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Amanda Kuhlman
amkuhlm@bgsu.edu

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Quality of Life, Health Status, and Academic Success in Undergraduates

Amanda M. Kuhlman

Dr. Mary-Jon Ludy and Dr. Amy L. Morgan

Bowling Green State University

Abstract

Background: Undergraduates are making their first autonomous health decisions. This is an opportune stage for examining the precursors to the chronic diseases of adulthood. The purpose of this study was to examine correlations between health status, quality of life, and academic success in college students.

Methods: A quality of life survey (Goodman, 1997) was utilized to determine the behavioral difficulties of 86 first and second year college students. Each of these behavioral categories were then examined for possible correlations with blood pressure, weight, body mass index (BMI), alcohol consumption, body fat percentage, and any changes in these categories from the first three weeks of school to before Thanksgiving 10-12 weeks later. Grade point averages (GPAs) were obtained from the office of Registration and Records at the conclusion of the Fall 2013 Semester to determine the associations between variables using Pearson correlation coefficients.

Results: Conduct problems were positively correlated with alcohol intake. Hyperactivity was positively correlated with weight change, BMI change, waist size, and alcohol intake. Peer problems were negatively correlated with alcohol change and positively correlated with body fat percentage. Total behavioral difficulties were positively correlated with body fat percentage and BMI. GPA was negatively correlated with conduct problems, hyperactivity, peer problems, total difficulties, alcohol intake, and body fat percentage.

Conclusions: Correlations may guide future programming for college health professionals. Modification in health related variables may lead to improved academic success.

Quality of Life and Health Status in Undergraduate College Students

There have been numerous studies showing the growing problems associated with poor diet and lack of exercise. Obesity is a serious issue that is often linked with this. One serious effect of obesity is the heightened risk of cardiovascular problems (Félix-Redondo, Grau, Baena-Díez, Dégano, de León, Guembe, & Fernández-Bergés 2013). Cardiovascular disease is the number one cause of death and in the United States for both men and women (Mosca et al., 2000). Recent studies in Vietnam (Van Ngoc Nguyen, Hong, Hoang, Nguyen, & Robert, 2013), China (Yi, Hai-Jun, Jun, & Zhiqiang, 2013), and Nigeria (Sabageh & Ojofeitimi, 2013) mention the increasing prevalence of obesity in adolescents. In a study conducted in the United States, it was found that16.9% of adolescents ages 2-19 were obese (Ogden, Carroll, Kit, & Flegal, 2012).

The continuation of this from adolescents to adults has led to even more concern. When looking at college students in particular, there have been several studies that examine the health of students (Malinauskas, Raedeke, Aeby, Smith, & Dallas, 2006; Haberman & Luffey, 1998), as poor health in adolescence predicts poor health in adulthood. There are several factors often associated with weight gain, such as increases in waist circumference (Lean, Han, & Morrison, 1995) and body fat (Eder et al., 2001). Primary among these factors is raised blood pressure. Blood pressure is of heightened importance, as it is a silent condition and is often unknown to people who are at risk of health problems associated with this.

Based on the results from the 2012-2013 "Freshman Health Study," there was in increase in body fat, waist circumference, blood pressure, and weight from the visit during the first three weeks of Fall Semester to directly before Thanksgiving Break 10-12 weeks later (Ludy, Morgan, & Leone, 2012). The captivating aspect of this increase was that the average weight gain was only 4 lbs, yet there was a significant increase in blood pressure. There was a 4.2 mmHg increase in systolic blood pressure and a 1.8 increase in diastolic blood pressure. Although 47.3% of

students started in a healthy blood pressure range, only 30.8% of students remained in this range for the second visit. In these 10-12 weeks, students who were pre-hypertensive increased from 45.1% to 51.6%, while the percentage of the students who were hypertensive jumped from 7.7% to 17.6% (Ludy, Morgan, & Leone, 2012). If anything, it would have been expected for blood pressure to be slightly higher in the initial visit due to a "white coat" effect, where the students would have increased blood pressure due to nerves and stress simply from being in a new environment with an unknown tester (Verdecchia et al., 1995). This "white coat" effect should not have had as much of an influence in a second visit when the students were familiar with both the tester and the environment. Thus, the significant increase in blood pressure between visits is particularly striking.

