

Comparing Depression, Anxiety, and Stress in Male vs Female Collegiate Student Athletes
during the COVID-19 Pandemic

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Abstract

The COVID-19 pandemic caused a shutdown that affected collegiate sports worldwide and continues to affect male and female student athlete's mental health. The dominant explanation for this has been forced social distancing and learning as well as gender specific responses to change. Data suggests that females are more likely to score higher on mental health screenings and questionnaires as females are more likely to internalize the vicissitudes of college. Recent studies have provided research to display how student-athletes differ from non-athletes regarding their mental health. However, research is limited regarding the pandemic affects athletes based on gender. We used the Depression Anxiety Stress Scale (DASS-21) to compare male and female intercollegiate athlete's responses to the pandemic. This research indicates there is no significant difference in mental health outcomes between male and female collegiate athletes in this setting.

Introduction

COVID-19 is the first pandemic the United States has seen since H1N1 in 2009 (CDC Website 2020). Since March 2020, many citizens have been left questioning what to do and how to cope with being asked to abide by guidelines such as physical distance and only leaving homes for necessity. With the loss of control over their lives and daily routines, overpowering feelings of doom and desperation are evident. Some may even go through the stages of grief due to an overwhelming sense of loss (Srivastava et al., 2020). According to a study done by Bullard in 2020, student athletes stated they were having an extremely hard time transitioning from face-

to-face classes to online material. Student-athletes often reported their grades were suffering and they were unable to receive the amount of help they would normally receive on campus. They felt fear over due to concerns they may not be in good enough shape when they return to sporting as many gyms and facilities have been closed, often more than once (Bullard 2020). Athletes generally report lower depression ratings than their non-athletic counterparts because they have higher internal (i.e. self-esteem) and external (i.e. social support) protective resources gained through the socialization in and through sports (Tantinen & Kristjansdottir, 2019). However, without the ability to socialize, athletes no longer have the rapport to fall back on. The ability to alleviate stress through physical activity was no longer an option for athletes and often caused a buildup of stress (Bullard, 2020). Around 33.5% of college students have clinically significant levels of depression in a cohort of both athletes and non-athletes, indicating depression is a significant health concern for college campuses (Armstrong et al., 2009).

The pandemic had many ramifications, with forced social distancing and schools closing their doors, mental health of student athletes has been called into question. Different from other pandemics, this one was accompanied by an “infodemic”- an excess of (mis) information on social media and elsewhere which was a major hazard to mental well-being (Srivastava et al. 2020). Females had a higher use of social media than males (Bullard 2020) and it is proposed that high levels of consumption of COVID-19 media likely causes additional stress for athletes (Alonzi et al 2020).. Fear of COVID-19 was clearly linked to both anxiety and depression symptomology, and those who reported more fear, also reported more mental health symptoms (Fitzpatrick et al. 2020).

Mental health of collegiate athletes deteriorated with the loss of social support from teammates, coaches, and athletic trainers due to COVID-19. As the pandemic continued, being

able to see a healthcare professional has been increasingly difficult. Appointments have been moved to a tele-health format and patients may not be getting the care that they need due to the high influx of COVID-19 patients and those with mental health distress may not be able to see the proper provider (Bullard, 2020). There is very little known about the mental health affects COVID-19 has had on athletes. The present study examined how student-athletes' mental health was associated with teammate social support, connectedness, and changes to athletic identity from before to during COVID-19.

Methods

Subjects

The study was approved from the Point Loma Nazarene University Institutional Review Board and followed the National Institute of Health standards for human research testing. Subjects provided written informed consent. Subjects were recruited from the Point Loma Nazarene University Division II collegiate sports teams and provided consent through the Athlete Monitoring Initiative (AMI). Subjects were required to meet the following inclusion criteria: male or female collegiate athletes, between 18 and 25 years of age, must be available for all data gatherings.

