



An Intervention for Mental Health Issues in College-Student Athletes: A COVID-19 Pandemic
Quantitative Study

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**An Intervention for Mental Health Issues in College-Student Athletes: A COVID-19
Pandemic Quantitative Study**

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Abstract

The COVID-19 pandemic has wreaked havoc internationally, domestically, and more specifically, it has significantly affected collegiate student-athletes, since the spring of 2020. The purpose of this study was to determine if a student-athlete focused mindfulness intervention could have an impact on mental health concerns during the COVID-19 pandemic return to sports in 36 Division I and Division II women's basketball student-athletes. A single group pretest-posttest study design utilizing the DASS-21 and two mindfulness interventions was conducted between March 2021 and January 2022. Results showed that participants had significantly less stress post-intervention compared to pre-intervention, $p = .019$. Additionally, there was a statistically significant difference in stress change scores by psychologist history, $p = .031$. Those who had not seen a psychologist had significantly greater change (improvement) in stress scores than those who had a history of seeing a psychologist. In addition, there was a significant difference in change scores between students who were quarantined and those who were not quarantined, $p = .042$. Those who were quarantined had greater change (improvement) in their stress scores relative to those who were not quarantined. Future research should look at mental health interventions in conjunction with athletic performance, other genders and over the span of one basketball season. Additionally, following up with abnormal mental health screenings from pre-participation exams and implementing mindfulness interventions could be beneficial. Implications for mindfulness interventions should be carefully selected, administered, and can be used to help smaller institutions with limited mental health resources in stressful/ non-pandemic times.

Keywords: mindfulness, COVID-19, pandemic, DASS-21, depression, anxiety, stress, student-athletes, women's basketball

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An Intervention for Mental Health Issues in College-Student Athletes: A COVID-19 Pandemic Quantitative Study

Student-athletes are prone to stress due to the pressure of juggling academics, sports, and social demands (Shannon et al., 2019). They have to manage the pressure of academics while performing at a high-level in their sport (Moreland et al., 2018; Sherry & Zeller, 2014). Additionally, anxiety of performing at a high level can distress student-athletes (Mistretta et al., 2017). The demands and pressures faced by them can negatively affect their mental status. Depression has been noted to afflict around 20% of student-athletes (Sudano & Miles, 2017). Furthermore, student-athletes are more likely than non-athletes to be afflicted by substance abuse problems, eating and mood disorders, sleep disturbances, and even suicide ideation (Moreland et al., 2018; Sudano & Miles, 2017). Despite their increased risk of mental health issues, college student-athletes are unlikely to acknowledge or seek mental health treatment (Moreland et al., 2018; Sudano & Miles, 2017). Consequently, there are few programs in place at colleges and universities to address student-athlete mental health needs. There needs to be more mental health interventions for student-athletes and subsequently more buy-in from college administrators, coaches, and athletic trainers in providing student-athletes access to interventions.

Problem Statement

The National Athletic Trainers' Association (NATA) recommends their constituents (athletic trainers) and stakeholders (coaches, administrators, mental health services, student affairs, and general counsel) recognize signs and symptoms of psychological problems among their athletes and refer those student-athletes to mental health services. They also need to construct and implement better educational plans, policies, and procedures than are currently available (Neal et al., 2013). Policies and procedures may include properly identifying and

recognizing student-athletes with mental issues and appropriately referring these individuals to mental health services (Neal et al., 2013). In response to this, some athletic departments have implemented policies and procedures that require student-athletes (upon recommendation) to have mental health screenings as part of their pre-participation physical exams via their sports medicine staff (Kaminski, 2016; Kroshus, 2016; Moreland et al., 2018; Sudano et al., 2017). The National Collegiate Athletic Association (NCAA) notes the need to address mental health concerns as an intervention to address the whole person and have recommended increased hiring of sport mental health providers (Kaminski, 2016). Most student-athletes can, at minimum, seek mental health services at their institutions counseling center, but far fewer have access to specialists in athlete mental health. Help seeking behaviors in student-athletes are further complicated as some student-athletes may ignore or underreport their mental health concerns due to the stigma associated with such issues (Cox et al., 2017).

The coronavirus pandemic (COVID-19) has disrupted college campuses and athletics (Sahu, 2020). In response to the pandemic, winter and spring 2020 championships were cancelled. During this time, student-athletes reported a variety of psychological dysfunction, disturbances, and/or distress (The University of North Texas Center for Sport Psychology and Performance Excellence, 2020). Upon return to sport during the pandemic, student-athletes may have suffered additional psychological distress due to their altered participation and training schedules in their respective sport. Because of the novel nature of COVID-19, it is unknown whether mental health interventions such as mindfulness could have positively impacted student-athletes' mental health post-COVID-19 sports play restrictions and adjusted/altered schedules.

Purpose Statement

The purpose of this study was to determine if a student-athlete focused mindfulness intervention could have an impact on mental health concerns during the COVID-19 pandemic return to sports. Specifically, this study addressed the following research question: Does a mental health intervention improve self-reported mental health concerns in NCAA Division I and Division II women's basketball student-athletes during their COVID-19 pandemic return to sport related activity? To answer the research question, the following objective was addressed: To determine if a mindfulness intervention provided to women's basketball student-athletes during the COVID-19 pandemic return to sport related activity would improve mental health as measured with the Depression, Anxiety, and Stress Scale-21 (DASS-21) via subscale scores, subscale change scores, and severity based upon the DASS-21 subscale scores.

