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Relationship between alcohol consumption, BMI, and weight perception in women aged 20-29 years

Andrea Renee Komm

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RELATIONSHIP BETWEEN ALCOHOL CONSUMPTION, BMI, AND WEIGHT
PERCEPTION IN WOMEN AGED 20-29 YEARS

By

Andrea Renee Komm

A Thesis
Submitted to the Faculty of
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By

Andrea Renee Komm

Approved:

Brent J. Fountain
Assistant Professor of Nutrition
(Major Professor, Committee Member)

William Mikel
Department Head of Food Science,
Nutrition, and Health Promotion
(Graduate Coordinator, Committee
Member)

Chiquita Briley
Assistant Professor of Nutrition
(Committee Member)

Vance H. Watson
Vice President of the Division
Agriculture, Forestry, and Veterinary
Medicine
Director of Mississippi Agriculture and
Forestry Experiment Station
Dean of the College of Agriculture
and Life Sciences

Name: Andrea Renee Komm

Date of Degree: May 4, 2007

Institution: Mississippi State University

Major Field: Nutrition

Major Professor: Brent J. Fountain, PhD, RD, LD

Title of Study: RELATIONSHIP BETWEEN ALCOHOL CONSUMPTION, BMI,
AND WEIGHT PERCEPTION IN WOMEN AGED 20-29 YEARS

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Candidate for Degree of Master of Science

Alcohol consumption and overweight in women are both becoming more prevalent in the United States. Data from NHANES 1999-2000 and 2001-2002 was collected consisting of non-pregnant women between the ages of 20 and 29 years. Variables measured were BMI, drinking occasions, drinking consumption per week, and women's perception of their weight. Data was analyzed using chi-square in application to SUDAAN to test significance between variables. Results indicated a correlation between weight perception and drinking occasions per week (p-value 0.013). Nutrition implications suggested that individuals who were classified as overweight had more drinking occasions than individuals classified as underweight.

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CHAPTER I

INTRODUCTION

Alcohol consumption has been connected to recreational social gathering for decades. After prohibition, alcohol has been viewed through movies, TV, magazines as an accepted individual and group pleasure. Alcohol not only has social ties but many people use it as a psychological and sociological escape which provides a euphoria or calming effect that reduces stress. However, for some the line between social drinking and addiction becomes distorted and the issue of alcoholism becomes apparent. The factors that influence the amount of alcohol consumed varies due to age, genetic make-up, income, educational level and health status regardless of gender. However among women, the effects of alcohol can lead to various degrees of health concerns such as increased risk of cancers, liver and cardiovascular diseases, brain damage and especially weight management issues (Schnohr, 2004).

The 2005 Dietary Guidelines suggest 2 drinks (per day) for a male and one drink (per day) for women. This constitutes a 12-ounce beer, a 5 ounce glass of wine, or 1.5 ounces of an 80-proof glass of distilled spirit. One alcoholic drink is believed to have 12 grams of alcohol which can provide 144 calories in a regular beer, approximately 100 calories in 5 ounces wine, 96 calories in ½ ounces 80 proof liquor (www.health.gov). Alcohol content can vary among drinks in each category. For example, the alcohol

content of wines varies from 7% to 14% with certain varieties containing more alcohol. Dark beers contain more alcohol than light beers (2006). Alcohol consumption is measured in three categories: low, moderate, and heavy alcohol consumption. The Institute of Medicine's (IOM) Committee on Diet and Health defines moderate drinking as less than one ounce of pure alcohol in a single day which is equivalent to two cans of beer, two small 3.5 ounce glasses of wine, or approximately two average cocktails (Anding 2001). Light drinkers consume less than 20 grams of alcohol per day, moderate drinkers get 15 to 25% of total calories from alcohol or approximately 20 to 60 grams per day, and heavy drinkers get more than 25% of their total calories per day from alcohol (Marsano 1993). Depending on the amount of alcohol that is consumed, alcohol can become a large contributor to overall caloric intake which may impact an individual's BMI.

Body Mass Index (BMI) was established in 1998 by the National Institute of Health (www.health.msn.com, 2005). BMI is, "a number calculated from a person's weight and height." BMI is calculated by weight (kg) divided by height (m)². BMI has been found to be an indicator of body fat and a way of classification of an individual's weight. Individuals are classified as being either underweight (< 18.5), normal weight (18.5 to 24.9), overweight (25 to 29.9), or obese (30 and above) (www.cdc.gov, 2007).

Alcohol consumption can have an effect on an individual's BMI status. Research has found that the energy in alcohol is not efficiently used. Alcohol has been found to increase an individual's metabolic rate significantly. This can cause an individual's metabolism to burn these alcohol calories rather than store them as fat (www.cdc.gov, 2007).

The purpose for examining past literature on alcohol consumption in women between 20 and 29 years of age, was to make individuals more aware of why women may drink, the risk factors, and nutritional implications with drinking alcohol. NHANES data was accessed to better show how much women are consuming, how often they are consuming alcohol, and if they are consuming alcohol due to their perceived body image.

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CHAPTER II
RELATIONSHIP BETWEEN ALCOHOL CONSUMPTION, BMI, AND WEIGHT
PERCEPTION IN WOMEN AGED 20-29 YEARS

Abstract

Alcohol consumption and overweight in women are both becoming more prevalent in the United States. Data from NHANES 1999-2000 and 2001-2002 was collected consisting of non-pregnant women between the ages of 20 and 29 years. Variables measured were BMI, drinking occasions, drinking consumption per week, and women's perception of their weight. Data was analyzed using chi-square in application to SUDAAN to test significance between variables. Results indicated a correlation between weight perception and drinking occasions per week (p-value 0.013). Nutrition implications suggested that individuals who were classified as overweight had more drinking occasions than individuals classified as underweight.