Procedure

Subjects completed a questionnaire consisting of the Depression, Anxiety, and Stress Scale-21 items or DASS-21, (Lovibond and Lovibond 1995) in their 2020-2021 school year. Using a Google form emailed to them from an athletic trainer, athletes answered the DASS-21 regarding how they felt before they arrived on campus, and how they feel arriving back to campus. The questionnaire was administered once in the fall, when the teams arrive for their

conditioning sessions and once in the spring, when the teams arrive back onto campus. The date of administration was different for each sport as they arrived on different days. The questionnaire asked the athletes to fill out the DASS-21 by reflecting on two different time points in the last year. The first was how they felt when they were home and the second was how they feel now that they have returned to campus. This study looked at the first time point reflection of how athletes felt when they were required to go home before the Fall and Spring semesters.

The appointed athletic trainer will review the results of each of the questionnaires. The athletic trainer rid data of all identifying factors of the student-athletes and gave the unidentified data to the lead investigator who ran the data. The subjects were placed into categories based on the DASS-21 scale. The DASS-21 uses five subscales: normal, mild, moderate, severe, and extremely severe. After subjects were placed into DASS-21 subscales, the data points were compared using the Ronk et al. (2013) distribution model. Based off the Ronk et al categories, subjects were classified into one of three categories, (a) *improved*, when a patient has made a positive change into an adjacent range; (b) *unchanged*, when a patient has not made a change in either direction, or (c) *deteriorated*, when a patient has made a negative change. These changes are based off the DASS-21 rating chart and whether a subject moved into a new category over time. For this study, we defined depression, anxiety, and stress in the words of Lovibond & Lovibond (1995) who created the DASS-21. Depression is characterized by a loss of self-esteem and incentive and associated with a very low perceived probability of attained personal life goals of significance to the individual. Anxiety involves longer term anticipation of negative events which typically, but not exclusively, are psychological in character. Stress is conceived as a persistent state of over-arousal which reflects continuing difficulty in meeting taxing life demands (Lovibond & Lovibond 1995).

All athletes who were noted to have increased anxiety, depression, or stress at any point (anyone over moderate according to the DASS-21) were red-flagged and seen by the appointed athletic trainer for those with higher symptomology. They were consulted and asked if they wanted further help in reaching out to someone who can better help them with their mental health. This was not a variable in this study, however, for medical purposes it is believed that this is needed for the athlete's wellbeing.

Equipment and Materials

Subjects used their own personal handheld mobile devices for completion of the questionnaires which were sent through Google Form by an investigator the day of testing.

Symptoms of anxiety, stress, and depression were measured through the Depression Anxiety Stress Scales (DASS-21) which is a 21-item self-report scale. Subjects must rate the extent to which each statement applies to them on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (very much applied to me). Due to the DASS-21 being a shortened version of the original DASS (42 item), each scale is multiplied by 2 and evaluated according to its severity with a maximum score of 42. The DASS-21 provides researchers with reliable and valid operationalization of mental health during the COVID-19 pandemic.

Data Analysis

Descriptive statistics (means \pm SD) for all responses to each of the DASS-21 scales were calculated across time (1st and 2nd time reflection) and sex (male vs female). An independent t-test was completed to compare the mean scores of depression, anxiety, and stress between sexes.

A chi-square analysis was used to determine the association between sex and the changes in DASS-21 categories (improved, unchanged, deteriorated). Using R Studio, a chi-square analysis was completed to examine the effects of the independent variables, time and sex, on the dependent variables: depression, anxiety, and stress. The DASS-21 uses five subscales (normal, mild, moderate, severe, extremely severe) where it places subjects based on the number they receive when answering the questions. We then compared the athlete's category for Fall and Spring and put them into three new categories. Subjects were placed into one of three classifications, (a) *improved*, when a patient made a positive change into an adjacent range; (b) *unchanged*, when a patient has not made a change in either direction, or (c) *deteriorated*, when a patient made a negative change. All statistical analyses were done at a significance level of 0.05 determined *a priori*.