Significance of the Study

If it was found that a mindfulness intervention given to student-athletes during the COVID-19 pandemic can decrease their self-reported mental health concerns, it would provide a resource athletic department personnel could use to meet student-athlete mental health needs. Identifying mental health concerns and applying an intervention may not only improve college student-athletes' mental health, but it may also result in better athletic performance. If a mindfulness intervention improves student-athlete mental health under an extremely difficult situation like the COVID-19 pandemic, then the intervention may also be effective in less stressful times.

Literature Review

Mental Health Issues

It was suggested that when students returned to college campuses in the fall of 2020, after stay at home orders were lifted and COVID-19 sanctions were modified upon Centers for Disease Control (CDC) guidelines, there would be an increased need for counseling and mental health services (Sahu, 2020). A survey conducted in mid-July 2020 confirmed an increased prevalence of depression (Redden, 2020). There are many factors that could have resulted in an increase in depression among college students such as financial stress the COVID-19 pandemic placed on them. Students were faced with the closure of college campuses, leaving them to have to find housing, buy meals, and find resources needed to adapt to online learning. Stress was compounded with concerns of how long the pandemic would last and social injustices that were experienced by students of color with the discriminatory availability of treatment and vaccines for COVID-19 (Cao et al., 2020; Redden, 2020). All of the stresses related to COVID-19 left students vulnerable to mental health issues upon their return to campus. Unfortunately, many students (as of July 2020) reported difficulty accessing mental health care (Redden, 2020).

Under usual circumstances, student-athletes face an inordinate amount of pressure and stressors related to balancing school, sport, and social life (Egan, 2019; Moreland et al., 2018; Ryan et al., 2018; Sherry & Zeller, 2014). It was supposed that stressors experienced by student-athletes would be further exacerbated when they return to sport after the COVID-19 mandatory hiatus in collegiate sports. With the need to address the repercussions of COVID-19, the importance of addressing mental health issues in college student-athletes continues to gain momentum (Hong et al., 2018). COVID-19 significantly disrupted college athletics and ultimately cancelled winter and spring 2020 championships. During this time student-athletes reported a variety of mental health concerns (depression, psychological distress, disordered

eating, risky drinking, body dissatisfaction, sleep issues, and being dissatisfied with life) (The University of North Texas Center for Sport Psychology and Performance Excellence, 2020). Upon return to campus, students faced the cancelations or postponements of division or conference games and tournaments, which led to changes in their athletics routines such as practices, games, strength and conditioning sessions, and other countable related activities (CARAs). Andreato et al. (2020) noted that student-athletes might worry about their athletic performance when they return to school and could have an increase in tension and anxiety due to the routine change in their respective sport.

Historically, student-athletes were thought to experience fewer mental health issues (Bär & Markser, 2013). Lack of disclosure by student-athletes may have contributed to this myth (Bär & Markser, 2013; Daniel 2018; Kaminski, 2016; Moreland et al., 2018). The stigma around having mental health issues and concerns about reactions of coaches and/or teammates may play a substantial role in why student-athletes tend to underreport mental health issues (Sudano & Miles, 2017). Mental health prevalence data for college student-athletes, specifically depression, shows continued need to investigate and understand their mental health concerns to more fully understand their needs and how to provide support (Cox et al., 2017).

While underreported mental health issues have been a concern, student-athletes have begun opening up about mental health, which has allowed greater focus on effective interventions. Upwards of 33% of NCAA Division I student-athletes reported symptoms of depression and student-athletes across all divisions are just as likely to report depressive symptoms as their non-athlete peers (Cox, et al., 2017; Gorczynski et al., 2017). Female college basketball players report pressure to succeed athletically, while at the same time they also fear injury (Sherry & Zeller, 2014) and pain that follows an injury (Rizeanu & Bratu, 2018). Higher

levels of depression and anxiety can lead to higher levels of pain perception. (Rizeanu & Bratu, 2018). Identification of anxiety and depression followed by early intervention can decrease perceived pain and help with future injury prevention (Rizeanu & Bratu, 2018). Because of the risks associated with playing sports, injuries, and other pressures on student-athletes, there is a need to focus on the mental health of this population. Research regarding student-athlete mental health has been ongoing for decades and it continues to gain interest. Previous and continued research sets the stage for exploration in college student-athletes and mental health interventions; specifically, an evidence-based, whole-person management intervention addressing depression, anxiety, and stress in college athletics. A specific whole-person management intervention that has gained traction recently is mindfulness.