Somewhat counterintuitively, it has been suggested that there is a correlation between hypertension and higher academic achievement, along with less behavioral and emotional problems in German adolescents (Berendes, Meyer, Hulpke-Wette., & Hermann-Lingen, 2013). The initial objective for this project was to study the relationship between health status and the quality of life of college students at Bowling Green State University (BGSU), when a strong focus on the comparison between blood pressure levels, academic achievement, and indicators of emotions and behavioral stability.

Methods

Eighty-six subjects were already participating in the "Freshman Health Study," and came in for two study visits, one during the first three weeks of school, and one during the two weeks prior to Thanksgiving Break 10-12 weeks later. The purpose of the "Freshman Health Study" was to examine the composition and patterns of weight change in college freshman at BGSU from 2012-2013 (Ludy, Morgan, Leone, 2012). This was then extended to examine the same

students for their sophomore year with the addition of new freshmen in the 2013-2014 school year. The subjects for the study were 18.4 ± 0.6 years old. They were predominately female (76.7 %) and freshmen (75.6%). The majority of the subjects were Caucasian (91.2%), with a minority Asian (1.2%), Hispanic (1.2%), and African American (5.8%). Subjects were closely divided between health majors (52.3%) and non-heath majors (47.7%).

At baseline (first 3 weeks of Fall semester) and pre-holidays (10-12 weeks later during the 2 weeks before Thanksgiving break). Blood pressure (automated cuff), height (calibrated stadiometer), weight (calibrated electronic scale), waist circumference (measuring tape), and body fat percentage (bioelectrical impedance analysis: BIA) were measured. Body mass index (BMI) was calculated from weight and height. Alcohol consumption and quality of life were self-reported using the Alcohol Use Disorders Identification Test (AUDIT-C; Bush et al., 1998) and Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), respectively. The SDQ assessed five elements related to quality of life: emotions, conduct problems, peer problems, hyperactivity, and social behavior. Individual scores were summed to calculate a "total difficulties score." Grade point average (GPA) was determined by reviewing each student's degree audit report following the Fall 2013 semester.

All variables were assessed at both visits, excluding the SDQ, which was completed only at visit two. Grade point average was reviewed only after the end of the Fall 2013 Semester.

IBM SPSS Statistics was used to evaluate the data. Pearson correlation coefficients were used to discern if a relationship existed between (A.) health status variables and SDQ scores, (B.) GPA and SDQ scores, and (C.) GPA and health status variables. Paired t-tests were used to determine if blood pressure, height, weight, waist circumference, body fat percentage, BMI, and

alcohol intake changed between visits. A p-value of < 0.05 was used to determine statistical significance.

It was hypothesized that there would be a positive correlation between total difficulties and both body fat and BMI. There was also an expectation that there would be a positive correlation between hyperactivity and weight change, BMI change, waist size, and alcohol intake. Also, it was expected that students with less conduct problems and less peer problems would have less alcohol intake and greater grade point averages.