Results

A total of 114 collegiate student athletes (61% female and 39% male) took part in this study with ten of eleven sports teams represented. In Table 1, deviations are shown in the total scores for males and females over the DASS-21 categories with mean and standard deviation. All means are less than the normative data put forth by Lovibond and Lovibond (1995). The only significant difference of change between males and females was with comparison of original DASS-21 scores. Stress was the only significant category when comparing between male and female scores using an independent t-test at a difference of 0.043 ($p = 0.05$). In the present study, 12% of subjects presented with two or more disorders according to the DASS-21 questionnaire and 8% presented with all three simultaneously.

There were no significant changes in the rates of symptomology between males and females in the fall vs. the spring based on the modified scoring categories from Ronk et al.

(2013). Most subjects remained unchanged regarding their DASS-21 scoring for depression (99%), anxiety (93%), and stress (89%). The percentages of subjects classified into each category on each DASS-21 scale are shown in Table 2 and Figure 1. It is important to note that 20 (29%) females and 5 (11%) males were red flagged for having high scores (anything over moderate) in at least one category in the Fall as seen in Figure 2. In the Fall, 39% of athletes present with any symptomology above normal while 31% of students presented with above normal symptomology in the Spring.

Table 1. Total scores from the DASS-21 and by gender for Fall and Spring with descriptive statistics

Dass-21	Categories	Total ^F (n=114)	Men ^F (n=45)	Women ^F (n=69)	Total ^S (n=114)	Men ^S (n=45)	Womens ^S (n=69)
DASS-D ^a	Normal	79 (69.2%)	39 (86.6%)	40 (57.9%)	92 (80.7%)	42 (93.3%)	49 (71%)
	Mild	10 (8.7%)	2 (4.4%)	8 (11.5%)	12 (10.5%)	2 (4.4%)	11 (15.9%)
	Moderate	17 (14.9%)	2 (4.4%)	15 (21.7%)	7 (6.1%)	1 (2.2%)	6 (8.6%)
	Severe	4 (3.5%)	0 (0%)	4 (5.7%)	2 (1.8%)	0 (0%)	2 (2.9%)
	Extremely Severe	4 (3.5%)	2 (4.4%)	2 (2.8%)	1 (.87%)	0 (0%)	1 (1.5%)
Score. Mean ± SD		3.7 ± 3.9	2.1 ± 3.2	4.7 ± 3.9	2.4 ± 3	1.2 ± 1.9	3.2 ± 3.3
DASS-A ^b	Normal	88 (77.2%)	39 (86.7%)	49 (71%)	94 (82.4%)	39 (86.7%)	55 (79.7%)
	Mild	9 (7.9%)	5 (11.1%)	4 (5.8%)	6 (5.3%)	3 (6.7%)	3 (4.3%)
	Moderate	13 (11.4%)	1 (2.2%)	12 (17.4%)	9 (7.9%)	3 (6.7%)	6 (8.7%)
	Severe	2 (1.8%)	0 (0%)	2 (2.9%)	2 (1.8%)	0 (0%)	2 (2.9%)
	Extremely Severe	2 (1.8%)	0 (0%)	2 (2.9%)	3 (2.6%)	0 (0%)	3 (4.3%)
Score. Mean ± SD		2 ± 2.6	1.2 ± 1.5	2.5 ± 3.1	1.8 ± 2.6	1.4 ± 1.8	2.1 ± 2.9
DASS-S ^c	Normal	97 (85%)	44 (97.7%)	53 (76.8%)	106 (92.9%)	43 (95.6%)	63 (91.3%)
	Mild	9 (7.8%)	0 (0%)	9 (13%)	7 (6.14%)	2 (4.4%)	5 (7.2%)
	Moderate	7 (6.1%)	1 (2.2%)	6 (8.7%)	0 (0%)	0 (0%)	0 (0%)
	Severe	0 (0%)	0 (0%)	0 (0%)	1 (.87%)	0 (0%)	1 (1.4%)
	Extremely Severe	1 (.87%)	0 (0%)	1 (1.45%)	0 (0%)	0 (0%)	0 (0%)
Score. Mean ± SD		4.1 ± 3.3	2.4 ± 2.4	5.2 ± 3.4	3 ± 2.6	2 ± 2.2	3.8 ± 2.7