Mindfulness Intervention

Mindfulness, developed by Jon Kabat-Zinn in 1979 for chronic pain patients, has been defined as a state of being nonjudgmentally aware in the present moment (Janssen et al., 2018; Sharma & Rush, 2014; Wielgosz et al., 2019). Mindfulness-based interventions (MBIs) train a person to be aware of moments and feelings, enhancing their ability to focus their attention and concentration on “in the moment experience” rather than allowing feelings and thoughts to take precedent (Röthlin et al., 2016). Mindfulness-based training is considered a whole person management intervention and is gaining momentum in managing mental health issues such as depression, anxiety, and stress and has been found to improve overall well-being (Shannon et al., 2019). In a recent study, Sampath et al. (2019) utilized the DASS-21 to identify depression, anxiety, stress and the Five Facet Mindfulness Questionnaire (FFMQ) to investigate if mindfulness improved the well-being of medical students. They found mindfulness was associated with significantly lower levels of depression and stress (Sampath, 2019).

Mindfulness-based interventions can also help with other complex psychopathologies such as addictive behaviors, post-traumatic stress disorder (PTSD), and pain disorders (Gordon et al., 2015; Shonin et al., 2013). Mindfulness-based interventions have become more popular in recent years with over 75% of mental health practitioners utilizing this technique in the United Kingdom and over 2 million adults in the United States using mindfulness meditation in 2012 (Morone et al., 2017; Shonin et al., 2013).

Mindfulness and Athletes

Mindfulness techniques have been used with college student-athletes to teach them to focus their attention on feelings, sensations, thoughts, and emotions occurring in their body as they are happening (Chen et al., 2019; Mistretta et al., 2017; Röthlin et al., 2016). MBIs have been shown to reduce negative emotions, reduce perceived stress, reduce the potential for injury, increase flow, improve satisfaction with life, and reduce worry (Glass et al., 2019; Petterson & Olson, 2017). Mindfulness was initially introduced into athletics via an acceptance and commitment approach (Gardner & Moore, 2004). This approach targeted the development of nonjudgmental present-moment acceptance of present feelings and thoughts (Gardner & Moore, 2004). Since then, techniques used to train athletes in mindfulness have included yoga, various forms of meditation, workshops, mediators, and breathing exercises (Bühlmayer et al., 2017; Chen et al., 2019; Goodman et al., 2014; Röthlin, et al., 2016; Shannon et al., 2019). For example, yoga interventions have been shown to increase mindfulness and decrease stress (Goodman et.al, 2014).

There are many reasons why mental health interventions are important to student-athletes and athletics in general. Athletes at all levels experience mental health concerns as a result of a stressful lifestyle, training loads, injuries, and competitions, which can affect athletic

performance (Schinke et al., 2018). This supports the use of appropriate evidence-based psychological interventions pre-performance, during performance, and after performance (Schinke et al., 2018). Psychological skills training (self-talk, imagery, goal-setting, and arousal control) has led to an increase in athletic performance when implemented and sustained daily over the course of weeks while also being combined with additional mindfulness intervention programs such as Mindfulness-Acceptance-Commitment, Acceptance and Commitment Therapy, and Mindfulness-Based Stress Reduction (Röthlin et al., 2016). Interestingly, an internet-based mental health intervention can also be utilized in athletes to reduce stigma, increasing mental health literacy, and to improve relations with providers (Gulliver et al., 2012). Mental health interventions are not only beneficial to student-athletes; they can also benefit the stakeholders (coaches, administrators, sports medicine personnel) of athletic departments (Aaron et al., 2020). A mindfulness-based intervention can be implemented across an entire athletic department and ultimately strengthen an organization (Aaron et al., 2020).

While student-athletes suffer from mental health issues at the same rates as their non-athlete peers with stressors related to the demands of academics, athletics, and/or their social lives, the COVID-19 pandemic has made these issues even more challenging to manage. Because of these stressors, mindfulness interventions may be more useful than ever before.

Mindfulness and Basketball Athletes

Mindfulness interventions have been shown to reduce anxiety, stress, and/or depression in basketball players (Burns, 2016; Dehghani et al., 2018; Rachbach, 2019; Vidic et al., 2016; Wolch et al., 2020). Mindfulness and meditation interventions can lead to performance enhancement, decrease in sport anxiety and experiential avoidance, and decreased stress (Burns, 2016; Dehghani et al., 2018; Vidic et al., 2016). Mindfulness-training programs can also improve

mental resilience and emotional intelligence among amateur basketball players (Ajilchi et al., 2019). Specifically, on the basketball court, mindfulness-based interventions can be used to help with free-throws and shooting slumps (Rachbach, 2019; Wolch et al., 2020). Brief mindfulness interventions have actually lowered anxiety in high-pressure basketball situations, such as attempting a free-throw (Wolch et al., 2020). Also, a mindfulness-based intervention can assist Division I college men's basketball players when they experience situations like a shooting slump (Rachbach, 2019). Shooting slump is a term used in basketball to define deficits in athletic performance when issues pertaining to depression, stress, and anxiety go unmanaged i.e. mental "clutter" (Rachbach, 2019).

The existing literature and gaps in the research provide support for the current study. Current literature has examined mental health, mindfulness interventions, mindfulness and student-athletes/athletes, and mindfulness and basketball student-athletes/athletes. Previous literature provides a foundation to support college student-athletes' capacity to overcome mental health struggles given the appropriate environment, tools, and resources such as mindfulness-based interventions in the team environment. The data has provided insight into the concerns of student-athletes and opportunity for continued research related to useful interventions, particularly in Division I men's basketball. No current literature exists using the DASS-21 assessment tool and MBIs in the identified study population of Division I and Division II women's college basketball during the COVID-19 pandemic.

