COMMUNITY COLLEGE STUDENT MENTAL HEALTH: USING ACHA-NCHA

DATA TO EVALUATE DIFFERENCES IN THE STUDENT EXPERIENCE BASED

ON SELF-REPORTED MENTAL HEALTH INDICATORS

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

DEPARTMENT OF HEALTH STUDIES

COLLEGE OF HEALTH SCIENCE

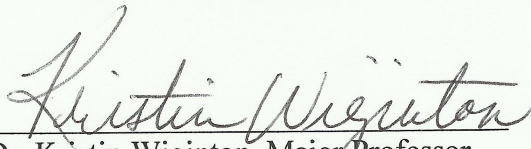BY

ANGELA C. NEARY B.S., M.S., M.A.

DENTON, TEXAS

MAY 2016

TEXAS WOMAN'S UNIVERSITY
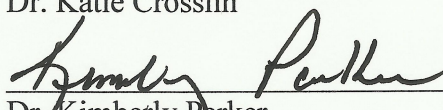DENTON, TEXAS

April 5, 2016

To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Angela C. Neary entitled "Community College Student Mental Health: Using the ACHA-NCHA Data to Evaluate Differences in the Student Experience Based on Self-Reported Mental Health Indicators." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Health Studies.
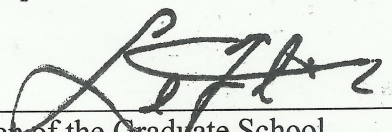
_____
Dr. Kristin Wiginton, Major Professor

We have read this dissertation and recommend its acceptance:

_____
Dr. Katie Crosslin

_____
Dr. Kimberly Parker

_____
Interim Department Chair

Accepted:

_____
Dean of the Graduate School

DEDICATION

To my parents, Joyce and Tony Orefice, for showing me at a young age how to work hard. You gave me the tools that helped me be successful. Thank you.

To my mentor and friend, Dr. Josh Bernstein, your commitment to see me succeed has been amazing. You inspired me to continue even when I struggled. Your guidance and friendship mean so much to me. Thank you.

And to my husband Brian Neary, thank you for your constant love, patience, and support. From cheering me on each day, leaving me inspirational quotes, and lifting me up with much needed laughter. You are my best friend. I love you.

ACKNOWLEDGMENTS

ABSTRACT

ANGELA C. NEARY

COMMUNITY COLLEGE STUDENT MENTAL HEALTH: USING ACHA-NCHA
DATA TO EVALUATE DIFFERENCES IN THE STUDENT EXPERIENCE BASED
ON SELF-REPORTED MENTAL HEALTH INDICATORS

MAY 2016

Depression, anxiety, and sleep disturbances are among the most prevalent mental

health disorders on college campuses. College students face numerous life challenges

that may exacerbate an underlying mental illness affecting students thinking, feelings

mood, daily functioning, and ability to relate to others. Mental and physical health plays

an important role in academic performance, and ultimately, student success, and the

transition to college life can affect overall health. The primary purpose of this research

study was to examine the American College Health Association-National College Health

Assessment II (ACHA-NCHA II) Institutional Data Report for relationships between

self-reported mental health disorders of anxiety, depression, and sleep disorders and

demographic characteristics, college mental health resources offered, and levels of

physical activity of college students. The sample consisted of 466 student participants

(65.5% female; 33.3% male) from a community college in central California during the

spring 2013 semester. Statistical procedures utilized included cross-tabulation with

Pearson's chi-square analysis, independent sample t-test, one-way ANOVA, logistic

regressions, and MANOVA. The primary results revealed more participants self-reported

diagnosis/treatment for anxiety (18%) and depression (17.8%). Participants with self-

reported anxiety, depression, and sleep disorders were female, Caucasian, with an

average age of 30 years. The results indicated a significant relationship between self-

reported diagnosis/treatment for anxiety and interest in receiving information on

depression or anxiety. Results also indicated a significant relationship between age,

gender, year in school, and general health and the effect on self-reported anxiety. The

student population in this study was also above the highest national estimate for

prevalence of obesity and below the national estimate for time spent on physical activity.

The ecological model was the framework used to determine potential avenues for

community colleges to improve services and resources for its students. This study

demonstrates the need to specifically address and evaluate community college campuses

across the nation. Future research needs to investigate benefits and barriers to mental

health access, utilization, and resources on campus; institutional support for mental health

awareness programs and campaigns; and innovative recreational and intramural

opportunities for students on campus.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

According to the National Alliance on Mental Illness (NAMI, 2015a), a mental

illness is a medical condition that interrupts an individual's thinking, feeling, mood, daily

functioning, and ability to relate to others. In 2013, the American College Health

Association utilized the National College Health Assessment II (ACHA-NCHA II, 2013)

to survey approximately 123,000 college students. Approximately 25% of young adults

between the ages of 18 and 24 have a diagnosable mental illness (National Alliance on

Mental Illness [NAMI], 2015b). College students face numerous life challenges that may

exacerbate an underlying mental illness, including intimate relationships, academic

pressure, distance from family and friends, juggling work and school, and financial

concerns (NAMI, 2007).

The transition from adolescence to early adulthood entails social, emotional, and

environmental challenges that require cognitive and adaptive skills (Bennett & Baird,

2006). There are specific changes that occur in the brain structure which can explain why

first year college students may be vulnerable to mental health challenges. The brain

continues to undergo dramatic restructuring well into the twenties and the region

associated with emotion and cognitive control, the prefrontal cortex, is the last area to

mature (Bennett & Baird, 2006; Jeffery, 2007). The maturation and development of the

prefrontal cortex, which is responsible for logical and organized thinking, decision

1

making, personality development, and complex planning, is not fully achieved until the approximate age of 25 (Arain et al., 2013).

Depression, anxiety, and sleep disturbances are among the most prevalent mental health disorders reported on college campuses. Serious mental illnesses include major depression, bipolar disorder, obsessive compulsive disorder, panic disorder, and post-traumatic stress disorder (NAMI, 2015). A recent survey revealed a prevalence of 11% for serious clinical depression among college students (ACHA-NCHA II, 2013). According to ACHA-NCHA II (2013), some factors affecting individual academic performance within the 12 months prior to the survey included stress (28.5%), anxiety (19.7%), sleep difficulties (19.4%), and depression (12.6%).

Numerous studies have proven that regular physical activity can improve mood and energy levels as well as decrease the risk of depression and other mental illnesses (American Psychological Association [APA], 2004; Guszkowska, 2004). Approximately 23% of young adults aged 18-24 do not engage in the recommended amount of physical activity and more than 80% of adults do not meet the guidelines for both aerobic and muscle-strengthening activities (Healthy People 2020, 2014a). Federal guidelines for adults participating in physical activity include at least 150 minutes of moderate aerobic intensity or 75 minutes of vigorous aerobic intensity per week and muscle strengthening activities two or more days of the week. Student service administrators and college health educators play an important role in developing and implementing policies and programs that promote physical activity for college students (Ferrara, 2009).

Mental illness can affect individuals of any age, race, or income. Students need access to information and tools through student support services that provide resources to meet the needs and demands of the student population. Providing mental health workshops and properly staffed counseling centers, health education programs, recreation centers, and on-campus intramural programs, can assist students in managing stressful life events and prevent the acute and chronic effects of an underlying mental health disorder.

Statement of Purpose

The purpose of this research study was to examine the ACHA-NCHAII Institutional Data Report for relationships between self-reported mental health disorders (anxiety, depression, sleep disorder) and level of physical activity, as well as use of mental health resources offered by a community college in central California. The effect of certain descriptive variables (age, sex, body mass index [BMI], year in school, race /ethnicity, grade point average [GPA], general health status) and physical activity on self-reported anxiety, depression, or sleep disorder, were also evaluated. The ecological model was the framework used to determine potential avenues for community colleges to improve services and resources for its students.

Research Questions

Research Question 1: What are the descriptive characteristics of students with self-reported anxiety, depression, or sleep difficulties?

Research Question 2: Is there a relationship between self-reported anxiety / depression, or sleep difficulties and receiving information / being interested in receiving information on anxiety / depression or sleep difficulties from the college?

Research Question 3: Do the demographic variables of age, gender, BMI, year in school, race, grade point average, and general health status have an effect on self-reported anxiety, depression, and sleep difficulties of the participants?

Hypotheses

Hypothesis 1: There will be no significant difference in physical activity (moderate aerobic, vigorous aerobic, strength training) between those with and those without self-reported anxiety, depression, or sleep difficulties.

Hypothesis 2: There will be no significant difference in physical activity (moderate aerobic, vigorous aerobic, strength training) between those who believe anxiety, depression, or sleep difficulties affected their academic performance and those who do not believe anxiety, depression, or sleep difficulties affected academic performance.

Hypothesis 3: There will be no significant difference in prior use of the college's mental health services between those with and those without self-reported anxiety, depression, or sleep difficulties.

Hypothesis 4: Age, gender, BMI, year in school, race / ethnicity, GPA, general health status, physical activity (moderate, vigorous, strength training) are neither predictive nor protective of self-reported anxiety, depression, or sleep difficulties.

Delimitations

The delimitations of this study were as follows:

1. The sample included those students at a California community college who completed the 2013 American College Health Assessment-National College Health Assessment II survey during the spring semester of 2013.

2. All participants were at least 18 years of age at time of survey completion.

Limitations

The limitations of this study were as follows:

1. The ACHA-NCHA II is a self-report online survey. Thus, recall bias and prevarication bias may have occurred on certain survey items.

2. Only ACHA-NCHA II surveys completed by students at one community college were used in this study. Thus, the findings are not generalizable to the larger college student population.

Assumptions

The assumptions for this study were as follows:

1. All participants answered and responded honestly to the spring 2013 American College Health Assessment-National College Health Assessment (ACHA-NCHA).

2. Data were recorded accurately by the community college representatives and ACHA-NCHA representatives.

Definitions of the Terms

Student Support Services: Leads colleges in achieving a vision, mission, values, goals, plans, and student learning and institutional effectiveness outcomes. Within this study, student support services include but are not limited to student health services, student life and leadership, counseling services, and disabled student programs and services.

Anxiety: Emotions characterized by feelings of tension, worried thoughts and physical changes (American Psychological Association [APA], 2015).

Physical Activity: Moderate-intensity cardio or aerobic exercise for at least 30 minutes on 5 or more days per week or vigorous-intensity cardio or aerobic exercise for at least 20 minutes on 3 or more days per week (ACHA-NCHA II, 2013)

Sleep Difficulties: Changes in sleep patterns that may include excessive daytime sleepiness, increased movement during sleep, difficulty sleeping, and abnormal sleep behaviors (Mayo Clinic, 2014).

Importance of the Study

This study will advance the discussion of college student health and the student services necessary to provide a successful college environment. The goal is to educate administrators, faculty, and staff on the status of self-reported anxiety, depression, and sleep difficulties among the college population, as well as the use of mental health resources on campus. Additionally, physical activity was evaluated in context with mental health and sleep disorders. The results should offer information necessary for campus health educators to develop and implement programming to improve the mental and physical health outcomes for its students.

CHAPTER II

REVIEW OF THE LITERATURE

Attending college is a significant life event for any individual. Traditional college students transition from high school to college by leaving home while non-traditional students return to college to advance their careers. Mental and physical health plays an important role in academic performance and, ultimately, student success and the transition to college life can affect overall health. According to NAMI (2015), one in four adults between the ages of 18-24 has a diagnosable mental illness which includes anxiety and depression. Mental health is not a product of just one factor but multiple risk factors, including individual, interpersonal, and institutional (Byrd & McKinney, 2012).

Physical activity is a pre-requisite for disease prevention and also for the reduction of stress and anxiety. According to Bray and Kwan (2006) students who were physically active their first year of college reported better psychological health than students who were inactive. Insufficient sleep and irregular sleep schedule have been associated with greater depressive symptoms, anxiety, and other mood disorders. Deprived sleep, including irregular sleep patterns, is highly prevalent among college students (Hershner & Chervin, 2014). A college environment must not only offer a positive educational experience via its curriculum, but should also provide supplemental student support services to promote a successful college experience. A detailed

examination of these transitions is presented including their relevance to mental health, physical activity, sleep, and the role of campus support programs.

Transitioning to College Life

Each semester traditional and non-traditional students begin or continue their education at the college level. Regardless of the student's age, gender, ethnicity, or socio-economic background the transition to college is associated with an increase in physical and psychological health problems (Bray & Kwan, 2006). During this transition, students are confronted with a new environment and changing roles with family and friends, all of which may increase depressive symptoms and anxiety for first year college students (Mayo Clinic, 2013). Greater independence, challenging course work, and financial responsibilities also make the transition more stressful (The JED Foundation, 2012).

National College Enrollment Trends

According to the National Center for Education Statistics (NCES), the total undergraduate enrollment was approximately 17.5 million for postsecondary institutions during the fall 2013 semester (2015). It is projected that undergraduate student enrollment will increase from 17.5 million to 19.6 million between 2013 and 2024 (NCES, 2015). In 2013, there were approximately 10.9 million full-time and 6.5 million part-time undergraduate students and it is projected that between 2013 and 2024, full-time enrollment will increase by 13% and part-time enrollment will increase by 12% (NCES, 2015). In 2012, approximately 41% of students 18-24 years old were enrolled in undergraduate institutions (NCES, 2013). Females made up 56% and males made up

44% of the undergraduate enrollment population in the fall of 2013 (NCES, 2015).

Between 2013 and 2024, it is projected that female enrollment will increase by 15% and male enrollment will increase by 9% (NCES, 2015). Of those enrolled for the fall 2013 semester, approximately 9.9 million were White, 2.9 million were Hispanic, 2.5 million were Black, 1.0 million were Asian, and 0.2 million were Native American and Pacific Islander (NCES, 2015). Between 1990 and 2013, Hispanic student enrollment increased from 0.7 million to 2.9 million and Black enrollment increase from 1.1 million to 2.5 million (NCES, 2015).

National Enrollment and Demographic Data of 2-year Colleges

With low tuition rates and open access, two-year colleges can provide opportunity for many first time and returning students. Students can stay in their local community, work toward transfer to a four-year university, take a variety of credit and non-credit courses, and have the flexibility to work at their own pace. In the United States, there are over 1000 two-year colleges open to students including public, independent, and tribal colleges. According to the American Association of Community Colleges (AACC, 2014), there were a total of 12.8 million students enrolled at the two-year level at the start of the 2012 school year.

Enrollment included 7.7 million (61%) students enrolled in credit course work while 5 million (39%) enrolled in noncredit classes (AACC, 2014). Women accounted for 57% and men accounted for 43% of the student population at the beginning of the fall 2012 semester (AACC, 2014). Thirty percent of students were under the age of 21, 57% were aged 22-39, and 14% were aged 40 and over (AACC, 2014). The ethnic population

of community college students during the fall 2012 semester included 51% White, 19% Hispanic, 14% Black, 6% Asian/Pacific Islander, 1% Native American, and 5% listed as other/unknown (AACC, 2014). Student demographics also included first generation college students (36%), single parents (17%), veterans (4%), and students with disabilities (12%; AACC, 2014). Of the 3 million high school graduates in 2013, approximately 2 million enrolled in college the following fall (NCES, 2013). The immediate college enrollment rate has increased six percent since 1990 (NCES, 2013). At the community college level, 42% of students were first time freshman who attended college right out of high school (AACC, 2014).

Transition to College

The transition to college life can expose students to circumstances and expectations that can be both positive and negative. For students, the experience of college is both socially and intellectually stimulating (Thurber & Walton, 2012). While the journey of meeting new people and learning exciting information related to a student's career path may be positive, some students are at risk for health challenges associated with the rigor of college life. New conditions may arise in a student's life, including anxiety and depression, while others may have mental health conditions exacerbated by the college environment (Thurber & Walton, 2012).

Homesickness, which is the distress or impairment caused by an actual or anticipated separation from home, is a condition new college students may experience (Thurber & Walton, 2012). Some students have the experience of being away from home before college by attending summer camps or traveling without their parents but all

students have to learn to manage their life independently. Students who suffer from homesickness report depression and anxiety, withdrawn behavior, and difficulty focusing on necessary steps for college success (Thurber & Walton, 2012). Prevention efforts to refine coping skills made in collaboration with high schools, family, college counselors, faculty, and mental health professionals can diminish the intensity of homesickness for new students (Thurber & Walton, 2012). College students need to make connections to feel socially accepted by their college peers. When social acceptance does not come easily for students, intense anxiety and depression can result (Thurber & Walton, 2012).

Mattanah et al. (2010) found a positive correlation when first year students had the opportunity to participate in peer lead social support groups. The study used the student adaptation to college questionnaire, social prevision scale, and UCLA loneliness scale. Compared to the control group, students in the peer lead social support group experienced less loneliness and greater perceived social support (Mattanah et al., 2010). Mattanah et al. (2010) also concluded that the benefits of peer lead social networks did not take place until the spring semester, proving it can take months for new social networks to develop.

According to Cleary, Walter, and Jackson (2011), students are not prepared for the adjustments when transitioning to college, including academic rigor, organization of study time, work, and extracurricular demands. Lack of preparedness and reports of psychological problems such as anxiety, depression, stress, and substance abuse have consistently been reported (Cleary et al., 2011). Studies indicate prevalence of mental illness is highest for students 15-21 years of age and therefore many young adults may

experience their first psychiatric episode during college (Beiter et al., 2015; Blanco et al., 2008; Mowbray et al., 2006). Evidence of students struggling with the college transition includes excessive absenteeism, late submission of assignments, decreased productivity, and inability to make decisions, which results in poor grades (Cleary et al., 2011).

According to Insel (2010), neuroimaging technology has shown that specific brain pathways, mainly located in the prefrontal cortex, are involved in major mental disorders. The maturation and development of the prefrontal cortex, which is responsible for logical and organized thinking, decision making, personality development, and complex planning, is not fully achieved until the approximate age of 25 (Arain et al., 2013). The prefrontal cortex is also associated with emotion and cognitive control and studies have shown that there continues to be dramatic restructuring of the brain well into individuals' mid-twenties (Bennett and Baird, 2006; Jeffery, 2007). The changes that occur in the brain structure can explain why transitioning first year college students may be vulnerable to mental health challenges.

Mental Illness: Anxiety and Depression

Mental illness has been a global health issue for centuries and the prevalence of mental illness is a serious challenge worldwide. Mental illness is not only an individual barrier, but also a societal limitation. In ancient times, mental illness was viewed as a form of religious punishment or demonic possession (Foerschner, 2010). By the 5th century B.C., Hippocrates shifted the focus of treating mentally ill individuals by changing their environment, occupation, or administering certain substances as medication (Unite for Sight, 2015). The middle ages brought back the belief that people

were possessed or in need of religion to cure their mental illness, thus leading to negative

attitudes that persist to this day. Currently in the United States, groups such as Mental

Health America (MHA), National Alliance on Mental Illness (NAMI), American

Psychological Association (APA), and the National College Health Association (NCHA)

work to overcome these deep rooted stigmas through research, education, advocacy, and

legislation.

Prevalence of Mental Illness in the United States

Mental illness costs the U.S. approximately $193 billion in lost earnings every

year (NAMI, 2015). Approximately 43.7 million (19%) adults 18 years and older

experience a form of mental illness in a given year and 13.6 million (4%) experience a

serious mental illness which impairs one or more major life activities (NAMI, 2015). In

the U.S., 26% of homeless adults, 20% of state prisoners, and 70% of youth in juvenile

justice systems have had a recent history of mental illness or have at least one mental

health condition (NAMI, 2015). From a multicultural perspective, 28% of American

Indian/Alaska Native (AI/AN) adults, 19% of White adults, 19% of Black adults, 16% of

Hispanic adults, and 13.9% of Asian adults are living with a mental health condition

(NAMI, 2015). Lesbian, gay, bisexual, transgender, and questioning (LGBTQ)

individuals are two times more likely to have a mental health condition and 11% of

transgender individuals reported being denied mental health care due to discrimination

(NAMI, 2015). According to NAMI, from the onset of mental health symptoms, the

average delay of obtaining help through treatment is approximately 10 years and nearly

60% of adults aged 18 and older along with 50% of youth aged 8-15 did not receive

mental health services within the previous year. With the lack of treatment, individuals

living with mental illness suffer with chronic medical conditions as well as die an average

of 25 years earlier than others (NAMI, 2015).

Prevalence of Mental Illness on College Campuses

One in four young adults between 18 and 24 has a diagnosable mental illness

(NAMI, 2015) and these mental health conditions create barriers to academic success.

