

Examining the Weight Trajectory of College Students

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ABSTRACT

Objective: To examine the weight trajectory of students over 4 years of college.

Methods: Anthropometric assessments were completed at the beginning and end of students' freshman year and the end of senior year to calculate body mass index. Questionnaires assessing weight-related behaviors were completed in senior year.

Results: Of the original 117 students, 86 remained in the study for 4 years. Body mass index was significantly higher at the end of senior year (mean, 24.84; SD, 4.46) vs the beginning of freshman year (mean, 23.59; SD, 4.01; $t[85] = 5.61$; $P < .001$). Weight was significantly higher at the end of senior year (mean, 71.32 kg; SD, 15.60) vs the beginning of freshman year (mean, 66.94 kg; SD, 14.02; $t[85] = 6.60$; $P < .001$). Students' mean weight gain was 4.38 kg and the sample increased from 23% to 41% overweight/obese. No significant associations were found between BMI and lifestyle factors.

Conclusions and Implications: This study suggests that students gain weight throughout college, which highlights the need for weight control interventions to target more than just freshman college students.

Key Words: BMI change, college students, obesity, weight gain (*J Nutr Educ Behav.* 2016; ■:1-5.)

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INTRODUCTION

Young adults entering college are a specific population of concern for overweight and obesity because the transition from high school to college is a vulnerable time for weight gain.¹ Weight gain in first-year college students is so prevalent it has been termed the freshman 15. However, most studies debunk the myth that students gain 15 lb (6.8 kg) in their first year at college, and instead suggest that freshman weight gain is closer to 3–5 lb.² There is no established correlation between weight gain or body mass index (BMI) and lifestyle factors for college students. Yet, it is acknowledged that college students generally do not meet physical activity recommendations or fruit and vegetable consumption guidelines.³ A trend has been observed of decreased fruit and

vegetable intake paired with increased alcohol consumption when students enter college.⁴ A preliminary pattern of freshman weight gain continuing throughout college has been suggested, but more research is needed.⁵ Gropper et al⁶ conducted one of the only studies examining the changes in 131 students' weight and body composition over 4 years of college. Significant gains in weight, percent body fat, and BMI were observed. Another study, by Racette et al,⁷ tracked changes in weight, BMI, exercise frequency, and dietary patterns of 204 students from freshman to senior year. Participants gained an average of 2.5 kg in 4 years and met neither physical activity recommendations nor dietary guidelines.

College weight gain is an important area to study because one's weight as a young adult is a predictor of the trajec-

tory of one's adult weight.⁸ Thus, targeting college students could be an effective way to combat the rising rates of overweight and obesity. This study aimed to examine the weight trajectory of college students over their 4 years in college and to determine whether there were significant associations between obesity-related health behaviors and BMI in college seniors.

METHODS

Before beginning their first year at a northeastern public university in fall, 2011, incoming freshmen were recruited to participate in a 1-year study on physical activity, incentives, and height/weight change; this study was called *Burn & Earn*. Students were recruited via mailings to their homes during summer, 2011; 117 participants enrolled. Over the course of their freshman year, data on students' height and weight were collected 4 times: once at the beginning and once at the end of each semester. More information about this study and its results can be found elsewhere.^{9,10} The University of Vermont's Committee on Human Research in the Behavioral and Social Sciences approved the study protocol.

For the current study, participants from the 2011 *Burn & Earn* study were

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contacted again in spring, 2015, when they were seniors, and asked to participate in an extension of the original study involving anthropometric assessments and information about their current health behaviors. Respondents scheduled a study assessment visit, when they completed a food frequency questionnaire (FFQ), an alcohol use disorders identification test (AUDIT), and a general questionnaire. The general questionnaire was exploratory and assessed behaviors previously shown to be related to weight, including physical activity frequency, living situation, grocery shopping habits, specific diet, relationship status, and work situation.^{11,12} At the assessment visit, study personnel also measured students' height and weight. A digitally calibrated scale (model BW800S; Tanita, Arlington Heights, IL) was used to measure participants' weight; height (in centimeters) was assessed using a wall-mounted stadiometer (Seca, Hanover, MD). Upon completion of the assessment visit, students were compensated \$50 for participation. The FFQs were submitted to Nutrition Quest (Berkeley, CA) for analysis and the remainder of the data was compiled in the university laboratory. Changes in height, weight, and BMI were calculated by comparing 2011–2012 data with 2015 data.

