

An exploratory study of weight and alcohol consumption among college students

C Duffrin, K Heidal, B Malinauskas, S McLeod, V Carraway-Stage

Citation

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Abstract

Objective: Determine if correlations exist between alcohol intake and body mass index for a college student population. **Participants:** The study targeted college students (n=148), ages 18-25 from a southeastern doctoral research university. **Methods:** Demographic, anthropometric, nutrition and food intake, and general health behavior data was collected by the dietetics students on each subject using verbal survey questioning. Basic anthropometric data was also collected on each subject. **Results:** In the populations studied, nearly 50% of the students fell into either the overweight or obese categories as defined by the World Health Organization ($\mu\text{BMI}=26.49$, with 26.1% $\text{BMI}>30.0$). The mean weekly alcoholic beverage intake for males was 8.75 (1449 kcal) and for females 4.96 (849 kcal). When subgroups were analyzed using Chi-square, students who drank beer were significantly more likely ($\chi^2=.021$, $p<.05$) to be categorized as overweight, which identifies a specific risk factor for this group.

BACKGROUND

College attendance signifies a point in time where many young people leave home for the first time and find a sense of independence.¹ Making life choices such as finding a job to pay for expenses and controlling dietary decisions creates autonomy for the student, but can also affect health risk outcomes in their future.^{1,2} Age 18-25 represent a significant transitional period after late adolescence, but before young adulthood that prompts the foundation of new behaviors.^{3,4}

Drinking alcohol is one popular behavior that is adopted by nearly 64% of full-time college students. The 21 to 25 year old population has the highest rate of alcohol consumption, regardless of their college or non-college status.⁵ However, research shows that students enrolled full-time in college are more likely to use alcohol than their non-college peers.⁶ In addition, Miller, et.al. (2008)⁷ discovered that students who work 20 or more hours, approximately 57% of the college population, are one and a half times more likely to be binge drinkers (drinking 5 or more drinks for men and 4 or more drinks for women in a row).^{8,9} This finding is concerning since recent studies by Breslow and Smothers (2005)¹⁰ found lower body mass indexes (BMI's) among those who drink less more often compared to those who drink heavier less often, placing many American college students at increased

risk for developing chronic disease. Since alcohol (7 kcal./g) is the second most energy dense macronutrient, following closely behind fat (9 kcal./g), continued research in determining the role alcohol plays in the obesity epidemic, especially within the 18-25 year age group, is warranted.^{11,12}

The United States has seen a gradual progression in obesity over the past 30 years; however, there has not been a similar rise in alcohol consumption.¹³ Researchers question if drinking alcohol influences larger BMI's. With alcoholic beverages averaging 140 kilocalories per drink and evidence showing drinkers to be less likely to compensate for the energy found in alcohol with a decrease in food consumption, going over recommended energy needs is highly probable.^{14,11,15} According to Tujague & Kerr. (2008), whose subjects were mainly 35 years and older, they found even though obese subjects consumed alcoholic beverages higher in calories, they did not consume the greatest amount of calories from alcoholic beverages per month like their normal weight counterparts. In fact, normal weight and underweight males consumed more calories from alcoholic beverages than overweight males and obese females consumed the least amount of energy from alcoholic beverages than females in other weight classifications.¹⁴

Although there have been studies comparing alcohol to BMI

among the adult population, little has been concluded for the college age population. The same can be said about the amount of specific beverages consumed between males and females among different weight classifications. Therefore, this study targeted college students ages 18-25 to investigate: a) student's preferences of specific alcoholic beverages in relation to their body mass index; and b) gender differences; and c) whether alcohol could be a causative for higher BMI's.

METHODS

In a nutrition research laboratory course, dietetic students were asked to recruit and be responsible for collecting data on six or more subjects currently enrolled on campus. Participant selection sites included the student union, student food service sites, several academic buildings, and general outdoor campus locations. A sample (n =148) was generated by students registered in multiple sections of Introduction to Nutrition. Anthropometric data was collected and participants completed a researcher developed survey of 107 questions. Demographic, anthropometric, nutrition and food intake, and general health behavior data was collected by the dietetics students on each subject using verbal survey questioning. To collect anthropometric data, research assistants recorded height and body weight measurements. Weight was measured to the nearest lb and height to the nearest 0.5 inches. Shoes, but no clothing items, were removed for these measurements. Height and weight were used to calculate BMI (kg/m^2). All data was analyzed using Statistical Package for the Social Sciences (SPSS) version 16.0. Statistical significance level was set at $p = 0.05$.

The study participants (n=148), were relatively representative of the national college population regarding gender, with 49.3% (n=73) male and 50.7% (n=75) female respondents. The national averages for gender are 42.8% male and 57.2% female.

The students were predominantly traditional aged ($\mu=19.99$, $sd=3.18$), and represented a wide number of ethnic groups, with 69.6% Caucasian, 16.9% African American, 2.0% Hispanic, 4.7% Asian-Pacific Islander, .7% Native American, and 4.1% Other.

This study was approved by the IRB review board at East Carolina University. Participants signed a written consent form after receiving verbal and written information regarding the objectives of the study and the expectations of the participant.

RESULTS

The measured BMI's of the students ranged from 17.0 to 45.0, with a mean of 26.49 ± 6.06 . Males presented with a slightly higher BMI ($\mu=26.96$, $SD=5.97$), than females ($\mu=26.04$, $SD=6.16$). When the study population was measured by the standard definitions from the World Health Organization, 2% (n=3) were defined as underweight ($BMI < 18.5$), 49.3% (n=73) as normal weight ($BMI = 18.6-25.0$), 26.5% (n=39) as overweight ($BMI = 25.1-29.9$), and 21.6% (n=32) as obese ($BMI > 30.0$). BMI's by gender are presented in table one.