College counseling centers across the United States report an increase in prevalence and

severity of mental health issues reported by students. According to NAMI (2012), 64%

of young adults who once attended college, are no longer attending college due to a

mental health related reason. Approximately 20% of youth aged 13-18 live with a mental

health condition while 50% of all lifetime cases of mental illness begin by age 14 and

75% begin by age 24 (NAMI, 2015). In the 2013 American College Health Association

report, anxiety and depression were reported as the top impediments to academic

performance (ACHA-NCHA II, 2013). Specifically, more than 13% of college students

were diagnosed or treated for anxiety while 11% were treated for depression (ACHA-

NCHA II, 2013).

Anxiety is defined as an emotion characterized by feelings of tension, worry, and

physical changes including high blood pressure, sweating, dizziness, and trembling

(APA, 2015). According to ACHA-NCHA II, a national survey of approximately

123,000 college students found that 23,013 (19%) students felt overwhelming anxiety in

the last 12 months and 14,112 (12%) felt the same within the last 30 days (2013).

Specific to gender, 6,636 (16%) males and 15,998 (21%) females, felt overwhelming

14

anxiety within the last 12 months; 3,616 (9%) males and 10,242 (13%) females, felt

overwhelming anxiety within the last 30 days (ACHA-NCHA II, 2013). Results from the

same survey revealed 15,626 (13%) students had been diagnosed or treated by a

professional for anxiety within the last 12 months (8% of males and 16% of females)

(ACHA-NCHA II, 2013).

Depression, an acute and chronic condition that often emerges as a comorbidity of

other diseases, is the leading cause of disability worldwide (NAMI, 2015). Depression,

also known as major depressive disorder or clinical depression is defined as a mood

disorder which causes a persistent feeling of sadness and loss of interest which causes

emotional and physical challenges (Mayo Clinic, 2015). According to the ACHA-NCHA

II national survey data of 123,000 college students, 13,291 (11%) students (7% male and

13% female) had been diagnosed or treated by a professional within the last 12 months

for depression (2013). A total of 18,367 (15%) students felt so depressed that it was

difficult to function in the last 12 months and 7,383 (6%) felt the same in the last 30 days

(ACHA-NCHA II, 2013). Specific to gender, 13% of males and 16% of females felt so

depressed that it was difficult to function within the last 12 months; 5% of males and 7%

of females felt the same within the last 30 days (ACHA-NCHA II, 2013). When asked

about "feeling very sad", 28,000 (23%) students reported sadness for the previous 12

months, 15,961 (13%) reported so for the last 30 days, and 28,185 (23%) reported the

same for the last 2 weeks (ACHA-NCHA II, 2013). Overall, female students were more

likely to report depression and feelings associated with depression when compared with

male students.

Why Depression and Anxiety?

According to Harper and Peterson, students are not prepared for the academic rigor of college (2005). Inadequate study habits exacerbate stress and anxiety for college students and 40% of students' state their source of anxiety, stress, and depression are related to academics (Beiter et al., 2015). According to the Higher Education Research Institute, more than 60% of college freshmen indicate they spent less than six hours per week studying (2002). For student success, it's essential that colleges and universities recognize the need to provide programs and workshops that address areas related to study skills, time management, and organization (Beiter et al., 2015).

Beiter et al. (2015), found a significant positive correlation between depression, anxiety, and stress and sources of academic performance, pressure to succeed, financial concerns, quality of sleep, relationships with friends and family, and overall health. A total of 374 undergraduate students (37% male and 63% female) aged 18 to 24 were surveyed (30% freshman, 26% sophomores, 22% juniors, 22% seniors). The study utilized the 21 question *Depression Anxiety Stress Scale* (DASS21) to investigate potential correlates of depression, anxiety, and stress in college students as well as questions to rate their level of concern associated with daily life challenges such as academics, family, and sleep (Beiter et al, 2015). According to Beiter et al., transfer students, upperclassmen, and those living off campus (18%) were the most stressed, anxious, and depressed (2015). Severe or extremely severe levels of anxiety accounted for 15% of the student population while depression accounted for 11% of the student population (Beiter et al., 2015). A second portion of the survey included a stressor

evaluation where students reported significance of life stressors, through a Likert scale list which included "not at all", "slightly", "somewhat", "moderately significant", or "extremely significant" (Beiter et al. (2015). According to Beiter et al. (2015), the top sources of life stressor concerns based on students answering "moderately significant" or "extremely significant" included academic performance (44% and 40%), pressure to succeed (33% and 37%), post-graduation plans (30% and 25%), finances (26% and 28%), and sleep (26% and 11%). Discussion recommended that, from a treatment perspective, colleges not only need to increase the number and scope of programs addressing depression, anxiety, and stress but also must address facets of daily life such as finances, sleep, relationships with family and friends, and overall health (Beiter et al., 2015). Providing college students with financial responsibility classes as well as programs specific to sleep, relationships, and overall health may be beneficial in reducing student depression, anxiety, and stress (Beiter et al., 2015).

The Effects of Sleep Deprivation

Deprived sleep, including irregular sleep patterns, is highly prevalent among college students (Hershner & Chervin, 2014). According to the ACHA-NCHA II (2013), sleep difficulties were listed in the top three reported issues related to poor academic performance. Fifty percent of college students exhibited daytime sleepiness and 60% of students reported they were dragging, tired, or sleepy at least three days a week (Hershner & Chervin, 2014). According to Hershner and Chervin (2014), insufficient sleep and irregular sleep schedules have been associated with greater depressive symptoms,

17

anxiety, and other mood disorders. Students who experience poor sleep patterns may also experience academic difficulties in college (Buboltz, Brown, & Soper, 2001).

National Prevalence of Sleep Difficulties

Sleep difficulties are defined as changes in sleeping patterns that include excessive daytime sleepiness, difficulty sleeping, and abnormal sleep behaviors (Mayo Clinic, 2014). According to the Centers for Disease Control and Prevention (CDC), it is estimated that approximately 70 million Americans are affected by sleep loss or sleep disorders (2015a). The National Institutes of Health (NIH, 2012) recommends school age children have at least 10 hours of sleep, teens need 9-10 hours of sleep, and adults need 7-8 hours of sleep. Thirty percent of adults report an average of six or less hours of sleep per day and only 31% of high school students report getting at least eight hours of sleep on an average school night (CDC, 2015a). Approximately 44% of 18 to 25 year olds, as well as 38% of males and 37% of females, reported they unintentionally fell asleep during the day at least once in the past month (CDC, 2015a).

National College Prevalence of Sleep Difficulties

According to the ACHA-NCHA II spring 2013 survey of 123,000 college students, a total of 23,240 (19%) students reported that within the last 12 months, sleep difficulties impacted their academic performance, including having received a lower grade on an exam or important project, having received a lower grade in a course, or having received an incomplete or dropped out of a course. Sleep difficulties have been linked to lower grade point average due to the fact sleep affects concentration, memory, and the ability to learn (University of Michigan, 2015). A total of 5,149 (4%) students

were diagnosed or treated for insomnia and 2,687 (2%) were diagnosed or treated with other sleep disorders (ACHA-NCHA II, 2013). Less than half of students (58,030; 48%) reported getting enough sleep 3-5 days out of the past 7 days to feel rested in the morning and 51,763 (43%) felt tired, dragged out, or sleepy 3-5 days of the week (ACHA-NCHA II, 2013). A total of 58,910 (49%) students felt that their sleepiness during daytime activities were a little problem, 28,680 (24%) found it to be more than a little problem, and 20,126 (17%) found it to be a big problem or a very big problem (ACHA-NCHA II, 2013). Combined, these findings account for 9 in 10 students reporting sleep to be a problem in completing daytime activities.

Depression, Anxiety, and Sleep

Byrd et al. (2014) found students who had poor sleep quality had approximately 2.4 times higher odds of common mental disorders such as depression and anxiety. The study utilized the *General Health Questionnaire* (GHQ-12) and the *Pittsburgh Sleep Quality Index* (PSQI) which include sleep disturbances, use of sleep medicine, daytime dysfunction, and overall sleep quality (Byrd et al., 2014). A total of 2,645 undergraduate students in Ethiopia were given the survey and it was found that 27% were characterized as having a common mental disorder and female students had a higher prevalence of depression and anxiety (31%) when compared to male students (25%) (Byrd et al., 2014). There was a significant correlation with common mental disorders and sleep quality as well as daytime sleepiness with a higher prevalence among female students than male students. Byrd et al. (2014) also concluded that sleep disorders and common mental disorders are global health issues due to social demands and academic expectations on

university students. The authors recommended colleges provide health promotion

programs that promote good sleep habits during the college years (Byrd et al., 2014).

Lund, Reider, Whiting, and Prichard (2010) found college students who reported

themselves as "poor quality sleepers" had significantly more problems with physical and

psychological health than those who reported themselves as "good quality sleepers". A

total of 1,125 college students aged 17 to 24 completed a survey about sleep habits which

included the PSQI and *Profile of Mood States* (POMS). The POMS is used to understand

negative moods including depression, tension, confusion, and anger (Lund et al., 2010).

One in four student participants (25%) reported getting less than 6.5 hours of sleep and

reported their sleep was chronically restricted (Lund et al., 2010). There was a

significant correlation between poor sleep quality and negative moods and poor quality

sleepers also reported higher levels of stress during the week and weekends compared to

good quality sleepers (Lund et al., 2010). Approximately 12% of poor quality sleepers

reported missing class three or more times in the past month because of illness compared

to 4% of good quality sleepers (Lund et al., 2010). When students were asked what factor

most interferes with sleep, 68% of students responded with stress including "stress about

school", "racing thoughts", and "worry about the future" (Lund et al., 2010).

Academic Performance and Sleep

Taylor, Vatthauer, Bramoweth, Ruggero, and Roane (2013) found that sleep

variables such as bedtime, wake time, and sleep efficiency were significantly correlated

with cumulative grade point average (GPA). Students who went to bed later and took

more naps were more likely to have lower cumulative GPA and students with higher

sleep efficiency had a significantly higher cumulative GPA (Taylor et al., 2013).

Mander, Santhanam, Saletin, and Walker (2011) found that memory performance is affected by lack of sleep and individuals with sleep deprivation had memory performance affected by two letter grades lower when compared with non-sleep deprived individuals. Kelly, Kelly, and Clanton (2001) also found a significant association between length of sleep and GPA in college students. Sleep length research classifies three types of sleepers: (1) short sleepers who sleep less than 6 hours per night, (2) average sleepers who sleep 7 to 8 hours per night, and (3) long sleepers who sleep 9 or more hours per night (Kelly et al., 2001). The study included a sample of 148 undergraduate students and GPA was reported by 76% of the sample. A one way analysis of variance discovered a significant effect of sleep on GPA (F=4.61) (Kelly et al., 2001). Long sleepers reported significantly higher GPAs than short sleepers, while no significant effect was found between GPAs for average sleepers and long or short sleepers (Kelly et al., 2001).

Physical Activity and Sleep

Physical activity has consistently been proven to promote improved sleep patterns. Seventy-six percent of individuals who included moderate to vigorous exercise during the week said they had a good night's sleep compared to 56% of non-exercisers (National Sleep Foundation, 2013). College students who exercise might expect to see a greater improvement in their sleep (Caldwell, Harrison, Adams, Quin, & Greeson, 2010). Studies have shown the importance of participation in physical activity and the positive effect activity has on sleep.

According to Caldwell, Harrison, Adams, Quin, and Greeson (2010), individuals with sleep difficulties who begin to exercise may see greater improvement in their sleep patterns. Caldwell et al. (2010) found a positive correlation between mindfulness, activity classes, and improvements in sleep quality. A total of 166 college students, aged 18 to 41, had the opportunity to participate in one of three activity classes which included Pilates, Taiji quan, and GYROKINESIS in order to increase mindfulness over a 15 week period. Mindfulness is defined as paying attention in particular ways and being in the present moment (Caldwell et al., 2010). The Pilates and GYROKINESIS classes met two times a week for 75 minutes or 3 times a week for 50 minutes depending on the class schedule and the Taiji quan class met two times a week for 50 minutes (Caldwell et al., 2010). Mindfulness, sleep quality, self-efficacy, mood, and stress were all assessed during the activity classes over a 15 week semester. Results revealed students who participated in the three classes had decreased sleep difficulty from 55% at the beginning of the semester to 48.1% at the end of the semester (Caldwell et al., 2010). Students who participated in the three classes demonstrated an overall increase in mindfulness which was associated with improved sleep, mood, self-efficacy, and perceptions of stress (Caldwell et al., 2010).

Prevention of Anxiety, Depression, and Sleep Disorders

Physical activity plays a major role not only in disease prevention but in relief of anxiety, depression, and sleep disorders. According to Bray and Kwan (2006), students who were physically active their first year of college reported better psychological health than students who were inactive. Students who were inactive scored lower on

psychological well-being investigations and were twice as likely to have consulted a physician regarding an illness when compared with active students. Compared to inactive college students, both male and female students who participated in some physical activity each week demonstrated a reduced risk of hopelessness and depression (Taliaferro, Rienzo, Pigg, Miller, & Dodd, 2009). Only 40% of college students participate in any kind of regular physical activity thus indicating more than half of college students do not meet the minimum recommendations of 150 minutes of moderate physical activity each week (Ferrara, 2009).

Federal Guidelines

According to the ACHA-NCHA II spring 2013 survey, within the past seven days 23% of students did not participate in moderate intensity aerobic exercise, 38% did not participate in vigorous intensity aerobic exercise, and 51% did not participate in 8-10 strength training exercises for 8-12 repetitions. Physical activity and fitness objectives of Healthy Campus 2020 are to increase the proportion of students who report meeting federal guidelines for aerobic physical activity and muscle-strengthening activity (Healthy Campus 2020, 2015a). Current baseline data shows 49% of college students are meeting guidelines for aerobic activity and 38% meet the guidelines for muscle strength activity (Health Campus 2020, 2015a). The Healthy Campus goal by 2020 is to increase the proportion of aerobic activity participation to 54% and muscle strength activity participation to 41% (Healthy Campus 2020, 2015a).

The federal guidelines for adults aged 18 and older include at least 30 minutes of moderate intensity aerobic activity on five or more days per week or vigorous intensity

for at least 20 minutes on three or more days per week (Healthy Campus 2020, 2015a). This activity level amounts to 150 minutes of moderate aerobic activity per week or 75 minutes of intense aerobic activity. The spring 2013 ACHA-NCHA II data shows that during the past 7 days only 10% of students met the requirement of 5 days of moderate activity (11% of males and 9% of females), while 12% of students met the 5 day requirements of vigorous intensity activity (13% of males and 11% of females). Moderate activity includes walking briskly (3 miles per hour or faster), water aerobics, bicycling less than 10 miles per hour, tennis, or ballroom dancing (Office of Disease Prevention and Health Promotion, 2015). Intense aerobic activity can include jogging or running, swimming laps, bicycling 10 miles an hour or faster or heavy gardening (Office of Disease Prevention and Health Promotion, 2015).

The benefits of muscle strengthening exercises include increased bone strength and muscular fitness of the major muscle groups which include the legs, hips, back, chest, abdomen, shoulders, and arms (Office of Disease Prevention and Health Promotion, 2015). Federal guidelines suggest two or more days of the week of muscle strengthening performance activities. There are no specific guidelines for how much time should take place during muscle strengthening but one set of 8 to 12 repetitions for each major muscle group has been shown to be effective (Office of Disease Prevention and Health Promotion, 2015). According to the ACHA-NCHA II (2013) survey of 123,000 college students, 14,051 (12%) (11% males and 12% females) met the strength training requirement. Examples of muscle strength activities include lifting weights (nautilus machine or free weights), utilization of resistance bands, body weight resistance such as

push-ups, pull-ups, and sit-ups as well as carrying heavy loads or heavy gardening (Office of Disease Prevention and Health Promotion, 2015).

Benefits of Physical Activity

There are numerous studies that show the benefits of exercise, both physically and mentally. Physically if individuals are active, they reduce their risk of heart disease, stroke, certain cancers, and lower blood pressure, improve metabolism, reduce problems related to diabetes, and improve the immune system (APA, 2004). Physical activity has been shown to decrease anxiety, depression, and sleep difficulties and has also been equally effective as an antidepressant for both genders. According to the APA (2004), the most powerful effect in reducing depression has been a combination of exercise and psychotherapy.

One study examined the association of physical activity with psychological well-being and illness during first year college students (Bray & Kwan, 2006). Bray and Kwan found students who participated in vigorous activity had more positive psychological well-being and fewer illnesses than students who were not sufficiently active. They found a two-fold greater incidence of physician visits among students who were insufficiently active, as well as lower levels of psychological well-being (Bray & Kwan, 2006).

Strohle et al. (2007) found regular physical activity was an important aspect in the lives of adolescents and young adults. The study included a 12 month cross-sectional and 4 year prospective-longitudinal epidemiological study of 2,548 individuals aged 14-24 years (Strohle et al., 2007). Mental disorders were assessed through the DSM-IV and

physical activity was assessed through a four question interview at baseline and follow-up (Strohle et al., 2007). Individuals who participated in regular physical activity were less likely to meet criteria for any DSM-IV mental disorder than individuals who were not physically active (Strohle et al., 2007). Although higher education was associated with higher rates of regular physical activity, females aged 18-24 were 1.5 times more likely to reduce physical activity when compared to females aged 14-17 (Strohle et al., 2007). Strohle et al. concluded that physical activity is associated with lower rates of some mental disorders suggesting a substantial protective effect especially for those with anxiety disorders. Their results also suggested that physical inactivity may be associated with the development of major medical and mental disorders.

From a diversity standpoint, a study by Suminski, Petosa, Utter, and Zhang (2010) examined the rates of physical activities in a multi-ethnic population of college students. A total of 2,836 male and female college students, aged 18-24, participated in the study and the *Self-Reported Physical Activity* (SRPA) questionnaire was utilized to assess current physical activity (Suminski et al., 2010). Of the student participants, 53% of female and 40% of male students did not participate in vigorous physical activity the month before the survey and 22% of females and 11% of males did not engage in any physical activity the month before the study (Suminski et al., 2010). According to Suminski et al. (2010), female students from minority groups displayed the highest rates of physical inactivity, with Asian (28%) and African-American (24%) females showing the highest proportions, followed by Hispanic (20%) and White (17%) females. The

study concluded the need for physical activity promotion at the college level, especially with females and minority groups.

Dinger, Brittain, and Hutchinson (2014) looked at the association between physical activity and health related factors in a sample of 67,861, mostly White college students aged 18-20 years. The National College Health Assessment II was used during the fall 2008 and spring 2009 academic year. Some factors reviewed included fruit and vegetable consumption, positive perception of general health, less perceived depression, and adequate sleep. Physical activity assessment included two questions related to participation of moderate and vigorous aerobic physical activity. It was concluded that there was a statistically significant association between physical activity and fewer feelings or symptoms of depression (Dinger et al., 2014). The study also found some concerning issues, although the association was small, which included students meeting current moderate to vigorous physical activity, being more likely to be involved in binge drinking, be involved in a physical fight, and have multiple sex partners (Dinger et al., 2014). The findings of this study suggest that intervention programs may offer a cost effective approach to improving the health and well-being of college students (Dinger et al., 2014).

A study by Taliaferro, Rienzo, Pigg, Miller, and Dodd (2009) looked at the association between physical activity and reduced rates of hopelessness and depression. Data from the 2005 ACHA-NCHA were utilized and included 43,499 college students between the ages of 18 and 25. A total of 65% reported feeling hopeless and 46% felt so depressed it was difficult to function. Seventy eight percent of males participated in

aerobic physical activity compared with 75% of females. Taliaferro et al. (2009) found a

significant association with reduced risk of hopelessness and depression for male and

female students who participated in physical activity compared with students who were

inactive, suggesting physical activity may be used as a modality in the treatment of

depression.

Loprinzi and Cardinal (2011) studied the association between physical activity

and sleep in a sample of 3081 adults between the ages of 18-85.   After controlling for

demographic variables of age, health status, BMI, smoking, and depression, the relative

risk of "often feeling overly sleepy during the day" compared to "never feeling overly

sleepy" decreased by 65% for individuals meeting the federal guidelines for exercise

compared to participants not meeting the guidelines (Loprinzi & Cardinal, 2011).