The researchers used SPSS (version 23, IBM Corporation, Armonk, NY, 2015) to analyze the data. A paired-samples *t* test was performed to examine anthropometric changes between freshman and senior years. An independent-samples *t* test was employed to examine differences in weight trajectory between originally overweight or obese students and originally normal weight students. The researchers performed regression analyses to determine associations between health behaviors and changes in BMI/weight.

RESULTS

Of the original 117 participants, 86 returned to the laboratory for follow-up measurements; this represented a 73.5% retention rate. Analyses of weight, BMI, and height change were performed using only the 86 participants who had complete data. Box plots of weight and BMI change indicated several outliers; however, there was no scientific justification for treating out-

liers differently. Histograms and q–q plots of weight change, BMI change, and the residuals of weight and BMI change indicated that the assumption of normality needed for valid *t* tests could be accepted. No significant difference was observed in BMI at the beginning of freshman year between those who participated in the senior year study and those who did not participate ($F_{1,115} = 0.14, P = .69$). Of the 86 students who completed the study, 58 were women and 28 were men. Average age was 21.5 years. Ninety-three percent of participants were white and 7% were Asian. Four students reported being Hispanic or Latino. As seen in the Table, there were significant increases in mean BMI, weight, and height from the beginning of freshman year to the end of senior year, as well as from the end of freshman year to the end of senior year. Mean weight gain was 4.38 kg over 4 years, 2.94 kg of which occurred after freshman year. Mean height increase from the beginning of freshman year to the end of senior year was 0.9 cm, when men gained 1 cm on average and women grew by 0.85 cm.

Students experience continued weight gain over all 4 years of college.

The number of overweight (BMI = 25–29.9) and obese (BMI ≥30) students increased from 20 at the beginning of freshman year to 35 by the end of senior year. At the conclusion of senior year, 41% of the sample was overweight or

obese (Figure). Only 11.6% of students maintained weight within 1 kg of freshman year weight. A total of 21% of students maintained weight within 3% of freshman year weight over 4 years. Stevens et al¹³ proposed a 3% weight change as the definition of weight maintenance. Twenty-two students, or 26% of the sample, maintained BMI within ±3% of their freshman year BMI. There was no significant difference in total change in BMI over 4 years between those who entered their freshman year in the normal BMI range ($n = 66$) and those who entered with a BMI in the overweight/obese categories ($n = 20$) ($P = .93$).

Based on the results of the FFQ, students' average caloric intake was 1,889 kcal/d. Mean fruit and vegetable consumption was 1.06 and 1.46 cups/d, respectively. Students consumed an average of 203 kcal/d of alcohol. Women averaged 164 kcal of alcohol, whereas men averaged 284 kcal of alcohol. The AUDIT results showed that 62% of the sample consumed alcohol 2–3 times/wk, and the most frequent response for number of drinks when drinking was 3–4 drinks. The AUDIT scores also indicated that 96.5% of participants were at very low risk for problem drinking behavior. Regression analyses indicated that there were no significant associations between weight change or BMI and lifestyle factors, including how students commuted to campus, relationship status, or where they obtained their food. Only 15% of participants regularly met physical activity guidelines of achieving 30 minutes of moderate physical activity 5 times/wk.

Table. Mean Weight, Height, and Body Mass Index (BMI) Values for Participants at the Beginning and End of Freshman Year and End of Senior Year ($n = 86$)

	Weight, kg	Height, cm	BMI, kg/m ²
Beginning of freshman year (fall, 2011)	66.94 (14.02)	168.23 (8.88)	23.54 (4.00)
End of freshman year (spring, 2012)	68.26 (13.74)	168.51 (9.00)	23.98 (3.93)
End of senior year (spring, 2015)	71.32 (15.60) ^{a,b}	169.13 (8.95) ^{a,b}	24.84 (4.46) ^{a,b}

^aSignificantly different from beginning of freshman year to end of senior year ($P < .001$, paired-samples *t* test); ^bSignificantly different from end of freshman year to end of senior year ($P < .001$, paired-samples *t* test).

Note: Data are shown as mean (SD).

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