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THE RELATIONSHIP BETWEEN CAMPUS WELLNESS CENTER USAGE AND
SYMPTOMS OF DEPRESSION IN COLLEGE FRESHMEN

BY

ALLISON LEONARD

A thesis submitted in partial fulfillment of the requirements for the

Master of Science

Major in Sport and Recreation Administration

South Dakota State University

2019

THE RELATIONSHIP BETWEEN CAMPUS WELLNESS CENTER USAGE AND SYMPTOMS OF DEPRESSION IN COLLEGE FRESHMEN

ALLISON LEONARD

This thesis is approved as a creditable and independent investigation by a candidate for the Masters of Science in Sport and Recreation Administration degree and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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ABSTRACT

THE RELATIONSHIP BETWEEN CAMPUS WELLNESS CENTER USAGE AND
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ALLISON LEONARD

2019

There is limited research done on the relationship between the program utilization at a campus wellness facility and the symptoms of depression in college freshmen. College students have been found to have a higher prevalence of depressive symptoms than the general population, possibly due to the stressors college life can add. Studies have been done on the effects of physical activity as an intervention for depression as well as on the benefits of campus wellness facilities; however, there have been few studies that look at both campus recreation and depression. The author's purpose for this study was to see if there was a correlation between the use of programs at the campus wellness center and self-reported symptoms of depression in first-semester college freshmen. A survey including questions on depressive symptoms and wellness center usage was handed out to students in freshmen seminar classes. There was a response rate of 184 participants, with 172 being first-semester freshmen. Questions were taken from the PHQ-8, a tool used to determine severity of depressive symptoms, and from a National Institute of Recreational Sports Association (NIRSA) study on the benefit of campus recreation. Frequency, Chi Square, and Spearman's rho were used to analyze the results. The most commonly used programs at the wellness center were cardiovascular training and weight training. The frequency of visits to the wellness center as well as open recreation, intramural sports, and group fitness program use all correlated

negatively with the PHQ-8 categorical score. This shows that first-semester freshmen who participate in those three programs and attend the wellness center more frequently have less depressive symptoms. The students also reported stressors similar to what is seen in other studies, with the most common stressor being the amount of coursework. There are future implications that can be taken from this study for campus recreation and wellness facilities to utilize with two major themes being affordability of programs and providing opportunities for students to learn how to manage their stressors and mental health.

Keywords: campus recreation, wellness center, depression, physical activity, college freshmen

INTRODUCTION

The college years of a person's life are considered years of transition and with this transition come new stressors. Students move away from their families and support groups; they are pushed to find new identities, and be involved and socialize (Blanco & Barnett, 2014). They also have a new access of things they might have been sheltered from in the past. Drugs and alcohol become easier to obtain. Students have new sexual experiences and more freedom with their life choices (Leino & Kisch, 2005). These stressors can account for a higher prevalence of depression in college students (Blanco & Barnett, 2014).

With all the new changes in college students, and particularly freshmen's, lives, depression and mental illnesses are a concern. Suicide is one of the top leading causes of death with adolescents and depression is a main risk factor (Babiss & Gangwisch, 2009). In the United States, about 9% of the population meet the Diagnostic and Statistical Manual of Mental Disorders (DSM- IV) criteria for depression but it is estimated that college students actually exceed the general population in terms of prevalence (Blanco & Barnett, 2014). According to Beiter et al. (2015), about 10% of college students within the United States have either been diagnosed with depression or treated in the past 12 months. In another study, the National College Health Assessment (NCHA) in 2006 found that 15% of college students were diagnosed with depression in their lifetime. Of those students, about 34% said that the diagnosis came within the past school year. This is a concern since in the same study they found that the diagnosis of depression in students has increased 56% from 2000 to 2007 (Elliot, Kennedy, Morgan, Anderson &

Morris, 2012). Depression in college students can have a few causes such as body image or low self-esteem, feeling less important than others, not being happy with life, or struggling with school and grades (Beiter et al., 2015; Furr, Westefeld, McConnell & Jenkins, 2001). Smoking, unhealthy dietary habits, not exercising, and not getting an appropriate or healthy amount of sleep are also all correlated with depression (Beiter et al., 2015).

One intervention that has been studied for assisting with depressive symptoms is physical activity. Multiple studies have shown that those who are physically active are less likely to exhibit symptoms of depression (Elliot et al., 2012; Goodwin, 2003). Babiss and Gangwisch (2009) found that among adolescents, participating in sports can actually help protect them from depression or feeling suicidal. Conn (2010) found both physiological and psychological hypotheses as to why physical activity can have an effect on depression. The physiological explanation includes the release of endogenous opiates, neurotransmitters, and other chemical factors in the brain. The psychological effects were that physical exercise offered a distraction, increased self-esteem and self-efficacy, and a sense of achievement. Sieverdes et al. (2012) pointed out that depression can result from reduced serotonin and norepinephrine and that physical activity elevates the levels of these neurotransmitters. It has been shown physical activity can improve psychological and cognitive functioning and improve life satisfaction (Goodwin, 2003). In addition, outdoor physical activity can decrease the feelings of depression and fatigue while making patients feels more active (Fruhauf et. al., 2016).