Additionally, the relative risk of "moderate to extreme difficulty concentrating when

tired" compared to "not having difficulty concentrating when tired" decreased by 45%

when participants met the federal exercise guidelines (Loprinzi and Cardinal, 2011).

Overall the study showed a significant association between physical activity and the

general productivity of sleep (Loprinzi & Cardinal, 2011).

The Role of Campus Support Programs

According to Douce and Keeling (2014) mental and behavioral health should be a

priority of support services on campuses. Colleges assume an important role and

responsibility for student success, but student awareness of college support programs is

crucial to their success. Students may not recognize the availability of mental health

services on campus and they may not realize they need help (Douce & Keeling, 2014).

According to the ACHA-NCHA II (2013) survey of 123,000 college students nationwide a total of 18,886 (16%) (11% males and 18% females) students utilized their current college/university counseling or health services for psychological or mental health services.

In addition to mental health counseling services, programs of outreach, education, and prevention should be included and promoted within the college atmosphere (Douce & Keeling, 2014). Providing a connection for students through awareness and a positive culture on campus are imperative to promote student success, reduce mental illness, increase physical activity, and provide a safer campus community.

The History and Infrastructure of Campus Health Services

In 1861, Amherst College was credited as having the first on-campus student health service program which focused on physical illnesses as well as programs which emphasized healthy exercise for students to avoid emotional problems (Kraft, 2011). Yet, it was not until 1910 when Princeton University established the first on-campus mental health service for students (Kraft, 2011). These services focused on "personality development" due to an observation of students withdrawing from classes because of emotional and personality issues (Kraft, 2011). Between 1910 and 1960, national conferences were held along with ACHA and APA to set basic standards of practice for on-campus health services which included mental health. By the 1960s, these efforts would result in the presence of mental health and psychological counseling on college campuses nationwide (Kraft, 2011). In 1961, the ACHA published recommendations, standards and practices for college health programs that provided a benchmark for

college health services and continues to be updated. In 1983, Dr. Robert Arnstein, a psychiatrist, at Yale University Health Services, suggested that the APA set diagnostic categories in the Diagnostic and Statistical Manual of Psychiatric Disorders, Edition IV (DSM-IV) that were more applicable to students (Kraft, 2011). To assist psychiatrists and counselors in meeting the needs of college students, diagnostic categories were added for treatment of adjustment disorders, eating disorders, and learning problems (Kraft, 2011).

Currently, most colleges and universities offer health services that include clinical services, counseling services, and health and wellness education programs. Funding for student health services first came from general university revenues but today many campuses charge a separate health fee for student health services as well as run programs through funded grants (Kraft, 2011). The health fee covers the students' visit to the campus health center and the majority of the time there is no extra charge for services provided at the health center.

Larger four-year universities house full medical facilities on campus and include primary physician and nursing care, x-ray services, lab tests, prescriptions, health and wellness programs, self-help resources, drug and alcohol resources, psychiatrist and licensed counselor care, psychological emergency services, individual and group counseling, and suicide prevention (Skorton and Altschuler, 2013). At most larger universities, students who are in crisis can utilize counseling services immediately or by making an appointment where they can discuss their current concerns and needs. At smaller and two-year colleges, registered nurses and nurse practitioners provide services

which include first aid, illness assessment with referrals, limited low cost prescriptions, over the counter medication, blood pressure, tuberculosis testing, cholesterol testing, and wellness literature, as well as individual and group counseling assessment with referrals by a licensed marriage and family therapist (LMFT) (Skorton and Altschuler, 2013).

According to Kraft (2011), many college mental health centers are understaffed and there is also the challenge of meeting the needs of treating students in crisis while providing care for seriously ill students. A positive trend in the last 40 years is the refinement of campus health education which has expanded into prevention efforts, mental health education, and substance abuse areas (Kraft, 2011). The cooperation of mental health professionals with health education specialists has expanded efforts within college communities.

Implications for Campus Health Services

Conley, Travers, and Bryant (2013) found a positive correlation with first year college students who had the opportunity to participate in an eight month psychosocial wellness seminar. Participants involved in the study included a total of 51 students, with the mean age of 18.4, included 29 intervention participants and 22 control participants (Conley et al., 2013). Participants in both the intervention and control group met weekly for 50 minutes over the fall and spring semesters. The wellness seminar offered intervention students with skills in stress management, problem solving, mindfulness, effective social communication, and psychosocial well-being and helped student recognize and work through stress and challenges faced by college students (Conley et al., 2013). The control group had a similar structure to the intervention group but

covered non-mental health related topics like global health and citizenship (Conley et al., 2013). The results showed the intervention group receiving the wellness seminar did not report differences at baseline, but reported a significantly greater perceived improvement over the course of the intervention in psychosocial adjustment to college and stress management (Conley et al., 2013). Most college mental health services use an individual based treatment model and have little emphasis on preventive resources, but many college campuses could benefit from interventions such as preventive programs or small group programs (Conley et al., 2013).

Grayson (2010) suggests the influence of time should be an important aspect at the college and university level. The college health service center staff of psychotherapists and counselors must take into account the time influences of the semester, in order to understand and help students (Grayson, 2010). The first two weeks of the semester is a significant transition and adjustment time for students, and the last few weeks preceding final examinations is when psychiatric emergencies are at their highest levels (Grayson, 2010). Students who seek help early are more likely to have therapeutic aims that are deeper, broader, and diffuse situations that are causing stress and anxiety (Grayson, 2010). College and university student mental health centers need to strive to eliminate wait lists or wait time for students and prompt help should be offered to all individuals who come in for help, not just emergency cases (Grayson, 2010). A delay in a session means the student may have to deal with the problem without help. Student and mental health center staff should also set time limits, which include a set number of sessions, depending on the evaluation and situation of the student

(Grayson, 2010). The college and university mental health services should eliminate any semblance of being viewed as rigid or unresponsive to student needs and schedules; therefore, the majority of sessions should be traditional in structure but also offer opportunities for students as circumstances dictate (Grayson, 2010).

Healthy Campus 2020 (2015a) objectives suggest college campuses increase the proportion of students receiving information on physical activity and strength activities as well as participation of aerobic activity by ten percent by the year 2020. Reed (2007) suggests that identifying environmental characteristics that affect an individual's activity pattern may be helpful in influencing policy change on college campuses.

The transition period to college may provide a "window of opportunity" for intervention efforts to assist students in staying physically active (Bray et al., 2011). According to Bray et al. (2011), transition into college is linked to steep declines in moderate to vigorous physical activity. As reported, physical activity can have a positive impact on depression and anxiety, as well as sleep. Bray et al. (2011) found that students who received print-mediated intervention reported significantly higher levels of moderate to vigorous physical activity. The participants, first year college students, were randomly assigned with one of three conditions which included a physical activity and action-planning brochure, *Canada's Physical Activity Guide* (CPAG), or a non-intervention control group. After a six week follow up, students who received the physical activity and action-planning brochure reported higher levels of moderate to vigorous physical activity compared to the CPAG and control group (Bray et al., 2011). Additionally, students averaged 600 minutes a week of moderate to vigorous physical activity prior to

coming to college and all groups showed a drastic decline (453 minutes) in physical activity upon entering college. The group that received the brochure showed the smallest decline in physical activity (129 minutes) when compared with the CPAG group (153 minutes) and the control group (147 minutes) (Bray et al., 2011). Targeting first year students through an organized and theory based print media campaign can increase physical activity.

The benefits of campus recreation in increasing physical activity cannot be overstated. Students attributed 91% of wellbeing, 89% of physical strength, 86% of stress management, 83% of self-confidence, and 75% of concentration to their participation in campus recreation facilities and programs (Forrester, 2014). The top activity choices included cardio-vascular training such as the treadmill, elliptical, or stationary bike; weight training; and open recreation such as basketball, volleyball, and soccer (Forrester, 2014). According to Reed, more effort to increase awareness, offer recreation facilities, and programs are needed at the college level (2007). Students generally have strong intentions to be physically active in college but report barriers to being active. Barriers include the availability of recreational facilities, programs offered on campus, and lack of awareness (Reed, 2007). Identification of environmental characteristics affect activity patterns of individuals, therefore policy changes need to take place to improve student access (Reed, 2007). Providing signage around campus which promotes recreational facilities as well as introduction sessions to incoming freshman on physical activity programs and facilities are ways in which colleges can foster increased physical activity and wellness for students (Reed, 2007).

Summary

Creating a healthy atmosphere for students should be the highest priority on every college campus. Given the research, students transitioning into college should be considered an important at-risk group (Bray & Kwan, 2006). The available literature shows it is apparent the transition to college life for both traditional and the non-traditional student can be challenging and the need for services of outreach, education, and prevention are a necessity. Because of the high levels of anxiety and depression, during the transition period, providing students with programs such as study skills, time management skills, and organizational skills can provide positive information and feedback to students. It is also important that college mental health services provide timely help to students in mental distress.

Colleges and universities need to understand there is a correlation between mental disorders and sleep and college policies as well as class schedules have significant impact on sleep, learning, and the health of their students (Hershner & Chervin, 2014). The college campus is also an important setting for the promotion of physical activity and general health practices which can create an environment that impacts students throughout their life.

Gaps in research and available literature specifically at the community college level need to be addressed. The majority of available literature focused on four-year universities and there is a need to address specific two-year colleges due to different needs and services. This study addressed the needs of students at the community college level in order to make suggestions to administration, health services, and health educators

that will impact implementation of services and programs to improve the overall health of students.

CHAPTER III

METHODOLOGY

Population and Sample

This study utilized secondary data from a cross-sectional survey to examine the relationships between self-reported mental health issues (anxiety, depression, sleep difficulties) and level of physical activity, as well as use of mental health resources offered by a community college in central California. The participant population ($n = 481$) for this study included students aged 18-30+ who attended the college during the spring 2013 semester and completed the American College Health Association-National College Health Assessment II (ACHA-NCHA II). All students at the college were emailed the survey and an on-campus administrator provided students with unique identification numbers to access the survey. Data were collected on the habits, behaviors, and perceptions of prevalent health topics (ACHA-NCHA II, 2013).

Protection of Human Participants

The use of secondary data for the purposes of this study resulted in exempt research protocol application and approval was granted in September of 2015 by the Texas Woman's University Institutional Review Board (IRB; see Appendix A). There was no contact made between the researcher and participants and the secondary dataset had no personal identifiers. At the time of data collection, participants were informed they had the option to not participate in the survey. Students who chose to participate in

the original study were informed they could choose not to answer a specific question(s) and could skip any question.

Data Collection Procedures

The instrument used for this study is the ACHA-NCHA II which is a national survey tool created by the American College Health Association. The American College Health Association introduced the original survey in 2000 and the instrument was used nationwide through the spring of 2008 (ACHA-NCHA II, 2013). In the fall of 2008, the revised survey which is used in this study includes modified and added questions. According to ACHA-NCHA (2014a), survey reliability and validity were demonstrated via a series of comparisons and statistical analyses using triangulation from different nationally representative databases, different approaches, and statistical procedures. Data were collected through Qualtrics which is an application service provider (ASP) using Software-as-a Service (SaaS) for creating, distributing, and collecting data for online surveys (ACHA-NCHA, 2014b).

The survey was emailed to all students at the institution during the spring 2013 semester and students had the choice to participate. The survey took students approximately 30 minutes to complete and assessed general health of the college student, disease and injury prevention, academic impacts, violence, abusive relationships and personal safety, alcohol, tobacco, and other drug use, sexual behavior, nutrition and exercise. Items added in the fall of 2008 assessed mental health, sleep disorders, self-injury, and abuse of prescription drugs. The spring 2013 survey included a total of 314

questions with 283 of the questions pertaining to specific health issues and 31 pertaining to demographics and student characteristics.

Data Analysis

This ACHA-NCHA II data set was analyzed with the current version of Statistical Package for Social Sciences (SPSS) Version 23.0 statistical software. Demographic variables were analyzed with descriptive statistics and the survey responses were coded using the NCHA codebook provided by the ACHA-NCHA. This study utilized a group of statistical procedures which included cross-tabulation with Pearson's chi-square analysis, independent samples t-test, One-Way ANOVA, logistic regressions, and Multivariate Analysis of Variance (MANOVA) to assess relationships between demographic variables and independent variables, as well as analyze the research questions and hypotheses.

Preliminary Analyses

Preliminary analyses were conducted on the ACHA-NCHA II dataset which was checked for invalid cases and values. At times, participants can drop out or stop a survey for many different reasons. According to Johnson (2005), participants who stopped participating in a survey should be removed if they did not complete more than 50% of the survey. Analysis revealed a total of three (0.6%) participants dropped out approximately midway through the survey and a total of 12 (2.5%) participants had three or more matrices of survey items with zero variation in their responses. After taking into account the 15 (3.1%) invalid respondents from the 481 survey participants, 15 cases were identified for removal from this study in order to reduce the risk of bias.

After preparing the data for analysis, it was observed that of the 466 recorded

cases, 54 cases contained at least one missing data point (11.59%) and of the 28 variables

of interest, 19 variables contained at least one missing data point (67.86%), which

amounted to a total of .843% missing information in the dataset. To assess whether the

pattern of missing values was missing completely at random (MCAR), Little's MCAR

test (Little, 1988) was conducted. The null hypothesis of Little's MCAR test is that the

pattern of data is MCAR and follows a χ^2 distribution. Using an expectation-

maximization algorithm, the MCAR test estimates the univariate means and correlations

for each of the variables. The results revealed that the pattern of missing values in the

data was not MCAR, χ^2 (29) = 60.52, p = .001. With the < 1% missing data and the

MCAR test results, it was determined that missing replacement was not necessary and

analyses were conducted using pairwise deletion. Pairwise deletion of missing data

means that only cases relating to each pair of variables with missing data involved in an

analysis are deleted.

Primary Analyses

For the purposes of this study, items pertaining to mental health (anxiety,

depression, sleep disorder), campus resources (received or interest in receiving

information on anxiety /depression, sleep difficulties; have you received mental health

services from the college), academic performance (related to anxiety, depression, and

sleep difficulties), and physical health (moderate exercise, vigorous exercise, and strength

training) were utilized for primary analyses. Additionally, seven (7) demographic

variables were included for analyses: age, gender, body mass index (BMI), year in

40

school, ethnicity, grade point average (GPA), and general health status. The variable, BMI was computed from height and weight and included as an additional variable for study. Research questions and hypotheses were analyzed with the following analyses described below.

Research Question #1: What are the descriptive characteristics of students with self-reported anxiety, depression, and sleep difficulties?

To analyze the first research question, descriptive statistics were calculated for all demographic variables which included means, standard deviations, medians, minimum and maximum for continuous variables of general health status, age, and BMI. Categorical variables, including gender, ethnicity, GPA, and year in school were calculated using frequencies and percentages. Descriptive statistics were also used to describe participants with and without self-reported anxiety, depression, insomnia, and other sleep disorders.

Research Question #2: Is there a relationship between self-reported anxiety/depression, or sleep difficulties and receiving information/being interested in receiving information on anxiety/depression or sleep difficulties from the college?

To analyze the second research question, multiple logistic regression was conducted to assess the relationship between the categorical independent variable (IV) which is, have participants been diagnosed/treated with anxiety, depression, insomnia, or other sleep disorders or not and the categorical dependent variable (DV) of have participants received or are participants interested in receiving information (0 = no; 1 =

yes) from the college on the following topics of anxiety, depression, and sleep difficulties.

Research Question #3: Do the demographic variables of age, gender, BMI, year in school, race, grade point average, and general health status have an effect on self-reported anxiety, depression, and sleep difficulties of the participants?

To analyze this research question, multiple logistic regression was conducted to predict if any of the demographic variables of age, gender, ethnicity, GPA, year in school general health, and BMI have an effect on being diagnosed/treated for anxiety, depression, insomnia, or other sleep disorder ($0 = No$; $1 = Yes$).

Hypothesis #1: There will be no significant difference in physical activity (moderate exercise, vigorous exercise, strength training) between those with and those without self-reported anxiety, depression, or sleep difficulties.

To analyze this hypothesis, multivariate analyses of variance (MANOVA) was conducted in order to test the multiple DV's of the continuous variables of moderate exercise, vigorous exercise, and strength training between the IV's of the categorical variable having been diagnosed/treated for anxiety, depression, insomnia, or other sleep disorders.

Hypothesis #2: There will be no significant difference in physical activity (moderate exercise, vigorous exercise, strength training) between those who believe anxiety, depression, or sleep difficulties affected their academic performance and those who do not believe anxiety, depression, and sleep difficulties affected academic performance.

To analyze this hypothesis a MANOVA was conducted in order to test differences on the three measures of physical activity (moderate exercise, vigorous exercise, and strength training) between those who believe and do not believe anxiety, depression, or sleep difficulties affected their academic performance. Coding was completed for the IV's stating within the last 12 months, have any of the following of anxiety, depression, and sleep difficulties affected academic performance where if participants answered "I have experienced this issue but my academics have not been affected" were considered one group (0 = No) and those who answered "received a lower grade on an exam or important project", "received a lower grade in the course", "received an incomplete or dropped the course", or "significant disruption in thesis, dissertation, research, or practicum" work were considered another group (1= Yes).

Hypothesis #3: There will be no significant difference in prior use of the college's mental health services between those with and those without self-reported anxiety, depression, or sleep difficulties.

To analyze this hypothesis, multiple logistic regressions were conducted to predict if those with self-reported anxiety, depression, insomnia, or other sleep difficulties have an effect on utilization of college's mental health services. The categorical variable of year in school was also analyzed as a covariate for this hypothesis.

Hypothesis #4: Age, gender, BMI, year in school, ethnicity, GPA, general health status, physical activity (moderate, vigorous, strength training) are neither predictive nor protective of self-reported anxiety, depression, or sleep difficulties.

43

To analyze this research question, multiple logistic regressions were conducted to predict if the demographic variables of age, gender, ethnicity, BMI, year in school, GPA, and general health status along with the continuous variables of moderate exercise, vigorous exercise, and strength training had an effect on participants being treated/diagnosed anxiety, depression, and insomnia, and other sleep disorders (0 = No; 1= Yes).

Statistical Power and Sample Size of the Secondary Analysis

A priori power analysis was performed using G*Power version 3.1.9 to determine the minimum sample size required to find significance with a desired level of power set at .80, an α-level at .05, and moderate effect sizes. Based on the analysis, it was determined that a minimum sample size of 242 participants was required to ensure adequate power for the multiple logistic regressions. In addition it was determined that a minimum of 180 participants were needed in order to ensure adequate power for the MANOVA (Cohen, 1988; Erdfelder, Faul, & Buchner, 1996; Faul, Erdfelder, Lang, & Buchner, 2007).

CHAPTER IV

RESULTS

The purpose of this research study was to examine the relationships between self-reported mental health disorders (anxiety, depression, sleep disorder) and level of physical activity, as well as use of mental health resources offered by a community college in central California. The effect of certain descriptive variables (age; sex; body mass index [BMI]; year in school; race/ethnicity; grade point average [GPA]; general health status; and physical activity) on self-reported anxiety, depression, or sleep disorder, were also evaluated.

Preliminary Analyses

The final sample for this study consisted of 466 participants who attended a California community college in the spring of 2013. The original sample included 481 participants. After an invalid case analysis review, a total of 15 participants were removed from the study. Three participants were removed due to stopping the survey on or before 50% of completion and 12 participants were removed due to no variance across items.

Frequencies and percentages for categorical demographic variables are shown in Table 1. The participant sample included 305 females (65.5%) and 155 males (33.3%). The majority of participants self-reported as Caucasian (62.4%). The largest proportions

of participants in the sample had an approximate GPA of 3.0 (47.9%) and were second

year undergraduate students (31.5%).

Table 1

Frequencies and Percentages for Categorical Demographic Variables

Categorical Variable	n	%
Gender		
Female	305	65.5
Male	155	33.3
Ethnicity		
Caucasian	291	62.4
Hispanic or Latino	79	17.0
Other	86	18.5
Approximate GPA		
4.0	140	30.0
3.0	223	47.9
Less than 3.0	79	17.0
Year in school		
1st year undergraduate	113	24.2
2nd year undergraduate	147	31.5
3rd year undergraduate	91	19.5
4th year undergraduate or higher	66	14.2

Frequencies not summing to N = 466 reflects missing data

Means and standard deviations for the continuous demographic variables are

outlined in Table 2. General health ranged from a score of 1 (poor) to a score of 5

(excellent) ($M = 3.42$, $SD = .90$). Participant age ranged from 18 to 66 years ($M = 26.33$,

$SD = 10.21$). Lastly, body mass index (BMI) ranged from 15.51 to 56.38 ($M = 25.67$, SD

$= 5.71$).