Results

Health Status

Body fat percentage increased from 25.6% to 26.3% from the beginning of the academic year to before Thanksgiving 10-12 weeks later ($t(85) = 3.229$, $p < 0.01$) (Fig. 1). Weight increased from 146.2 lbs to 148.5 lbs ($t(85) = 5.199$, $p < 0.001$). Similarly, BMI increased from 23.7 kg/m^2 to 24.0 kg/m^2 ($t(85) = 4.005$, $p < 0.001$) (Fig. 2). Height also increased, with a change from 65.7 in to 65.8 in ($t(85) = 3.024$, $p < 0.01$). There were no significant differences found between visits for any of the following variables: waist circumference, alcohol use, systolic blood pressure, or diastolic blood pressure.
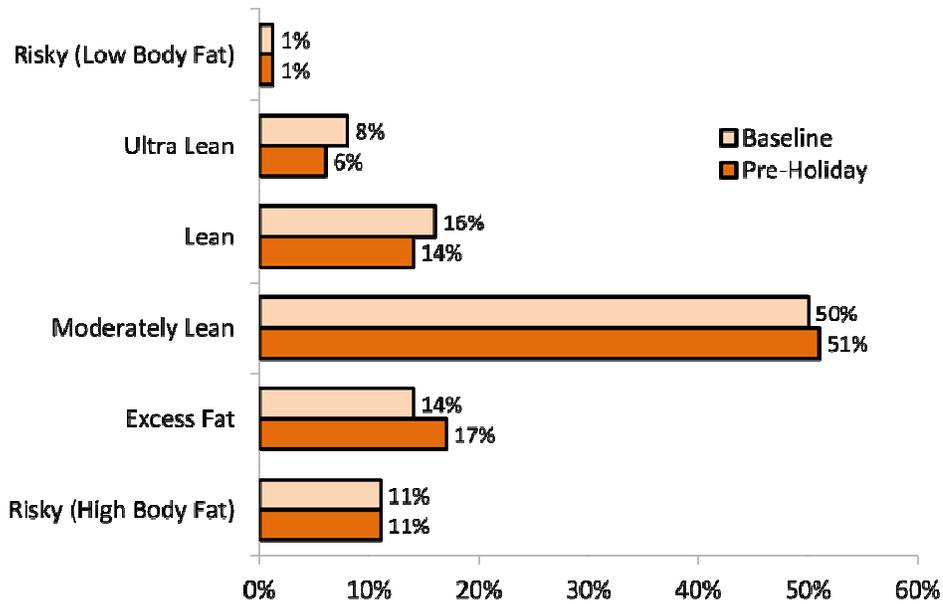
Figure 1. Body Fat Percentage in College Students. There was a body fat increase from 25.6% at baseline to 26.3% pre-holiday.
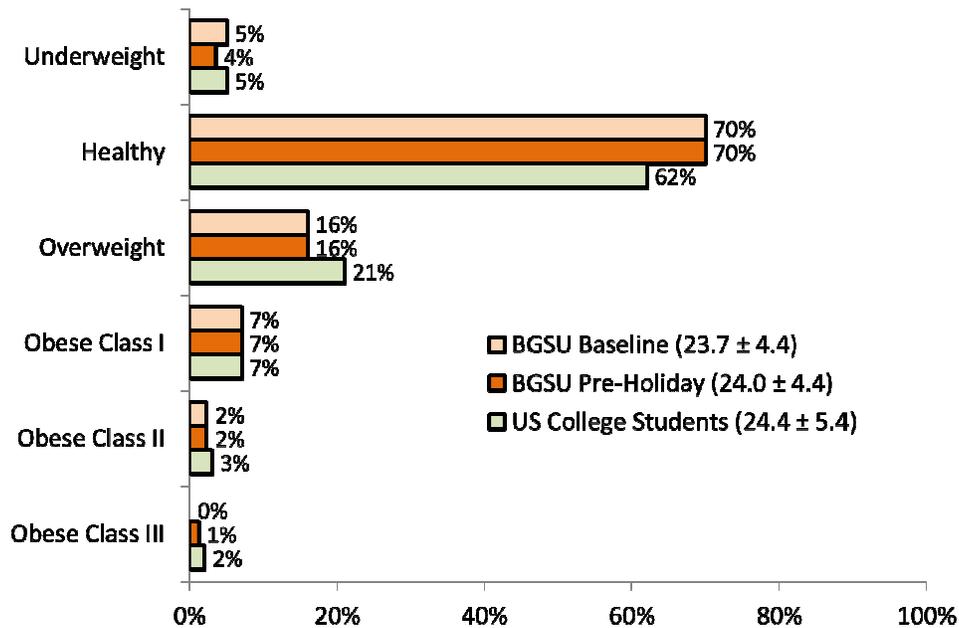

Figure 2. Body Mass Index (BMI) in College Students. The BMI increased 0.3 kg/m^2 between the baseline visit value of 23.7 kg/m2 and pre-holiday visit values of 24.0 kg/m^2 (American College Health Association, 2012).