Although there haven't been many studies done on depression and wellness center use, there have been studies done on the overall benefits of leisure activity and campus

recreation use for college students. Belch, Gebel, and Maas (2001) stated that among freshmen, those more likely to use the recreation facility are also more likely to perceive positive benefits. They were more likely to remain in college after both one semester and one year than those who did not use the recreation center. Those who specifically used the intramural sports program also had positive effects in their physical health, alcohol consumption, satisfaction with their life in college, ability to get a degree, and leadership skills. Students who are involved in extracurricular activities also have a higher grade point average, an easier time adjusting socially, and are more likely to stay in school (Forrester, 2006). Furr, Westefeld, McConnell, and Jenkins (2001) found that students who felt as though they were a part of a community would be less likely to report feeling lonely.

These studies that show how involvement on a college campus, and specifically at the recreation center, are a great start. However, limited research has been done on how the use of collegiate wellness centers affect the depressive symptoms of these students. The proposed study is particularly interested in college freshmen, due to the newness of the stressors of college life. There also is a gap in literature on the programs specific to a college wellness center as opposed to exercise in general. Many wellness centers have multiple types of programming as a way to reach more students. These programs include outdoor recreation, intramural sports, sport clubs, fitness and cardio classes, and general gym use. By surveying college freshmen on their depressive symptoms as well as areas of use with the wellness center, the author hopes to bridge this gap. The purpose of this study is to see if there is a correlation between the types of programs used, the frequency

of programs used, and the time spent using these programs offered at the Wellness Center and symptoms of depression in college freshmen.

LITERATURE REVIEW

College Students and Depression

Depression is a serious mental disorder that can reach a person of any age. Depending on the study, there can be a wide range of statistics on the prevalence of depression in any given age range. Kessler et al. (2003) found that there is a lifetime prevalence of 16.2% for major depression disorder in adults within the United States. The National Institute of Mental Health reports a prevalence of 7.1% of U.S. adults with at least one depressive episode and this rate is higher among females as well as among those ranging in age from 18-25 years old. No matter the prevalence, depression is a costly disorder that can affect a person's ability to go to work, be productive, and get along with others (Leino & Kisch, 2005; Pratt & Brody, 2008).

College represents a time of many changes in a person's life. Because of these changes, this is a time where depression or depressive symptoms may become more prevalent (Beiter et al., 2015). The prevalence statistics of the general population and college students are very different. Beiter et al. (2015) reported that approximately 10% of college students were diagnosed with or treated for depression in the past 12 months. They also reported that at The Franciscan University Counseling Center, the number of students and the number of visits for depression have increased from 196 clients and 1,000 visits in 2007/08 to 340 clients and 2,311 visits in 2012/13 (Beiter et al., 2015). The purpose of this study was to examine the reasons for this increase. Beiter et al.

(2015) found that there were 10 main concerns that the students were reporting, the first four relating directly to college life and the remaining six relating to personal and interpersonal life.

One stressor that is cited as relating to depressive symptoms in college freshmen is that the freshmen are separated from established social networks for the first time (Brandy, Penckofer, Solari-Twadell, & Velsor-Friedrich, 2015). This includes support from both peers and parents. Liao, Chen, and Lin (2018) addressed five stress indicators: academic, financial, intimate relationship, peer relationship, and parent-adolescent relationship. Students with high academic and financial stress but low peer-related stress were less likely to feel depressed while those with academic, financial, and peer stress or all five stressors were more likely to feel depressed (Liao, Chen, & Lin, 2018)

Furr, Westefeld, McConnell, and Jenkins (2001) performed a follow-up study to one done in 1987. The results found in the original study was that 81% of participants experience depression, with depression in this instance being self-identified and not diagnosed (Furr et al., 2001). The results from the follow up study about a decade later had 53% of participants experiencing depression, again with the same criteria (Furr et al, 2001). Although there was a significant decrease in percentage of those experiencing depression, the authors do not explain why this might have happened. Furthermore, it was found that more than 5% of people older than 12 experience depression and that it is a leading cause of disability for people from 15-44 years of age (Pratt & Brody, 2008).

One tool that assesses college student's overall health is the National College Health Assessment. In 2006, this questionnaire showed that 14.8% of college students had been diagnosed with depression at some point in their lifetime, with 34.4% of that

being within the past school year (American College Health Association, 2006). In 2007, the percentage jumped to 15.3% of students having been diagnosed with depression, and then dropped back down to 14.9% in 2008 (American College Health Association, 2007, 2008).