Demographics

There are many different groups that consume alcohol as a beverage. No one specific type of individual consumes alcohol. However, there are groups that are more likely to consume alcohol. Within the past 50 years, alcohol consumption has increased considerably. In 1950, it was found that only 6% of college women drank more than once

a week. However, in 2002, it was found that two out of every five college aged women engaged in binge drinking. According to Shirachi (2006), it is estimated that 90% of college students consume at least one alcoholic beverage a year (Shirachi 2006). Approximately 10% of US college students consume more than 15 alcoholic drinks per week (Anding 2001). An individual's gender, race, education, and income can all play a part in alcohol consumption. Women aged 18 to 24 are considered to be within the age group that consumes the most alcohol and is most dependant on alcohol than any other age group of women. The General Household Survey of 1998 found that 14% of women aged 18 years of age and older consumed more than the recommended safe limit. The study also found that 2% of women drank at limits that were dangerous to their health. The survey showed that within 12 years, the proportion of women drinking in excess of the safe limit of alcoholic drinks had increased 9%. From 1996 to 2000, women who drank to dangerous levels had increased by 17% (Angove 2003).

The CORE survey which is commonly used to assess drug and alcohol use in college aged individuals was administered in the following study. There were 412 college aged women who took the survey and of the sample, 61% reported having binge drank within the past 2 weeks. Of the 412 women, 212 (51%) were within their first year of college, 70 (17%) were classified as sophomores, 62 (15%) were juniors, and only 30 (7%) were seniors. This shows that as the women progressed in college, the occurrence of binge drinking became more uncommon. Amongst the 412 college women, 332 (81%) were under the age of 21 and only 80 (19%) women were of the legal drinking age (Vickers 2004).

During the spring of 2002, a questionnaire from the National College Health Assessment Survey (NCHA) was administered to a random sample of 4,485 undergraduate students aged 18 years of age and older at a major public university. Only 31% of the questionnaires were returned. Of the 31% of students, nearly 5% were the age of 18, 16% were 19 years old, 23% were 20 years of age, and 56% were 21 years of age or older. Approximately 68% of those who responded were women. Within the two week setting that individuals were to account for in the survey, approximately 23% of the students reported having consumed five or more alcoholic drinks within a single sitting at least once or twice. Approximately 20% of the students claimed to have consumed at least the same amount of alcohol on three or more occasions during a two week period (Delva 2004). According to the National Survey of Families and Households (NSFH), the number of women reporting over 30 drinks a month was found to be quite small (Rodriguez 2006).

Many recent assessments have found that college drinking has considerably increased, especially a frequent increase in binge drinking amongst college aged women. According to Wechsler and colleagues, their analysis of data from the College Alcohol Study (CAS) from 1993-2001 found that there was a significant increase in college women's drinking. Within this time period, the percentage rate of binge drinkers did not change, however, the number of frequent binge drinkers did increase. A rise in the percentage of college aged women who drank on ten or more occasions within a 30 day time span was noted. The percentage of women who would drink with the intention of getting drunk increased from 35.6% to 42.4%. These results from the CAS show the number of college aged women and drinking habits that have increased considerably and

may soon match that of the college men's drinking rate. Young (2005) found that among college aged men and women, the percentage of 'heavy drinkers' drinking to get drunk was quite similar (Young 2005). The 2000 Harvard College Alcohol study was conducted on a random college campus. The study reports that there was a considerably high risk of alcohol consumption on the campus. Approximately 55% of the students reported binge drinking during the previous year. Of the individuals, 42% reported being drunk three or more times within a month; and 35% stated that they had binge drank within a two week time span (Wilke 2005).

In a study of college students drinking, a continuity of high school to college drinking pattern was noted. Approximately 69% of the sample was consistent with their high school drinking pattern into college. This included 47% of students not experiencing binge drinking habits in either high school or college. Approximately 22% of the sample stated that they experienced binge drinking at both levels (Reifman 2003). Leibsohn (1994) conducted a study of freshman students at a Midwestern University on high school and college drinking habits. Approximately 86% of the respondents stated that they had kept the same pattern of either getting drunk or not getting drunk from high school to college. Leibsohn (1994) concluded that: "By the time students enter college their drug and alcohol patterns are well established"(Leibsohn 1994). According to Reifman (2003), amongst high school non binge drinkers, women had a much higher probability of taking up binge drinking during their college life than males (Reifman 2003).

An individual's race is also taken into account when classifying a group of individuals that are more likely to be classified as having drinking habits. The CORE

survey which is commonly used to assess drug and alcohol use in college aged individuals was administered in a survey. Within this survey, race and ethnicity were taken into account. Within the survey of 397 individuals, 95% of the respondents were white, 1% were black, 1% Hispanic, 2% Asian/Pacific Islander, 1% American Indian/Alaskan Native, and 1% reported other. Of these individuals, 61% stated that they had partaken in binge drinking once during two weeks (Vickers 2004). A questionnaire from the National College Health Assessment Survey (NCHA), stated women represented 68% of the survey and 81.5% of the respondents were White non-Hispanic, 8.6% were Black non-Hispanic, and 5.8% were Hispanic. The study found that White non-Hispanic women experienced more alcohol-related problems than Black non-Hispanic women. Women of the Black non-Hispanic ethnicity were also much more conservative in their drinking norms than White non-Hispanic women. Although African Americans are more prone to abstain from alcohol than white women, they have a higher prevalence of being heavy drinkers than their white counterparts. A recent study by Delva (2004), has shown that exposure to discrimination has had an impact on why some African American women drink (Delva 2004). Among 1,231 undergraduate students involved in a web-based 2001 Student Life Survey, demographic along with racial/ethnic backgrounds were taken into account. The majority of the women were white, 73% (Young 2005). The National Survey of Families and Households, similar to other studies show that African Americans and other ethnic groups were less likely to drink and have less than five or more drinks per day than white women (Rodriguez 2006). Alcohol rates in high school prior to college, have been found to be significantly lower in African American and Hispanic individuals than white women (Wilke 2005).

