

Relationship Between Meal Plan, Dietary Intake, Body Mass Index, and Appetitive Responsiveness in College Students

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ABSTRACT

Introduction: One third of the approximately 23,000 undergraduates in the United States are overweight or obese. College students appear to be more vulnerable to disproportionate weight gain during this time.

Method: Cross-sectional. Diet, body mass index, and appetitive responsiveness were assessed in 80 undergraduates enrolled in three different meal plans, unlimited access, points, and none.

Results: Appetitive responsiveness was positively correlated with fat ($r = 0.34$, $p = .002$) but not added sugars across groups. Unlimited access-plan students had higher fat consumption than no-plan students, regardless of appetitive responsiveness. Unlimited access-plan students had higher

fruit and vegetable consumption and higher dairy consumption than point-plan students. There were no group differences for body mass index. All groups were below the U.S. Department of Agriculture guidelines for dairy and fruit and vegetable intake.

Discussion: Optimizing the college campus food environment toward healthful, affordable choices is likely to improve dietary habits and might minimize college weight gain. *J Pediatr Health Care.* (2016) ■, ■-■.

KEY WORDS

College health, food environment, appetitive responsiveness

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INTRODUCTION

College students represent approximately half of the late adolescent and young adult population in the United States (Hussar & Bailey, 2011). The most recent survey by the American College Health Association (2012) reported that one third of the approximately 23,000 undergraduates were overweight or obese. Further, college students appear to be more vulnerable to disproportionate weight gain during college (Economos, Hildebrandt, & Hyatt, 2008; Gropper, Simmons, Connell, & Ulrich, 2012; Racette, Deusinger, Strube, Highstein, & Deusinger, 2008; Vella-Zarb & Elgar, 2009). Excess weight change in college is of concern because it likely will persist into adulthood (Gordon-Larsen, Adair, Nelson, & Popkin, 2004; Singh, Mulder, Twisk, Van Mechelen, & Chinapaw, 2008) and may lead to a greater risk for chronic diseases such as hypertension, cardiovascular disease,

and Type 2 diabetes (Franks et al., 2010; Suglia, Clark, & Gary-Webb, 2013; Tirosh et al., 2011).

Studies have attempted to determine which variables might explain disproportionate weight gain in college (Childers, Haley, & Jahns, 2011; Greaney et al., 2009; LaCaille, Dauner, Krambeer, & Pedersen, 2011). One common concern expressed by college students has been that the campus food environment and meal plan policies heavily influence on their dietary intake with regard to food quality, food choice, and overeating and thus may contribute to excess weight gain (Childers et al., 2011; Greaney et al., 2009; LaCaille et al., 2011; Nelson, Kocos, Lytle, & Perry, 2009; Smith-Jackson & Reel, 2012; Strong, Parks, Anderson, Winett, & Davy, 2008). Students reported that college all-you-can-eat buffets or meal plans provide easy access to unhealthful foods (Greaney et al., 2009; LaCaille et al., 2011; Nelson & Gordon-Larsen, 2006; Smith-Jackson & Reel, 2012) and that self-control was difficult when making food choices, leading to overconsumption (Nelson et al., 2009). Students report that college meal plans could have a positive effect on their dietary intake by removing fiscal barriers to purchasing healthy food (Strong et al., 2008).

Despite reports from students that all-you-can-eat buffets contribute to overconsumption and weight gain, few studies have examined the effect of the campus food environment on dietary intake and weight change. Levitsky, Halbmaier, and Mrdjenovic (2004) found that college freshmen gained approximately 1.9 kg in a 15-week period. Twenty percent of the variance in weight gain was attributed to eating at all-you-can-eat dining halls, and intake of junk food or high-fat food contributed to another 40% of the variance. Brown, Dresen, and Eggett (2005) determined that students with a prepaid meal plan had moderately higher consumption of fruits and vegetables. These studies provide some support that the campus food environment or meal plans have both positive and negative effects on dietary intake in college.

How personal characteristics and appetitive responsiveness (i.e., the drive to eat in the absence of physiologic hunger) may affect food choice with unlimited access to a variety of healthful and nonhealthful food has not been fully examined. Researchers have hypothesized that certain individuals' appetitive drives may be more susceptible to environments where highly palatable foods are readily available, similar to college campuses' all-you-can-eat buffets. Such availability and proximity of foods, particularly foods laden with added sugars and fat, may stimulate the drive to eat beyond one's physiologic needs (Lowe et al., 2009). Individuals who consume foods beyond their energy needs are at greater risk for weight gain and, over time, obesity (Cappelleri et al., 2009). The ongoing epidemic of obesity warrants examining how the food-abundant environment of all-you-can-eat buffets might affect

the dietary habit of students with greater appetitive responsiveness.

There were two aims of this study. First, examined the relationship between body mass index (BMI) and dietary intake among students with different university meal plans. Second, we sought to determine if appetitive responsiveness influenced dietary intake, particularly intake of added sugars and fat, according to meal plan. Our a priori hypothesis was that students with unlimited-access meal plans (UAPs) have higher consumption of foods high in fats and added sugars compared with students with limited point plans (PPs) or no meal plan (NP). Further, we hypothesized that students with greater appetitive responsiveness would consume greater amounts of foods high in fats and sugars in particular.

METHODS

Sample and Setting

A convenience sample of undergraduate students at a small, public university in New England was recruited. The university carries two types of meal plans, the UAP, with which students have unrestricted access to any of the three all-you-care-to-eat buffet-style dining halls on campus, and the PP, with which students purchase food items à la carte via a point system. Students who live on campus are required to enroll in a meal plan, whereas students who live off campus do not. Freshmen living on campus are required to have the UAP, and second-, third-, or fourth-year students may choose between the two types of plans. Inclusion criteria consisted of English-speaking, full-time undergraduate students over 18 years of age who were willing to participate. To capture a wide diversity of students, the primary investigator (RG) approached students at a variety of campus locations including the main student union center, one of the campus libraries, different dining halls, and one undergraduate nursing course.

Procedures

Subjects were recruited in mid-fall semester during one academic year. Students were approached at various campus locations on 5 weekday occasions during a 2-week period. They completed a demographic survey and meal plan status/type as well as the Dietary Screener Questionnaire (DSQ), Percentage Energy From Fat Screener (PFat), and Power of Food Scale (PFS). Implied consent was obtained when participants submitted completed questionnaires. The University's institutional review board approved this study.

Measures

Dietary Screener Questionnaire

The DSQ (National Cancer Institute [NCI], 2010) is a short, self-reported questionnaire developed for the National Health and Nutrition Examination Survey to

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