(^a)DASS-D: 7-item DASS-21 Depression Subscale. (^b) DASS-A: 7-item DASS-21 Anxiety Subscale. (^c) DASS-S: 7-item DASS-21 Stress Subscale. (F): Fall Term. (S): Spring Term.

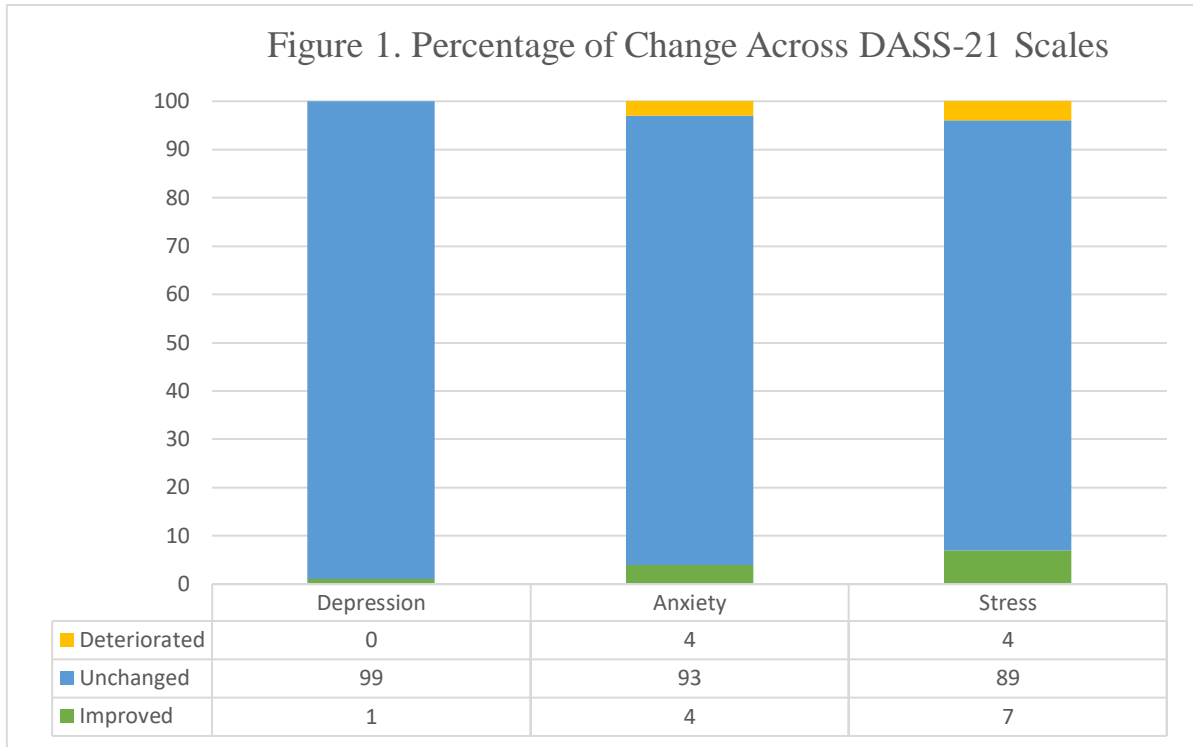
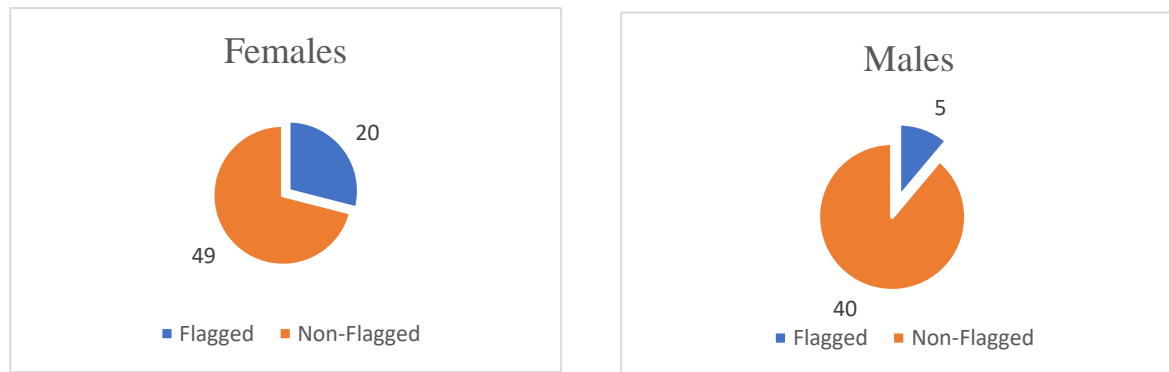