Method

Study Design

This was a quasi-experimental study using a single group pretest-posttest design to see if a mindfulness intervention would improve mental health issues (depression, anxiety, and/or stress) in Division I and Division II collegiate women's basketball players. Data for this study were collected online using Qualtrics (Qualtrics, Provo, UT), an online survey platform. The study took place from March 2021 to January 2022. Prior to data collection, the study was approved by the institutional review board at the University of Indianapolis.

Participants

Participants were NCAA Division I and Division II collegiate women basketball players. Inclusion criteria for this study were: undergraduate scholarship and non-scholarship women basketball student-athletes, those who had extra years of eligibility due to being redshirted, and graduate transfers (fifth year seniors). Participants who quit the team or were asked to not be a member of the team, and those who became academically ineligible during the study were removed from the study. Women's basketball student-athletes who played at a community college, junior college, or a college that was a member of the National Association of Intercollegiate Athletics (NAIA), NCAA Division III, were excluded. Student-athletes under 18 years of age were excluded from the study.

An a priori sample size estimation was calculated using G*Power 3.1 (Faul et al., 2007). Based on conducting a paired *t* test, with the following parameters, two-tailed, effect size of 0.45, alpha of .05, and power of .80, the estimated minimum sample size required was 40.

Data

Data were collected online at two different time periods, pre-intervention and post-intervention. Demographic data collected prior to the intervention included: age (years), race

(American Indian, Native, Black or African American, Asian, Hispanic or Latino, Native Hawaiian, other Pacific Islander, White or Caucasian, other race, refused answer, unknown), and student classification (freshman, redshirt freshman, sophomore, redshirt sophomore, junior, redshirt junior, senior, redshirt senior, and graduate transfer).

Data on injury history was also collected pre-intervention which included participation lost in sports during their college basketball career due to injury (yes or no), when injury occurred during their college basketball career (past or present and how long injury occurred during college (days/weeks/months). History of utilizing a psychologist and/or sports psychologist (yes or no), if yes, when (exact date and/or dates if they saw a mental health provider more than once) and for how long (days/weeks/months) was requested. A question asked if there was a mindfulness program at their school (yes, no, or unsure), if yes, a Likert-like scale of 0-5 was utilized with 0 = never used it, 1 = rarely used it, 2 = sometimes used it, 4 = used it often, and 5 = always used it. Finally, history of having COVID-19 (yes or no), quarantined due to COVID-19 (yes or no), if yes, how many times and for how long, self-isolated due to COVID-19 (yes or no), if yes, how many times and for how long, and when they returned to their sport (summer or fall of 2020). A question was asked if there was hospitalization due to COVID-19 and if so for how long. A question was also asked if the athlete had any long-term symptoms of COVID-19 (yes or no), and if yes, for how long. At both pre-intervention and post-intervention, DASS-21 scores were collected to measure the outcomes of anxiety, depression, and stress.

Instruments

For this study, the DASS-21 was used. The DASS-21 scale is self-report and was created to measure the negative emotional states of depression, anxiety, and stress (Psychology

Foundation of Australia, 2018). The DASS-21 scale includes three subscales, depression, anxiety, and stress (Psychology Foundation of Australia, 2018). All three scales consist of 7 questions which are answered on a Likert-like scale of 0-3 with 0 = never and 3 = almost always. Responses to each scale are totaled giving each one a range of scores from 0-21 (Psychology Foundation of Australia, 2018). Score cut-off values are established for all three subscales with lower scores representing normal and higher scores designated as extremely severe. The DASS-21 offers a web-based questionnaire, which is free to access, and can be administered in groups or individually (Psychology Foundation of Australia, 2018).

The DASS-21 has strong internal consistency, Cronbach's alpha coefficients of .91 for depression, .80 - .84 for anxiety, and .88 - .90 for stress among both Malaysian students and U.S. adults has been reported (Manap et al., 2019; Sinclair et al., 2011). Another study (on college-aged students) showed that total DASS-21 scores were highly correlated for measures of depression and anxiety than specific scores of depression and anxiety and also showed good coefficient omega estimates (.88 for depression, .83 for anxiety, .85 for stress) for measuring internal consistency of the DASS-21 (Osman et al., 2012). Glass et al. (2019) noted the DASS-21 had acceptable to excellent construct validity, concurrent validity, and internal consistency for all three subscales on U.S. college students while Manap et al. (2019) denoted this tool as well established, easy to use, and reliable. Other studies established that the DASS-21 and the three subscales needed additional research to provided stronger psychometric properties and its clinical usage as compared to other established instruments (Osman et al., 2012 & Sinclair et al., 2011).