Campus Recreation

College campuses provide many different programs, facilities, and activities for students to become involved in. One of these programs that has been growing is campus recreation, which can be referred to as recreation centers, wellness centers, and recreation and wellness facilities. The types of programming offered at the campus recreation facilities vary between college campuses, but the impact they have remains consistent. Forrester (2006) pointed out the important fact that extracurricular activities need to be a part of education as a whole and not just supplemental to education. He cites multiple benefits that have been linked to involvement in the extracurricular activities. Some benefits include a better grade point average, an ease to social integration, increases in student learning, increases in student retention, and student development (Forrester, 2006). To further his points Forrester (2006) introduced Astin's theoretical model. Astin's student involvement theory, in very broad terms, states that students who participate in extracurricular activities would be less likely to drop out of school and in addition would be more satisfied with their college experience. Astin (1999) defines involvement as "the amount of physical and psychological energy that devotes to the academic experience" (p. 518). This includes energy spent studying, time on campus, participation in organizations, and interactions with peers and faculty (Astin, 1999).

Belch, Gebel, and Maas (2001) indicated that not only do freshmen who use the recreational facility and programming have higher levels of perceived benefits in personal development but also that the intramural sports program has had a positive influence on things such as health, degree attainment, satisfaction with college, leadership, and alcohol consumption. They also stated that freshmen utilizing the facility had a greater retention rate both after one semester and one year compared to those who did not use the facility or programming (Belch, Gebel, & Maas, 2001). Omar-Fauzee, Yusof, and Zizzi (2009) investigated why students do or do not use the recreation facility. Students reported using the facility to take care of their wellbeing, to hang out, to participate in recreational activities for health or to be healthy, to be less stressed, to keep in shape, to meet new people, and to have fun. Henchy (2013) also found that students will devote more time to learning when they are members of a community, which is something a recreation facility gives them. The sense of belonging will also increase the likelihood of remaining at school for college students (Henchy, 2013). Furthermore, Miller (2011) found that the students felt the recreation center played a role in creating a bond not only with that facility but also with the university as a whole. Students felt that the recreation center was essential in creating a sense of community and that the students who used the facility were more likely to be integrated with the university, which had an impact on retention (Miller, 2011). Henchy (2011) also reports social benefits related to campus recreation use. Her results showed 81% of students felt more at home, had a better sense of belonging, and had more opportunity to make friends from participation.

Physical Activity as an Intervention

When it comes to treatments for depression, counseling and medications can sometimes come with a stigma. One intervention that has been studied that does not have that stigma is physical activity. Physical activity is important for overall physical health but it could also be important for mental health. Martinsen (2008) has suggested physical activity alone or in conjunction with other interventions may be a preventative measure for depression. In her meta-analysis, Conn (2010) stated that there are both physiological and psychological mechanisms to physical activity that can have this effect of reduced symptoms of depression. The physiological explanation given by Conn (2010) matches the monoamine hypothesis, which states that reduction of serotonin and norepinephrine result in depressive symptoms (Sieverdes et al., 2012). This is an important concept to the physiological explanation because physical activity can help to elevate those serotonin and norepinephrine levels as well as endogenous opiates, endocannabinoids, anti-inflammatory cytokines, cerebral blood flow, and hypothalamic-pituitary-adrenal axis function (Conn, 2010; Sieverdes et al., 2012).

Conn (2010) also mentions psychological aspects that reduce depressive symptoms including distraction, increased self-efficacy, increased self-esteem, increased behavioral activation, increased sense of achievement, and increased self-determination. The results of the meta-analysis were that physical activity, whether supervised by a clinician or unsupervised, significantly improved depressive symptoms (Conn, 2010). In a cross-sectional study, Branco et al. (2014) found that women without depression were more likely to be physically active. Elliot et al. (2012) found that those students who reported no physical activity were 26% more likely to report depressive symptoms and

that physical activity may be used to help those experiencing depressive symptoms. Using the NCHA survey, Elliot et al. (2012) found that students reporting three to seven days of physical activity per week (medium to high levels) experience less depressive symptoms than those students reporting zero to two days.

While physical activity on its own can have benefits, it has also been studied what the effect of outdoor recreation specifically can have on depression. Participating in outdoor recreation can have a positive impact on physical, psychological, and social well-being (Wilson & Christensen, 2012). Not only has the increase in vitamin D been shown to have correlates with depression, but being out in the natural environment can help improve attention capacity, cognitive functioning, increase self-discipline, and enhance personal satisfaction (Irandoost & Taheri, 2017; Wilson & Christensen, 2012). Wilson and Christensen (2012) found in their study a significant negative relationship between depression and outdoor recreation among individuals with disabilities.

There has been a significant amount of studies done to show that physical activity decreases depressive symptoms. In addition, studies that have been done on campus recreation centers show significant benefits to those who utilize the offered programs. Although campus recreation has many benefits, one that has minimal research is how the programs offered can impact students with depressive symptoms. Addressing this gap in knowledge may provide insights into possible interventions for those with depressive symptoms or diagnoses.