Quality of Life

There was a moderate positive relationship between conduct problems and alcohol intake ($r = 0.349$, $p = 0.001$). There were weak negative relationships between peer problems and both alcohol intake change ($r = -0.213$, $p < 0.05$) and body fat percentage ($r = 0.239$, $p < 0.05$). There was a weak positive correlation between hyperactivity and alcohol intake ($r = 0.265$, $p < 0.05$), as well as weak positive correlations between hyperactivity and waist size ($r = 0.217$, $p < 0.05$), weight change ($r = 0.278$, $p = 0.01$), and BMI change ($r = 0.270$, $p < 0.05$). Total behavioral difficulties were positively correlated with body fat percentage and BMI, and there were weak positive relationships between total behavioral difficulties and body fat percentage ($r = 0.266$, $p < 0.05$) and total difficulties and BMI ($r = 0.220$, $p < 0.05$). There were no significant correlations found with the emotional or prosocial scales with systolic blood pressure, diastolic blood pressure, height, weight, BMI, alcohol consumption, body fat percentage, and any changes in these categories.
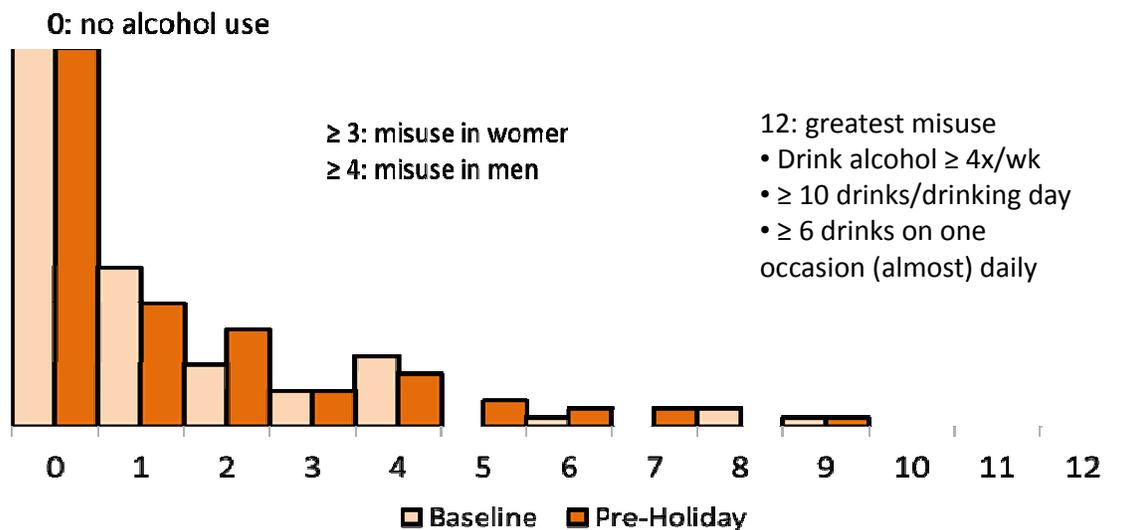

Figure 3. Alcohol Use in College Students. Alcohol intake was found to negatively correlate with hyperactivity ($r = 0.265$, $p < 0.05$), peer problems ($r = -0.213$, $p < 0.05$), and conduct problems ($r = -0.279$, $p < 0.01$) (AUDIT-C; Bush et al., 1998).

Academic Performance

There was a weak negative relationship between GPA and both conduct problems ($r = -0.279$, $p < 0.01$) peer problems ($r = -0.284$, $p < 0.01$). There was a moderate negative relationship between GPA and both hyperactivity ($r = -0.349$, $p = 0.001$ and the total difficulties score ($r = -0.371$, $p < 0.001$).