Procedures

Recruitment

The primary investigator (E. B.) sent an email describing the study along with the link of the survey to the Athletic Directors (AD), women's basketball athletic trainers, and women's basketball coaches at member institutions of the Missouri Valley Conference (MVC), Ohio Valley Conference (OVC), Summit League, ASUN Conference, Southland Conference, Big Sky Conference, Metro Atlantic Athletic Conference (MAAC), Conference USA, Big Ten Conference, Western Athletic Conference (WAC), Horizon League (HL), PAC-12, Mid-American Conference (MAC), Pennsylvania State Athletic Conference (PSAC), and the Mountain East Conference, from March 2021 through December 2021. The AD and/or women's basketball athletic trainers/coach sent the email describing the study along with the survey link to all women's basketball student-athletes at their respective institutions. The women's basketball student-athletes interested in participating in the study then clicked on the link that contained the survey and informed consent.

Informed Consent

The institutional review board informed consent form was used and collected as part of the pre-intervention and post-intervention data collection surveys. A hyperlink to the survey was provided in potential participants' email and the AD, athletic trainer, coaches' email. Possible participants could not proceed through the study without first acknowledging they agreed to be in the study. Potential participants had time to examine the implications their consent had upon them as individuals and could request a video conference with the primary researcher to ask any questions they may have before consenting. Participants were required to provide informed

consent at both pre-intervention and post-intervention time periods. Those who did not agree to be in the study were taken to the end of the survey.

Data Collection

Data were collected at two separate time periods, pre-intervention and post-intervention through Qualtrics. Data collection started in March 2021 and was completed in January 2022. Prior to completing the pre-intervention survey, participants created a unique identification number that was used to link pre-intervention and post-intervention survey responses. The identification number was the first 3 letters of their father's (or mother's) name and last 3 digits of their phone number (ex. DAR-768).

Over 6 weeks, participants watched two different 3 to 10-minute mindfulness videos. The pre-intervention survey was sent out one-week prior to the intervention and collected participant demographics and characteristics, and a baseline DASS-21. Participants had two weeks to complete the pre-intervention survey. An email reminder was sent out halfway into the process to both the participant and the athletic trainer, AD, or coach. After completing the pre-intervention survey, a link to the first intervention video was sent to participants from their AD, athletic trainer, or coach via email. Participants were then directed to the Google form with the video by clicking on the link. Participants had one week to watch the first video. An email reminder was sent out 48 hours prior to the deadline to watch the first video.

One week after the deadline for watching the first video, the link became inactive and participants were provided, via email, a link to the second video. Participants were then directed to the Google form with the second video by clicking on the link. An email reminder was sent out 48 hours prior to the deadline to watch the second video. One week after the deadline for watching the second mindfulness video, participants had two weeks to complete the post-

intervention survey. An email reminder was sent out halfway into this process to both the participant and the athletic trainer/coach. Participants had to provide informed consent to complete the post-intervention survey. Next, participants confirmed if they watched the entirety of both mindfulness videos. If they did not indicate they watched at least one of the videos in its entirety, they did not progress any further in the survey. Participants were removed from the study if they did not complete both the pre-intervention and post-intervention surveys or if they did not confirm they watched at least one of the mindfulness videos. Data on participants who did not complete the study were retained and only descriptive data were analyzed (Table 7 and 8).

Intervention

The intervention for this study was watching two online mindfulness videos. After completion of the demographics and baseline DASS-21, participants accessed and watched an online mindfulness video provided to them by the primary investigator. The content of the mindfulness video included a brief introduction to mindfulness and an explanation and demonstration of one technique that can be utilized (Chen et al., 2019). A second video was available to participants one week after the deadline to watch the first video. The second mindfulness video reviewed the technique from the previous video and an additional mindfulness technique was explained and demonstrated (Chen et al., 2019). The mindfulness videos were no longer than 3-10 minutes. These videos were taken from YouTube and are free and accessible to the public. The videos were chosen to represent information from the developer of the mindfulness concept (Jon Kabat-Zinn) and two common mindfulness techniques. The first video was taken from Stop, Breathe, and Think app and was accessible on YouTube (Meditation4 SelfHealth, n.d.). This was a 3-minute video on mindful breathing to relieve stress. One expert

reviewer gave the app good reviews (Buckmaster, 2019). The second video was taken from the Calm app and was accessible on YouTube (Calm, 2016). This was a 10-minute video that focused on to “Be Present”. The Calm app is free and accessible to all Big Ten student-athletes, coaches, full-time members of the university athletic departments and the Big Ten Conference staff (Big Ten Conference, 2020).

Data Management

All precautions were made to try to ensure data collected would be anonymous and confidential and would remain so after the study ended. Data were and are currently secured privately on the primary researcher’s computer. Data from both the pre-intervention and post-intervention surveys were exported from Qualtrics into two separate Microsoft Excel spreadsheets after the post-intervention survey had been closed. Pre-intervention and post-intervention Excel files were combined into one file by linking participants’ unique identification number. Data were examined for errors and data manipulation was conducted (i.e., calculation of DASS-21 total scores).