METHODS

Data Collection and Research Procedure

The participants from this study were from a midsized public university in the Midwest. The participant pool was college freshmen in their first semester at the university and living on campus. Data were collected from all students completing the survey, although transfer students were excluded from this study since they have already had time to assimilate into the college setting. The author obtained consent from freshmen seminar instructors to hand out the survey during their class time. Six classes were chosen from Chemistry, Nursing, Education and Human Sciences, Agricultural Systems Technology, and Academic and Career Success. The class enrollment ranged from 23 to 58 students. These classes were chosen based on the range of majors offered at the university in order to try to recruit students from diverse backgrounds and interests. Paper surveys were handed out and students were given the option to take the survey or decline by reviewing a consent statement at the beginning of the survey stating that implied consent would be given with the return of the survey. Students who completed the survey also had the opportunity to put their name in for a chance to win one of twelve (12) \$20 Amazon gift card by writing their email on a page provided and handing that in separately. The author has obtained approval from this university's Institutional Review Board (IRB) (Appendix A). The data collection took place from mid-October through early November.

Of the data that was collected, basic demographic analysis was examined for all respondents. Subsequently, data from any respondent who was not a first-semester freshmen was removed for descriptive analysis. There were participants that had missing

data; however, as long as they were not missing a majority of the data or data that was necessary to answer the research questions, their responses were still included.

Instruments

There are three major components used for this study including demographic questions, the Patient Health Questionnaire (PHQ-8), as well as questions relating to frequency of use of the campus Wellness Center. The PHQ-8 is a validated questionnaire and differs from the PHQ-9 in that it excludes the question on suicidal ideation. The decision was made to drop this question based on the setting in which the survey would be given precluded any immediate help being given. Questions were arranged in a four point Likert Scale ranging from “not at all” to “nearly every day”, with each answer being assigned a certain amount of points (zero to three). At the end of the survey, the total points were summed and using that raw score, students were categorized into five groups reflecting their depression symptoms: no score (0-4), minimal symptoms (5-9), mild symptoms (10-14), moderate symptoms (15-19), and severe symptoms (20+).

A study done with the military has shown the PHQ-8 to be comparable to the PHQ-9, with only 0.26% of the participants scoring differently. They also found the PHQ-8 to have high specificity and sensitivity with the PHQ-9 (Wells, Horton, LeardMann, Jacobson, & Boyko, 2013). Although this questionnaire has been used for diagnosis purposes, the current study uses the scoring system to assess rate of depressive symptoms and not as a means to diagnose depression.

Questions on Wellness Center usage are based on a study done by Forrester (2014) with modifications made to fit the particular institution and the variables on which the current study focused. The program areas that were asked about in this survey were

cardiovascular training, weight training, open recreation, group fitness classes, intramural sports, sport clubs, outdoor adventures, and personal training. These were structured in a five point Likert Scale, which ranged from “never” to “5 or more times per week.” A question was also included asking about time spent at the Wellness Center per visit with answers including: less than 30 minutes, 30-59 minutes, 60-89 minutes, and 90 minutes or more.

A question was also created based on the perceived stressors of college students that had been addressed in prior studies. This question asked participants to “check all that apply” and included the most common stressors reported through other research. The six stressors were being away from family, amount of coursework, pressure to drink or do drugs, pressure to make new friends, dietary habits, and lack of sleep. A seventh option was provided for participants to fill in any additional stresses.

Statistics

Data were collected and transferred to an online spreadsheet and analysis was done using SPSS software. Descriptive analysis was applied to understand the demographics of the respondents as well as the common stressors. Chi-Square analyses were applied between the PHQ-8 score and the questions regarding gender, employment status, whether they go to the gym with or without a friend, the frequency of their visits, and the time spent at the Wellness Center per visit. A Spearman’s rho correlation was also considered to examine the relationship between the PHQ-8 score and each activity offered in the Wellness Center individually, the frequency of visits, and the time spent per visit. The activities used in this analysis were cardiovascular training, weight training,

open recreation, group fitness classes, intramural sports, sport clubs, outdoor programming including the rock wall, and personal training. Statistical significance for this study is $p < 0.05$.

RESULTS

There were 184 survey respondents at the end of data collection with 172 (93.5%) of these respondents being true college freshmen. The majority were eighteen years of age (60.3%), female (65.8%), and in-state students (59.8%). The responses to the employment question indicated a nearly even split but that slightly more participants had not been employed in the past month (53.3%). Although Table 1 shows demographic data for the total 184 participants, all the following statistics were computed using only the 172 first-semester freshmen.