An individual's educational status has been found to correlate with their alcohol consumption. In a National Alcohol Survey of adult Swedish individuals above the age of 17, women with an education level ending at the elementary level have a lower risk of problems for controlling drinking. Women with only a high school degree are twice as likely to have a problem controlling their drinking habits than women with a college education. In women, it appears that alcohol problems decrease with the higher the education level of the women (Selin 2005). According to research in Copenhagen, educational levels and amount of alcohol consumed were compared. Educational levels were divided into three categories, less than 8 years education, 8-11 years education, and greater than 11 years of education. The study showed there is a higher mortality risk related to alcohol consumption among women with less than 8 years of education. Women with greater than 11 years of education had the lowest percentage of individuals with mortality risk associated with alcohol (Schnohr 2004).

Studies have found that college drinking habits can affect an individual in later stages of their life. Heavy alcohol consumption has been found to affect and cause health related problems in an individual's life for as long as ten years after graduation (Young 2005). Data from the National Survey of Families and Households found that women with a high education level along with a higher income and residing in a metropolitan area were more likely to consume greater amounts of alcohol (Rodriguez 2006).

Several factors attribute to increased alcohol consumption but the most significant variable is income. Income level is a factor that should be taken into account when looking at alcohol consumption. When looking at controlling alcohol, women in the lowest income quartile were found to be six times more likely to have problems with

controlling alcohol consumption than those individuals in the highest income quartile. The odds of having alcohol related problems appear to decrease as their income level increases (Selin 2005). Studies done in Britain and Norway have shown that unemployed individuals appear to have a decreased consumption of alcohol. However, in the United States, research has found that alcohol abuse and consumption was much higher in unemployed and laid-off individuals than those who were employed. It was also found that individuals entering the welfare program had an increased rate of alcohol consumption and drug abuse. However, alcohol consumption and drug abuse had no relation to why individuals left welfare assistance. According to the National Survey of Families and Households, non-employed and retired individuals were more likely to have no alcohol consumption within a month period. However, among those that do consume more than 30 drinks a month, there was no difference among those individuals who were full-time employed and non-employed. Working women that were receiving welfare were found to consume 12 or more drinks per month than full-time individuals not receiving welfare. Women that were retired and consumed alcohol were found to consume 12 or more drinks per month greater than full-time employed women. Research has also shown that alcohol abuse can have a significant negative association with maintaining ones employment (Rodriguez 2006).

Alcohol and its Affects on Nutrition and Health Status

Many people end up hurting either themselves and/or someone else with heavy alcohol consumption. Among college students, Prentice and Miller states, “Alcohol constitutes one of the greatest health risks to college students” (Shirachi 2006). Many

college students experience more problems from drinking due to their young age and intolerance to heavy consumption of alcohol. Alcohol related problems have been found to be more prevalent in individuals who consume alcohol more frequently over individuals who consume a large amount of alcohol at one given occasion. However, Selin (2005) showed that health problems amongst women are said to be caused mainly by binge drinking rather than by the volume of alcohol consumed which is the problem in males (Selin 2005).

Alcohol becomes a health problem due to water diluting alcohol in the bloodstream, while fat retains alcohol. Therefore, our brains and other organs are being exposed to higher concentrations of alcohol for a longer length of time (Harvard Women's Health Watch, 2006). In general, many studies have shown that the established risk factors for coronary heart disease and mortality rates include heavy tobacco and alcohol use, physical inactivity, and obesity. These risk factors are unequally distributed amongst the different social levels (Schnohr 2004). Heavy alcohol use is associated with serious, acute problems (Shirachi 2006). Studies have shown that alcohol consumption increases an individual's risk for chronic diseases such as hypertension, stroke, osteoporosis, and various cancers of the upper gastrointestinal tract, breast and colorectal cancer (Ruf 2005). Women who became alcohol dependent suffered consequences such as brain damage, psychiatric problems, damage to the cardiovascular, musculoskeletal, and gastrointestinal systems; anemia, and fatal accidents (Harvard Women's Health Watch, 2006). Frequent intake of small amounts of alcohol is found to be more beneficial in helping prevent coronary heart disease than bingeing on alcohol per drinking occasion (Tolstrup 2005). An individual who moderately consumes alcohol has lower

risk factors for cardiovascular morbidity and mortality (Ruf 2005). Moderate alcohol consumption also can be associated with a lower risk for the development of type 2 Diabetes (M Flechtner-Mors 2004). Bagnardi et al. (2001) suggests that alcohol consumption increases the risks for someone to have cancers of the oral cavity, pharynx, esophagus, and larynx. Cancers that were found to have less correlation with alcohol consumption were cancers of the stomach, colon, rectum, liver, breast, and ovary. Total ethanol intake tends to increase the amount of alcohol that an individual consumes. Therefore, cancer can be a direct result. If an individual is consuming alcohol along with smoking cigarettes, they have an increased risk for larynx, lung, and bladder cancers. Individuals who are consuming alcohol on a regular basis are characterized by less healthy dietary patterns which can easily lead to a high risk for cancer (Ruf 2005). When looking at individuals with chronic health problems related to drinking, age has no impact on their problems. However, there is a higher risk of such problems later in one's life. This is due to the fact that there is time to develop these problems throughout one's lifetime. High mean alcohol consumption is found to be related to alcohol related health problems such as liver cirrhosis (Selin 2005). Excess body weight has also been found to be a risk factor for alcoholic liver disease (Suter 2005). Due to consuming less alcohol over a shorter period of time than men, women are at a greater risk for developing liver disease (Angove 2003). Suter (2005) found that there was a lower risk of cardiovascular problems in individuals that have a slow rate of alcohol metabolism. These subjects do however have a higher risk for other alcohol related diseases. Also found is the fact that individuals with a slow alcohol-elimination rate have a stronger effect on increased body weight which could lead to obesity. The consumption of alcohol has been found to be a

risk factor for the deposition of abdominal fat. Beer has been found to be associated with an increased abdominal fat mass (Suter 2005).

