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The relationship between depression, stress, and alcohol, tobacco and other drugs (ATOD) among college students from 2010-2015

Transitions that occur in young adulthood, like attending college, are often accompanied by increased stress (Arnett, 2000). Approximately half of all young adults living in the US will enroll in and receive some form of post-secondary education (US Department of Education, 2016). Stress and its related health and academic consequences can significantly affect the quality of life of college students. College students can experience stress from many different sources including concern over finances (Hicks & Heastie, 2008), academic hardships and demands, career concerns, and pressure from family (Aselton, 2012; Beiter *et al.*, 2015). Depression succeeds stressful events, putting college students at risk for mental illness. The transition to college can also be a stressor. Hudd and colleagues (2000) found that about 52% of college students reported having high levels of stress during the semester. Transition-related stressors include developing interpersonal relationships, meeting academic expectations, and living in a new environment, such as the residence halls (Mahmound, 2011; Aselton, 2012; Geisner, Mallett, & Kilmer, 2012).

Depression is the most common health issue for college students (Buchanan, 2012). In 2016, an estimated 16.2 million adults (6.7% of the population) aged 18 years or older in the US had experienced at least one major depressive episode in the last year (Center for Behavioral Health Statistics and Quality, 2017). In 2016, the National Survey on Drug Use and Health Methodological Survey reported that the prevalence of adults with a major depressive episode with impairment was highest among

individuals 18-25 years old (10.9%), higher than all other age groups surveyed (CBHSQ, 2017). Major depression is characterized by at least 5 of the diagnostic symptoms for at least a 2-week period. These diagnostic symptoms include: depressed mood or loss of interest or pleasure, problems with sleep, eating, energy, concentration, self-image, or recurrent thoughts of death or suicide (American Psychiatric Association, 2000). Depression in college students has been linked to low GPA, less satisfying relationships, and poor coping skills (Aselton, 2012). Warranting attention and support, depression can significantly impact the quality of life and learning experience in college. Less desirable coping measures, such as alcohol, tobacco, and other drugs (ATOD) are commonly used as responses by students.

College-age students have a greater tendency to use less desirable coping strategies, such as drinking alcohol, using drugs and/or tobacco use, to help with managing psychological distress associated with college life. Misra, McKean, West, & Russo (2000) noted that freshmen showed more less desirable coping behaviours than upperclassmen. Students who have more frequently used less desirable coping measures were reported to have significantly higher levels of depression and anxiety (Mahmoud, Staten, Hall, & Lennie, 2011). Maladaptive coping methods may relieve a students' mental distress, but only temporarily. In addition to being female, students who were transfers, upperclassmen, or lived off-campus reported more stress, anxiety, and depression (Beiter *et al.*, 2015). Of these categories, upperclassmen reported the most

stress. Higher depression scores were reported with seniors than other grade levels (Mahmoud *et al.*, 2011; Beiter *et al.*, 2015). The stress of completing their academic career, as well as post-college career concerns can be a significant source of stress in upperclassmen. These stressors can act as a catalyst for students to engage in maladaptive coping strategies.

Less desirable coping strategies have a significant impact on the physical and mental health of college students. College years are often associated with increased rates of depression, other mental health issues, and alcohol consumption (Geisner *et al.*, 2012). Alcohol continues to be the drug of choice for college students, with 63% reporting that they drank, 41% saying they were drunk at least once in the last 30 days.

Many students feel the need to consume alcohol in order to cope with their mental distress. Pierceall and Keim (2007) found that 75% of community college students surveyed were moderately stressed, while 12% of students were in a high-stress category and showed that students commonly used less desirable coping strategies such as drinking alcohol, smoking, and using illegal drugs. College-aged individuals are at their peak lifetime risk of diagnosable alcohol disorders, and two-thirds of students with diagnosable alcohol dependence met the criteria before the age of twenty-five (Geisner *et al.*, 2012). Heavy and frequent alcohol use during the college years, can have lasting effects on students.