Table 1. Demographics of Participants

	Frequency	Percent
Year in school		
First Semester	172	93.50%
Second Semester	4	2.20%
Sophomore	10	5.40%
Junior	1	0.50%
Age		
Eighteen	111	66.50%
Nineteen	47	28.10%
Twenty	8	4.80%
Twenty-one	1	0.60%
Gender		
Male	62	33.90%
Female	121	66.10%
Employed in Past Month		
Yes	85	46.60%

No	98	53.60%
<hr/>		
Geographic Demographic		
In-State	110	59.80%
Out-of-State	73	39.70%
International	1	0.50%
<hr/>		

In order to determine the physical activity of the students prior to coming to college, the survey asked how often the participant took part in sport or exercise. A small majority of respondents participated in some sort of sport or exercise 5 or more times per week (39.7%) before coming to college and only 4 out of 184 (2.2%) had never considered themselves involved with sport and exercise.

Since there was also the option for the students to use off-campus facilities that are not a part of the Wellness Center, a question was asked if they used a facility other than the Wellness Center for physical activity. Of the responses 63 (34.2%) reported they did use another facility and 119 (64.7%) did not use another facility.

The frequency with which the participants reported the different types of stressors the respondents was examined. Of the six stressors that were provided, three were acknowledged by over half of the respondents. Amount of coursework (82.6%) was the most frequent, followed by lack of sleep (60.5%) and dietary habits (52.3%). The remaining stressors were being away from family (46.5%), pressure to make new friends (39.5%), and pressure to drink or do drugs (11.6%). There was a fill in the blank option for respondents to add a stressor they experience that was not on the list, which was used by 13 participants (7.6%).

Table 2. First-Semester Freshmen's PHQ-8 Score by Category

	Not Scored	Minimal	Mild	Moderate	Severe
Frequency	78	47	28	11	4
Percent	45.3%	27.3%	16.3%	6.4%	2.3%

The frequency of each of the PHQ-8 categories was examined (Table 2). Each category of the PHQ-8 relates to the cumulative score of the survey. The answer to each question was assigned a point value, which are then totaled and categorized.

There were multiple questions asked regarding Wellness Center usage as well as specific program use. Table 3 shows the programs offered at the Wellness Center, which included cardio, weight training, open recreation (open rec), group fitness classes (group fit), intramural sports (IM sports), sport clubs, outdoor programs and climbing wall (outdoor programs), and personal training. A majority of responses shows that the areas are never used; however, there is a much larger percent of participants who have never used specific programming such as sport clubs (90.8%), personal training (86.4%), outdoor programs (82.6%), or group fit (81%). The more general exercise areas such as cardio and weight training still show a majority of students have never used them but that there is some variation in the extent of usage. It is also interesting that open recreation, group fit, intramural sports, and sport clubs all had zero responses for being used 5 or more times per week.

Table 3. Wellness Center Programs and Freshmen's Frequency of Use

	Never	1-3 times/month	1-2 times/week	3-4 times/week	5 or more times/week
Cardio	75 (40.8%)	34 (18.5%)	34 (18.5%)	30 (16.3%)	6 (3.3%)
Weight Training	98 (53.3%)	35 (19%)	18 (9.8%)	16 (8.7%)	11 (6.0%)
Open Rec	134 (72.8%)	19 (10.3%)	14 (7.6%)	3 (1.6%)	0 (0%)
Group Fit	149 (81%)	6 (3.3%)	14 (7.6%)	3 (1.6%)	0 (0%)
IM Sports	137 (74.5%)	14 (7.6%)	23 (12.5%)	1 (0.5%)	0 (0%)
Sport Clubs	167 (90.8%)	1 (0.5%)	3 (1.6%)	2 (1.1%)	0 (0%)
Outdoor Programs	152 (82.6%)	13 (7.1%)	4 (2.2%)	1 (0.5%)	2 (.1%)
Personal Training	159 (86.4%)	5 (2.7%)	4 (2.2%)	4 (2.2%)	1 (0.5%)

Chi-Square analyses were conducted to determine if there was any relationship between their symptoms of depression and gender, employment status, whether they attend the Wellness Center with or without a friend, their frequency of visits, and their time spent per visit as shown in Table 4. Whether or not they go to the gym with a friend was the only variable significantly related to depression symptoms. Although gender was not significant to the PHQ score, its score bordered significance and therefore, is worth some attention. Employment, frequency, and time spent at the gym were all insignificant.

Table 4. Chi-Square Results Compared Against PHQ-8 Categorical Scores

	X^2	P-value
Gender	$X^2(4, 167) = 9.36$	$p = .053$
Employment	$X^2(4, 167) = 2.47$	$p = .649$
Participation With/Without Friend	$X^2(4, 162) = 10.64$	$p = .031 < .05$
In-state/out-of-state	$X^2(4, 168) = 2.43$	$p = .658$
Frequency of Use	$X^2(12, 166) = 19.27$	$p = .082$
Time Spent	$X^2(12, 153) = 7.88$	$p = .795$

The final statistics conducted were Spearman's rho correlations between the PHQ-8 and the individual programs offered at the wellness center. There were several significant findings. It was found that there was a statistical significant negative

correlation between the PHQ and frequency of visits ($r = -.277, p < 0.01$), open recreation ($r = -.259, p < 0.01$), intramural sports ($r = -.249, p < 0.01$), and group fitness ($r = -.157, p < 0.05$). There was no significant correlation found in time spent per visit, cardio, weight training, sport clubs, outdoor programming, or personal training.