Table 2
Rates of Improvement, Unchanged, and Deterioration Across DASS-21 Scales in a Sample of 114 Student-Athletes

Classification	Depression Scale (%)	Anxiety Scale (%)	Stress Scale (%)
Improved	1%	4%	7%
Unchanged	99%	93%	89%
Deteriorated	0%	4%	4%

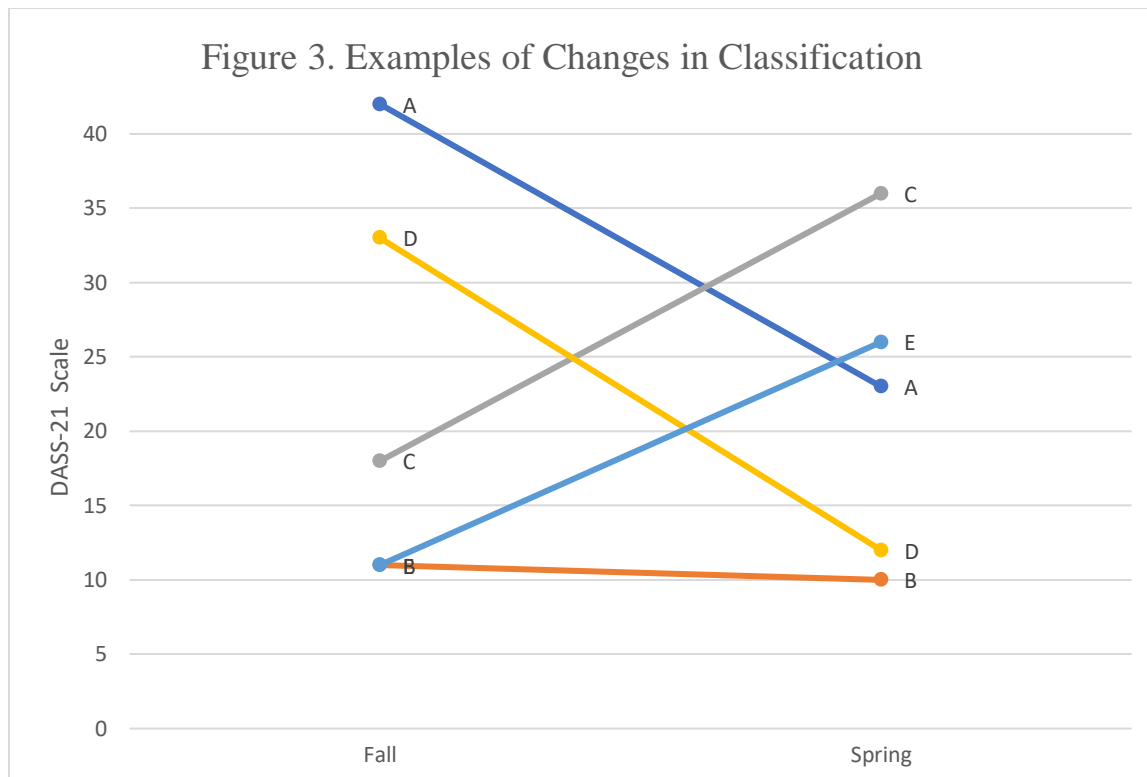
Note. DASS-21= 21-item Depression Anxiety Stress Scales (P.F. Lovibond & Lovibond, 1995)