Depression and stress can also contribute to the use of tobacco in college students. 11% of smokers reported that they first tried cigarettes after the age of nineteen, and 11.5%-22% of college students who previously never smoked progressed to occasional or daily smoking during their college years (Morrell, Cohen & McChargue, 2010). Increased tobacco use can be due to an increase in stress levels of students. Students are more likely to use tobacco when stressed (Melaku, Mossie, & Negash, 2015). Individuals, especially females, are more likely to smoke to manage their depression and have greater levels of nicotine dependence compared to males (Morrell *et al.*, 2010). When students are experiencing symptoms of depression, tobacco use is often a common maladaptive coping mechanism used. More specifically, depression

vulnerability can be a potential risk factor for smoking among college females (Morrell *et al.*, 2010).

Marijuana use has been found to be used as a stress relief technique or coping strategy in college students (Aselton, 2012). Frequency of marijuana use is not associated with overall well-being, and unlike tobacco, is used more often by males than females (Allen & Holder, 2014). In 2016 the Monitoring the Future Study showed that 39% of full-time college students reported using marijuana at least once in the last month, and 22% indicated using marijuana at least once in the last 30 days, the highest level of marijuana use in 30 years (Schulenberg *et al.*, 2016).

In addition to alcohol, tobacco, and marijuana use, opioids and sedatives are also used as a less desirable coping strategy among college students. In order to ease their stress and depression, students may be self-medicating with opioids or sedatives. Students who reported feeling depressed were 1.18-1.43 times likely to report opioid use and 1.36 times likely to report sedative use, especially in females (Zullig & Divin, 2012).

Furthermore, infrequent use (one-two times) of nonmedical sedatives, sleeping medications, and opioids were more prevalent than frequent use (three or more) in college students (McCabe, West, Teter, & Boyd, 2014). Use is also more prevalent in same-aged nonstudents than in regular students. McCabe *et al.* (2014) also indicated a steady decline in the medical, diversion, and nonmedical use of prescription opioids over the past decade in college students with the national average decreasing from 8.8% in 2006 to 5.4% in 2012. In 2016, a national survey conducted by the University of Michigan revealed that 7% of the 870 respondents had misused opioid painkillers, an increase from just 4% in 2015. The National Survey on Drug Use and Health (2015) found that 119 million Americans, 12 and older, take prescription painkillers, tranquilizers, sedatives or, increasingly stimulants like *Adderall*. College students appear to have higher rates of amphetamine misuse, highlighting the trend of using these drugs to increase academic performance (Schulenberg *et al.*, 2016)

Though stress seems to be normalized during the college years, it can have lasting effects on students.

Current Study

The purpose of this paper is to explore the relationship between mental health (stress, depression) and alcohol, tobacco, and other drug (ATOD) use among college students from 2010-2015 utilizing the American College Health Association-National College Health Assessment data.

Data and Methods

Data about student stress, depression, drug and alcohol use along with other demographic information between 2010 and 2015 were retrieved from the American College Health Association (ACHA) - National College Health Assessment (NCHA) Survey. The ACHA-NCHA is a nationally recognized survey that collects data about students' health behaviours and perceptions. There were a total of 587,537 survey responses between the 2010 and 2015 period. Data retrieved and used from the ACHA-NCHA survey included: diagnosis with depression in the last 12 months, interested in receiving more information about depression, level of stress within the past 12 months, usage of alcohol, cigarettes, opioid, marijuana and sedatives within the last month. Data on students and university attributes were also retrieved and included: race, gender, sexual orientation, religious affiliation university campus size, university public vs private status, and city size of campus location.

Two different logistic regression models were used as the primary method of analysis. The first model examined the relationship between diagnoses of depression and substance use while controlling for the student and university attributes. The dependent variable was students who had been diagnosed with depression within the last 12 months. The second model examined students with stress and substance use. The dependent variable was students who had reported more than average stress and tremendous stress and controlled for university and student attributes. Results that were reported back and interpreted included odds ratios, confidence intervals and P values along with data frequencies. Data analysis was conducted with SPSS software.