Data Analysis

Data imported from the Excel spreadsheet were analyzed using IBM SPSS Statistics for Windows, Version 28.0 (IBM Corp., Armonk, NY). All comparisons were two-tailed and a significance level of less than .05 was considered statistically significant. Normality of data was determined using the Shapiro-Wilk test and visual inspection of histograms, Q-Q plots, and boxplots. Descriptive statistics was conducted to describe the sample and the outcome constructs (depression, anxiety, and stress). Nominal data (gender, race, student classification, injury history, psychologist/sport psychologist history, mindfulness program, COVID-19 history, and quarantine history) was reported as frequencies and percentages. For comparison purposes, due

to limited responses in categories in three variables, race, student classification, and if there was a mindfulness program at their school did they use it, were collapsed. For race, the “Other” category was assigned to the “African-American” category; for student classification, the categories were collapsed into “redshirt” and “non-redshirt”. Because the majority of participants (77.8%) were unsure whether they had a mindfulness program, the variable wasn’t used for comparisons.

Interval and ratio data (age and three subscale DASS-21 scores) were reported as medians and minimum and maximum values. To determine if there was a change in the three subscale DASS-21 scores after participating in the mindfulness intervention, Wilcoxon signed-ranks tests were used due to the data not being normally distributed. Change scores were calculated by taking each of the three subscale DASS-21 post-scores minus the three subscale DASS-21 pre-scores. Comparison of DASS-21 subscale change scores was conducted by using Mann-Whitney U tests while comparison of severity based on DASS-21 subscale scores were conducted by utilizing marginal homogeneity tests. Correlations between DASS-21 subscale scores, age, and missed playing days were analyzed by using Spearman rho tests.

Results

A total of 106 student-athletes responded to the pre-intervention survey, 76 (70.4%) watched the first intervention video, 53 (49.1%) watched the second intervention video, 44 (40.7%) completed the post-intervention survey; however, only 36 (33.3%) completed the pre-intervention survey, one or both interventions, and the post-intervention survey. (Descriptive statistics are presented in Tables 1 and 2.) The median age was 20.5 years and the majority of the sample was African-American (52.8%), sophomores (30.6%), and had a history of injury (61.1%). Additionally, the majority of the sample had not utilized a psychologist (72.2%) and

most were unsure if their school had a mindfulness program (77.8%). Finally, a majority did not have a history of testing positive for COVID-19 (55.6%); however, the majority had been quarantined (55.6%). The median number of days missed due to injury in their college basketball career was 10.5, days spent self-isolated due to being COVID-19 positive was 10, and the number of COVID-19 quarantine (due to being a close-contact to someone that was COVID-19 positive) days was 17.5.

A total of 70 student-athletes did not complete the study (Comparisons between those who completed the study and those who did not complete the study are presented in Table 7 and 8). The majority of the sample was white (52.9%), freshmen (31.4), and had a history of injury (62.9%). Additionally, the majority had not utilized a psychologist (81.4%), while most also were unsure if their school had a mindfulness program (60%). Finally, a majority did have a history of testing positive for COVID-19 (52.9%) and the majority had been quarantined (81.4%). The median age was 20 years, number of days missed due to injury in their college basketball career was 42, days spent self-isolated due to being COVID-19 positive was 10, and the number of COVID-19 quarantine (due to being a close-contact to someone that was COVID-19 positive) days was 14.

Of note, there were 8.5% more African-Americans that completed the study than their white counterparts. 11% more sophomores completed the study while 14.6% more seniors dropped out of the study. Also, 9.2% more participants who completed the study had a history of utilizing a psychologist/sports psychologist while 17.8% more participants who completed study were unsure if their school had a mindfulness program. Interestingly, 25.9% more of participants who did not complete study had a history of quarantine and tested positive for COVID-19 (8.5%). Interestingly, those who completed the study missed 31.5 less days due to injury but

were quarantined for 4 more days. The two-sided Fisher's exact test indicated there was a statistically significant difference ($p = .006$) in quarantine history between those who completed the survey versus those who did not complete the survey. Finally, there was a significant difference in COVID-19 isolation days between those who completed the survey versus those who did not complete the survey, Mann-Whitney U test, $Z = -2.12$, $p = .044$.

Pre-intervention and Post-intervention Comparisons By DASS-21 Subscales

To determine if there was a change in depression, anxiety, and stress, after participating in a mindfulness intervention, pre- and post-intervention DASS-21 subscale scores were compared. Since data were not normally distributed, DASS-21 scores were compared using the non-parametric Wilcoxon signed-ranks test. As can be seen in Table 3, there was not a significant difference in depression and anxiety scores after participating in the intervention and effect sizes were weak for depression and negligible for anxiety. For stress, post-intervention scores were statistically significantly smaller compared to pre-intervention scores, signed-ranks test, $Z = -2.34$, $p = .019$, with a moderate effect size.

To determine if there were differences in the level of severity between pre-intervention and post-intervention results, severity scores were compared using marginal homogeneity tests. As reported in Table 4, there was no significant change in severity based on depression ($p = .537$), anxiety ($p = 1.000$), and stress ($p = .157$) subscale scores.

Comparison of DASS-21 Subscale Change Scores by Student Demographics, Characteristics and COVID-19 History

Comparisons were made between student demographics and DASS-21 subscale change scores (Table 5). There was not a significant difference in change scores for most student demographics, student characteristics, and COVID-19 history results including: race, student

classification, injury history, and COVID-19 occurrence. However, there was a statistically significant difference in stress change scores by psychologist history. Those who did not see a psychologist had significantly greater change (improvement) in stress scores than those who had a history of seeing a psychologist, Mann-Whitney U test, $Z = -2.14$, $p = .032$. In addition, there was a significant difference in change scores between students who were quarantined and those who were not quarantined. Those who were quarantined had greater change (improvement) in their stress scores relative to those who were not quarantined, Mann-Whitney U test, $Z = -2.03$, $p = .043$.