Suter (2005) has shown that individuals who consume alcohol on a regular basis have a higher blood pressure. Excessive alcohol intake has been identified as a major cause of hypertension. In a cross-sectional study by Suter (2005), it was found that systolic and diastolic blood pressure are increased as a result of weekly alcohol consumption. A regression model stated that this was the fourth most important determinant of blood pressure along with abdominal fat mass (Suter 2005).

Alcohol has a large effect on the digestive system. Alcoholics have been found to be more susceptible to glossitis, a painful inflammation of the tongue; stomatitis which is inflammation of the mouth, a bacterial overgrowth that leads to tooth decay, and periodontitis which is inflammation of support tissues around the teeth. These disorders have an affect on an individual's ability to taste food which can cause eating difficulties. Many alcoholics tend to have a poor protein intake which can cause them to become zinc deficient also leading to an altered ability to taste food and appetite loss (Marsano 1993).

Duffy (2005) has shown that alcohol intake has a large effect on the risk of breast cancer in women. By simply drinking one drink per day, the risk of developing breast cancer increases by approximately 9-11%. Low levels of alcohol consumption have shown to increase the risk of breast cancer. Alcohol has been found to affect the development of breast cancer simply by lowering the blood folate levels. Several study results have shown that the increased risk of breast cancer in some alcohol consumers may be restricted due to the low levels of folate supplements and/or vitamins in a woman's regular diet. Due to the fact that even low levels of alcohol can have a large

effect on the risk of breast cancer, women should also be aware that there is no safe risk-free amount of alcohol (Duffy 2005).

Women have to be very careful when becoming pregnant to abstain from drinking alcohol. There are many effects that can occur from drinking alcohol while pregnant. These effects can include low birth weight, spontaneous abortion, premature labor, stillbirths, physical and mental abnormalities, and fetal alcohol syndrome (Angove 2003).

Some studies have shown that high consumption of alcohol can lead to the use of other mood altering substances such as cigarettes, marijuana, or cocaine. Another health issue with high consumptions of alcohol is driving under the influence or drunk driving. A study in a Northern California county has been done on the prevalence of fatal and nonfatal injuries such as auto accidents and injuries due to violence which were a result of alcohol consumption (Salome 2005).

Unfortunately, many health issues caused by large amounts of alcohol consumption or alcoholism are non-reversible. Approximately 23% of all deaths are due to the result of some sort of alcohol consumption (Ruf 2005).

The National Institute on Drug Abuse (NIDA) has set out to find development of gender-specific intervention programs for alcohol and drug abuse. Interventions have also been developed especially for women who have shown dependence to an unhealthy risk behavior such as smoking dependence, low physical activity, eating disturbances, and alcohol addiction (Vickers 2004). The Institute of Medicine stated that no single treatment approach could be seen to be effective for all problematic drinkers. Women do need treatment services that recognize their specific needs in relation to self-esteem, poor self image, self-harm, and depression (Angove 2003). There are many protective barriers

that women can take to help protect themselves while drinking. A study showed that 74.6% of individuals admitted using a designated driver, 74.3% stated that they would eat before or during drinking, 65.4% would keep track of the number of drinks consumed, and 39.6% avoided playing drinking games. A major study found that students who engaged in more protective barriers were less likely to have alcohol-related problems (Delva 2004).

Alcohol and Personal Lives

The issue of social stigma amongst individuals, alcohol, and socio-economic status has become a popular research study. In a historical analysis, it was found that alcohol consumption was much more exaggerated in individuals of a lower socio-economic status. However, Selin (2005) found no association between an individual's social status and their frequency of alcohol consumption (Selin 2005).

There are many studies that show that one's marital status has an affect on their drinking habits. Studies show that individuals without a spouse or individual's that have at one time had a spouse are at a much higher risk for risky alcohol consumption and alcohol related harm. Women who are currently separated or divorced are found to consume more alcohol in one sitting than other women. Women who are currently married have only about half the risk for impaired self-control. Women living in a household with children do not appear to have any kind of correlation with the risk of alcohol-related health problems. Interpersonal problems appear to be in relation with the effect of binge drinking moreover than the volume of alcohol consumed (Selin 2005).

Geography and population density are two factors that are taken into account when looking at whether one's location of residence affects their drinking habits. In U.S. literature, there are two types of areas, wet and dry regions. Dry regions indicate strong temperance movements, less frequent heavy drinking, and more individuals who are refraining from alcohol use. Many studies indicate that more problems seem to arise in the "dryer" regions even though they may have the same level of drinking as the wet areas. Cahalan and Room (1974) compared drinking habits in these two regions and they concluded that dryer regions involved heavier drinking and problems associated with spouses and jobs. In wetter regions, the only heavy drinking problems resulted in medical consequences (Selin 2005).

Among college student's place of residence has an affect on their alcohol consumption. Students who live on a college campus have been found to partake in more high risk heavy drinking than students who commute to campus (Wilke 2005). After controlling for alcohol consumption, results show that socio-demographic indicators are weak indicators for negative consequences of drinking (Selin 2005).