DISCUSSION

The main purpose of this study was to expand the literature about college students and depression by looking into college freshmen, their use of the campus wellness or recreation facility, and whether or not it may have had an impact on their symptoms of depression. The three main areas that were of focus were; 1) the specific programs used, 2) the frequency of visits, and 3) how long each visit lasted.

When looking into the specific programs at recreation and wellness centers, it is important to think about the different programs that can be offered and why those may or may not have some impact on self-reported depression symptoms. The programs that are offered at this particular wellness center are open recreation, intramural sports, sport clubs, group fitness, outdoor programming including the climbing wall, personal training, and the general fitness of cardio and/or weight training. All of these include physical activity to an extent, which has been suggested as an intervention to reduce depressive symptoms. There is evidence based on self-reporting, such as that done by Elliot et al. (2012), that shows that a certain amount of physical activity per week can result in less depressive symptoms. There is also the physiological evidence mentioned by Conn (2010) and Sieverdes et al. (2012) that shows how physical activity can change neurotransmitter functioning in the brain. Some of these programs also differ in that they

include socialization or being outdoors, which Wilson and Christensen (2012) found also has an effect on depressive symptoms.

The most popular programs at this wellness center tended to be those generalized fitness programs such as cardiovascular training or weight training. Both programs reported the most frequent use by college freshmen in the study. Sport clubs, personal training, outdoor programming, and group fitness had the least amount of students who participated, respectively. There could be a couple reasons for this lack of participation. For instance, each of these programs may have an associated cost. In order to be able to improve on the facility, equipment, and programming, recreation centers need to operate on student fees that are typically included in tuition. In some cases, the student fee is not sufficient and recreation centers need to charge for access to certain amenities. Sport clubs often need additional funding, such as club dues, to be competitive. Group fitness passes may be charged on a semester/yearly basis or class by class. Personal training and outdoor pursuits can be fee based as well, which helps to cover the high cost of equipment or personnel certifications (Taylor, Canning, Brailsford, & Rokosz, 2003). This could be a barrier for students who otherwise might be interested.

Intramural sports and open recreation did have more participation, although not quite as much as cardio and weight training. A reason for this is that different intramural sports occur at different times and therefore at the time of this study, there might be less participation. Sports scheduling can differ per university but typically are dependent on weather and facility space. For example, outdoor sports can only occur at the beginning of the fall semester and end of the spring semester due to weather. Intramural sports are another program that may have an associated fee such as a forfeit fee or entry fee (Taylor

et al., 2003). Looking at the programs and their usage in comparison with the categorical scores of the PHQ-8, there are a couple significant findings. Open recreation, intramural sports, and group fitness all had a statistically significant negative correlation with the PHQ-8. This means that the more a person participated in these programs, the less severe they reported depressive symptoms were.

Another topic in this study was the frequency of visits and the amount of time spent at the facility or, more specifically, if there is any correlation between how often or how long a person participates in any program at the wellness center and what their score on the PHQ-8. There was a statistically significant negative correlation between frequency of visits and the PHQ-8 score. Again, this means that the more a person came to the wellness center, the less symptoms they reported. Results from a study by De Mello et al. (2013) showed an inverse relationship between physical activity and depression, which suggests the less physically active a person is the more likely they will have symptoms of depression. Legrand and Heuze (2007) found that exercising only once a week was not effective in decreasing depressive symptoms. Participants in their study who exercised three to five times per week may see effects similar to antidepressants (Legrand & Heuze, 2007). Supporting these findings, another study found higher depression scores in individuals who exercised two to three times per month or less compared with individuals who exercised at least two to three times per week (Hassmen, Koivula, & Uutela, 2000).

Although there was a statistical significance in the negative correlation, it was below the threshold of being practically significant. This means that the frequency of visits may not have a great enough impact to actually cause the decrease in depressive

symptoms. This could indicate a missing piece of information such as the quality of the time spent at the wellness center. There was no correlation between the amount of time spent at the wellness center and the PHQ-8. This means that a person's symptoms were not affected by whether they were at the wellness center for less than 30 minutes or for over an hour and a half.

There are two additional findings that may suggest future research. The first was whether college freshmen typically went to the gym alone or with a friend and the PHQ-8 depression category. This relationship was significant and showed that a college freshmen who went to the gym alone scored higher on the PHQ-8. This aligns with a study that shows individuals with higher depression levels were less likely to want their leisure activity to have social interaction (Blanco & Barnett, 2014). A possible reason for freshmen going with a friend having lower symptoms of depression is that they have a friend (or friend group) with whom they feel they belong. Past studies have shown that a sense of belonging has an important role in a person's experience of depression, low feelings social belonging are related to depression, and social belonging is actually a better predictor of depression than social support (Hagerty, Williams, Coyne, & Early, 1996; Hagerty & Williams, 1999). This is supported in another study that compared to social isolation, feeling lonely had stronger associations to depressive symptoms (Matthews et. al., 2016). This can have implications on the types of programs offered at wellness centers, such as ones to encourage meeting new people with similar interests.