Figure 1

Table 1

Gender	Underweight (BMI <18.5)	Normal Weight (BMI 18.6-25.0)	Overweight (BMI 25.1-29.9)	Obese (BMI >30.0)
Male (n=73)	0% (n=0)	49.3% (n=36)	28.8% (n=21)	21.9% (n=16)
Female (n=74)	4.1% (n=3)	50% (n=37)	24.3% (n=18)	21.6% (n=16)

The drinking behavior of the study population varied by gender, with 61.6% (n=45) reporting the use of alcohol and 65.3% of females (n=49) reporting the use of alcohol. Mean alcohol use by gender is presented in table two.

Figure 2

Table 2

Gender	Beer Use	Mean/Week	Wine Use	Mean/Week	Mixed Drinks	Mean/Week
Male	38	5.87	19	.41	30	2.47
Female	30	2.56	14	.49	39	1.81

It should be noted that of the 94 students who reported using alcohol, only 12 reported use at greater than 14 drinks (approximately two drinks per day) , per week.

Significant differences in BMI were found when coded into the World Health Organization definitions, with 1=underweight, 2=normal weight, 3=overweight, and 4=obese, and consumption of each type of alcohol was tested. Levene's Statistic was run ($p=.000$), therefore equal variance was not assumed and appropriate findings for the ANOVA statistic are reported in table three.

Figure 3

Table 3

	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
Beer Use and BMI	418.080	3	139.360	3.361	.021*
	5929.157	143	41.463		
	6347.237	146			
Wine Use and BMI	6.615	3	2.205	2.297	.080
	137.297	143	.960		
	143.913	146			
Liquor Use and BMI	83.932	3	27.977	1.710	.168
	2323.833	142	16.365		
	2407.765	145			
Mixed Drinks and BMI	.013	3	.004	.141	.935
	4.249	143	.030		
	4.261	146			

*Sig<.05

Data for differences between subgroups for BMI and beer consumption is reported in table four.

Figure 4

Table 4

BMI	N	Beer Consumption
Obese	32	.2450
Underweight	3	.5833
Normal	73	2.5262
Overweight	39	5.0200

It should be noted that BMI was not found to be significantly different when correlated to gender, ethnicity, income, marital status, major, traditional/non-traditional status, living quarters, meal sources, job status, or tobacco use.

COMMENT

The link between obesity and alcohol consumption is one that is difficult to determine. In this study, regardless of alcohol intake, the sample population of college students presented with a relatively high mean BMI (26.49). It is especially noteworthy that 21.6% of this population met the definition for obesity as defined by the World Health Organization. The population also had a mean age of a second semester sophomore status student (mean age=19.99), and other research has found this timeframe to be a period of moderate weight gain. Therefore, alcohol consumption by this cohort may represent a source of new calories in their overall diet. The consumption of alcoholic beverages among the study population accounted for an average of 8.75 drinks for males and 4.86 drinks for females. Given an average caloric level of approximately 120 calories for beer, 130 calories for wine, and 280 calories for mixed drinks, the average male student ingested 1449 calories per week from alcohol and the average female ingested 878 calories per week from alcohol.

While the number of calories ingested from alcohol was relatively modest on a weekly basis, the cumulative effect of

chronic alcohol consumption may be significant. If alcohol consumption was limited to the academic environment and the student was in this environment for two semesters per year (32 weeks), then the total mean caloric intake from alcohol consumption equaled 46,368 kcal's for males and 28,096 kcal's calories for females. If we divide this by 3500 calories per pound of additional weight, this would equal a mean of 13.25 pounds for males and 8.03 pounds for females. While this study did not determine whether or not the drinking behavior of students was constant over their academic careers, alcohol consumption may very well be a large contributor to weight gain in college if this phenomenon was consistent and occurred in the college population as a whole.

Results from this study also found a statistically significant correlation between beer consumption and overweight status occurred with college students. Interestingly, a post-hoc analysis indicates that students who were in the overweight category drank the most beer while those in the obese category drank the least. This may indicate different drinking patterns or preferences for different types of alcohol (beer, wine and/or mixed drinks) and supports the findings of Tujage, et.al. This may also indicate a difference in socialization levels which certainly warrants additional study. If the risk of weight gain among college students was confirmed with further research, using this finding as a potential avenue for educational programs aimed at limiting alcohol consumption in this population could be potentially effective.

LIMITATIONS

This study was performed with a volunteer study sample, which limits the overall generalizability of the population. In addition, the campus setting may not be representative of all campuses and the behaviors may not be consistent in a longitudinal timeframe.

CONCLUSIONS

Overall, this study found that alcohol consumption among college students contributes significantly to caloric intake in their diets and has potential to cause weight gain. In the populations studied in this project, nearly 50% of the students fell into either the overweight or obese categories as defined by the WHO. They also exhibited drinking behavior that could add to weight gain in their early college careers. Students who drank beer were especially prone to being categorized as overweight which identifies a specific risk factor for this group.

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Author Information

Christopher Duffrin, PhD

East Carolina University, Brody School of Medicine, Greenville, NC

Kimberly B. Heidal, PhD, RD

East Carolina University, Department of Nutrition Science, Greenville, NC

Brenda Malinauskas, PhD, RD

East Carolina University, Department of Nutrition Science, Greenville, NC

Sara McLeod, BS

East Carolina University, Department of Nutrition Science, Greenville, NC

Virginia Carraway-Stage, MS, RD

East Carolina University, Department of Nutrition Science, Greenville, NC