Among college women, 55% of the women surveyed stated they had experienced at least one alcohol related problem within the past year. These problems included, 43.2% of women had done something that they regretted after the fact, 37.6% of women said they had forgotten where they were or what they had done while drinking. Approximately 24.1% of the women stated they had physically injured themselves while drinking, and 13% stated they had been experiencing academic problems due to their drinking (Delva 2004). From the study conducted by Delva (2004), 21.2% of women studied admitted to having unprotected sex while under the influence. A national study

of college students concluded that individuals engaging in high volumes of alcohol were much more prone to engage in sexual behavior with multiple partners within one month. High risk drinking has also been found to be related closely to sexual assault. Studies of college students found that approximately 12 to 14% of women who reported having unwanted sexual contact had been under the influence of alcohol. Presley et al. (2002) concluded that 10% of males who participated in a national survey of college drinking admitted to sexually taking advantage of an individual that was under the influence of alcohol at the time. Alcohol is believed to decrease the likelihood of resolving any misperceptions of sexual signals. Alcohol reduces a women's ability to self-defend herself and can provide an excuse for someone's sexually aggressive behavior (Wilke 2005).

An individual's social context is a significant factor to high-risk drinking. An individual's peers can directly affect an individual to partake in high-risk drinking by simply encouraging or forcing them to drink. Individuals can indirectly be influenced by their peers through what they believe are perceived norms. Peer norms have been found to have a greater influence on an individual's drinking than parental norms or even one's religious influences. A lot of students admit that they drink more due to the fact that they believe that their peers around them are drinking more as well. However, this is usually a misconception because most individuals are not drinking as much as others perceive. For each additional drink a woman thought her peers were consuming, the odds of high-risk drinking increased by 28% (Wilke 2005). An individual's academics can be directly involved from binge drinking. Problems can include having a grade-point average lower than a 3.0, missed classes, poor performance on tests or projects, and even

falling behind in their schoolwork (Vickers 2004). Individuals who are part of a Greek organization have been found to consume more alcohol, drink more frequently, and experience more risky consequences than those who are not a member of a fraternity or sorority. Sorority women were found to be 2.2 times more likely to report high-risk drinking than non-sorority members. Fraternities with the reputation of partaking in heavy drinking have been found to be appealing to students looking at a fraternity to join. However, most women looking at a sorority are more prone to join the sorority that does not have the reputation of heavy alcohol consumption (Wilke 2005).

Studies have shown that women who experience depression are at a much higher risk of becoming frequent heavy drinkers. Many women have been found to use alcohol as a coping method for their depression. A major risk factor of depression is found in women who consume more than five drinks on a maximal drinking occasion. Women have also been much more prone to using alcohol as their own self-medication for their depression. Heavy alcohol use may also increase the risk of major depression in women (Wang 2001).

Excessive alcohol intake has been related to some self-harm and successful suicide. Women who misuse alcohol have been found to have a history of suicide attempts and psychiatric treatment. Women who experience alcohol problems are much more likely to experience greater psychosexual dysfunction, low self-esteem, anxiety, and bulimia than do women without alcohol related problems. A lot of women who experience emotional pain appear to cover up their emotions with excessive drinking. Even if a woman has a history of emotional and/or physical abuse, they may later turn to

alcohol abuse to help with these problems. Women appear to become more upset when they engage in heavy drinking (Angove 2003).

Studies reported that a lot of women believed that men were more attracted to a woman if she could consume a large amount of alcohol at a time. Some college women admitted that they were drinking more heavily simply to just prove their own heterosexuality. College men reported that they were more attracted to a woman that could consume the “guy drinks” (Young 2005).

Alcohol and Weight

A study by Gutierrez-Fisac (1995) has stated that alcoholic’s body weight tends to be lower than that of individuals without an addiction to alcohol (Gutierrez-Fisac 1995). Suter (2005) states, “Presently one-third of the U.S. adult population is overweight.” In the U.S., alcohol provides adults between 6 and 10% of their total calorie intake. However, in heavy alcohol consumers, this may increase to 50%. Alcoholic beverages also represent the third most important source of energy. The top two include breads and sweets (Suter 2005). Alcoholic beverages are considered to be energy dense and are being added to one’s total daily energy intake (Ruf 2005).

College aged women report having more weight and food-related concerns than college aged males. Amongst individuals that participated in a CORE survey, women who stated they engaged in binge drinking activity were also more likely to have concerns about their weight than individuals who did not engage in binge drinking. Due to alcohol related weight gain, many women have an increased concern for their weight. However, many women may turn to binge drinking due to the fact that they are not

satisfied with their body. Women may also partake in binge drinking to try and distract themselves or others from their appearance (Vickers 2004).

Eating disorders and alcoholic consumption can be found to be related. Over the last two decades, there has been a large awareness of the relation between eating disorders and substance abuse such as alcohol and cigarette consumption. Studies have shown that women with symptoms of eating disorders have become much more likely to have significantly higher frequency and intensity of alcohol consumption. Women who are taking in alcohol are usually doing so as a result of high levels of body dissatisfaction and a strive for thinness (Granner 2002). These women therefore, are at a much higher risk than others to develop an eating disorder. Dunn et al. (2002) implemented a study on women who purge and alcohol consumption. It was stated that women who purged also stated they had heavier alcohol consumption than women who did not report purging. There are lots of other studies that show elevated rates of alcohol consumption. Dunn et al. (2002) however, found that there is no significant difference amongst alcohol use in persons with Bulimia Nervosa and those without. Women who purge have been found to have more negative consequences of alcohol use than non-purging women. Some of these negative consequences include injury to self and/or others along with risky sexual behavior. The study shows that individuals involved in purging had more frequent alcohol consumption and severe consequences than individuals not involved in purging (Anderson 2005). Studies have shown that stress and individual's own coping styles are factors in both eating disorders and alcohol use (Granner 2002).