Table 2

Means and Standard Deviations for Continuous Demographic Variables

	n	Minimum	Maximum	Mean	Std. Deviation
General Health	462	1.00	5.00	3.43	.90
Age	461	18	66	26.33	10.21
BMI	461	15.51	56.38	25.67	5.71

Frequencies and percentages for categorical independent and dependent variables are shown in Table 3. More participants self-reported diagnosis/treatment for anxiety (n = 84, 18%) and depression (*n* = 83, 17.8%) than those diagnosed/treated for insomnia (n = 37, 7.9%) and other sleep disorder (*n* = 15, 3.2%). A larger percentage of participants reported their academic performance was affected by anxiety (*n* = 124, 26.6%) than by depression (*n* = 77, 16.5%). Sleep difficulties affected academic performance in nearly a quarter of the sample (*n* = 113, 24.2%). More participants received information on depression/anxiety (*n* = 170, 36.5%) from their college than sleep difficulties (*n* = 80, 17.2%). Only a small percentage of participants received mental health services from their current university/college (*n* = 33, 7.1%). Lastly, participants were interested in receiving information on depression/anxiety (*n* = 207, 44.4%) and sleep difficulties (*n* = 208, 44.6%).

Table 3

Frequencies and Percentages for Categorical Independent and Dependent Variables

Categorical Variable	*n*	%
Diagnosed/treated for anxiety		
No	382	82.0
Yes	84	18.0
Diagnosed/treated for depression		
No	383	82.2
Yes	83	17.8
Diagnosed/treated for insomnia		
No	428	91.8
Yes	37	7.9
Diagnosed/treated for other sleep disorder		
No	449	96.4
Yes	15	3.2
Academic performance affected by anxiety		
No	107	23.0
Yes	124	26.6
Academic performance affected by depression		
No	100	21.5
Yes	77	16.5
Academic performance affected by sleep difficulties		
No	161	34.5
Yes	113	24.2
Received information on depression/anxiety		
No	293	62.9
Yes	170	36.5
Received information on sleep difficulties		
No	380	81.5
Yes	80	17.2

Table 3 (continued)

Frequencies and Percentages for Categorical Independent and Dependent Variables

Categorical Variable	*n*	%
Received mental health services from current university		
No	425	91.2
Yes	33	7.1
Interested in receiving information on depression/anxiety		
No	251	53.9
Yes	207	44.4
Interested in receiving information on sleep difficulties		
No	249	53.4
Yes	208	44.6

Frequencies not summing to N = 466 reflects N/A or missing data.

Means and standard deviations for continuous independent and dependent variables are outlined in Table 4. Moderate exercise (of at least 30 minutes) participation ranged from zero days to seven days per week ($M = 2.58$, $SD = 2.01$). Vigorous exercise (of at least 20 minutes) participation ranged from zero to seven days per week ($M = 1.68$ $SD = 1.88$). Strength training (of 8-10 exercises for 8-12 repetitions) participation ranged from zero to seven days per week ($M = 1.28$, $SD = 1.73$).

Table 4

Means and Standard Deviations of Continuous Independent and Dependent Variables

	n	Minimum	Maximum	Mean	Std. Deviation
Moderate exercise	464	.00	7.0	2.58	2.01
Vigorous exercise	460	.00	7.0	1.68	1.88
Strength training	458	.00	7.0	1.28	1.73

Crosstab analyses using Pearson's chi-square and Cramer's *V* tests were conducted to examine the relationship among demographic variables. As shown in Table 5, the relationship between ethnicity and approximate GPA was significant, x^2 (4) = 25.02, p = <.001, Cramer's *V* = .169. A greater proportion of Caucasian participants had an approximate GPA of 4.0 (37.4%) compared to Hispanic/Latino (11.5%) and participants from other ethnicities (30.4%). In addition, a greater proportion of Hispanic/Latino participants (32.1%) had less than a 3.0 GPA compared to Caucasian (13.9%) and participants from other ethnicities (17.7%). The relationship between ethnicity and gender or ethnicity and year in school was not significant (*ps* > .05).

Table 5

Frequencies and Percentages for Gender, GPA, Year in School by Ethnicity

	Caucasian		Hispanic/Latino		Other			
	n	%	n	%	n	%	x^2	p
Gender							.99	.607
Female	196	67.8	49	62.0	56	65.1		
Male	93	32.2	30	38.0	30	34.9		
Approximate GPA							25.02	<.001
4.0	105	37.4	9	11.5	24	30.4		
3.0	137	48.8	44	56.4	41	51.9		
Less than 3.0	39	13.9	25	32.1	14	17.7		
Year in school							6.94	.326
1st year undergrad	75	29.0	19	24.7	17	22.4		
2nd year undergrad	93	35.9	29	37.7	24	31.6		
3rd year undergrad	48	18.5	21	27.3	21	27.6		
4th year undergrad or higher	43	16.6	8	10.4	14	18.4		

Crosstab analyses using Pearson's chi-square and Cramer's *V* tests were conducted to examine the relationship among demographic variables. As shown in Table 6, the relationship between approximate GPA and ethnicity was significant, x^2 (4) = 25.02, p = <.001, Cramer's *V* = .169. A greater proportion of participants with an approximate GPA of 4.0 were Caucasian (76.1%) compared to participants with an approximate GPA of 3.0 (61.7%) and less than 3.0 (50.0%). In contrast, a greater proportion of participants with a GPA less than 3.0 were Hispanic or Latino (32.1%) compared to participants with an approximate GPA of 4.0 (6.5%). The relationship between approximate GPA and gender or approximate GPA and year in school was not significant (*ps* > .05).

Table 6

Frequencies and Percentages for Gender, Ethnicity, Year in School by GPA

	4.0		3.0		Less than 3.0		x^2	p
	n	%	n	%	n	%		
Gender							1.80	.406
Female	98	70.0	148	66.4	47	61.0		
Male	42	30.0	75	33.6	30	39.0		
Ethnicity							25.02	<.001
Caucasian	105	76.1	137	61.7	39	50.0		
Hispanic/Latino	9	6.5	44	19.8	25	32.1		
Other	24	17.4	41	18.5	14	17.9		
Year in school							5.01	.543
1st year undergrad	31	26.1	56	26.7	17	24.3		
2nd year undergrad	39	32.8	77	36.7	26	37.1		
3rd year undergrad	23	19.3	50	23.8	15	21.4		
4th year undergrad or higher	26	21.8	27	12.9	12	17.1		

A one-way analysis of variance (ANOVA) was conducted to determine if ethnicity (i.e., Caucasian, Hispanic/Latino, or Other) differed on general health, age, or BMI. Results revealed a significant effect of ethnicity on BMI scores, $F (2, 452) = 3.32$, $p = .037$, partial $n^2 = .014$. As shown in Table 7, participants who were Hispanic/Latino had significantly higher BMI scores ($M = 27.01$, $SD = 6.02$) than Caucasian participants ($M = 25.19$, $SD = 5.24$). The relationship between ethnicity and general health and age was not significant ($ps > .05$).

Table 7

Means and Standard Deviations for General Health, Age, BMI by Ethnicity

	n	M	SD	F	p
General Health				1.75	.175
White	290	3.48	.85		
Hispanic/Latino	78	3.27	1.00		
Other	84	3.37	1.02		
Age				2.31	.101
White	289	26.85	10.80		
Hispanic/Latino	79	24.09	7.23		
Other	86	26.45	10.30		
BMI				3.32	.037
Caucasian	291	25.19	5.24		
Hispanic/Latino	78	27.01	6.02		
Other	86	26.03	6.80		

A one-way ANOVA was conducted to determine if approximate GPA (i.e., 4.0, 3.0, or less than 3.0) differed on general health, age, or BMI. Results revealed a significant effect of approximate GPA on the participants age, $F(2, 437) = 18.16$, $p < .001$, partial $n^2 = .077$. As shown in Table 8, participants who had an approximate GPA of 4.0 were significantly older ($M = 30.39$, $SD = 12.93$) than participants with an approximate GPA of 3.0 ($M = 24.22$, $SD = 8.04$) and participants with a GPA of less than 3.0 ($M = 24.61$, $SD = 7.87$). The relationship between GPA and general health as well as BMI was not significant ($ps > .05$).

Table 8

Means and Standard Deviations for General Health, Age, and BMI by GPA

	n	M	SD	F	p
General Health				1.68	.187
4.0	138	3.51	.91		
3.0	222	3.42	.87		
Less than 3.0	78	3.28	.94		
Age				18.16	<.001
4.0	140	30.39	12.93		
3.0	223	24.22	8.04		
Less than 3.0	77	24.61	7.87		
BMI				1.45	.235
4.0	140	25.86	6.27		
3.0	223	25.16	5.24		
Less than 3.0	78	26.30	5.18		

A one-way ANOVA was conducted to determine if approximate year in school (i.e., 1st year undergrad, 2nd year undergrad, 3rd year undergrad, and 4th year undergrad or higher) differed on general health, age, or BMI. Results revealed a significant effect of year in school on participant age, $F (3, 411) = 8.73$, $p < .001$, partial $n^2 = .060$. As shown in Table 9, participants who were 1st year undergraduates were significantly younger ($M = 22.40$, $SD = 6.90$) than participants who were 2nd year undergraduates ($M = 26.22$, $SD = 10.50$), and 4th year undergraduates and higher ($M = 29.55$, $SD = 11.13$). The relationship between year in school and general health as well as BMI was not significant ($ps > .05$).

Table 9

Means and Standard Deviations for General Health, Age, and BMI by Year in School

	n	*M*	*SD*	*F*	*p*
General Health				.67	.572
1st year undergraduate	113	3.36	.96		
2nd year undergraduate	145	3.47	.87		
3rd year undergraduate	90	3.41	.85		
4th year undergrad and higher	66	3.55	.90		
Age				8.73	<.001
1st year undergraduate	111	22.40	6.90		
2nd year undergraduate	147	26.22	10.50		
3rd year undergraduate	91	25.15	7.96		
4th year undergrad and higher	66	29.55	11.13		
BMI				.36	.780
1st year undergraduate	113	25.78	5.86		
2nd year undergraduate	147	25.26	5.37		
3rd year undergraduate	91	25.23	5.47		
4th year undergrad and higher	65	25.87	5.36		

Crosstab analyses using Pearson's chi-square and Cramer's V tests were conducted to examine the relationship among demographic variables and independent variables. As shown in Table 10, the relationship between participants receiving mental health services from their current university/college and year in school was significant, x^2 (3) = 8.13, p = .043, Cramer's V = .141. A greater proportion of participants who received mental health services from their university/college were 4th year undergraduates and higher (33.3%) compared to participants who did not receive mental

health services (14.2%). The relationship between receiving mental health services and gender, ethnicity, or approximate GPA was not significant ($ps > .05$).

Table 10

Frequencies and Percentages for Gender, Ethnicity, GPA, Year in School by Received Mental Health Services from Current University/College

| | Received Mental Health Services | | |
| | No | | Yes | | | |
	n	%	n	%	x^2	p
Gender					1.17	.280
Female	277	65.6	24	75.0		
Male	145	34.4	8	25.0		
Ethnicity					2.11	.348
Caucasian	267	64.0	19	59.4		
Hispanic or Latino	74	17.7	4	12.5		
Other	76	18.2	9	28.1		
Approximate GPA					3.97	.138
4.0	126	31.2	11	35.5		
3.0	209	51.7	11	35.5		
Less than 3.0	69	17.1	9	29.0		
Year in school					8.13	.043
1st year undergrad	105	27.6	7	23.3		
2nd year undergrad	139	36.5	7	23.3		
3rd year undergrad	83	21.8	6	20.0		
4th year undergrad or higher	54	14.2	10	33.3		

Primary Analyses

Research Question One

    Research question one focused on the descriptive characteristics of students with self-reported anxiety, depression, and sleep difficulties. This research question was

assessed via crosstab analyses using Pearson's chi-square, Cramer's V tests, and one-way

ANOVA. As shown in Table 3, more participants self-reported diagnosis/treatment for

anxiety (n = 84, 18%) and depression (n = 83, 17.8%) than insomnia (n = 37, 7.9%) and

other sleep disorder (n = 15, 3.2%). A majority of the sample who self-reported anxiety

were female (76.2%), Caucasian (67.9%), with an average age of 29 years, and were 1st

year (26.2%) or 3rd year (25%) undergraduates (Table 11). Similarly, a majority of the

sample who self-reported depression or insomnia, respectively, were female (72.3%,

62.2%), Caucasian (66.3%, 62.2%), and were 1st year (25.3%, 24.3%) or 2nd year (22.9%,

32.4%) undergraduates (Table 11).

The proportions of students with a GPA of 4.0 or at least a 3.0 were similar

between those with anxiety (35.7%, 38.1%) and depression (32.5%, 39.8%). Of interest,

nearly one in five students with anxiety (19%) or depression (19.3%) had a GPA below

3.0, while only one in ten students with insomnia (10.8%) had a GPA below 3.0.

Students with self-reported depression had the lowest general health status (*M*=2.87) and

highest BMI (*M*=27.78) in comparison to students with anxiety (*Health M*=3.12, *BMI*

M=26.05) and insomnia (*Health M*=3.17, *BMI M*=26.21).

Table 11

Descriptive Characteristics of Students with Self-Reported Anxiety, Depression, and Sleep Difficulties

Demographic variable	Anxiety		Depression		Insomnia		Other Sleep Disorder	
	n	%	n	%	n	%	n	%
Gender								
Female	64	76.2	60	72.3	23	62.2	9	60.0
Male	17	20.2	20	24.1	13	35.1	5	33.3
Ethnicity								
Caucasian	57	67.9	55	66.3	23	62.2	8	53.3
Hispanic/Latino	10	11.9	10	12.0	5	13.5	2	13.3
Other	13	15.5	14	16.9	9	24.3	4	26.7
Year in school								
1st year undergrad	22	26.2	21	25.3	9	24.3	5	33.3
2nd year undergrad	15	17.9	19	22.9	12	32.4	4	26.7
3rd year undergrad	21	25.0	16	19.3	10	27.0	3	20.0
4th year undergrad or higher	12	14.3	9	10.8	3	8.1	0	0.0
GPA								
4.0	30	35.7	27	32.5	13	35.1	5	33.3
3.0	32	38.1	33	39.8	19	51.4	6	40.0
Less than 3.0	16	19.0	16	19.3	4	10.8	3	20.0
General Health								
M	3.12		2.87		3.17		2.87	
SD	1.02		.98		1.00		1.13	
Min	1.00		1.00		1.00		1.00	
Max	5.00		5.00		5.00		5.00	
Age								
M	29.24		29.74		30.65		29.53	
SD	11.39		11.51		12.38		10.78	
Min	18		18		18		19	
Max	64		64		60		53	

Table 11(continued)

Descriptive Characteristics of Students with Self-Reported Anxiety, Depression, and Sleep Difficulties

	Anxiety		Depression		Insomnia		Other Sleep Disorder	
Demographic variable	n	%	n	%	n	%	n	%
BMI								
M	26.05		27.78		26.21		25.71	
SD	6.40		7.60		6.91		6.74	
Min	15.51		16.92		15.51		16.92	
Max	48.54		56.38		52.72		38.45	

Note. Percentages not summing to 100 reflect missing data

Research Question Two

Several logistic regressions were conducted to examine the relationship between self-reported anxiety/depression and sleep difficulties and if participants had received or were interested in receiving information on anxiety/depression or sleep difficulties from the college. As shown in Table 12, the overall model was significant, x^2 (4) = 20.80, *p* <.001, Nagelkerke R^2 = .060. Of all the predictor variables, only whether or not participants were diagnosed/treated for anxiety was a significant predictor (OR=2.064, 95% CI: 1.03-4.14, *p* = .041), indicating individuals diagnosed/treated for anxiety are two times more likely to report interest in receiving information on depression or anxiety when compared to participants not diagnosed or treated for anxiety. None of the remaining predictors of diagnosed/treated for depression, insomnia, or other sleep disorders were significant in the model. In addition, the overall models predicting whether or not participants received information on depression or anxiety, sleep

difficulties, and if they were interested in receiving information on sleep difficulties were

not significant, ($ps > .05$).

Table 12

Summary of Logistic Regression Predicting Interested in Receiving Information on Depression/Anxiety Using Diagnosed/treated for Anxiety, Depression, Insomnia, or Other Sleep Disorders

	β	Odds Ratio	95% CI Lower	95% CI Upper	p
Diagnosed/treated for anxiety	.725	2.064	1.03	4.14	.041
Diagnosed/treated for depression	.587	1.798	.89	3.63	.101
Diagnosed/treated for insomnia	-.002	.998	.46	2.18	.997
Diagnosed/treated for other sleep disorders	-.521	.594	.19	1.86	.371

Note: $x^2(4) = 20.80$, $p < .001$, Nagelkerke $R^2 = .060$.

Research Question Three

Research question three asked if the demographic variables of age, gender, BMI, year in school, GPA, and general health status have an effect on self-reported anxiety, depression, and sleep difficulties. A logistic regression analysis was conducted to predict diagnosis or treatment for anxiety from age, gender, ethnicity, GPA, year in school, general health, and BMI (Table 13). Overall, the model was significant, $x^2(11) = 33.55$, $p < .001$, Nagelkerke $R^2 = .139$. Of all the predictor variables, age ($OR = 1.043$, 95% CI: 1.01-1.07, $p = .006$,), gender ($OR = .411$, 95% CI: .21-.82, $p = .011$,), year in school-2nd

60

year undergraduate (OR = .438, 95% CI: .20-.95, p = .037,), and general health (OR = .666, 95% CI: .48-.93, p = .017,) were significant predictors. Older participants were more likely to be diagnosed or treated for anxiety. Female participants were more likely to be diagnosed or treated for anxiety when compared to male participants. Participants who were second year undergraduates were less likely to be diagnosed or treated for anxiety when compared to first year undergraduates. Lastly, participants with lower general health scores were more likely to be diagnosed or treated for anxiety. None of the remaining predictors (e.g., ethnicity-Hispanic/Latino, ethnicity-Other; GPA-4.0, GPA-less than 3.0, 3rd and 4th year in school; or BMI) were significant predictors of participants' diagnosis/treatment for anxiety.

Table 13

Summary of Logistic Regression Predicting Diagnosed/Treated for Anxiety Using Age, Gender, Ethnicity, GPA, Year in School, General Health, and BMI

	β	Odds Ratio	95% CI Lower	95% CI Upper	p
Age	.042	1.043	1.01	1.07	.006
Gender	-.890	.411	.21	.82	.011
Ethnicity-Hispanic/Latino[a]	-.435	.648	.28	1.47	.301
Ethnicity-Other[a]	-.413	.661	.30	1.47	.312
GPA-4.0[b]	.263	1.300	.67	2.54	.442
GPA-Less than 3.0[b]	.637	1.891	.85	4.21	.119

Table 13 (continued)

Summary of Logistic Regression Predicting Diagnosed/Treated for Anxiety Using Age, Gender, Ethnicity, GPA, Year in School, General Health, and BMI

	β	Odds Ratio	95% CI Lower	Upper	p
Year in school-2nd year undergraduate[c]	-.826	.438	.20	.95	.037
Year in school-3rd year undergraduate[c]	.135	1.144	.54	2.43	.725
Year in school-4th year undergraduate and higher[c]	-.237	.789	.33	1.92	.601
General health	-.406	.666	.48	.93	.017
BMI	-.032	.969	.91	1.03	.289

Note: $x^2(11) = 33.55$, $p < .001$, Nagelkerke $R^2 = .139$
[a]Compared to Caucasian. [b]Compared to 3.0. [c]Compared to 1st year undergraduate

A logistic regression analysis was conducted to predict diagnosis or treatment for depression from age, gender, ethnicity, GPA, year in school, general health, and BMI, see Table 14. Overall, the model was significant, $x^2(11) = 37.67$, $p < .001$, Nagelkerke $R^2 = .162$. Of all the predictor variables, age ($OR = 1.038$, 95% CI: 1.01-1.07, $p = .015$,) and general health ($OR = .452$, 95% CI: .31-.65, $p < .001$,) were significant predictors. Older participants were more likely to be diagnosed or treated for depression. Participants with lower general health scores were more likely to be diagnosed/treated for depression. None of the remaining predictors (e.g., gender; ethnicity-Hispanic/Latino; ethnicity-

62

Other; GPA-4.0; GPA-less than 3.0; 2nd, 3rd, 4th year in school; or BMI) were significant

predictors of participants' diagnosis/treatment for depression.

