants were excluded if missing gender (n=6) or age (n=85), and/or having reported an age that was likely erroneous (n=11). Transgendered individuals were also excluded (n=15). The final sample size was 16,539. The missingness of key outcome variables ranged from 0.3% (television viewing) to 1.3% (BMI). Observations with missing values were excluded from individual analyses; thus sample sizes varied slightly between models. Analyses were conducted using SAS v.9.1 (SAS Institute, Cary, NC, 2001).

RESULTS

Overall, 34.7% of participants were male, and 86.0% was White, 2.6% African-American or Black, 5.2% Asian/Pacific Islander, 1.1% Latino/Hispanic, 0.8% American Indian, and 3.0% other/mixed race (1.5% were missing data on race). Respondents from two-year colleges (compared to those from four-year colleges) were more likely to be married/have a domestic partner (28.3% vs. 16.6%, respectively), older (27.0±0.8 versus 24.3±0.8 years, interquartile range: 20-31 years versus 20-25 years), have one dependent child (12.7% vs. 5.3%) or two dependent children (17.9% vs. 8.0%), work 20-39 hours/week (35.0% vs. 22.0%) or 40 hours/week (21.3% vs. 14.9%) for pay, have more credit card debt (\$1,327 vs. \$876), and were less likely to be Asian/Pacific Islander (2.6% vs. 4.9%), live in a residence hall, fraternity or sorority (1.2% vs. 28.1%), and have health insurance (84.1% vs. 89.2%).

Across all types of students, on average, many did not meet national health recommendations (Table 1). In unadjusted analyses, females attending two-year colleges had a higher prevalence of overweight and obesity, lower levels of physical activity, and more television viewing, soda consumption, fast food consumption, and diet pill use, compared to four-year college students ($p<0.05$). Females attending four-year colleges were more likely to engage in unhealthy weight control behaviors (laxative use, binge eating, induced vomiting) and video gaming. There were fewer differences among males; in unadjusted analyses, males attending two-year colleges reported less strenuous activity and more soda and fast food, compared to males attending four-year colleges ($p<0.05$).

Adjusted models were conducted to assess these differences independent of age, race/ethnicity, relationship status, dependent children, hours/week worked for pay, credit card debt, living situation and health insurance (Table 1). Despite adjusting for these covariates, most relationships remained significant; those that were no longer significant were: strength training, diet soda consumption, and taking diet pills among females only, as well as fast food consumption among both males and females.

DISCUSSION

Our findings highlight differences in weight status, physical activity, media use, dietary intake, and weight control behaviors between students attending two-year versus four-year colleges, particularly women. In general, females attending two-year colleges exhibited less healthful dietary and physical activity patterns than those attending four-year colleges. There were fewer differences among males, although males attending two-year colleges were less likely to engage in strenuous physical activity and more likely to consume soda and fast food. Interestingly, a majority of these differences between two- and four-year students were evident even after controlling for numerous sociodemographic factors.

Unadjusted estimates are important in assessing which young adult subgroups are engaging in the least healthful weight practices and are most in need of health promotion efforts. In contrast, adjusted estimates allow us to estimate these disparities independent of various sociodemographic factors that may confound this relationship. Although two-year college students clearly exhibit less healthful lifestyle patterns, it is important to understand whether this difference is because two-year colleges better represent racial minorities and low-income groups, who are at greater risk for obesity, or whether there are other factors at work in lives of these young adults that are not wholly explained by sociodemographic characteristics. Given that many of the associations between student status and weight behaviors remained significant in adjusted models, these findings suggest that there are other lifestyle factors that need further exploration in future research. Little research to date has explored the modifiable determinants and contextual characteristics that influence young adult weight status; such work may be critical in understanding how we can effectively intervene with these groups.

Recently, we also explored disparities in young adult dietary patterns and found results similar to that of our current study(13). Findings from our previous study indicated that 18-23 year-old study participants who were not college students or were enrolled in two-year colleges had poorer dietary intakes than those attending four-year colleges. Our current study augments this work by exploring a more comprehensive range of weight-related behaviors and outcomes. Although there has been recent scientific interest in educational disparities among other young adult health behaviors(14, 15), to our knowledge there are no recent studies that have examined a wide range of weight-related behaviors across these populations.