Suter (2005), states that the pattern of heavy alcohol consumption is the major cause of malnutrition. Low to moderate alcohol consumption can enhance an individual

to gain weight, whereas, higher levels of alcohol consumption can actually enhance weight loss. Another factor that alcohol can have on body weight can be related to individuals skipping meals due to their alcohol consumption. When an individual consumes alcohol on a regular basis, they become almost resistant to weight gain due to their increased energy expenditure. When an individual adds alcohol consumption to their diet, an increase in energy intake will be a result. In a cross-sectional epidemiological study, a positive relationship between self-judged fat intake and the level of alcohol intake has been noted. Suter (2005), also states that alcohol intake and carbohydrate intake have an inverse relationship. However, there were many studies mentioned that found little relation between alcohol intake, carbohydrate composition, and overall energy intake (Suter 2005). In the EPIC Heidelberg study, it was found that women who increased their alcohol consumption had a low intake of carbohydrates and fiber and a high intake of protein. High fat intake was found to be the highest in subjects that were considered to be in the midrange of alcohol intake. For women who consumed high amounts of alcohol, they also consumed more dairy products and animal products, lower intake of fruits, cereal products, vegetable fat, and non-alcoholic beverages than women who abstained from alcohol consumption (Ruf 2005).

There is a common belief that most beer drinkers are going to be more obese or overweight than either nondrinkers or wine and spirits drinkers. This is believed due to the fact that beer contains more carbohydrates per unit of ethanol than most wines and/or spirits. Data from the third Czech MONICA survey in 1992 states that the mean weekly intake of alcohol in women is approximately 22 grams. In this study, the mean BMI of women was 26.9. Beer intake was not found to be related to an individual's total

cholesterol (Bobak 2003). A study on drinking and body mass index (BMI) found that those that drank the least amount of alcohol also had the lowest BMI scores. Those individuals that consumed infrequent amounts of alcohol were found to have an increased BMI. In the EPIC Heidelberg study, women with heavy alcohol consumption had a mean BMI of 24.6 kg/m² compared to 25.8 kg/m² for women who abstained from alcohol consumption. In a Nurses' Health Study, it was reported that women who consumed moderate amounts of alcohol had a BMI score 15% lower than that of women who did not consume alcohol (Ruf 2005). Small hip circumference was directly associated with the amount of alcohol that a women consumed. Women who frequently drank showed a correlation with having small hips. This study also stated that drinking frequency was inversely associated with large waist circumference (Tolstrup 2005).

Westerterp-Plantenga performed a study on alcohol and food/meal intake. This study found that on days when an individual consumed alcohol, they also consumed a significant amount more food, the duration of meals was longer, and their level of satiation was prolonged. It can be stated that alcohol is considered to be "unregulated empty calories." Body weight can be affected by individuals that have a slow alcohol elimination rate and individuals that have a faster rate of alcohol metabolism may not experience as much weight gain. It has become obvious through studies that if alcoholic calories are added with other calories, this results in weight gain. In a Framingham study, individuals who had just currently lost weight were having trouble keeping the weight loss off due to a stressful lifestyle and alcohol consumption. Obese subjects were found to consume more alcohol than non-obese subjects in a French survey. Also noted was that obese African American men and women had a high alcohol intake. A controversial

small interventional study observed that only in individuals with a greater body weight status did alcohol consumption lead to weight gain. These studies suggest that high alcohol consumption (greater than 21 units/week) is positively correlated with higher risks of obesity (Suter 2005).

The purpose for examining past literature on alcohol consumption in women between 20 and 29 years of age, was to make individuals more aware of why women may drink, the risk factors, and nutritional implications with drinking alcohol. NHANES data was accessed to better show how much women are consuming, how often they are consuming alcohol, and if they are consuming alcohol due to their perceived body image.

Methods

Data Collection Procedures

The National Health and Nutrition Examination Survey (NHANES) was used to collect data. This nutrition and health survey has been in place since the early 1960's. The survey is conducted by the National Center for Health Statistics (NCHS), Division of Health Examination Statistics (DHES), and part of the Centers for Disease Control (CDC). Approximately 7,000 individuals, of all ages, are interviewed in their homes; within the 7,000, around 5,000 complete the health examination component of the survey each year. Most of these health examinations are conducted within a mobile examination centers (MEC). These MEC's provide a good place to conduct these examinations and get results of high quality. For those individuals that are unable to go to the MECs, they are given an abbreviated health examination survey in their homes.

The NHANES 1999-2000 and 2001-2002 includes an over-sample of individuals ranging from, low-income individuals, adolescents 15-19 years of age, individuals 60+ years of age, Mexican Americans, and African Americans. The first step is to make sure that the eligible sample for the survey and the tasks carried out are related to the data management and survey operations that are to be performed. The survey design implemented by NHANES is classified as a stratified, multi-stage probability sample of the civilian non-institutionalized US population. There are four stages of sample selection. These four stages include; selection of Primary Sampling Units (PSUs) which are considered counties or small groups of contiguous counties, segments within PSUs (a block or groups of blocks containing a cluster of households), households within segments, and one or more participants within households. There are 15 PSUs that are visited within a twelve month time span.

Households that are selected for inclusion in the NHANES sample are then sent a letter in the mail informing them that an NHANES interviewer will be visiting their home. The household interview process is made up of; the screener, sample person, and family interviews. Each of these has a separate questionnaire. Individuals classified as trained household interviewers are the individuals that administer each questionnaire. The setting for most of the interview's questionnaires takes place within the participant's home. After the questionnaire is administered, the data is recorded using a Blaise format computer-assisted personal interview (CAPI) system.