The second finding was between the gender of the students and their PHQ-8 score. Although this was not statistically significant ($p = 0.053$), it is worth discussing the implications. Previous studies have shown evidence of females having a higher

prevalence of depression. In a study done in six European countries, 22.4% of females reported depressive symptoms compared to 13.9% of males (Angst et al., 2002). In addition, they categorized participants into 7 age groups ranging from 16 to 75 or older. Females in every age groups had a higher prevalence for major depression and, although it was not statistically significant, for minor depression as well (Angst et.t al., 2002). The National Institute of Mental Health reports similar findings, with 8.7% of female adults and only 5.3% of males reporting a major depressive episode. Even though the results from this study were not statistically significant, they were very close to being significant.

Stressors experienced by college students was referenced as an area of concern by Beiter et al. (2015). College students of all ages experience these stressors, but because they are relatively new experiences to first-semester freshmen, they may have a greater impact on students' mood and depressive symptoms. The most common stressor reported by the freshmen was the amount of coursework, followed by lack of sleep. This would make sense, since the increase in coursework might lead to students staying awake later to do homework or study. Dietary habits was also a common stressor, which could be caused by the ease of getting fast food as well as the student's parents no longer cooking for them. The stressor that was reported the least was pressure to drink or do drugs. This may be because the students do not feel they are being pressured into drinking or drug use, or because they do not feel it is necessarily a stressor.

Limitations and Future Studies

There are a few limitations to this study that should be acknowledged. First, the data consists of self-report surveys. This can result in inaccurate accounts due to memory

lapse/selective memory, recalling past events incorrectly, exaggerating or minimizing events, or bias based on social norms. Although the author tried to combat this by only asking the participants to recall the past two weeks, a future recommendation for memory lapse would be to have a longitudinal study over the course of a semester or year and have participants keep diary entries. This raises another limitation, which is that this is a cross-sectional study and therefore only shows a brief amount of information. Again, having a study with data collection over a period of a semester, year, or entire academic career can allow researchers to see how college freshmen's physical activity and depression symptoms change over this period of time. Having a longitudinal might also be able to show how student's stressors change from freshmen to senior year and how that correlates to their depressive symptoms and wellness center use.

A third limitation is the sample size and demographics. A variety of class types were selected as a part of the study to increase the range of majors; however, the ratio of males to females was not taken in to account. In addition, although different majors were analyzed, a future study could look in to the course loads for each major and the different stressors those students experience. The current study only collected data from one university with a relatively smaller sample size. Therefore, a future study could extend to more universities to provide a larger sample size.

Practical Implications

This study can provide insight into universities as a whole but more specifically campus wellness centers on how to improve the quality of time at college for students. One change that could increase participation in sport clubs, intramural sports, and group fitness classes would be to offer those programs without a fee or with a reduced cost for

students who need financial aid. Wellness centers might also offer programs that involve coming with a friend and getting a reduced fee, because coming with a friend was correlated with lower depressive symptoms. Wellness centers could also work with the university to offer seminars on healthy eating, time management, or mental health every month that would be free for students to attend or come with a coupon for a program at the wellness facility.

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APPENDIX A

**SOUTH DAKOTA STATE UNIVERSITY***Institutional Review Board*

Date: September 18, 2018

Investigator: Allison Leonard

Project Title: The Effect of Campus Wellness Center Usage on Symptoms of Depression in College Freshmen

Determination: Exempt, Category 2

Approval #: IRB-1809009-EXM

The project referenced above is exempt from further review by the Institutional Review Board (IRB) for the protection of human subjects. Exemption is claimed on number 46.101 (b) (2) of the criteria for exemption outlined in 45 CFR 46, section 101.

Note: If the project is changed, it must be re-submitted to the IRB for a determination of whether it still satisfies exemption criteria. Any unanticipated problems or adverse events must be promptly reported to the Board. The SDBOR requires that research data be retained for seven years following completion of a study, and research materials for three.

Dianne Nagy
Research Integrity and Compliance Officer

APPENDIX B

Dear SDSU Students,

The attached survey is a part of a Master's thesis project designed to understand the comprehensive benefits of participating in physical activity, specifically those programs offered on college campuses through the Wellness Center. Please take a few moments to answer the following survey regarding Wellness Center usage and mental health.

We recognize that your time is valuable and appreciate you taking the time to complete this survey as a part of an effort to better understand how facilities such as the Wellness Center impact students. Your participation in this survey is greatly appreciated, and these surveys will help to bridge a very important gap in literature.