Table 14

Summary of Logistic Regression Predicting Diagnosed/Treated for Depression Using Age, Gender, Ethnicity, GPA, Year in School, General Health, and BMI

	β	Odds Ratio	95% CI Lower	Upper	*p*
Age	.038	1.038	1.01	1.07	.015
Gender	-.478	.620	.31	1.23	.171
Ethnicity-Hispanic/Latino[a]	-.608	.544	.23	1.31	.176
Ethnicity-Other[a]	-.213	.808	.36	1.83	.609
GPA-4.0[b]	-.021	.979	.48	2.01	.176
GPA-Less than 3.0[b]	.254	1.289	.55	3.03	.609
Year in school-2nd year undergraduate[c]	-.408	.665	.30	1.46	.307
Year in school-3rd year undergraduate[c]	-.077	.926	.40	2.12	.855
Year in school-4th year undergraduate and higher[c]	-.423	.655	.24	1.77	.405
General health	-.795	.452	.31	.65	<.001
BMI	.004	1.004	.95	1.06	.877

Note: $x^2(11) = 37.67$, p <.001, Nagelkerke $R^2 = .162$
[a]Compared to Caucasian. [b]Compared to 3.0. [c]Compared to 1st year undergraduate

A logistic regression analysis was conducted to predict diagnosis or treatment for insomnia from age, gender, ethnicity, GPA, year in school, general health, and BMI, see Table 15. Overall, the model was not significant, x^2 (11) = 18.51, p = .070, Nagelkerke R^2 = .109. Of all the predictor variables, only age (OR = 1.054, 95% CI: 1.02-1.09, p = .005) was a significant predictor, indicating that older participants are more likely to be diagnosed/treated for insomnia. None of the remaining predictors (e.g., gender; ethnicity-Hispanic/Latino; ethnicity-Other; GPA-4.0; GPA-less than 3.0; 2nd, 3rd, 4th year undergraduate; general health; BMI) were significant predictors of the participant's diagnosis/treatment for insomnia.

Table 15

Summary of Logistic Regression Predicting Diagnosed/Treated for Insomnia Using Age, Gender, Ethnicity, GPA, Year in School, General Health, and BMI

	β	Odds Ratio	95% CI Lower	95% CI Upper	p
Age	.053	1.054	1.02	1.09	.005
Gender	-.104	.901	.39	2.09	.809
Ethnicity-Hispanic/Latino[a]	.187	1.205	.40	3.63	.740
Ethnicity-Other[a]	.672	1.958	.78	4.95	.155
GPA-4.0[b]	-.107	.899	.37	2.17	.813
GPA-Less than 3.0[b]	-1.822	.162	.02	1.27	.083
Year in school-2nd year undergraduate[c]	-.250	.779	.29	2.12	.625

Table 15 (continued)

Summary of Logistic Regression Predicting Diagnosed/Treated for Insomnia Using Age, Gender, Ethnicity, GPA, Year in School, General Health, and BMI

	β	Odds Ratio	95% CI Lower	95% CI Upper	*p*
Year in school-3rd year undergraduate^c	.089	1.093	.39	3.10	.868
Year in school-4th year undergraduate and higher^c	-1.052	.349	.08	1.53	.162
General health	-.185	.831	.54	1.29	.412
BMI	-.010	.990	.92	1.07	.781

Note: $x^2(11) = 18.51$, p = .070, Nagelkerke $R^2 = .109$
^{a}Compared to Caucasian. ^{b}Compared to 3.0. ^{c}Compared to 1st year undergraduate

A logistic regression analysis was conducted to predict diagnosis or treatment for other sleep disorders from age, gender, ethnicity, GPA, year in school, general health, and BMI, see Table 16. Overall, the model was not significant, $x^2 (11) = 16.34$, $p = .129$, Nagelkerke $R^2 = .171$. Of all the predictor variables, age (OR = 1.086, 95% CI: 1.02-1.15, $p = .006$) was a significant predictor and had an odds ratio of 1.086, indicating older participants are more likely to be diagnosed/treated for other sleep disorder. None of the remaining predictors (e.g., gender; ethnicity-Hispanic/Latino; ethnicity-Other; GPA-4.0; GPA-less than 3.0; 2nd, 3rd, 4th year undergraduate; general health; BMI) were significant predictors of the participant's diagnosis/treatment for other sleep disorder.

Table 16

Summary of Logistic Regression Predicting Diagnosed/Treated for Other Sleep Disorder Using Age, Gender, Ethnicity, GPA, Year in School, General Health, and BMI

	β	Odds Ratio	95% CI Lower	Upper	*p*
Age	.083	1.086	1.02	1.15	.006
Gender	.144	1.155	.32	4.24	.828
Ethnicity-Hispanic/Latino[a]	-.296	.744	.13	4.18	.737
Ethnicity-Other[a]	.554	1.741	.38	7.99	.476
GPA-4.0[b]	-.073	.930	.20	4.30	.926
GPA-Less than 3.0[b]	.927	2.527	.52	12.36	.252
Year in school-2nd year undergraduate[c]	-1.062	.346	.08	1.51	.157
Year in school-3rd year undergraduate[c]	-.704	.495	.10	2.36	.377
Year in school-4th year undergraduate and higher[c]	-19.017	.000	.00		.997
General health	-.465	.628	.32	1.24	.182
BMI	-.093	.911	.80	1.04	.170

Note: $x^2(11) = 16.34$, p = .129, Nagelkerke R^2 = .171
[a]Compared to Caucasian. [b]Compared to 3.0. [c]Compared to 1st year undergraduate

Hypothesis One

Hypothesis one stated there will be no significant difference in physical activity between those with and those without self-reported anxiety, depression, or sleep

66

difficulties. Several MANOVA's were conducted to examine if there were significant differences between moderate exercise, vigorous exercise, or strength training and those with self-reported anxiety, depression, insomnia, or other sleep disorders. Results revealed no significant differences for physical activity (moderate, vigorous, and strength training) by anxiety, $F (3, 450) = .93$, $p = .424$, $n^2 = .006$, depression, $F (3, 450) = 1.16$, $p = .327$, $n^2 = .008$, insomnia, $F (3, 449) = .23$, $p = .878$, $n^2 = .002$, or other sleep disorders, $F (3, 449) = .36$, $p = .781$, $n^2 = .002$.

Hypothesis Two

Hypothesis two stated there will be no significant difference in physical activity between those who believe and do not believe anxiety, depression, or sleep difficulties affect their academic performance. Several MANOVA's were conducted to examine if there were significant differences between moderate exercise, vigorous exercise, or strength training and anxiety, depression, insomnia, or other sleep difficulties affecting academic performance. Results revealed no significant differences for physical activity (moderate, vigorous, and strength training) by those believing any of the following affected academic performance: anxiety $F (2, 223) = 1.23$, $p = .300$, $n^2 = .016$; depression $F (3, 169) = .872$, $p = .457$, $n^2 = 015$; or sleep difficulties $F (3, 262) = .134$, $p = .940$, $n^2 = .002$.

Hypothesis Three

Hypothesis three stated there will be no significant difference in prior use of the college's mental health services between those with and those without self-reported anxiety, depression, and sleep difficulties. A logistic regression was conducted to predict

diagnosis or treatment for anxiety for those who received mental health services from their current university/college (Table 17). Education was also used as a covariate in this model. Overall, the model was significant, $x^2(4) = 26.52$, $p < .001$, Nagelkerke $R^2 = .105$. Of the predictor variables, received mental health services from current university/college (95% CI: 2.77-13.61, $p < .001$) and year in school-2nd year undergraduate (95% CI: .23-.97, $p = .042$) were significant. Participants who received mental health services from their current university/college had an odds ratio of 6.138 and 2nd year undergraduates had an odds ratio of .470, indicating that participants who received mental health services from their current university/college were six times more likely to be diagnosed or treated for anxiety compared to participants who did not receive mental health services. In addition, participants who were 2nd year undergraduates were more likely to be diagnosed/treated for anxiety compared to 1st year undergraduates. The remaining predictors (e.g., 3rd year undergraduate, 4th year undergraduate and higher) were not significant predictors of being diagnosed/treated for anxiety.

Table 17

Summary of Logistic Regression Predicting Diagnosed/Treated for Anxiety Using Received Mental Health Services from Current University or Other Potential Covariates

	β	Odds Ratio	95% CI Lower	Upper	*p*
Received mental health services from current University	1.815	6.138	2.77	13.61	<.001

Table 17 (continued)

Summary of Logistic Regression Predicting Diagnosed/Treated for Anxiety Using Received Mental Health Services from Current University or Other Potential Covariates

	β	Odds Ratio	95% CI Lower	Upper	*p*
Year in school-2nd year undergraduate[a]	-.755	.470	.23	.97	.042
Year in school-3rd year undergraduate[a]	.168	1.183	.59	2.39	.639
Year in school-4th year undergraduate and higher[a]	-.308	.735	.32	1.69	.469

Note: $x^2(4) = 26.52$, p <.001, Nagelkerke $R^2 = .105$
[a]Compared to 1st year undergraduate

A logistic regression was conducted to predict diagnosis or treatment for depression from received mental health services from their current university/college, see Table 18. Education was also used as a covariate in this model. Overall, the model was significant, $x^2(4) = 20.42$, $p <.001$, Nagelkerke $R^2 = .084$. Of all the predictor variables, only received mental health services from current university/college was a significant predictor, (95% CI: 2.81-14.01, $p <.001$) and had an odds ratio of 6.278. This indicates that participants who received mental health services from their current university/college were six times more likely to be diagnosed/treated for depression compared to participants who did not receive mental health services. The remaining predictors (e.g., 2nd and 3rd year undergraduate, 4th year undergraduate and higher) were not significant predictors of being diagnosed/treated for depression.

Table 18

Summary of Logistic Regression Predicting Diagnosed/Treated for Depression Using Received Mental Health Services from Current University or Other Potential Covariates

	β	Odds Ratio	95% CI Lower	Upper	p
Received mental health services from current University	1.837	6.278	2.81	14.01	<.001
Year in school-2nd year undergraduate[a]	-.415	.660	.33	1.32	.242
Year in school-3rd year undergraduate[a]	-.151	.859	.41	1.83	.694
Year in school-4th year undergraduate and higher[a]	-.635	.530	.21	1.32	.171

Note: $x^2(4) = 20.42$, p <.001 , Nagelkerke $R^2 = .084$
[a]Compared to 1st year undergraduate

Hypothesis Four

Hypothesis four stated that age, gender, BMI, year in school, ethnicity, GPA, general health status, moderate exercise, vigorous, exercise, and strength training are neither predictive nor protective of self-reported anxiety, depression, or sleep difficulties. A logistic regression analysis was conducted to predict diagnosis or treatment for anxiety from age, gender, ethnicity, GPA, year in school, general health, and BMI (Table 19). Overall, the model was significant, x^2 (14) = 33.99, p = .002, Nagelkerke R^2 = .144. Of all the predictor variables, age (*OR*= 1.036, 95% CI: 1.01-1.07, p = .020,), gender (*OR* = .409, 95% CI: .20-.82, p = .011,), and year in school-2nd year undergraduate (*OR* = .424, 95% CI: .19-.93, p = .032,) were significant. This indicates that older participants were

more likely to be diagnosed or treated for anxiety. In addition, male participants were less likely to be diagnosed or treated for anxiety when compared to female participants. Finally, 2nd year undergraduates were less likely to be diagnosed or treated for anxiety compared to first year undergraduates. None of the remaining predictors (e.g., ethnicity-Hispanic/Latino; ethnicity-Other; GPA-4.0; GPA-less than 3.0; 3rd and 4th year undergraduate; BMI; general health; moderate and vigorous exercise; and strength training) were significant predictors of the participant's diagnosis/treatment for anxiety.

Table 19

Summary of Logistic Regression Predicting Diagnosed/Treated for Anxiety Using Age, Gender, Ethnicity, GPA, Year in School, General Health, BMI, Moderate Exercise, Vigorous Exercise, and Strength Training.

	β	Odds Ratio	95% CI Lower	95% CI Upper	*p*
Age	.036	1.036	1.01	1.07	.020
Gender	-.895	.409	.20	.82	.011
Ethnicity-Hispanic/Latino[a]	-.445	.641	.28	1.47	.294
Ethnicity-Other[a]	-.524	.592	.26	1.37	.219
GPA-4.0[b]	.344	1.410	.71	2.79	.323
GPA-Less than 3.0[b]	.685	1.984	.88	4.47	.098
Year in school-2nd year undergraduate[c]	-.858	.424	.19	.93	.032

71

Table 19 (continued)

Summary of Logistic Regression Predicting Diagnosed/Treated for Anxiety Using Age, Gender, Ethnicity, GPA, Year in School, General Health, BMI, Moderate Exercise, Vigorous Exercise, and Strength Training.

	β	Odds Ratio	95% CI Lower	Upper	*p*
Year in school-3rd year undergraduate[c]	-.025	1.025	.48	2.20	.950
General health	-.315	.730	.51	1.04	.079
BMI	-.026	.974	.92	1.03	.380
Moderate exercise	.008	1.008	.82	1.22	.933
Vigorous exercise	-.066	.936	.74	1.18	.582
Strength training	-.105	.901	.71	1.14	.377

Note: $x^2(14) = 33.99$, $p = .002$, Nagelkerke $R^2 = .144$
[a]Compared to Caucasian. [b]Compared to 3.0. [c]Compared to 1st year undergraduate

A logistic regression analysis was conducted to predict diagnosis or treatment for depression using age, gender, ethnicity, GPA, year in school, general health, and BMI (Table 20). Overall, the model was significant, $x^2 (14) = 38.23$, $p < .001$, Nagelkerke $R^2 = .168$. Of all the predictor variables, age ($OR = 1.034$, 95% CI: 1.00-1.07, $p = .020$,) and general health ($OR = .463$, 95% CI: .32-.68, $p < .001$,) were significant, indicating that older participants and participants with lower general health scores are more likely to be treated or diagnosed for depression. None of the remaining predictors (e.g., ethnicity-Hispanic/Latino; ethnicity-Other; GPA-4.0; GPA-less than 3.0; 3rd and 4th year

undergraduate; BMI; moderate and vigorous exercise; and strength training) were

significant predictors of the participant's diagnosis/treatment for depression.

Table 20

Summary of Logistic Regression Predicting Diagnosed/Treated for Depression Using Age, Gender, Ethnicity, GPA, Year in School, General Health, BMI, Moderate Exercise, Vigorous Exercise, and Strength Training

	β	Odds Ratio	95% CI Lower	Upper	*p*
Age	.034	1.034	1.00	1.07	.032
Gender	-.474	.622	.31	1.24	.176
Ethnicity-Hispanic/Latino[a]	-.583	.558	.23	1.36	.199
Ethnicity-Other[a]	-.267	.765	.33	1.80	.540
GPA-4.0[b]	.085	1.088	.53	2.26	.820
GPA-Less than 3.0[b]	.302	1.353	.57	3.20	.492
Year in school-2nd year undergraduate[c]	-.457	.633	.29	1.40	.259
Year in school-3rd year undergraduate[c]	-.151	.860	.37	2.00	.727
Year in school-4th year undergraduate and higher[c]	-.455	.634	.23	1.73	.375
General health	-.769	.463	.32	.68	<.001
BMI	.005	1.005	.95	1.06	.861
Moderate exercise	.126	1.134	.94	1.37	.193

Table 20 (continued)

Summary of Logistic Regression Predicting Diagnosed/Treated for Depression Using Age, Gender, Ethnicity, GPA, Year in School, General Health, BMI, Moderate Exercise, Vigorous Exercise, and Strength Training

	β	Odds Ratio	95% CI Lower	Upper	*p*
Vigorous exercise	-.062	.940	.74	1.20	.617
Strength training	-.129	.879	.68	1.13	.314

Note: $x^2(14) = 38.23$, p $<.001$, Nagelkerke $R^2 = .168$
[a]Compared to Caucasian. [b]Compared to 3.0. [c]Compared to 1st year undergraduate

A logistic regression analysis was conducted to predict diagnosis or treatment for insomnia from age, gender, ethnicity, GPA, year in school, general health, and BMI (Table 21). Overall, the model was not significant, $x^2 (14) = 18.43$, $p = .188$, Nagelkerke $R^2 = .114$. Of all the predictor variables, only age ($OR = 1.054$, 95% CI: 1.02-1.10, $p = .007$,) was significant, indicating that older participants are more likely to be diagnosed/treated for insomnia. None of the remaining predictors (e.g., gender; ethnicity-Hispanic/Latino; ethnicity-Other; GPA-4.0; GPA-less than 3.0; 2nd, 3rd and 4th year undergraduate; general health; BMI; moderate and vigorous exercise; and strength training) were significant predictors of the participant's diagnosis/treatment for insomnia.

Table 21

Summary of Logistic Regression Predicting Diagnosed/Treated for Insomnia Using Age, Gender, Ethnicity, GPA, Year in School, General Health, BMI, Moderate Exercise, Vigorous Exercise, and Strength Training.

	β	Odds Ratio	95% CI Lower	Upper	*p*
Age	.053	1.054	1.02	1.10	.007
Gender	.012	1.012	.43	2.40	.978
Ethnicity-Hispanic/Latino[a]	.287	1.332	.44	4.07	.614
Ethnicity-Other[a]	.640	1.896	.71	5.10	.205
GPA-4.0[b]	.024	1.024	.41	2.54	.959
GPA-Less than 3.0[b]	-1.743	.175	.02	1.39	.099
Year in school-2nd year undergraduate[c]	-.422	.656	.23	1.86	.427
Year in school-3rd year undergraduate[c]	-.044	.957	.33	2.79	.935
Year in school-4th year undergraduate and higher[c]	-1.125	.325	.07	1.46	.143
General health	-.186	.830	.52	1.33	.441
BMI	-.006	.994	.92	1.07	.881
Moderate exercise	.059	1.061	.83	1.35	.637
Vigorous exercise	-.027	.973	.71	1.34	.867
Strength training	-.072	.930	.68	1.27	.650

Note: $x^2(14)18.43 =$, p = .188 = , Nagelkerke R^2 =.114
[a]Compared to White. [b]Compared to 3.0. [c]Compared to 1st year undergraduate

A logistic regression analysis was conducted to predict diagnosis or treatment for other sleep disorder from age, gender, ethnicity, GPA, year in school, general health, and, BMI, (see Table 22). Overall, the model was not significant, x^2 (14) = 15.66, p = .335, Nagelkerke R^2 = .175. Of all the predictor variables, only age (OR = 1.080, 95% CI: 1.02-1.15, p = .014,) was significant, indicating that older participants are more likely to be diagnosed/treated for other sleep disorder. None of the remaining predictors (e.g., gender; ethnicity-Hispanic/Latino; ethnicity-Other; GPA-4.0; GPA-less than 3.0; 2nd, 3rd and 4th year undergraduate; general health; BMI; moderate and vigorous exercise; and strength training) were significant predictors of the participant's diagnosis/treatment for other sleep disorder.

Table 22

Summary of Logistic Regression Predicting Diagnosed/Treated for Other Sleep Disorder Using Age, Gender, Ethnicity, GPA, Year in School, General Health, BMI, Moderate Exercise, Vigorous Exercise, and Strength Training.

	β	Odds Ratio	95% CI Lower	95% CI Upper	*p*
Age	.077	1.080	1.02	1.15	.014
Gender	.212	1.236	.33	4.68	.755
Ethnicity-Hispanic/Latino[a]	-.276	.758	.13	4.41	.758
Ethnicity-Other[a]	.200	1.221	.22	6.92	.822
GPA-4.0[b]	.177	1.193	.24	5.92	.829

Table 22 (continued)

Summary of Logistic Regression Predicting Diagnosed/Treated for Other Sleep Disorder Using Age, Gender, Ethnicity, GPA, Year in School, General Health, BMI, Moderate Exercise, Vigorous Exercise, and Strength Training.