The interviewer must show an official identification badge upon arrival at a household's home. The interviewer then requests that the individual answer a brief questionnaire (Household Screener Questionnaire Module 1) which is given to determine

whether or not household occupants are eligible to participate in the examination process. The interviewer then proceeds to explain the household questions to all individuals over the age of 16. Their rights are then explained to them along with assurance of the confidentiality of the survey. A good portion of the household questionnaires are given on the initial visit. For survey participants under the age of 16, a proxy (usually the SP's parent or guardian) is conducted. Individuals under the age of 16 are only eligible to self-report if there is no one living in the household over the age of 16. Respondents are then asked to sign an Interview consent form which is stating that they agree to participate in the household portion of the survey. Individuals between the ages of 16 and 17 must give consent and their parents or guardian must also give consent for their participation. After the household questionnaire is completed, a second consent brochure is explained to the participants. Participants are encouraged to participate in the NHANES health examination section of the interview process. An additional consent form is required if they give their consent to participate. The interviewer then calls the NHANES field office to schedule an examination appointment. Any expenses (gas, childcare, etc) that the individual will have to pay to participate in this examination appointment will be reimbursed.

There are different target populations for some of the NHANES questionnaire sections. For example, alcohol frequency questions were simply asked to individuals greater than 20 years of age. When using the data, it was very important to review the survey questionnaire codebooks thoroughly to determine the target population in each questionnaire, section, and sub-section.

Upon arrival to the MEC, the coordinator greets the participant and goes over all pertinent information with them. Individuals under the age of six are asked to provide a urine specimen. Along with the MEC coordinator, the survey team consists of one physician, one dentist, two dietary interviewers, three certified medical technologists, five health technicians, one phlebotomist, two interviewers, and one computer data manager. The entire examination takes approximately three hours. After a participant has completed with the whole process, they are then compensated for their time and any expenses they had to pay to participate. Some of the results from the examination are given to the participant before they leave the MEC. The other findings are then mailed to the participant once the laboratory results and tests are completed.

NHANES public use data files can all be linked by using a common survey participant identification number (variable name: SEQN). By using this merged data, it ensures that the appropriate information is correctly linked together. All of the data files are to be sorted by SEQN. Within the 2001-2002 NHANES data files, not all of the files are going to have the same number of records. Therefore, it is important to look at the number of records in each data file due to the fact that gender and age can have an effect on this number.

Administrative and confidential information and data are not publicly released. Most data analyses require either the examined sample weight or the interviewed sample weight. If using NHANES 2001-2002, the two-year sample weight should be used. If using combined analysis from NHANES 1999-2000 and 2001-2002 as was the case for this study, the four-year sample weights were used.

Demographic data file variables are placed into three categories; status variables, recoded demographic variables, and interview and examination sample weight variables. Status variables provide core information on the participant. Recoded demographic variables include age, gender, race/ethnicity, current or highest grade of education completed, country of birth, poverty income ratio, income, and a pregnancy status variable.

The NHANES 1999-2000 and 2001-2002 survey contains data on a total of 21,004 individuals. All of this data was collected between January 1999 and December 2002. The NHANES data pulled is all in SAS transport file format. The XPORT engine for SAS should be used to access the data.

Variable List

The analysis variables were comprised of demographics, BMI, and alcohol consumption. From the demographic section (DEMO) the following were included, gender of which all males were excluded, age of which only females 20-29 were included. Anthropometric variables included BMI (kg/m²) that was calculated from the measurements taken at the MEC.

Data Analysis

Data were analyzed using SAS (version 9.1.2, 2005, SAS Institute Inc., NC, USA). The mean and standard error of all data were calculated with SUDAAN, a statistical analysis program that takes into account the sample weights and design when calculating estimates. The chi-square test of independence was applied in SUDAAN to

test for significant differences between variables. An alpha value of 0.05 was used for determination of significance between variables.

Results

The study investigated alcohol consumption with weight perception along with an individual's actual weight status. The study consisted of 630 non-pregnant women between the ages of 20 and 29 years. Of the 630 women, 12.38% (n=78) were 20 years of age, 31.58% (n=199) were 21-23 years old, 27.93% (n=176) were 24-26 years of age, and 28.09% (n=177) were 27-29 years of age. Amongst the 630 women, 27.55% (n=173) had less than a high school degree, 24% (n=151) had a high school diploma or GED, 48.41% (n=304) had higher than a high school diploma, and 0.4% (n=2) did not answer.

In Table 1, individuals are classified as being either underweight, normal weight, overweight, or obese. BMI is calculated by dividing an individual's weight in pounds by his or her height in inches squared and then multiplied by a conversion factor of 703. As recommended by NIH, a BMI of 18.5 or less is considered underweight, 18.5-24.9 indicates normal weight, 25-29.99 indicates overweight, 30-39.99 indicates that an individual is obese, and 40 and above indicates morbid obesity (www.nhlbi.nih.gov).

Table 1
BMI Range of Women

BMI Group	Frequency	Percent
Underweight	22	3.49
Normal Weight	265	42.06
Overweight	155	24.60
Obese	157	24.92
Morbidly Obese	31	4.92

After looking at the BMI range of the women, their perception and thoughts about their weight were also considered. As part of the weight questions, the subjects were asked to classify their current perception on their weight. They were to classify themselves as either being overweight, underweight, or about the right weight. Amongst the 630 women, 57.46% (n=362) considered themselves overweight, 4.44% (n= 28) stated they were underweight, and 38.10% (n=240) considered themselves to be about the right weight.

Next, participants were then asked to state their satisfaction with their body. Amongst the 630 women in the study, only 56.04% (n=353) answered the question. Of the 56.04%, 4.25% (n=15) stated that they would like to weigh more, 66.86% (n=236) would like to weigh less, and 28.90% (n=102) stated that they were satisfied with their weight.

The amount of self-reported alcohol intake by women was recorded. Women were asked to state the number of drinks that they consumed. After answering, they were prompted to state the duration time of their response as either within a month, week, or day. An average of the amount of alcohol per day was determined and based on the

previous answer. Groups were determined based on drinks per day. Less than 2 drinks per day was classified as low alcohol consumption, 2-5 drinks per day was considered moderate alcohol consumption, greater than 5 drinks per day was classified as high alcohol consumption.