Results

Seventy percent of the survey respondents were white (Table 1.1) and approximately 65%

where female (Table 1.2). Close to 88% of the survey respondents report as being heterosexual (Table 1.3) and similarly 88% also reported as not having any religious affiliation (Table 1.4). Students were primarily from public universities (Table 1.5) with two thirds attending public schools and the largest group of students, at 40%, were from schools that had 20,000 or more students (Table 1.6). Finally, the largest grouping of students, at 34.4%, attended universities in towns and cities that were between 50,000 and 250,000 people (Table 1.7).

In total there were approximately 64,700 students or over 11% (Table 1.8) of the total number of students who had been diagnosed with depression within the past year. Rates of being diagnosed with depression (within the past 12 months) have steadily increased every year from 2010 to 2015 from 9.75% to 13.06% (Table 1.10). Students' interest in receiving information about depression from the universities has also steadily increased from 45% to 56% between 2010 and 2015 (Table 1.12). During the same time period cigarette usage (within the past month) decreased, while marijuana usage slightly increased and alcohol usage remained constant and both sedative and opioid use declined (Table 1.11). Finally, over 52% of students in the survey between 2010-2015, reported having more than average or a tremendous level of stress (Table 1.9).

Results from the logistical regression model of depression and substance use analysis (Table 2) indicate that those who used alcohol, cigarettes, opioids, marijuana and sedatives were more likely to have been diagnosed with depression within the past 12 months while controlling for campus size, public vs private university status, belonging to a religion, race, gender, sexual orientation and city size. Specifically, those who used sedatives (OR = 2.37, C.I. 2.30 - 2.45) and cigarettes (OR = 1.48, C.I. 1.45 - 1.51) were far more likely to have been diagnosed with depression. This means a positive relationship between sedative use (and cigarettes) with depression. Those who use sedatives were 2.37 times more likely (when compared to those who didn't use sedatives) to have been diagnosed with depression. Thus, for each increase in sedative use, the odds of being diagnosed with depression increases by a factor of 2.37. Those were female (OR = 2.46, C.I. 2.37 - 2.48), white (OR = 1.55, C.I. 1.52 - 1.58) and LGBTQ (OR =

2.42, C.I. 2.37 - 2.48) were also far more likely to have been diagnosed with depression within the last 12 months. Those who attended bigger universities (OR = 0.959, C.I. 0.94 - 0.98) and were affiliated with a religion (OR = 0.934, C.I. = 0.905 - 0.964) were less likely to have been diagnosed with depression. An odds ratio of less than 1 implies a negative relationship and corresponds with a lower odds of being diagnosed with depression while attending a bigger university (or being affiliated with religion) while compared to those who attend smaller universities.

Results from the logistic regression of stress and substance use (Table 2.1) which looked at students who had reported more than average stress and substance use while controlling for campus size, public vs private university status, belonging to a religion, race, gender, sexual orientation and city size were somewhat similar to the results from the previous model (Table 2.2) which looked at depression, with one exception. Those who used opioids were less likely to have reported having more than average stress (OR = 0.87, C.I. 0.83 - 0.91). Those who used alcohol were more likely to have reported more than average stress (OR = 1.24, C.I. 1.21 - 1.26). The role of alcohol was found to have more of an impact on stress than depression as the Odds Ratio was 1.24 vs 1.05. The exception was campus size which went from marginally protective in the depression model (OR = 0.96, C.I. 0.94 - 0.98) to being harmful (OR = 1.08, C.I. 1.06 - 1.09) in the stress model.

Discussion

The purpose of this research was to determine the relationship between mental health including stress and depression with alcohol, tobacco, and other drug (ATOD) use among college students from 2010-2015 utilizing the American College Health Association-National College Health Assessment data. A plethora of research indicates the relationship between experiencing stress and depression. College students today are faced with multitasking in a much different fashion than forty years ago which may explain some of continual increase in stress. Over 70% of part time students are working and over 40% of full times students are working (Carnevale *et al.*, 2015). Students are balancing many expectations such as achieving high grades in order to enroll

in graduate school. Graduate education is needed more than ever for many individuals to thrive in their careers. Most students report course work to be the largest stressor (Pryor, Hurtago, DeAngelo, Palucki, & Tran, 2010).