	β	Odds Ratio	95% CI Lower	95% CI Upper	*p*
GPA-Less than 3.0[b]	1.191	3.289	.63	17.27	.159
Year in school-2nd year undergraduate[c]	-1.133	.322	.07	1.46	.142
Year in school-3rd year undergraduate[c]	-1.060	.346	.06	1.95	.230
Year in school-4th year undergraduate and higher[c]	19.053	.000	.00		.997
General health	-.213	.808	.38	1.73	.583
BMI	-.059	.943	.82	1.08	.393
Moderate exercise	.033	1.033	.70	1.54	.871
Vigorous exercise	-.162	.851	.48	1.51	.580
Strength training	-.069	.933	.56	1.56	.791

Note: $x^2(14) = 15.66$, p = .335, Nagelkerke $R^2 = .175$
[a]Compared to Caucasian. [b]Compared to 3.0. [c]Compared to 1st year undergraduate

Summary of Results

Overall, results revealed more participants self-reported diagnosis or treatment for anxiety and depression than participants with insomnia or other sleep disorders. A majority of the sample that self-reported anxiety, depression, and sleep difficulties were

female, Caucasian, and in the first two years of college. Age, gender, year in school, and general health were significant predictors of diagnosis or treatment for anxiety. Students more likely to be diagnosed or treated for anxiety were older, female, 1st year undergraduates, and had lower general health scores. A larger percentage of participants reported their academic performance was affected by anxiety than by depression or sleep difficulties. Students more likely to be diagnosed or treated for depression were older, had the lowest general health scores, and had the highest average BMIs reported. Age was both a significant predictor of participants being diagnosed and treated for insomnia and other sleep disorders indicating that older participants were more likely to be diagnosed or treated for a sleep disorder. Participants diagnosed or treated for anxiety were two times more likely to report interest in receiving information on depression or anxiety when compared to participants not diagnosed or treated for anxiety. Participants who received mental health services from their current university/college were six times more likely to be diagnosed and treated for anxiety and depression compared to participants who did not receive mental health services. A higher number of second year undergraduates who received mental health services were also diagnosed and treated for anxiety. A concerning issue with the students who self-reported anxiety, depression, or sleep difficulties is the high BMI average of 26, indicating a higher proportion of overweight / obese participants. The following chapter further discusses the implications of these findings.

CHAPTER V

DISCUSSION

This study was conducted to investigate the relationships between self-reported mental health disorders of anxiety, depression, and sleep disorders and the level of physical activity, mental health resources offered, and demographic variables of college students. Secondary data from the cross-sectional survey created by the American College Health Association was utilized. Statistical procedures included cross-tabulation with Pearson's chi-square analysis, independent sample t-test, one-way ANOVA, logistic regression, and MANOVA.

Summary

The final sample for this study consisted of 466 participants which included 305 females (65.5%) and 155 males (33.3%). The majority of participants self-reported as Caucasian with an average age of 26 years. The largest proportions of participants were second year undergraduates and had an approximate GPA of 3.0. General health of the participants ranged from a score of 1 (poor) to a score of 5 (excellent), with an average general health score of 3.42. Body mass index (BMI) ranged from 15.51 to 56.38 with an average BMI of 25.67. Participants reported more days of moderate exercise (at least 30 minutes), with an average of 2.58 days per week, followed by 1.68 days of vigorous exercise (at least 20 minutes), and 1.28 days of strength training (8-10 exercises for 8-12 repetitions). Results revealed more participants self-reported diagnosis or treatment for

anxiety and depression than participants with insomnia or other sleep disorders. A

majority of the sample that self-reported anxiety, depression, and sleep difficulties were

female, Caucasian, and in the first two years of college. Age, gender, year in school, and

general health were significant predictors of diagnosis or treatment for anxiety. A larger

percentage of participants reported their academic performance was affected by anxiety

than by depression or sleep difficulties. Students more likely to be diagnosed or treated

for depression were older, had the lowest general health scores, and had the highest

average BMIs reported. Participants diagnosed or treated for anxiety were two times

more likely to report interest in receiving information on depression or anxiety when

compared to participants not diagnosed or treated for anxiety. Participants who received

mental health services from their current university / college were six times more likely

to be diagnosed and treated for anxiety and depression compared to participants who did

not receive mental health services. A higher number of second year undergraduates who

received mental health services were also diagnosed and treated for anxiety.

Conclusions

Research Question 1: What are the descriptive characteristics of students with self-

reported anxiety, depression, and sleep difficulties?

More participants self-reported diagnosis/treatment for anxiety and depression

than those diagnosed/treated for insomnia and other sleep disorder. The majority of the

sample who self-reported anxiety, depression, and sleep disorders were Caucasian and

female. Participants with self-reported anxiety, depression, and sleep disorders ranged

from 18 to 64 years with an average age of 30 years. The largest percentages of

participants with anxiety, depression, and sleep disorders in the sample had an approximate GPA of 4.0 to 3.0, had general health score averages between 2.87 to 3.17. BMI for this group ranged from 15.51 to 56.38 with an average BMI of 26 which is within the overweight category according to Healthy Campus 2020. First year undergraduates had the highest prevalence of anxiety and depression, while 2nd year undergraduates had the highest prevalence of insomnia, and 1st year undergraduates had the highest prevalence of other sleep disorders.

Research Question #2: Is there a relationship between self-reported anxiety/depression, or sleep difficulties and receiving information/being interested in receiving information on anxiety/depression or sleep difficulties of the participants?

Results from a logistic regression analysis indicated a significant relationship ($p = .041$) between self-reported diagnosis/treatment for anxiety and interest in receiving information on depression or anxiety. Overall, the model predicting interest in receiving information on depression or anxiety from a diagnosis or treatment for anxiety was significant ($p < .001$) indicating individuals diagnosed/treated for anxiety are two times more likely to report interest in receiving information on depression or anxiety when compared to participants not diagnosed or treated for anxiety. There were no significant relationships between self-reported diagnosis/treatment for depression, insomnia, or other sleep disorders and whether or not participants received information on depression, anxiety, or sleep difficulties, and if they were interested in receiving information on sleep difficulties.

Research Question #3: Do the demographic variables of age, gender, BMI, year in school, race/ethnicity, GPA, and general health status have an effect on self-reported anxiety, depression, and sleep difficulties of the participants?

Results from a logistic regression analysis indicated a significant relationship in demographic variables. Age was a significant predictor of self-reported anxiety, depression, and sleep difficulties. Older participants were more likely to be diagnosed or treated for anxiety ($p = .006$), depression ($p = .015$), insomnia ($p = .005$), and sleep disorders ($p = .006$). Male participants were less likely to be diagnosed or treated for anxiety compared to female participants ($p = .011$). Participants who were 2nd year undergraduates were less likely to be diagnosed or treated for anxiety compared to participants in their first year of college ($p = .037$). Participants with lower general health scores were more likely to be diagnosed or treated for anxiety ($p = .017$). Participants with lower general health scores were more likely to be diagnosed or treated for depression ($p < .001$). Overall, the models for self-reported anxiety and self-reported depression were significant ($p < .001$). Models for insomnia and other sleep disorders were not significant.

Hypothesis 1: There will be no significant difference in physical activity (moderate, aerobic, vigorous aerobic, strength training) between those with and those without self-reported anxiety, depression, or sleep difficulties.

Hypothesis one failed to be rejected because results from several MANOVA's indicated no significant differences between physical activity (moderate aerobic, vigorous aerobic, and strength training) and individuals with or without self-reported anxiety,

depression, or sleep difficulties. Results revealed no significant differences for physical

activity (moderate, vigorous, and strength training) by anxiety, F (3, 450) = .93, p = .424,

n^2 = .006, depression, F (3, 450) = 1.16, p = .327, n^2 = .008, insomnia, F (3, 449) = .23, p

= .878, n^2 = .002, or other sleep disorders, F (3, 449) = .36, p = .781, n^2 = .002.

Hypothesis 2: There will be no significant difference in physical activity (moderate

aerobic, vigorous aerobic, strength training) between those who believe anxiety,

depression, or sleep difficulties affected their academic performance and those who do

not believe anxiety, depression, or sleep difficulties affected academic performance.

Hypothesis two failed to be rejected because results from several MANOVA's

indicated no significant differences between physical activity (moderate aerobic, vigorous

aerobic, and strength training) and those who believe and do not believe anxiety,

depression, or sleep difficulties affect their academic performance. Results revealed no

significant differences for physical activity (moderate, vigorous, and strength training) by

those believing any of the following affected academic performance: anxiety F (2, 223)

= 1.23, p = .300, n^2 = .016, depression F (3, 169) = .872, p = .457, n^2 = 015, or sleep

difficulties F (3, 262) = .134, p = .940, n^2 = .002.

Hypothesis 3: There will be no significant difference in prior use of the college's mental

health services between those with and those without self-reported anxiety, depression, or

sleep difficulties.

Hypothesis three was rejected because a logistic regression analysis revealed that

participants who received mental health services from their current university/college

were more likely to be diagnosed or treated for anxiety and depression compared to

participants who did not receive mental health services. Participants who received

mental health services from their current college were six times more likely to be

diagnosed or treated for anxiety and depression compared to participants who did not

receive mental health services. In addition, participants who were 2nd year

undergraduates were more likely to be diagnosed or treated for anxiety compared to 1st

year undergraduates.

Hypothesis 4: Age, gender, BMI, year in school, race/ethnicity, GPA, general health

status, physical activity (moderate aerobic, vigorous aerobic, and strength training) are

neither predictive nor protective of self-reported anxiety, depression, or sleep difficulties.

Hypothesis four was rejected. Overall, the models for anxiety ($p = .002$) and

depression ($p < .001$) were significant. A logistic regression analysis revealed older

participants were more likely to be diagnosed or treated for anxiety. In addition, male

participants were less likely to be diagnosed or treated for anxiety compared to female

participants. Finally, 2nd year undergraduates were less likely to be diagnosed or treated

for anxiety compared to first year undergraduates. A logistic regression revealed older

participants and participants with lower general health scores were more likely to be

treated or diagnosed for depression. A logistic regression analysis did not reveal a

statistically significant effect for sleep disorders and exercise and other descriptive

variables. The overall model for insomnia and other sleep disorders was not significant

($p = .188$, $p = .335$), although older participants were more likely to be diagnosed/treated

for insomnia and other sleep disorders.

Discussion and Implications

The descriptive findings of this study are consistent with those of the larger ACHA-NCHA II spring 2013 national reference group executive summary (ACHA-NCHA II, 2013), although it is worth noting the prevalence of anxiety, depression, insomnia, and sleep difficulties were higher in this study: anxiety (18% versus 13%), depression (17.8% versus 11%), insomnia (7.9% versus 4%), and sleep difficulties (3.2% versus 2%).

Sleep difficulties are a common problem for college students as they acclimate to an independent environment with heavy educational demands. One study revealed 11% of college students sleep well, while 40% only felt well rested two days per week (Stickgold, 2008). Participants with sleep difficulties may face health implications that include obesity, diabetes, cardiovascular disease, and decreased immune function (Rogers, 2008). According to Stickgold (2008), sleep difficulties can negatively affect the learning process where individuals have a difficult time concentrating, focusing on information, as well as remembering past information.

Mental health issues at the college level are an emerging crisis. According to the American Psychological Association (2011), mental health issues have a broad reach beyond the personal to others in the environment, including roommates, classmates, faculty, and staff. According to Lee, Olson, Locke, Michelson, and Odes (2009), the stress of relocation, separation from family and friends, meeting new people, and academic challenges can result in not only personal adjustment but social and academic adjustment. Students question their own identity, relationships, direction in life, and self-

worth which often causes inner turmoil (Lee et al. 2009). According to Nipcon et al. (2007), loneliness and lack of social support negatively impact retention of college freshman. A study completed by the National Alliance on Mental Illness [NAMI] (2012) surveyed 765 college students diagnosed with a mental illness who are or were currently enrolled in the past 5 years. Results indicated 64% of those students were no longer attending because of mental health issues. In the same study, 45% of students did not receive accommodations from their college and 50% did not access the mental health services on campus (NAMI, 2012). According to Vidourek, King, Nabors, and Merianos (2014), without help and treatment, students are at risk for lower grade point average, school dropout, and unemployment.

In the current study, a majority of those who self-reported diagnosis or treatment for anxiety, depression, and sleep disorders were female and Caucasian. The ACHA-NCHA survey sample was majority female (64%) and Caucasian (65%). Nationally, at the community college level, 57% of students are female while Caucasian, non-Hispanic students accounted for 50% of the enrollment for the fall of 2013 (American Association of Community College [AACC], 2015). According to the National Center for Education Statistics (2013), female students comprise 56% of undergraduate enrollment. Eaton et al. (2012) reported substantial differences in prevalence rates of mental health issues between males and females. Females had higher rates of mood and anxiety disorders while males had higher rates of antisocial personality and substance disorders such as drug and alcohol abuse. Specifically, females were more likely to suffer from major depression, generalized anxiety disorder, panic disorder, and social phobia when

compared with their male counterparts (Eaton et al., 2012). The cause of gender differences are not well understood, yet theories propose different source effects, including response bias; biological, social, and demographic influences; and differing service utilization rates for help seeking behaviors (Eaton et al., 2012). Yorgason, Linville and Zitzman (2008) found female students were twice as likely as male students to utilize mental health services on campus.

The average age of participants in the current study was older (26 years) than the national survey results for undergraduate students (23 years). Results from this study revealed older participants were more likely to be diagnosed or treated for anxiety, depression, and sleep difficulties. Females, first year college students, and participants with lower general health scores were more likely to be diagnosed or treated for anxiety and depression. According to the National Alliance on Mental Illness, a survey of 765 college students diagnosed with a mental health condition revealed 60% of participants were between the ages of 18-27 while 37% were between the ages of 18-22 (Grasgreen, 2012). In the same survey, 82% of students were female, 71% attended a 4 year university, and 19% attended a community college (Grasgreen, 2012). Community colleges provide access to education for many nontraditional students, such as adults who work while attending school (AACC, 2016). The inclusive mission of community colleges makes them appealing to a broad range of people who seek particular programs or opportunities of special interest (AACC, 2016).

Average BMI was higher for participants in the current study (26), compared to the average BMI of the national survey results (24) (ACHA-NCHA II, 2013). According

to Healthy Campus 2020 (2015a), healthy weight is defined as a BMI of 18.5-24.9. An individual with a BMI of 25-29.9 is considered overweight (ACHA-NCHA II, 2013). Approximately 30-35% of college students are considered overweight or obese based on BMI standards (Ferrara, 2009). In the current study 1st and 4th year undergraduate participants had a BMI slightly higher than 2nd and 3rd year undergraduates. Race/Ethnicity also had a significant effect on BMI scores indicating Hispanic/Latino participants had significantly higher BMI scores (27) compared to Caucasian participants (25). In the current study, individuals who self-reported depression had a higher BMI (27.8) than those with anxiety (26), insomnia (26.2), or other sleep disorders (25.7). According to Ferrara (2009), a decrease in physical activity, and nutrition related factors such as increased consumption of junk food and snacking contribute to weight gain and increased BMI in college. According to the Centers for Disease Control and Prevention (2015b), individuals who are overweight or obese have an increased risk of acute and chronic conditions, including diabetes, heart disease, stroke, certain cancers, sleep apnea, depression, anxiety, and other mental disorders. Multiple studies have shown that individuals who are overweight also have a higher prevalence of poor health behaviors such as smoking, lack of physical activity, depression, and alcohol consumption (Coups, Gaba, & Orleans, 2004; Pronk, et al., 2004; Spring, et al., 2012). In the current study overweight participants only incorporated an average of 2.5 days per week of moderate exercise, approximately 1.5 days a week of vigorous exercise, and approximately 1 day a week of strength training. The current study also indicates those individuals treated or diagnosed for depression were more likely to have lower general health scores.

According to Katon et al. (2010), adults and seniors who obtained a college degree decreased the likelihood of exhibiting multiple unhealthy lifestyle behaviors.

In the current study, participants who received mental health services from their current university or college were more likely to be diagnosed or treated for anxiety. Early diagnosis of mental disorders such as anxiety can prevent onset of depression and other secondary conditions such as substance abuse (Anxiety Disorder Association of America [ADAA], 2007). Many college students do not recognize that anxiety disorders are treatable and they are also not aware of their on-campus college resources that offer treatment (ADAA, 2007). Barriers that prevent students from seeking help include embarrassment, not knowing or understanding the symptoms they are experiencing are treatable, financial concerns, and using drugs or alcohol (ADAA, 2007). Additional risk factors for not seeking or receiving mental health services include isolation, poor academic performance, withdrawal from classes or school, and attempted suicide in extreme cases (ADAA, 2007).

The current study indicated a significant relationship between interest in receiving information on depression or anxiety from those individuals who were diagnosed or treated for anxiety. Information regarding mental health can be distributed via health professionals, printed material, and digital media (Rieh & Hilligoss, 2008). There are multiple ways to obtain health information but health professionals remain a valuable and reliable source of information for college students (Fox & Duggan, 2013). Doctors, nurses, counselors, or clinicians are the central resources for information or support during a health episode or diagnosis and 70% of U.S. adults obtained information, care,

or support from a doctor or other health care professional (Fox & Duggan, 2013). At

most colleges, health services are offered through several channels, including clinical

services, counseling services, and health and wellness educational programs. Services for

participants in the current study include an on-campus health center which provides a

primary care clinic for short term illness and minor medical problems; health screenings

which include blood pressure, cholesterol screenings, BMI, and tuberculosis testing;

personal and mental health counseling which include individual, couples, small group

counseling as well as stress, anxiety, depression and substance counseling; and health

education resources which include wellness literature, low cost insurance plans, and diet

and nutrition information. Staff consists of two physician assistants and three mental

health counselors who offer approximately 33 hours of mental health services per week

to approximately 10,000 students. Participants in the current study are also assessed a

mandatory health fee in accordance with the California Education Code and district

policies.

Although a large percentage of individuals are seeking information through health

professionals, they are also seeking information online. According to Fox and Duggan

(2013), a nationwide survey of approximately 3000 adults revealed that 72% sought

health information online within the past year and 77% started with search engines such

as Google, Bing, or Yahoo. Thirteen percent of individuals started their search on health

information sites such as WebMD, while 2% used Wikipedia, and 1% started their search

on social network sites such as Facebook (Fox & Duggan, 2013).

Specific to college students, Basic and Erdelez (2014) reported that approximately 74% of college students actively and 64% of college students passively used the internet to acquire health related information more than once a month. Mental health was one of the most common searches for health information, as well as exercise/fitness, diet/nutrition, alcohol consumption, and flu/cold information (Basic & Erdelez, 2014). According to Horgan and Sweeney (2010), a study of 922 university students revealed 31% searched for mental health information online, 68% indicated they would use the internet for mental health support, while 79% preferred face to face mental health support. The most important factors identified by college students regarding health information internet searches included confidentiality, anonymity, engagement (ability to ask questions), and credibility of the site (Horgan & Sweeney, 2010).

An important component health professionals must account for when providing health related information, is the level of health literacy for the target group. According to the CDC (2015c), health literacy is defined as "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions". A study by Ickes and Cottrell (2010) assessed health literacy levels of college students using the Test of Functional Health Literacy (TOFHLA). The TOFHLA assesses numeracy understanding such as prescription labels, appointment slips, and glucose monitoring as well as comprehension levels such as health care materials (Ickes & Cottrell, 2010). Results from a sample of 399 students indicated health literacy scores to be adequate with 89% of students believing health literacy to be an important indicator of health status (Ickes & Cottrell,

2010). Although college students may have adequate health literacy scores, the National Assessment of Adult Literacy (NAAL) found 36% of adults have basic or below basic health literacy levels (Vernon, Trujillo, Rosenbaum, & DeBuono, 2007). Implications of poor health literacy include poor health status, more hospitalization, higher mortality rates, higher health care costs, and more medication and health care treatment errors (Vernon et al. 2007). Limited literacy levels may influence mental health through the inability to recognize anxiety or depressive symptoms, receiving and understanding information, as well as beliefs about mental health which may contribute to low levels of help seeking behavior (Coles & Coleman, 2010; Lincoln et al., 2011). Low literacy levels limit access to resources which can allow those with mental health challenges to avoid risk or minimize consequences of mental health problems (Lincoln et al., 2011). Mental health counselors need to increase their attention to literacy levels and provide thorough literacy assessments in order to offer appropriate educational material, programs, and successful rehabilitation approaches (Lincoln et al, 2011).