Figure 2. Number of Flagged Male and Female Athletes vs Non-Flagged Athletes for Fall



The chi-square analysis showed that there was no association between the changes in categories and sex and there was no change between sex. The p-value for the Depression was 0.635, Anxiety it was a 0.296, and Stress was a 0.417 showing that there was no statistically significant relationship between sex and change in categories.

Figure 3 shows five patients' Fall and Spring depression scale scores that have been selected and plotted to illustrate five different profiles. Patient A has moved into the improved category as their jump from 42 to 23 was large enough to move them into the next category. Patients B, D, and E were categorized as unchanged as their changes in number was not large enough to put them into a new category. Patient C was categorized as deteriorated as their increase in symptoms from 18 to 36 was enough to change into a higher category.



Discussion

The aim of this current study was to assess the mental health disparities between male and female collegiate athletes during the COVID-19 pandemic and provide evidence for healthcare professionals, coaches, and athletic staff on mental health concerns as it relates to gender. Although the DASS-21 cannot be used to diagnose mental health disorders, it is a helpful tool to identify the prevalence of symptoms as it uses a dimensional rather than categorical conception of psychological disorder. In this population, there were minimal changes in prevalence of depression, anxiety, and stress. The prevalence of symptoms for depression, anxiety, and stress in this population were noted over two time points. During Fall 2020, 21% (24) of participants reported symptoms of depression, 14% (17) reported symptoms of anxiety, and 7% (8) reported symptoms of stress. During Spring 2021, 7% (9) of subjects reported symptoms of depression, 9% (13) reporting symptoms of anxiety, and 1% (1) reported symptoms of stress. Ramon-Arbues et al. (2020) reported similar rates of depression in college students compared to our Fall time point at 18.4%. However, the rates of anxiety (23.6%) and stress (34.5%) are significantly higher than those reported in this study. They also reported that 22.5% of their subjects presented 2 mental disorders and 9.7% reported all of them simultaneously. In the present study, 12% of students had 2 mental disorders while 8% reported all simultaneously in Fall 2020. In Spring 2021, only 2% of student had 2 mental disorders while 5% reported all simultaneously. Although these studies show some similarity in the reporting of symptoms in the Fall, the Spring showed only a few students who had a decreased in symptoms, the majority were unchanged.

Males and females differ in prevalence rates for specific mental health disorders (Eaton et al. 2012). This is because women tend to ruminate more frequently than men, focusing

repetitively on their negative emotions and problems rather than engaging in more active problem solving (Eaton et al 2012), as well as internalizing the effects of stressful situations or negative feedback (Storch et al. 2005). Female athletes may be exposed to a greater number of stressors during their collegiate careers than male athletes. They may also internalize the changes of collegiate athletics differently than male and non-athletes (Storch 2005), as women often present with internalized symptoms while men display more sensitivity to their external career and goal-oriented factors (Albert 2015). After the declaration of the COVID-19 pandemic, women were noted to have higher levels of depression and anxiety likely due to high levels of consumption of COVID-19 media, disproportionate economic impact, and increased domestic responsibilities (Alonzi et al 2020). Women were also more likely to have fear about COVID-19 which is linked to depression and anxiety symptomology (Fitzpatrick, Harris, and Drawve 2020). The NCAA noted in their Wellness Survey that women were more likely to indicate that the time away from college sports in the spring and summer negatively impacted their mental health as well as physical conditioning as compared to men, however there was an increase in men's feelings of sadness, loneliness, hopelessness, and anger as compared to the previous survey (NCAA 2020). Tahtinen and Kristjansdottir (2019), reported that women were more likely to have both anxiety and depression than their male counterparts, however, athletes had lower levels of both than non-athletes when using the General Anxiety Disorder 7 (GAD 7) screening. Unfortunately, the use of a different screening tool does limit the comparability of these findings.