You must be 18 years or older to participate in this thesis study. There will be no risk anticipated from participating in this survey. Your response will remain anonymous and confidential, and your participation in this study is strictly voluntary. Not participating in this survey will have no impact on your grade for this class. You will have a chance to win one of the ten \$20 Amazon gift cards by filling out the tear off page at the end of the survey and turning that in to a separate pile to ensure anonymity.

By filling out and turning in this survey, you are giving consent. This form may be kept.

If you are concerned about yourself or a friend suffering from depression or suicidal thoughts, please consider calling a crisis hotline, such as the crisis call center 1-800-273-8255.

Sincerely,

Allison Leonard
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The first grouping of questions are demographic.

Are you a first semester freshmen

- Yes No

If you answered no to the above question, what academic standing best describes you

- Second semester freshmen Sophomore
 Junior Senior

Age _____

What is your gender

- Male Female
 Non-binary Other/not listed

Are you currently or were you employed in the past month

- Yes No

Are you an:

- In state student Out of state student
 International student

Prior to the start of college, how often did you participate in sport or exercise?

- never 1-2 times per month
 1-2 times per week 3-4 times per week
 5 or more times per week

The following questions are regarding your use of the South Dakota State University Wellness Center and the programs offered there.

Do you currently use a facility other than the Wellness Center for recreational physical activity?

- Yes No

Of the following program areas offered at the Wellness Center, which have you participated in (select all that apply)

- Outdoor programming Intramural Sports
 Sport Clubs Fitness and Cardio Classes
 General fitness (weight and cardio training) None of the above

How often do you exercise at or participate in a program offered at the Wellness Center

- Never 1-3 times per month
 1-2 times per week 3 or more times per week

How long do you typically spend at the Wellness Center per visit

- less than 30 minutes 30-59 minutes
 60-89 minutes 90 minutes or more

How often do you participate in the following activities offered at the Wellness Center (only mark one per line)

	Never	1-3 times per month	1-2 times per week	3-4 times per week	5 or more times per week
Cardiovascular Training (treadmill, bike, swim) not including fitness classes					
Weight Training					
Open Recreation (pick-up games)					
Group Fitness Classes					
Intramural Sports					
Sport Clubs					
Outdoor adventure activities and/or trips (including climbing at the climbing wall)					
Personal Training					

When you go to the Wellness Center, are you more likely to

Go by yourself

Go with a friend

What are common stressors you have faced since starting the Fall Semester (check all that apply)

Being away from family

Amount of coursework

Pressure to drink or do drugs

Pressure to make new

friends

Dietary habits

Lack of sleep

Other _____

This last section is questions regarding mental health.

How often during the **past two weeks** were you bothered by...

1. Little interest or pleasure in doing things

Not at all (0)

Several days (1)

More than half the days (2)

Nearly every day (3)

2. Feeling down, depressed, or hopeless
- | | |
|--|---|
| <input type="checkbox"/> Not at all (0) | <input type="checkbox"/> Several days (1) |
| <input type="checkbox"/> More than half the days (2) | <input type="checkbox"/> Nearly every day (3) |
3. Trouble falling asleep, staying asleep, or sleeping too much
- | | |
|--|---|
| <input type="checkbox"/> Not at all (0) | <input type="checkbox"/> Several days (1) |
| <input type="checkbox"/> More than half the days (2) | <input type="checkbox"/> Nearly every day (3) |
4. Feeling tired or having little energy
- | | |
|--|---|
| <input type="checkbox"/> Not at all (0) | <input type="checkbox"/> Several days (1) |
| <input type="checkbox"/> More than half the days (2) | <input type="checkbox"/> Nearly every day (3) |
5. Poor appetite or overeating
- | | |
|--|---|
| <input type="checkbox"/> Not at all (0) | <input type="checkbox"/> Several days (1) |
| <input type="checkbox"/> More than half the days (2) | <input type="checkbox"/> Nearly every day (3) |
6. Feeling bad about yourself – or that you’re a failure or have let yourself or your family down
- | | |
|--|---|
| <input type="checkbox"/> Not at all (0) | <input type="checkbox"/> Several days (1) |
| <input type="checkbox"/> More than half the days (2) | <input type="checkbox"/> Nearly every day (3) |
7. Trouble concentrating on things, such as reading the newspaper or watching television
- | | |
|--|---|
| <input type="checkbox"/> Not at all (0) | <input type="checkbox"/> Several days (1) |
| <input type="checkbox"/> More than half the days (2) | <input type="checkbox"/> Nearly every day (3) |
8. Moving or speaking so slowly that other people could have noticed. Or, the opposite – being so fidgety or restless that you have been moving around a lot more than usual
- | | |
|--|---|
| <input type="checkbox"/> Not at all (0) | <input type="checkbox"/> Several days (1) |
| <input type="checkbox"/> More than half the days (2) | <input type="checkbox"/> Nearly every day (3) |

Please write your email address on the line below, tear on above dotted line, and hand in for a chance to win an amazon gift card. The address will only be used to contact gift card winners, and will not be used for any other purpose.