Limitations

As the ACHA-NCHA is a self-reported online survey, recall bias and prevarication bias may have occurred on certain survey items. On items pertaining to mental health, some participants may have underestimated or refused to accurately address a mental health issue due to stigma associated with mental illness. A stigma related to mental illness includes stereotypes and prejudice that result from misconceptions about mental illness (Corrigan & Watson, 2002). Only one community college was utilized for this study, limiting the generalizability of results to the larger

college student population. Regardless, the results lined up with those from the ACHA-NCHA national analyses. Another limitation of the study is that BMI was calculated using height and weight and women tend to underestimate their weight by approximately five pounds and both men and women tend to overestimate their height (Moody, 2013; Wen & Kowaleski-Jones, 2012).

Recommendations

Healthy Campus 2020 objectives are a set of comprehensive resources and tools to guide college health professionals and students to improve health outcomes (Healthy Campus 2020, 2015a). These objectives should be considered by campus health educators and college health center professionals to provide healthier outcomes for a campus community. At present, there are no Healthy Campus 2020 objectives related to increasing the proportion of students who receive information on anxiety or depression from their institutions or increasing health literacy on campuses. Healthy People 2020 do have objectives related to health information and literacy which are relevant and presented below (Healthy People 2020, 2014b).

Healthy People 2020 Objectives

- HC/HIT-1: Improve the health literacy of the population.
- HC/HIT-1.1: Increase the proportion of persons 18 and older who report their health care provider always gave them easy-to-understand instructions about what to do to take care of their illness or health condition by ten percent from 64.1% to 70.5%.

Healthy Campus 2020 Objectives

- NWS-8: Increase the proportion of students who are at a healthy weight with a ten percent improvement from 61.6% to 67.8%. At 51%, the proportion of students at a healthy weight in this study was well below these standards.

- NWS-9: Reduce the proportion of students who are obese by ten percent from 11.6% to 10.4%. The proportion of obese students in the current study was nearly twice that of the standard set for this objective (obese students = 19.1%; overweight students = 24.9%).

- PA-2.1: Increase the proportion of students who report meeting current federal guidelines for aerobic physical activity by ten percent improvement from 48.7% to 53.5%. The proportions of students in this study who met moderate activity guidelines (18%) and vigorous activity guidelines (28%) were below the standard.

- PA-2.2: Increase the proportion of students who report meeting current federal guidelines for muscle strengthening activity by ten percent improvement from 37.6% to 41.4%. The proportion of students in this study who met this standard was lower than the standard (35%).

- MHMD-6a: Increase the proportion of students reporting a diagnosis of depression and receiving treatment with a ten percent improvement from 83.5% to 91.9%. In this study, the proportion of students diagnosed/treated for depression who received mental health services from current university (51.5%) and the proportion of students diagnosed/treated for depression who received mental

health services from a counselor/psychologist (31.5%) was at the lower threshold of this standard.

- MHMD-6b: Increase the proportion of students reporting a diagnosis of anxiety and receiving treatment with a ten percent improvement from 78.9% to 86.8%. In this study, the proportion of students diagnosed/treated for anxiety who received mental health services from current university (51.5%) and the proportion of students diagnosed/treated for anxiety who received mental health services from a counselor/psychologist (32.4%) was above the lower threshold of this standard.

Because community colleges are more likely to have a population comprised of traditional and non-traditional students, health and wellness services must incorporate a comprehensive approach to meet the needs of all students. The following recommendations are suggested based on the findings of this study as well as relevant research, Healthy Campus 2020, and Healthy People 2020 objectives. The Ecological Model is a solid foundation to be utilized by campus health educators, health centers, and administrators in the promotion of physical and mental health initiatives on campus. Significant and dynamic interrelationships exist among social determinants of health and a student's health status; thus, interventions are most likely to be effective when addressed at the individual, interpersonal, and institutional level (Healthy Campus 2020, 2015b). Health challenges are not a product of just one factor but multiple risk factors (Byrd & McKinney, 2012). At the intrapersonal level, health is observed through self-esteem, coping skills, self-opinion, and competence of academic skills. The interpersonal

level focuses on the functioning of college students in the social environment, including social activities. The institutional level refers to the educational setting of academic requirements and curriculum, teaching practices, and the institutional climate (Byrd & McKinney, 2012).

Intrapersonal Level

Factors at the intrapersonal level include knowledge, attitudes, behaviors, skills, and developmental history of an individual which include gender, racial and religious identity, sexual orientation, economic status, financial resources, values, goals, expectations, age, genetics, resiliency, time management skills, health literacy and accessing health care skills, and stigma of accessing counseling services (Healthy Campus 2020, 2015b). Health educators must account for student's knowledge, attitudes, development and behavior, as well as skills, in order to promote positive mental health outcomes. At the intrapersonal level the goal is understand the motivation of an individual and foster behavioral change that reduces the risk of health challenges, like mental health crises (Green & Kreuter, 2005).

To understand the motivation of students and guide changes in individual health behaviors, questionnaires, assessments, and screenings should be incorporated and are recommended within multiple health education courses on campus, through on-campus health fairs for students, and through individual health counseling. Health educators also need to be aware of the individual process of behavior change. The Transtheoretical Model (TTM; Gilbert, Sawyer, & McNeill, 2011) serves as a useful foundation for the intrapersonal level and should be utilized by health educators and wellness coordinators

to assess motivation and develop processes to promote positive behavior change. The

major concept of the TTM is the Stages of Change, which includes five stages an

individual progress through before achieving a behavior change. These stages include

precontemplation (unaware of mental health issue or aware with no intention of making a

change), contemplation (acknowledges a need for change), preparation (intends to seek

help within the next six months), action (actively involved in behaviors to prevent or treat

mental health condition), and maintenance (maintains prevention or treatment behaviors

for six or more months) (Lynch, Elmore, & Kotecki, 2014). A recommended tool for

community college health educators is to incorporate "choosing to change" worksheets

which are questionnaires allowing each student to identify psychological health

challenges, how they can improve, and plans to identify and prevent triggers associated

with mental health issues. The worksheets should also be utilized by the health educator

as a screening tool for each individual student. Another useful theory developed for

predicting behavior change is the health belief model which looks at perceived

susceptibility, severity, benefit, barriers, cues to action, and self-efficacy. Students may

seek mental health care such as counseling from their college or information from health

educators on campus if they believe (perceived susceptibility) anxiety puts them at risk

for negative health outcomes such a poor sleep or illness. Students may also seek mental

health services if they recognize their anxiety is severe (perceived severity) enough to

warrant treatment. If students believe they will feel better, have less anxiety, get better

grades, and sleep better (perceived benefits), they may be more inclined to seek mental

health counseling. Perceived barriers may include time challenges, lack of open

appointments at the mental health center, or stigma associated with mental health treatment. Cues to action for students to seek treatment for anxiety may come from health center information, campus health fairs, health education courses, or mental health peer organizations on campus. Once students seek treatment for anxiety, their perceived confidence in adhering to treatment recommendations (self-efficacy) is essential for improving their mental health status (Gibson & King, 2012; Lynch et al., 2014).

Interpersonal Level

Factors at the interpersonal level incorporate formal and informal social networks and social support systems which include but are not limited to family, friends, roommates, supervisors/work peers, athletics, recreation, intramural sports, and campus clubs. Most colleges use an individual based model which does not focus on social networking or social support systems. As noted by Conley, Travers, and Bryant (2013), students who participated in wellness seminars and training over the semester reported greater psychosocial adjustment to college. Embracing on-campus programs such as peer counseling and intramural recreational activities improve social networking for students on campus. Providing a connection for students through awareness and a positive culture on campus are imperative to promote student success, social connections, reduce mental illness, and provide a safer campus community.

Organizations and trainings that have been proactive and shown to be a positive practice at the interpersonal level include *Active Minds* and *Kognito At Risk Training*. Active Minds is a student run organization with emphasis on providing information and resources to students regarding mental health and mental illness. Currently there are

numerous campus chapters in the California Community College system and utilizes peer to peer connections on and off campus. The organization provides peer education, information and resources, advocacy, empowers students to speak openly about mental health, and encourages help seeking behaviors (Active Minds, 2015). The goal of Active Minds is to remove the stigma that surrounds mental health challenges as well as create a comfortable environment for students on campus. Programs provided through Active Minds include National Day without Stigma, Stress Less Week, mental health unity pledge, and Post SecretU which is a student run art project to encourage peer to peer communication regarding mental health. Kognito At Risk Training is a mental health training program to provide social connections on campus, peer to peer outreach, and faculty and staff training. Kognito is an online interactive program for college students, peer leaders, and faculty/staff and is listed on the National Registry of Evidence-Based Programs and Practices (NREPP) (Kognito, 2016). The purpose of the training is to assist peers, faculty, and staff in providing social support to students who are exhibiting signs of distress from a mental health crisis such as depression, anxiety, substance abuse, and suicidal intentions.

Recreational opportunities on campus can not only improve social connectedness but also address the increased prevalence of obesity on campuses. The physical and mental benefits of physical activity are well documented, with significant improvements in the risks associated with heart disease, obesity, diabetes, certain cancers, sleep disorders, anxiety and depression. According to Bray and Kwan (2006), students who were physically active their first year of college reported better psychological health than

students' who were inactive. Taliaferro et al. (2009) reported a reduced risk of hopelessness and depression for male and female students who participated in physical activity, suggesting physical activity may be used as a modality in the treatment of depression and other mood disorders. Providing recreational program opportunities for cardiovascular and strength training such as open gym time can have a positive impact on mental health. Community colleges should incorporate recreational and intramural sport program opportunities on campus for positive student health outcomes. Programs can include basketball, volleyball, weight training, walking/jogging trails on campus, and swimming.

Institutional Level

One of the key issues for many community colleges is the lack of institutional support for well-staffed health centers on campus. Students may be informed of the campus offerings through the health center, but the lack of support staff, on-site counselors/psychologist, and programs can limit the opportunity for students to obtain help in a timely manner. According to the American Counseling Association (2013), a maximum recommended ratio of students to school counselors is 250 to 1 and student to school psychologists is 1,000 to 1. Some community college campuses in California offer no full-time mental health counselors while 2-3 part-time licensed family therapists are responsible for a population of 10,000 or more students. Colleges are attempting to bridge the gap and offer educational programs for faculty and staff to improve the recognition of mental health needs of students on campus. Currently some community colleges in California offer a Mental Health First Aid class to faculty and staff on

campus. The training course provides lay people, such as faculty and staff, methods in assisting someone who may be in the early stages of developing a mental health problem or is in a mental health crisis (Mental Health First Aid USA, 2014).

MAP-IT Framework is an on-campus initiative that can help campuses organize institutional policy interventions based on specific health objectives. The MAP-IT framework was adapted from Healthy People 2020 and is also used to achieve Healthy Campus 2020 objectives (American College Health Association, 2015). The MAP-IT framework is based on campus initiatives that take a course of action to mobilize, assess, plan, implement and track health outcomes on campus (American College Health Association, 2015).

The MAP-IT framework recommends a mental health coalition via mobilization of campus and community partnerships as the first course of action for the college campus. Partnerships can be established through mobilization of campus administration, academic programs, counseling services, first year services, recreational sports, student peer education, wellness and prevention services, as well as public health centers and health departments, mental health organizations within the community, and city parks and recreation departments (American College Health Association, 2015).

The second recommendation is to assess the needs and assets of the college by using the ACHA-NCHA II survey to identify unique needs of the campus. The results of this study identified the following immediate needs: reduce the proportion of obese and overweight students; increase the proportion of students who meet moderate, vigorous, and muscle strength training activity standards; increase the proportion of students

diagnosed/treated for depression who receive mental health services from their current university or counselor/psychologist; and increase the proportion of students diagnosed/treated for anxiety who receive mental health services from their current university or counselor/psychologist.

The third recommendation of the MAP-IT framework is to plan and incorporate health objectives that are specific to the assessment needs. From the results of this study, health objective recommendations are incorporated from Healthy Campus 2020 and Healthy People 2020. Objectives specific to mental health assessment from Healthy Campus 2020 include increasing the proportion of students reporting diagnosis of depression or anxiety and receiving treatment for depression and anxiety. Objectives specific to better overall health outcomes include increasing the proportion of healthy weight students, increasing physical activity on campus, and reducing the proportion of overweight and obese students. Specific objectives related to Healthy People 2020 include improvement of health literacy within the community college population as well as increase the proportion of individuals 18 years and older who report their health care provider gave them easy to understand instructions.

The MAP-IT framework also recommends implementation of campus programs. To increase the proportion of students diagnosed/treated for depression or anxiety who receive treatment on community college campuses or through off-campus counselors/psychologists, community colleges should establish a mental health framework that is evidence-based and policy-driven. The JED Foundation campus program is an extensive strategic plan and policies for mental health promotion and

implementation on college campuses. In 2000, the JED Foundation was founded by

Donna and Phil Satow after they lost their son Jed to suicide (The JED Foundation,

2016a). The Satow's recognized a necessity for programming and resources on college

campuses to assist professionals, students, and parents in identifying and addressing

mental health issues and, hopefully, prevent suicide (The JED Foundation, 2016a). Over

100 colleges and universities in the U.S. developed mental health programs based on the

JED Foundation framework. The JED Foundation is at the forefront of organizations that

focus on mental health and suicide prevention at the college level.

The JED Foundation framework specific to mental health promotion includes

institutional policy; system and strategic planning; fostering a positive environment for

development of life skills, connectedness, academic performance, student wellness;

identifying students at risk; increasing help-seeking behaviors of students; providing

mental health and substance use disorder services; and environmental safety to improve

mental health outcomes for all students. Campus Mental Health Action Plan

(CampusMHAP) is one program specific to mental health planning which guides college

professionals in developing a comprehensive plan to promote mental health on campus.

The plan includes a series of steps, similar to the MAP-IT framework, including

identifying the problem, setting long-range goals, conducting research to identify

strategies and interventions, developing interventions, and conducting both an internal

and external evaluation plan (The JED Foundation, 2011).

Successful implemented programs provided through the JED Foundation and help

guide the framework discussed above include the college and university suicide

prevention accreditation program which offers continuing education specific to college

psychologist, social workers, and counselors (The JED Foundation, 2016b). Other

programs provided by the JED foundation include "Help a Friend in Need" which is a

community guide for Facebook and Instagram users to help identify if a friend is in

emotional distress as well as "Half of Us" which provides online, on-air and live on-

campus events to raise awareness about the prevalence of mental health issues on campus

(The JED Foundation, 2016b). A tool for campus health center staff, created by the JED

Foundation is a five minute video entitled emotional health 101 which provides

information related to emotional health and help-seeking behaviors, and can be shown

during student orientations (The JED Foundation, 2016b). The JED Foundation has

dedicated years to research, program implementation, and improvement of student mental

health on campus and offers a solid foundation from which community colleges can

promote a positive environment for students.

     To decrease the proportion of obese and overweight students on campus and

increase physical activity, community colleges should offer open recreation and creative

intramural programs for students throughout the academic year. Activity initiatives

might include open gym time for a fitness room, weight room, and gymnasium access.

Intramural sports like basketball, sand volleyball, rugby, or soccer can provide an active

and social environment for students interested in team competition. Activity programs on

campus improve the physical health of students, improve social connections, promote

optimism, and reduce mental health symptoms. Community colleges should also

implement a policy which requires students to take at least one physical activity class on

campus during their first year in college. The multiple offerings through Kinesiology and

Physical Education departments can provide students with a unique on-campus class

experience while benefitting the students' physical, social, and mental health.

The final aspect of the MAP-IT framework is to longitudinally track the progress

of programs and policies. At the community college level, data should be assessed yearly

through the ACHA-NCHA II to evaluate the college demographics, student mental

health, physical activity level, sleep disorders, as well as utilization and help seeking

behaviors for anxiety and depression. The ACHA-NCHA II survey can assist college

services in tracking objectives and making necessary adjustments to policy and campus

programs.

Future Research

Further studies need to specifically assess and evaluate community college

campuses across the nation. The majority of literature for this study focused on four-year

universities that offer extensive university health center services and robust recreational

facilities and programs for a student population primarily comprised of resident students.

At the community college level, most students are non-resident commuters who live off

campus or at home. Future research should also evaluate mental health service utilization

at the community college level, as well as student to counselor ratio. In this study,

students who utilized the mental health counseling services at their college were six times

more likely to be diagnosed and treated for anxiety and depression. Future research

should evaluate the benefits and barriers to access for mental health resources on

community college campuses. To improve utilization of mental health services on

campus and lower the stigma associated with mental health, innovative awareness campaigns should be a priority goal for college health services. The student population in this study was above the highest national estimate for prevalence of obesity and below the lowest national estimate for time spent on moderate, vigorous, and muscle strengthening activities. The association between physical activity and improved mental health outcomes should serve as a motivating factor for community colleges to provide broad and innovative recreational and intramural opportunities for students. The benefits extend well beyond the campus borders when community colleges invest in providing an environment that reflects compassion and support for the physical and mental challenges of their students.

REFERENCES

Active Minds. (2015). *About us*. Retrieved from http://www.activeminds.org/about

American Association of Community Colleges. (2014). *2014 fact sheet*. Retrieved from

> http://www.aacc.nche.edu/AboutCC/Documents/FactSheet_2014_bw_r2.pdf

American Association of Community Colleges. (2015). *2015 community college fast*

> *facts*. Retrieved from

> http://www.aacc.nche.edu/AboutCC/Pages/fastfactsfactsheet.aspx

American Association of Community Colleges. (2016). *Students at community*

> *colleges.* Retrieved from

> http://www.aacc.nche.edu/AboutCC/Trends/Pages/studentsatcommunitycolleges.a

> spx

American College Health Association. (2015). *Healthy campus 2020: MAP-IT*

> *framework*. Retrieved from

> https://www.acha.org/HealthyCampus/Implement/MAP-

> IT_Framework/HealthyCampus/Map-It_Framework.aspx?hkey=bc5a1b28-ae96-

> 4f06-b3ee-ed492441e7db

American College Health Association-National College Health Assessment. (2014a).

> *Generalizability, reliability, and validity analysis.* Retrieved from

> http://www.acha-ncha.org/grvanalysis.html

American College Health Association-National College Health Assessment. (2014b). *ACHA-NCHA: Frequently asked questions.* Retrieved from http://www.acha-ncha.org/docs/ACHA-NCHA-WEB_FAQ.pdf

American College Health Association-National College Health Assessment II. (2013). *Spring 2013 reference group executive summary.* Retrieved from http://www.acha-ncha.org/docs/ACHA-NCHA II_ReferenceGroup_ ExecutiveSummary_Spring2013.pdf

American Counseling Association. (2013). *Student support act: Reducing the student to counselor ratio*. Retrieved from http://www.counseling.org/government-affairs/current-issues/position-papers/2013/02/11/student-support-act-reducing-the-student-to-counselor-ratio

American Psychological Association. (2004). *Exercise helps keep your psyche fit*. Retrieved from http://www.apa.org/research/action/fit.aspx

American Psychological Association. (2011). *The state of mental health on college campuses: A growing crisis*. Retrieved from http://www.apa.org/print-this.aspx

American Psychological Association. (2015). *Psychology topics: Anxiety.* Retrieved from http://www.apa.org/topics/anxiety/index.aspx Anxiety Def:

Anxiety Disorder Association of America. (2007). *An audit of mental health care at U.S. college and universities: Focus on anxiety disorders*. Retrieved from http://www.adaa.org/sites/default/files/FINALCollegeReport.pdf

Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., Sandhu, R.,. . . Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric Disease and Treatment, 9*, 449-461. doi:10.2147/NDT.S39776

Basic, J., & Erdelez, S. (2014). Active and passive acquisition of health-related information on the web by college students. *Proceeding of the American Society for Information Science and Technology, 51*(1)*,* 1-5. doi: 10.1002/meet.2014.14505101149

Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M.,... Sammut, S. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *Journal of Affective Disorders, 173*, 90-96. doi:10.1016/j.jad.2014.10.054.