Most athletes participating in the present study did not change categories according to the DASS-21 and there was no significant change within the chi-square analysis of the Ronk et al. categorical data. Many athletes continued to stay in their original category through both time

points, leading to 99% being unchanged for depression, 93% being unchanged for anxiety, and 89% being unchanged for stress after using the categories described by Ronk et al (2013). Many of the subjects did not have a change in their mental health over the course of the two time points. This could be because the athletes were already back on campus and therefore felt some relief from the stress and difficulties that they experienced at the start of the pandemic. The athletes in this study returned to campus in the Fall of 2020 amid strict COVID-19 regulations to complete 8-week conditioning sessions with their teammates, coaches, and strength and conditioning staff. With their return to campus in the Spring, female athlete's depression scores categorized as moderate decreased by 15%, their stress scores decreased by 9%, and their anxiety scores decreased by 8%. Although these numbers weren't necessarily significant, these findings align with those reported by Hagiwara et al. (2017), which show female college students gain mental health benefits from giving and receiving social support and require more social support to reduce stress than males. Although there was only a significant change in the means of stress between males and females (0.043), the percentage change over time for females was higher than that of males due to their lower prevalence of symptomology.

It is also worth mentioning that this is a private college institution and that although there was no significant difference between males and females, this demographic had much lower rates of scores compared to the normative data put forth by Lovibond and Lovibond (1995). This may show that those in private religion-based institutions gave students more social connections and help throughout the COVID-19 pandemic, that they did not experience the levels of depression, anxiety, and stress that other student-athletes at public institutions may have.

Limitations

This study is not without limitations. Firstly, the students completed the questionnaires once they had returned to back to campus and the student's mental health may have changed from when COVID-19 regulations were first introduced. This could also have changed the outcomes because athletes were asked to think back regarding how they felt before they arrived on campus which may have skewed their answers to the DASS-21 questions as it was not about how they were currently feeling. Secondly, not all athletes were present on campus at the time the questionnaires were completed and therefore those athletes could have had more mental health disparities than their counterparts who were able to make it back to campus. Thirdly, the DASS-21 is a useful tool in identifying symptomology of those who are depression, anxious, or stressed and may be at risk. However, as it does not give a formal diagnosis, additional tools would be required. Finally, the data collection for this study was over a 5-month time span and there were likely different life and academic conditions for college student athletes. New COVID-19 regulations throughout that period in differing states could also have affected athletes as they had the possibility of returning home during this time frame. In the Spring, athletes completed the questionnaire at different time periods as regulations required a gradual return possibly impacting what was reported on their DASS-21 screenings.

Conclusion

This study provides preliminary findings on mental health between male and female student athletes at the division II level during the COVID-19 pandemic. There was minimal evidence found that females had a higher prevalence of DASS-21 symptomology than males. The reduction in stress was the only symptom change that was significantly different between males and female student athletes. Considering there were a higher percentage of females in each

mental health category, it is still important to prioritize mental health accessibility as well as social support systems. More studies are warranted to find if different periods of social distancing guidelines affected male and female student athlete differently as other schools experienced longer distancing periods. Future research should study how student athlete's mental health has improved since the beginning of the COVID-19 pandemic and what lifestyle attributes helped them most.

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