Depression is well documented to succeed stress. As indicated earlier, depression rates have steadily increased from 2010 to 2015. This is consistent with other research reporting college students' stress rates are the highest ever reported (Pryor, Hurtago, DeAngelo, Palucki, & Tran, 2010). Rates for cigarette usage decreased, marijuana consumption increased and alcohol usage remained constant during this time. Students indicate wanting more information on how to decrease depression while over half of students' report having more than average and/or tremendous levels of stress (Table 1.12). Students reporting depression also were more likely to have used ATOD. The results indicate a correlational relationship between depression and ATOD. As mentioned in the results, the students reporting high stress levels also consumed higher levels of alcohol.

Diagnosed depression is more common among women than men. Females have cognitive patterns that can contribute to higher levels of depression such as rumination. Females are more likely to ruminate and are therefore more likely to experience depression (Johnson & Whisman, 2013). While smoking levels have decreased, the use of marijuana has increased. Marijuana use increased 30% from 2006 (Johnston *et al.*, 2016). With the legalization of marijuana, perceptions of health risks associated with marijuana reduced and availability increased which may contribute to the increase in usage.

In this study, LGBTQ also indicated higher levels of depression and stress. This is consistent with other research studies. The LGBTQ population is still facing social challenges and stigmas as evident by a Gallup poll indicated only "66% of people believe gay or lesbian relations between consenting adults should be legal" (2015). Socially, it may be more challenging for individuals with differing sexual practices from heterosexuality to find supportive friends and partners. Social support can help mitigate or reduce both stress and depression. By reducing these, one may be less likely to desire using ATOD.

ATOD comprise is an easy-to-access resource that in the moment seemingly masks the negative

feelings of fear and hopelessness. However, there are behavioural approaches to managing stress and depression which have been shown to be effective college students including meditation (Oman, Shapiro, Thoresen, Plante, & Finders, 2010), yoga (Caldwell, Harrison, Adams, Quin, & Greeson, 2010) and journaling (Flinchbaugh, Moore, Chang, & May, 2011) and these methods may be preferred for their low cost and accessibility. Traditional college students are at a malleable place in human development where skills can easily be learned and many methods are free of cost. It is vital for students to have access to learn these skills and use them to develop a healthy sustainable lifestyle.

Conclusion

This research study clearly indicates the desire students have to learn stress management skills and learn more about depression. Health educators, counsellors and teachers must make an effort to teach and demonstrate healthy and effective coping techniques so that students can utilize these techniques over the course of their life. Lifelong health techniques are strongly needed and more research is required to develop and teach effective skills.

Limitations

This study has a heavy weighting on Caucasian participants. Thus, a study reflecting a more generalizable audience of the United States is recommended for future research. The majority of the participants are women derived from large universities over 20,000 students. Previous research indicates depression is more common among women. The researchers recommend future research to include a variety of races/ethnicities and gender.

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Table 1: Descriptive Statistics -
587,537 survey responses between 2010 and 2015

Characteristics	Percent
1.1 Ethnic Distribution	
White	70.3
Asian	12.5
Latino/Hispanic-American	9.9
Black/African-American	5.8
Native American	1.5
1.2 Gender	
Male	34.3
Female	65.4
Transgender	0.3
1.3 Sexual Orientation	
Heterosexual	88.7
Gay/Lesbian	2.8
Bisexual	4.0
Unsure	2.1
Not Reported	2.4
1.4 Religious Affiliation	
Yes	11.3
No	32.0
1.5 University Public/Private Status	
Public	66.3
Private	33.7
1.6 University Campus Size	
Less than 2,500	9.4
2,500 – 4,999	8.6
5,000 – 9,999	15.7
10,000 – 19,999	25.5
20,000 or more	40.8
1.7 City Size of Campus Location	
>= 500,000	26.1
250,000 – 499,999	8.2
50,000 – 249,999	34.3
10,000 – 49,999	23.8
2,500 – 9,999	5.8
<2,500	1.6
1.8 Diagnosis of Depression within the past 12 months	
Yes	11
No	87.3
No response	1.7
1.9 Self-Reported Level of Perceived Stress	
No stress	1.7
Less than average stress	7.7
Average stress	37.2
More than average stress and tremendous stress	52.0
Not reported	1.4
<i>Table continues above in next column</i>	