Bennett, C. M., & Baird, A. A. (2006). Anatomical changes in the emerging adults brain: A voxel-based morphometry study. *Human Brain Mapping, 27*, 766-777. doi: 10.1002/hbm.20218

Blanco, C., Okuda, M., Wright, C., Hasin, D. S., Grant, B. F., Liu, S.,...Olfson, M. (2008). Mental health of college students and their non-college-attending peers: Results from the national epidemiologic study on alcohol and related conditions. *Journal of American Medical Association, 65*(12), 1429-1437. doi: 10.1001/archpsyc.65.12.1429

Bray, S. R., Beauchamp, M. R., Latimer, A. E., Hoar, S. D., Shields, C. A., & Bruner, M. W. (2011). Effects of a print-mediated intervention on physical activity during

transition of the first year of university. *Behavioral Medicine, 37*, 60-69. doi: 10.1080/08964289.2011.571306

Bray, S. R., & Kwan, M. Y. (2006). Physical activity is association with better health and psychological well-being during transition to university life. *Journal of American College Health*, *55*(2), 77-82. doi:10.3200/JACH.55.2.77-82

Byrd, D. R., & McKinney, K. J. (2012). Individual, interpersonal, and institutional level factors associated with the mental health of college students. *Journal of American College Health*, *60*(3), 185-193. doi:10.1080/07448481.2011.584334

Byrd, K., Gelaye, B., Tadessea, M. G., Williams, M. A., Seblewengel, L., & Berhanec, Y. (2014). Sleep disturbances and common mental disorders in college students. *Health Behavior and Policy Review, 1*(3), 229-237. doi:10.14485/HBPR.1.3.7

Buboltz, W. C., Brown, F. & Soper, B. (2001). Sleep habits and patterns of college students: A preliminary study. *Journal of American College Health, 50*(3), 131-135. doi:10.1080/07448480109596017

Caldwell, K., Harrison, M., Adams, M., Quin, R. H., & Greeson, J. (2010). Developing mindfulness in college students through movement-based courses: Effects on self-regulatory self-efficacy, mood, stress, and sleep quality. *Journal of American College Health, 58*(5), 433-442. doi:10.1080/07448480903540481

Centers for Disease Control and Prevention. (2015a). Inefficient sleep is a public health problem. Retrieved from http://www.cdc.gov/features/dssleep/

Centers for Disease Control and Prevention. (2015b). *The health effects of overweight and obesity*. Retrieved from http://www.cdc.gov/healthyweight/effects/

Centers for Disease Control and Prevention. (2015c). *Learn about health literacy*.

    Retrieved from http://www.cdc.gov/healthliteracy/learn/understanding.html

Cleary, M., Walter, G., & Jackson, D. (2011). Not always smooth sailing: Mental health

    issues associated with the transition from high school to college. *Issues in Mental*

    Health Nursing, 32, 250-254. doi:10.3109/01612840.2010.548906

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.).

    Hillsdale, NJ: Lawrence Erlbaum Associates.

Coles, M. E., & Colman, S. L. (2010). Barriers to treatment seeking for anxiety disorders:

    Initial data on the role of mental health literacy. *Depression and Anxiety, 27*(1),

    63-71. doi:10.1002/da.20620

Conley, C. S., Travers, L. V., & Bryant, F. B. (2013). Promoting psychosocial

    adjustment and stress management in first-year college students: The benefits of

    engagement in a psychosocial wellness seminar. *Journal of American College*

    Health, 61(2), 75-86. doi:10.1080/07448481.2012.754757

Corrigan, P. W., & Watson, A. C. (2002). Understanding the impact of stigma on people

    with mental illness. *World Psychiatry, 1*(1), 16-20

Coups, E. J., Gaba, A., & Orleans, T. (2004). Physician screening for multiple

    behavioural health risk factors. *American Journal of Preventative Medicine, 27*

    (2S), 34-41. doi:10.1016/j.amepre.2004.04.021

Dinger, M. K., Brittain, D. R., & Hutchinson, S. R. (2014). Association between physical

     activity and health-related factors in the national sample of college students.

     Journal of American College Health, 62(1), 67-74.

     doi:10.1016/j.amepre.2004.04.021

Douce, L. A., & Keeling, R. P. (2014). *A strategic primer on college student mental*

     health. Retrieved from http://www.apa.org/pubs/newsletters/access/2014/10-

     14/college-mental-health.pdf

Eaton, N. R., Krueger, R. F., Skodol, A. E., Grant, B. F., Keyes, K. M., Balsis, S.,

     Markon, K. E.,. . .Hasin, D. S. (2012). An invariant dimensional liability model of

     gender differences in mental disorder prevalence: Evidence from a national

     sample. *Journal of Abnormal Psychology, 121*(1), 282-288. doi:

     10.1037/a0024780

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis

     program. *Behavior Research Methods, Instruments, & Computers, 28*(1), 1-11.

Faul, F., Erdfelder, E., Land, A.G., & Buchner, A. (2007). GPOWER 3: A flexible

     statistical power analysis program for the social, behavioral, and biomedical

     sciences. *Behavior Research Methods, 39*(2), 175-191.

Ferrara, C. M. (2009). The college experience: Physical activity, nutrition, and

     implications for intervention and future research. *Journal of Physiology Online*,

     12(1), 23-35.

Foerschner, A. M. (2010). *The History of Mental Illness: From Skull Drills to Happy*

    Pills. Retrieved from http://www.studentpulse.com/articles/283/the-history-of-

    mental-illness-from-skull-drills-to-happy-pills

Forrester, S. A. (2014). *The benefits of campus recreation*. Received from

    http://rfc.wayne.edu/mort-harris/forrester_2014-report.pdf

Fox, S., & Duggan, M. (2013). *Health online 2013*. Retrieved from

    http://www.pewinternet.org/2013/01/15/health-online-2013/

Gibson, P., & King, C. (2012). Health behavior theories and research: Implications for

    suicidal individuals' treatment linkage and adherence. *Cognitive Behavior*

    Practice, 19(2), 209-217. doi:10.1016/j.cbpra.2010.11.005

Gilbert, G. G., Sawyer, R. G., & McNeill, E. B. (2011). *Health education: Creating*

    strategies for school and community health (3rd Ed.). Sudbury, Massachusetts:

    Jones and Bartlett Publishers.

Grasgreen, A. (2012). *Colleges don't always help with mental health issues, student*

    survey shows. Retrieved from

    https://www.insidehighered.com/news/2012/10/30/colleges-dont-always-help-

    mental-health-issues-student-survey-shows

Grayson, P. A. (2010). College time: Implications for student mental health services.

    Journal of American College Health, 33(5), 198-204.

    doi:10.1080/07448481.1985.9939605

Green, L. W., & Kreuter, M. W. (2005). *Health program planning: An educational and*

    ecological approach. New York, New York: McGraw-Hill.

Guszkowska, M. (2004). Effects of exercise on anxiety, depression, and mood. *Psychiatria Polska*, *38*(4), 611-620.

Harper, R. & Peterson, M. (2005). *Mental health issues and college students.* Retrieved from http://www.nacada.ksu.edu/tabid/3318/articleType/ArticleView/articleId/141/article.aspx

Healthy Campus 2020. (2015a). *Student objectives.* Retrieved from https://www.acha.org/HealthyCampus/Objectives/Student_Objectives/HealthyCampus/Student_Objectives.aspx?hkey=a9f191de-243b-41c6-b913-c012961ecab9

Healthy Campus2020. (2015b). *Ecological model.* Retrieved from http:www.acha.org/Healthy/Campus/ecological_model.cfm.

Healthy People 2020. (2014a). *Physical activity*. Retrieved from http://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity

Healthy People 2020. (2014b). *Health communication and health information technology*. Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/health-communication-and-health-information-technology/objectives

Hershner, S. D. & Chervin, R. D. (2014). Causes and consequences of sleepiness among college students. *Nature and Science of Sleep, 6*, 73-84. doi: 10.2147/NSS.S62907

Higher Education Research Institute. (2002). *College Freshmen Spend Less Time Studying And More Time Surfing The Net, UCLA Survey Reveal.* Retrieved from http://heri.ucla.edu/pr-display.php?prQry=18

Horgan, A., & Sweeney, J. (2010). Young students' use of the internet for mental health information and support. *Journal of Psychiatric and Mental Health Nursing, 17,* 117-123. doi: 10.1111/j.1365-2850.2009.01497.x

Ickes, M. J., & Cottrell, R. (2010). Health literacy in college students. *Journal of American College Health, 58*(5), 491-498. doi:10.1080/07448481003599104

Insel, T. R. (2010). *Understanding mental disorders as circuit disorders*. Retrieved from http://www.brainfacts.org/Diseases-Disorders/Psychiatric-Disorders/Articles/2010/Understanding-Mental-Disorders-as-Circuit-Disorders

Jeffery, J. (2007). Cognition and brain development in students of traditional college-going age. Retrieved from http://www.teaglefoundation.org/Resources/Additional-Resources/Cognition-and-Brain-Development-in-Students-of-Tra

Johnson, J.A. (2005). Ascertaining the validity of individual protocols from web-based personality inventories. *Journal of Research in Personality. 39*(1), 103-129. doi:10.1016/j.jrp.2004.09.009

Katon, W., Richardson, L., Russo J., McCarty, C. A., Rockhill, C., McCauley, E., Richards, J.,...Grossman, D. C. (2010). Depressive symptoms in adolescence: The association with multiple health risk behaviours. *General Hospital Psychiatry, 32*(3), 233–239. doi:10.1016/j.genhosppsych.2010.01.008

Kelly, W. E., Kelly K. E., & Clanton, R. C. (2001). The relationship between sleep length and grade point average among college students. *College Student Journal, 35*(1), 84-86.

Kognito. (2016). *About*. Retrieved from https://www.kognito.com/about/

Kraft, D. P. (2011). One hundred years of college mental health. *Journal of American College Health, 59*(6), 477-481. doi:10.1080/07448481.2011.569964

Lee, D., Olson, E. A., Locke, B., Michelson, S. T., & Odes, E. (2009). The effects of college counseling services on academic performance and retention. *Journal of College Student Development, 50*, 305-319. doi:10.1353/csd.0.0071

Lincoln, A., Espejo,, D., Johnson, P., Paasche-Orlow, M., Speckman, J. L., Webber, T. L.,. . .White, R. F. (2011). *Literacy in the lives of people with serious mental illness*. Retrieved from http://www.bumc.bu.edu/healthliteracyconference/files/2011/07/Alisa-Lincoln.pdf

Little, R.A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*(404), 1198-1202. doi:10.1080/01621459.1988.10478722

Loprinzi, P. D., & Cardinal, B. J. (2011). Association between objectively-measured physical activity and sleep, NHANES 2005-2006. *Mental Health and Physical Activity, 4*, 65-69. doi:10.1016/j.mhpa.2011.08.001

Lund, H. G., Reider, B. D., Whiting A. B., & Prichard, J. R. (2010). Sleep patterns and predictors of disturbed sleep in a large population of college students. *Journal of Adolescent Health, 46,* 124-132. doi: 10.1016/j.jadohealth.2009.06.016

Lynch, A., Elmore, B., & Kotecki, J. (2014). *Health: Making choices for life.* Glenview, IL: Pearson Education, Inc.

Mander, B. A., Santhanam, S., Saletin, J. M., & Walker M. P. (2011). Wake deterioration

    and sleep restoration of human learning. *Current Biology, 21*(5), 183-184. doi:

    10.1016/j.cub.2011.01.019

Mattanah, J. F., Brooks, L. J., Ayers, J. F., Quimby, J. L., Brand, B. L., & McNary, S. W.

    (2010). A social support intervention to ease college transition: Exploring main

    effects and moderators. *Journal of College Student Development, 51*(1), 93-108.

    doi: 10.1353/csd.0.0116

Mayo Clinic. (2013). *Healthy lifestyle: Tween and teen health.* Retrieved from

    http://www.mayoclinic.org/healthy-lifestyle/tween-and-teen-health/in-

    depth/college- depression/art-20048327

Mayo Clinic. (2014). *Diseases and conditions: Sleep disorders: Definition*. Retrieved

    from http://www.mayoclinic.org/diseases-conditions/sleep-

    disorders/basics/definition/con-20037263

Mayo Clinic. (2015). Disease and conditions: Depression

    Retrieved from

    http://www.mayoclinic.org/diseasesconditions/depression/basics/definition/con-

    20032977

Mental Health First Aid USA. (2014*). Mental health first aid USA manual*.

    Lutherville, Maryland: Health Association of Maryland, Inc.

Moody, A. (2013). *Adult anthropometric measures, overweight and obesity*. Retrieved

    from http://www.hscic.gov.uk/catalogue/PUB13218/HSE2012-Ch10-Adult-

    BMI.pdf

Mowbray, C. T., Mandiberg, J. M., Stein, C. H., Kopels, S., Curlin, C., Megivern, D., Strauss, S., Collins, K., . . .Lett, R. (2006). Campus mental health services: Recommendations for change. *American Journal of Orthopsychiatry, 76*(2), 226-237. doi:10.1037/0002-9432.76.2.226

National Alliance on Mental Illness. (2007). *Mental illness on campus: What you can do to help.* Retrieved from http://www2.nami.org/Content/NavigationMenu/Find_Support/NAMI_on_Campus1/Mental_Illness_Fact_Sheets/MentalIllnessonCampus.pdf

National Alliance on Mental Illness. (2012). *College students speak: A survey report on mental health.* Retrieved from https://www.nami.org/getattachment/About-NAMI/Publications-Reports/Survey-Reports/College-Students-Speak_A-Survey-Report-on-Mental-Health-NAMI-2012.pdf

National Alliance on Mental Illness. (2015a). *Mental illnesses: What is mental illness?* Retrieved from http://www2.nami.org/Content/NavigationMenu/Inform_Yourself/About_Mental_Illness/by_Illness/What_is_Mental_Illness_.htm

National Alliance on Mental Illness. (2015b). *Learn about the issue.* Retrieved from http://www2.nami.org/Content/NavigationMenu/Find_Support/NAMI_on_Campus1/Learn_About_The_Issue/Learn_About_The_Issue.htm

National Center for Education Statistics. (2013). *Digest of education statistics: Table 302.60: Percentage of 18- to 24-year-olds enrolled in degree-granting institutions, by level of institution and sex and race/ethnicity of student: 1967 through 2012*. Retrieved from http://nces.ed.gov/programs/digest/d13/tables/dt13_302.10.asp

National Center for Education Statistics. (2015). *Undergraduate enrollment*. Retrieved from http://nces.ed.gov/programs/coe/indicator_cha.asp

National Institutes of Health. (2012). *How much sleep is enough?* Retrieved from https://www.nhlbi.nih.gov/health/health-topics/topics/sdd/howmuch

National Sleep Foundation. (2013). *National sleep foundation poll finds exercise key to good sleep.* Retrieved from http://sleepfoundation.org/media-center/press-release/national-sleep-foundation-poll-finds-exercise-key-good-sleep

Nipcon, M. F., Huser, L., Blanks, E. H., Sollenberger, S., Befort, C., & Kurpius, S. E. R. (2007). The relationship of loneliness and social support with college freshmen's academic performance and persistence. *Journal of College Student Retention: Research, Theory, & Practice*, *8*, 345-358. doi:10.2190/A465-356M-7652-783R

Office of Disease Prevention and Health Promotion. (2015). *Physical activity guidelines for Americans*. Retrieved from http://health.gov/paguidelines/guidelines/

Pronk, N. P., Anderson, L. H., & Crain A. L. (2004). Meeting recommendations for

    multiple healthy lifestyle factors. Prevalence, clustering, and predictors among

    adolescent, adult, and senior health plan members. *American Journal of*

    Preventative Medicine, 27, 25–33. doi:10.1016/j.amepre.2004.04.022

Reed, J. (2007). Perceptions of the availability of recreation physical activity facilities on

    a university campus. *Journal of American College Health*, *55*(4), 189-194. doi:

    10.3200/JACH.55.4.189-194

Rieh, S. Y. & Hilligoss, B. (2008). *College students' credibility judgement in*

    information-seeking process. Retrieved from

    http://rieh.people.si.umich.edu/papers/rieh_credibility_chapter3.pdf

Rogers, A. E. (2008). *Sleep and health*. Retrieved from

    http://healthysleep.med.harvard.edu/need-sleep/whats-in-it-for-you/health

Skorton, D., & Altschuler, G. (2013). *How college health centers help students*

    succeed. Retrieved from

    http://www.forbes.com/sites/collegeprose/2013/09/23/how-college-health-

    centers-help-students-succeed/

Spring, B., Moller, A. C., & Coons, M. J. (2012). Multiple health behaviors: Overview

    and implications. *Journal of Public Health, 34*(S1), i3-i10. doi:

    10.1093/pubmed/fdr111

Stickgold, R. (2008). *Sleep and memory*. Retrieved from

    http://healthysleep.med.harvard.edu/need-sleep/whats-in-it-for-you/memory

Strohle, A., Hofler, M., Pfister, H., Muller, A., Hoyer, J., Ulrich Wittchen, H., . . .Lieb,

    R. (2007). Physical activity and prevalence and incidence of mental

    disorders in adolescents and young adults. *Psychological Medicine, 37*, 1657-

    1666. doi: http://dx.doi.org/10.1017/S003329170700089X

Suminski, R. R., Petosa R., Utter, A. C., & Zhang, J. (2010). Physical activity among

    ethnically diverse college students. *Journal of American College Health, 51*(2),

    75-80. doi:10.1080/07448480209596333

Taliaferro, L. A., Rienzo, B. A., Pigg, M., Miller, D., & Dodd, V. J. (2009). Association

    between physical activity and reduced rates of hopelessness, depression, and

    suicidal behavior among college students. *Journal of American College Health,*

    57(4), 427-435. doi:10.3200/JACH.57.4.427-436

Taylor, D. J., Vatthauer, K. E., Bramoweth, A. D., Ruggero, C., & Roane, B. (2013).

    The role of sleep in predicting college academic performance: Is it a unique

    predictor? *Behavioral Sleep Medicine, 11*(3), 159-172. doi:

    10.1080/15402002.2011.602776

The JED Foundation. (2011). *A guide to campus mental health action planning*.

    Retrieved from https://www.jedfoundation.org/CampusMHAP_Web_final.pdf

The JED Foundation. (2012). *Transition year: The transition*. Retrieved from

    http://www.transitionyear.org/parent/articles.php?cat=3

The JED Foundation. (2016a). *About us: History*. Retrieved from

    https://www.jedfoundation.org/about/history

The JED Foundation. (2016b). *For campus professionals: Programs and research*. Retrieved from https://www.jedfoundation.org/professionals/programs-and-research

Thurber, C. A., & Walton, E. A. (2012). Homesickness and adjustment in university students. *Journal of American College Health, 60*(5), 415-419. doi: 10.1080/07448481.2012.673520

Unite for Sight. (2015). *Module 2: A Brief History of Mental Illness and the U.S. Mental Health Care System.*Retrieved from http://www.uniteforsight.org/mental-health/module2

University of Michigan. (2015). *Sleep*. Retrieved from http://campusmindworks.org/students/self_care/sleep.asp

Vernon, J. A., Trujillo, A., Rosenbaum, S., & Debuono, B. (2007). *Low health literacy: Implications for national health policy*. Retrieved from http://publichealth.gwu.edu/departments/healthpolicy/CHPR/downloads/LowHealthLiteracyReport10_4_07.pdf

Vidourek, R. A., King, K. A., Nabors, L. A., & Merianos, A. L. (2014). Students' benefits and barriers to mental health help-seeking. *Health and Psychology Behavioral Medicine, 2*(1), 1009-1022.

Wen M., & Kowaleski-Jones, L. (2012). Sex and ethnic differences in validity of self-reported adult height, weight and body mass index. *Ethnicity & Disease, 22,* 72.

Yorgason, J. B., Linville, D., & Zitzman, B. (2008). Mental health among college

students: Do those who need services know about and use them? *Journal of*

American College Health, 57(2), 173-181. doi: 10.3200/JACH.57.2.173-182

Appendix A

IRB Approval Letter

TWU

EXAS WOMAN'S UNIVERSITY

DENTON DALLAS HOUSTON

Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378
email: IRB@twu.edu
http://www.twu.edu/irb.html

DATE: September 24, 2015

TO: Ms. Angela Neary
            Health Studies

FROM: Institutional Review Board - Denton

Re: *Exemption for Community college student mental health: Using the ACHA-NCHA data to*
        evaluate differences in the student experience based on self-reported mental health indicators
        (Protocol #: 18579)

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was
determined to be exempt from further review.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data
collection at that agency. Because a signed consent form is not required for exempt studies, the filing
of signatures of participants with the TWU IRB is not necessary.

Although your protocol has been exempted from further IRB review and your protocol file has been
closed, any modifications to this study must be submitted for review to the IRB using the Modification
Request Form. Additionally, the IRB must be notified immediately of any adverse events or
unanticipated problems. All forms are located on the IRB website. If you have any questions, please
contact the TWU IRB.

cc.   Dr. Roger Shipley, Health Studies
      Ms. Kristin Wiginton, Health Studies
      Graduate School