There was a weak negative relationship between alcohol use and grade point average ($r = -0.246$, $p < 0.05$). There was also a moderate negative relationship between body fat percentage and grade point average ($r = -0.318$, $p < 0.005$).

Discussion

Blood pressure was a major focus of the initial project proposal. Interestingly, there was no correlation between quality of life, academic performance, or health status variables. This could be due to the size of the study. It could also be due to the different racial compositions of the two populations studied. The study conducted on German adolescents by Berendes et al. had a population of 7,688 and suggested that a large number of the adolescents were hypertensive or pre-hypertensive (Berendes et al., 2013). Our study conducted in 2013-2014 had a population of 86 and did not suggest such a large population of hypertensive and pre-hypertensive students. The different nationalities within the populations studied could lead to different results than expected. The eating and exercising behaviors of German adolescents may be entirely different than that of college students in the United States. Though this sample size is not miniscule, a larger sample size may have led to results that were more comparable from year to year by allowing for a larger population of students with higher blood pressure specifically.

All of the correlations found were weak to moderate. This is not unexpected, as there are many factors that contribute to all of the categories examined. It would not be expected for a

large correlation to be found between GPA and conduct problems because of the numerous other areas of emotional health, physical health, time studying, family emergencies, etc. that contribute to GPA. Though the correlations were not particularly strong, the multiple correlations in the weak to middle range suggest that there is a definite relationship between physical wellbeing and quality of life. When looking at the total difficulties scale, the positive correlation to both body fat and BMI demonstrate this, as did the positive correlation between hyperactivity and weight change, BMI change, waist size, and alcohol intake.

Some unexpected correlations did occur. For example, the negative correlation between peer problems and alcohol intake change. Subjects with less than ideal peer circumstances demonstrated a decrease in alcohol intake from the beginning of the school year to before Thanksgiving. This could exist because those with peer problems are less likely to socialize, and therefore drink less than other college students without peer problems, as social events have been identified as a drinking motive for college students (Grant, Brown, & Moreno, 2013). This is particularly relevant on a campus where alcohol is not permitted in the dorm rooms of underage students.

Though the students with peer problems tend to drink less, those with conduct problems indicated higher alcohol intake. This correlation could be viewed in multiple ways. People with conduct problems may drink to relax. This may occur because alcohol is a depressant (Kushner et al., 2013). On the other hand, drinking could lead to more conduct problems. With decreased inhibition, students susceptible to conduct problems could be more likely to fight or lose their temper than when sober with more reservations, as alcohol is known for weakening impulse control (Miller & Fillmore, 2013).

As expected, students with less conduct problems and less peer problems tended to have higher grade point averages. This could be because of time spent dealing with the aftermath caused by conduct and peer problem situations, which could take time away from attending class and studying. Additional factors can be caused by conduct and peer problems. Depression and turning to substance abuse are two such aspects that could also lead to lower grade point averages. The negative relationship between alcohol use and grade point average could be attributed to the time spent abusing alcohol or recovering from alcoholic events, which would also lessen the time the student was able to study and attend class.

Conclusion

In a study on 86 students at BGSU, it was found that conduct problems were positively correlated with alcohol intake. Hyperactivity was positively correlated with weight change, BMI change, waist size, and alcohol intake. Peer problems were negatively correlated with alcohol change and positively correlated with body fat percentage. Total difficulties, which is encompasses the emotional symptoms, conduct problems, hyperactivity, and peer problem scales, had a positive correlation with body fat percentage and BMI. It was found that academic performance in terms of grade point average is negatively correlated to conduct problems, hyperactivity, peer problems, total difficulties, alcohol use, and body fat percentage. The modification of health-related behaviors could help improve health related risks, quality of life, and academic performance of students. This could be pushed by universities through the provision of easily accessible work out equipment and affordable healthy food options. It is hoped that the alteration of lifestyle of college students would result in a healthier adult population.

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