Correlations Between DASS-21 Subscale Change Scores and Age and Missing Playing Days

Correlations were calculated between age, injury history missed playing days, COVID-19 self-isolation days, COVID-19 quarantine days, and DASS-21 subscale change scores (Table 6). For depression subscale scores, correlations ranged from negligible ($r = -.03$) to weak ($r = .28$) with neither correlation reaching statistical significance. The correlations for anxiety subscale change scores also ranged from negligible ($r = .02$) to weak ($r = .28$) with neither correlation reaching statistical significance. For stress change scores, the correlations were negligible for age and COVID-19 change scores, $r = -.02$, $r = .05$, respectively. However, Spearman rho tests showed a statically significant weak positive correlation between injury history missed days and stress change scores, $r = .32$, $p = .048$.

Discussion

The COVID-19 pandemic wreaked havoc on college athletics and unfortunately new variants, such as Omicron, continued to postpone, cancel, and alter basketball practices and games into 2022 (The University of North Texas Center for Sport Psychology and Performance Excellence, 2020). Additionally, student-athletes were subjected to further disruptions such as

relocated campus housing situations, virtual and/or altered academic courses, and quarantined and/or self-isolated due to exposure or having COVID-19 again (The University of North Texas Center for Sport Psychology and Performance Excellence, 2020). The stressors of student-athletes have now been compounded for a longer period of time with policies in place for vaccinated and unvaccinated individuals. Furthermore, unvaccinated student-athletes had to adhere to additional policies when they came in close contact with a positive individual and could have had to quarantine and face additional testing if they became symptomatic. Moreover, elapsed time since initial vaccine dose may have led to additional self-isolation despite previous infections. Due to these increased instances of quarantines, self-isolations, and detachment from their teams, there has been an additional call for mental health interventions to help combat mental health issues (Bullard, 2020). Because of all the added COVID-19 stressors, in conjunction with the already busy schedule that student-athlete have, there was a need to explore ways to reduce these and other mental health issues. In turn, this study surveyed NCAA Division I and Division II collegiate women's basketball players to explore whether a mindfulness intervention could improve their perceived depression, anxiety, and stress.

Demographics and COVID-19 History

Tables 1 and 2 explain the demographics, COVID-19 history, along with missed playing time either due to injury or due to COVID-19 (quarantined or self-isolation). The majority of participants in this study were Division 1 and Division II, African-American, sophomores that missed playing time due to injury and/or due to COVID-19 (quarantined or self-isolation). Of particular note, a majority did not utilize a psychologist/sports psychologist and were unsure if their institution had a mindfulness program. Specifically, the demographics of this study are homogenous in nature as were a couple other studies that also focused on female women's

basketball players (Dehghani et al., 2018; Vidic et al., 2016). In 2019, the Institute for Diversity and Ethics in Sport (TIDES) released the 2019 College Racial and Gender Report Card, which showed that in 2020-2021, 40.6% of Division I women's basketball student-athletes were African-American (Lapchick, 2021). Also, importantly a much larger study showed there was also a lack of counseling across the COVID-19 time points that reflected ongoing mental health issues in student-athletes (especially African-Americans) and the lack of resources available (The University of North Texas Center for Sport Psychology and Performance Excellence, 2020). Notably, the present study has similar percentages of African-Americans compared to all of Division I women's basketball, while also being the largest group with ongoing mental health issues. Our study also found similar findings in retrospect to utilization of a psychologist/sports psychologist and their awareness of a mindfulness program.

Pre-Intervention and Post-Intervention Comparisons

This study focused on women's basketball student-athletes and encompassed two seasons in a non-controlled environment. This non-controlled environment had many external factors that could have contributed to depression, anxiety, and stress, with the addition of COVID-19, and the many policies and procedures associated with the NCAA and the individual institutions. As seen in Table 2, the population missed playing time due to injuries and COVID-19 related quarantines and self-isolations. Pre-COVID-19, sports anxiety was alleviated in a mindfulness-based intervention that primarily utilized women's basketball athletes (Dehghani et al., 2018). In a non-controlled environment, and pre-COVID, other female sports, like tennis, had an improvement in anxiety scores after a 4-week mindfulness intervention but not stress, which could have been attributed to a small sample size and non-randomization (Li, et al., 2019) while rowers reduced their stress after an 8-week mindfulness based intervention (Jones et al., 2020).

These aforementioned pre-COVID-19 studies were highly influential in forming the hypothesis that mindfulness-based studies can alleviate stress or anxiety in student-athletes.