Characteristics		Percent				
1.10 Diagnosed with Depression within the past 12 months From 2010 – 2015						
YEAR						
2010		9.75				
2011		10.74				
2012		10.88				
2013		11.01				
2014		12.01				
2015		13.06				
1.11 Substance use – Cigarettes, Alcohol, Marijuana, Opioid, Sedatives						
YEAR	Cig.	Alc.	Mar.	Opi.	Sed.	
2010	33.59	79.06	36.83	2.39	6.24	
2011	33.32	78.69	36.63	2.14	6.03	
2012	31.54	79.69	36.64	2.16	5.71	
2013	31.12	78.69	37.86	2.17	5.75	
2014	28.62	79.87	39.03	1.93	5.05	
2015	26.21	78.75	39.08	1.62	5.04	
1.12 Desire for more information						
YEAR						
2010		45.07				
2011		47.33				
2012		48.09				
2013		48.89				
2014		52.07				
2015		56.58				

Table 2: Logistic Regression Results

2.1. Logistic Regression Results of Depression and Substance Use				
Variable	S.E.	Exp(B) (Odds Ratio)	95% C.I. for EXP(B) Lower	95% C.I. for EXP(B) Upper
Religion	0.016	0.934***	0.905	0.964
Campus Size	0.01	0.959***	0.94	0.979
City Over 50,000	0.01	1.021***	1.00	1.042
Alcohol	0.013	1.049***	1.022	1.077
Private University	0.011	1.078***	1.056	1.10
Opioid	0.026	1.195***	1.137	1.257
Marijuana	0.011	1.24***	1.214	1.266
Cigarettes	0.011	1.482***	1.452	1.514
Race White	0.011	1.549***	1.516	1.582
Gender Female	0.01	2.016***	1.976	2.057
Sedatives	0.016	2.37***	2.297	2.447
Sex Orientation	0.012	2.426***	2.369	2.484
Constant	0.017	0.034***		
** Significant at 95%, *** Significant at 99% Were sorted by odds ratio				
2.2 Logistic Regression Results of Stress and Substance Use				
Variable	S.E.	Exp(B) (Odds Ratio)	95% C.I. for EXP(B)	
Opioid	0.022	0.868***	0.83	0.906
Religion	0.01	0.874***	0.856	0.892
Marijuana	0.007	1.018***	1.004	1.032
City Over 50,000	0.007	1.042***	1.028	1.055
Campus Size	0.006	1.079***	1.065	1.092
Cigarettes	0.007	1.229***	1.212	1.246
Alcohol	0.007	1.239***	1.221	1.257
Private University	0.007	1.253***	1.236	1.27
Race White	0.006	1.367***	1.35	1.384
Sedatives	0.14	1.54***	1.497	1.584
Sex Orientation	0.01	1.626***	1.595	1.658
Gender Female	0.006	1.746***	1.727	1.766
Constant	0.009	0.41***		
** Significant at 95%, *** Significant at 99% Were sorted by odds ratio				

Education and Health

The journal, published by SHEU since 1983, is aimed at those involved with education and health who are concerned with the health and wellbeing of young people. Readership is worldwide and in the UK include: primary; secondary and further education teachers; university staff and health-care professionals working in education and health settings. The journal is online and open access, continues the proud tradition of independent publishing and offers an eclectic mix of articles.

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