Although this study is among the first of its kind and includes data from a large, diverse sample, it has several weaknesses. Our sample was drawn from one geographic region, which may limit generalizability. Self-reported measures are also subject to error and reporting bias. Our survey response rate was 37.1% (30.4% among 2-year colleges; 40.7% among 4-year colleges); thus our study may be subject to selection bias. Logistical challenges with diverse young adult populations make it difficult to achieve higher response rates; nonetheless, this remains a concern. Other limitations include a lack of data on access to physical activity facilities, multiple dimensions of socioeconomic status (beyond weekly hours worked for pay and credit card debt), and available leisure time. Finally, although post-secondary institutional settings may provide an important framework for the delivery of health promotion interventions, it is important to note that a significant proportion of high-risk youth at this age may not enroll in colleges and universities. Additional research is needed to understand lifestyle factors among young adults not attending college.

Overall, these findings suggest important differences in obesity and weight behaviors between two-year and four-year college students, particularly females. In part, these disparities may be attributed to factors beyond basic sociodemographic differences in these populations. Despite the disparities, however, few young people overall are engaging in healthy lifestyles. Effective health promotion efforts are needed for all young adults.

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Table 1

Prevalence estimates for weight-related behaviors and health outcomes among students attending two- and four-year Minnesota post-secondary institutions (2007–2008).

	Females (n=10,804)			Males (n=5,735)			
	2-year: n=3,866 %	4-year: n=6,938 %	p-value (crude)	2-year: n=1,713 %	4-year: n=4,022 %	p-value (crude)	p-value (adjusted) ^a
<i>Weight status</i>							
Overweight (BMI ≥25 kg/m ²)	46.1	37.4	0.002	55.1	51.2	0.26	0.80
Obese (BMI ≥30 kg/m ²)	22.4	15.2	0.0004	20.9	17.5	0.16	0.34
<i>Physical activity & sedentary behaviors</i>							
No strenuous exercise in the past week	39.8	31.1	0.0006	30.7	23.8	0.002	0.02
<2 hours/week of moderate-intensity physical activity	66.5	60.3	0.001	62.7	59.0	0.13	0.49
No strengthening exercises in the past week	42.4	36.9	0.001	34.8	32.1	0.18	0.80
2 hours/day of TV viewing	52.9	46.9	0.03	56.4	51.4	0.11	0.23
2 hours/day of video gaming	21.0	33.8	<0.0001	40.4	46.6	0.08	0.99
<i>Dietary behaviors</i>							
<5 servings/day of fruits or vegetables	87.7	86.2	0.17	90.0	88.3	0.11	0.97
1 regular soda /day	18.4	12.1	0.0007	34.4	26.5	0.002	0.0001
1 diet soda /day	20.8	17.8	0.05	16.1	13.6	0.14	0.84
Eating breakfast <5 days/week	55.2	54.3	0.78	64.3	67.2	0.35	0.62
Eating fast food several times per week or more	16.0	11.4	0.006	26.6	21.0	0.002	0.06
Eating at other restaurants several times per week or more	10.6	10.4	0.87	13.1	13.7	0.75	0.08
<i>Weight intentions and weight control</i>							
Trying to lose weight	68.9	67.5	0.31	42.1	41.6	0.80	0.64
Using laxatives to control weight ^b	3.1	2.4	0.08	1.4	1.2	0.78	0.40
Taking diet pills ^b	7.8	5.7	0.009	2.5	3.4	0.15	0.07
Binge eating ^b	15.0	17.7	0.004	9.7	10.4	0.44	0.15
Inducing vomiting to control weight ^b	3.3	4.5	0.003	0.9	1.1	0.47	0.87

Note: Sample sizes for individual analyses vary slightly due to a small degree of missing data

^aModels adjusted for age, race/ethnicity, relationship status, number of dependent children, weekly hours worked for pay, credit card debt, living situation (i.e., living on-campus or off-campus), and health insurance (yes/no).

^bParticipants reported engaging in any of these unhealthy weight control behaviors a few times per year or more.