Table 2 shows that 456 (72.38%) of the women aged 20-29 was considered to be in the low alcohol consumption group (less than 2 average drinks per day), 114 (18.10%) were in the moderate alcohol consumption group (2-5 average drinks per day), and 60 (9.52%) of women were classified as in the high alcohol consumption (4-7 average drinks per day).

Table 2
Amount of Drinks Consumed per Day

# of Drinks/Day	Frequency	Percent
Low Alcohol Consumption (<2 avg drinks/day)	456	72.38
Moderate Alcohol Consumption (1-3 avg drinks/day)	114	18.10
High Alcohol Consumption (4-7 avg drinks/day)	60	9.52

Individual drinking occasions were also taken into account. Subjects were classified into 3 categories, no alcohol occasions (0 drinks per week), low drinking occasions (1-3 occasions per week), high drinking occasions (4-7 occasions per week).

Table 3 shows that 235 subjects (37.30%) reported no alcohol occasions, 389 subjects (61.75%) had low drinking occasions, and 6 subjects (0.95%) had high drinking occasions.

Table 3

Number of Drinking Occasions per Week

Drinking Occasions/Week	Frequency	Percent
No Alcohol Occasions	235	37.30
Low Drinking Occasion	389	61.75
High Drinking Occasions	6	0.95

When looking at the 630 women in the study, BMI categories were compared with drinks consumed per day to determine if there was any significance in weight and alcohol consumption. As mentioned previously, individuals were placed in a category of either low, moderate, or high alcohol consumption within a year.

Table 4

Results of Chi-Square Analysis of Drinks per Day with BMI Status and Weight Perception

	Low Alcohol Consumption	Moderate Alcohol Consumption	High Alcohol Consumption	χ^2	P-Value
BMI Group					
Underweight	4.64% (n=14)	3.94% (n=5)	6.08% (n=3)	5.54	0.6945
Normal Weight	43.4% (n=181)	50.51% (n=58)	42.85% (n=26)		
Overweight	24.44% (n=116)	23.64% (n=26)	20.88% (n=13)		
Obese	22.66% (n=121)	19.2% (n=20)	27.45% (n=16)		
Morbidly Obese	4.82% (n=24)	2.72% (n=5)	2.74% (n=2)		
Weight Perception					
Overweight	56.38% (n=254)	61.39% (n=67)	64.92% (n=41)	2.44	0.6581
Underweight	4.59% (n=21)	3.42% (n=6)	1.95% (n=1)		
Normal Weight	29.03% (n=81)	35.19% (n=41)	33.13% (n=18)		

As shown in Table 4, there was no significance in an individual's BMI group and the number of drinks consumed per day. These results also showed that there was no statistical significance in the correlation between weight perception and the amount of

alcohol consumed during a day. Drinking occasion and BMI were compared together to see if they were significantly related. An individual's weight perception was also compared with drinking occasions.

Table 5

Results of Chi-Square Analysis of Alcohol Occasions with BMI Status and Weight Perception

	No Alcohol Occasions	Low Drinking Occasions	High Drinking Occasions	X ²	P-Value
BMI Group					
Underweight	5.57% (n= 7)	4.3% (n=15)	0% (n=0)		
Normal Weight	42.74% (n=90)	45.65% (n=172)	56.99% (n=3)		
Overweight	25.15% (n=60)	23.43% (n=94)	13.04% (n=1)	7.63	.4901
Obese	22.54% (n=67)	22.32% (n=88)	29.97% (n=2)		
Morbidly Obese	4% (n=11)	4.3% (n=20)	0% (n=0)		
Weight Perception					
Overweight	50.07% (n=126)	62.17% (n=232)	67.09% (n=4)		
Underweight	7.02% (n=13)	2.69% (n=15)	0% (n=0)	15.15	0.013
Normal Weight	42.9% (n=96)	35.13% (n=142)	32.91% (n=2)		

These results showed that there was no significance in an individual's BMI group and the number of drinking occasions that an individual has within a week. The results showed a statistical significance between weight perception and drinking occasions within a week.

Discussion

Using the data combined sets from 1999-2000 and 2001-2002 NHANES, 3.49% individuals were classified as underweight, 42.06% were normal weight, 24.6% were overweight, 24.92% obese, and 4.92% were classified as morbidly obese. There are many factors that have contributed to the dramatic rise of overweight and obesity in the

United States. These factors include social, cultural, and economic cultural changes over time. Alcohol content can vary amongst drinks within a category such as liquor, beer, and wine. Therefore, different alcoholic drinks can contain different amounts of calories.

Non-pregnant women age 20-29 were evaluated based on their alcohol consumption, BMI status, and weight perception. These subjects were classified into BMI ranges, their perception of their current weight to evaluate if there was any significance with alcohol consumption and drinking occasions.

Results showed that there was no statistical significance between alcohol consumption, the average number of drinks consumed per day, and a women's BMI. An individual's BMI range did not appear to be affected by the average amount of alcohol that they consumed per day or by the number of alcohol occasions that women are having within a one week period. However, based on the way NHANES questions were asked, only an average number of drinks per day could be determined.

There was a statistical significance between an individuals alcohol occasions per week and their perception of their weight. Results showed that individuals that had low to high drinking occasions were more likely to classify themselves as being overweight. Suter states that individuals who consume a low to moderate amount of alcohol can enhance weight gain, whereas, high levels of alcohol consumption can actually enhance weight loss. A study by Ruf found that subjects who drank the least amount of alcohol also had the lowest BMI scores. Ruf also found that women with heavy alcohol consumption had a lower BMI than those women who abstained from alcohol consumption.

In summary, alcohol can have some effect on an individual's perception of their own body. No definite conclusion can be drawn from this particular study on the effects of alcohol consumption or drinking occasions on BMI and weight perception. There is a need for further investigation into alcohol consumption and drinking occasions on a women's BMI status and weight perception.

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