This study utilized mindfulness intervention(s) to examine if there would be a change in DASS-21 subscale (depression, anxiety, and stress) scores. The results can be found in Table 3. As hypothesized, there was a significant difference in at least one subscale - namely, the stress subscale was notably lower. However, there was no significant reduction in either the depression subscale or the anxiety subscale. Interestingly, it is not uncommon for one or two of the subscales of the DASS-21 (depression, anxiety, and stress) to be reduced while also seeing little change in a third while using similar mindfulness-based interventions and self-reporting tools. Programs such as yoga and meditation with other similar self-reporting tools improved mental health in regular students in as early as 6-weeks (Lemay, et al., 2019). This particular study utilized two internet/web-based applications to deliver the mindfulness-based interventions, which has been a supported distribution method (Hoffman & Gomez, 2017) and also was successful in reducing depression and anxiety (Gulliver, et al., 2012). Additionally, targeting specific mindfulness-based interventions could have helped with obtaining the results i.e. some interventions could specifically help with stress, anxiety, and/or depression (Shonin et al., 2013).

Comparisons of Severity Based on Subscale Scores

As noted in Table 4, there were no significant findings when looking at frequency and percentage for severity from pre-intervention and post-intervention based upon the DASS-21 subscale scores. The majority of the population's subscale scores would have been classified as normal while other severity scores varied from no change, improving, or worsening. Even as early as 2021, there were more noted mental health issues in college-students, especially females with suggestion of needing professional psychological therapy and counseling (Chen & Lucock,

2022). As stated before, the Omicron variant, vaccination vs. non-vaccination policies and procedures were external variables that presented themselves during this study, which could have made scores worse. Additionally, not having the mental health resources/lack of knowledge about mental health resources could have also accounted for DASS-21 scores not improving in certain categories. For example, specifically looking at anxiety severity scores, five more subjects ended up normal post-intervention and seven improved to mild post-intervention but three more ended up severe post-intervention. Specifically, looking at stress severity scores, three more subjects ended up normal post-intervention while three improved in the moderate category and two improved in the moderate category while two unfortunately got worse in the mild category. Having more subjects that were not classified in the normal category along with having more interventions sessions could possibly improve “abnormal” severity scores.

DASS-21 Subscale Change Scores

Table 5 compares participant demographics, COVID-19 history, and the DASS-21 subscale change scores while Table 6 examined any correlations between age, missed playing time, and DASS-21 subscale change scores. Interestingly, those who were quarantined had improvement in their stress scores relative to those who were not quarantined, while those who did not see a psychologist had improvement in stress scores than those who had a history of seeing a psychologist. A constant theme revolving around scores getting worse is the fluidity of COVID-19 over the past two years regarding policies and procedures and the sheer number of days that participants were being subjected to quarantine. Table 2 shows that participants quarantined from 7 to 56 days. Being quarantined and isolated from others for as potentially long as 2.5 months could have devastating mental health repercussions on anyone. During these times, social media could be assumed as the primary means to pass the time. Interestingly, more

exposure to social media led to worsening mental health in Chinese college students (Zhao & Zhao, 2020). Contrastingly, because of the potential of more than normal utilization of social media and completing our web-based mindfulness-based intervention could in fact have contributed to scores improving. This could be due to quarantined participants already being subjected to more social media i.e. on their device more and had the ability to pay attention to the intervention without distraction. Additionally, being quarantined over holidays and other special events could have decreased stress if they completed one intervention before they were quarantined. The worsening of mental health with little background of preexisting mental health issues were exacerbated over the pandemic i.e. previous traumas, lack of family and friend interactions, and decreased exercising could have all been a relevant factor for better scores while quarantined (Robillard et al., 2021). Scores worsened with participants not in quarantine. This might have been due that they were able to live a “normal” life, dealt with the everyday stressors of school, athletics, and socializing and maybe did not pay attention to the mindfulness intervention. Participants who never had a history of interactions with a psychologist/sports psychologist had better improvement in stress scores than those that did have an interaction with these mental health providers. The importance of both these mental health providers are without question in athletics. Those participants who never had access to a mental health counselor had improved stress change scores with the mindfulness-based interventions. The results indicate the importance of a mental health counselor and it evidently had better effects on those participants than our mindfulness-based interventions, thus there was no improvement. The importance of mindfulness-based interventions being directed by a mental health professional might have prevented those results we found. Due to the COVID-19 pandemic, mental health resources were stretched thin. Mental health professionals directing college programming e.g. mindfulness-

based programming can not only be preventative and psychoeducational but also cost efficient and effective (Seppala et al., 2020). Table 6 shows a correlation between injury history, missed days, and stress change scores. COVID-19 and injuries can contribute to student-athletes missing practice and/or games. Table 2 indicated that participants have missed 2.5 days to near three-quarters of a year due to injury. Mindfulness has been shown to not only improve mental health but to reduce injury and even facilitate recovery from injury (Anderson et al., 2021). Injuries were common following the COVID-19 pandemic shutdown of sports and throughout the past two years. One German soccer team saw an increase in muscular injuries returning from the COVID-19 pandemic shutdown in 2020 (Sheshardi et al., 2021). Domestically, Major League Baseball (MLB) saw the incidence rate of injuries twice the rate as compared to 2 seasons before (Platt et al., 2021). The NCAA is currently collecting its injury data over the COVID-19 pandemic via their injury surveillance program (Parsons et al., 2021).

Limitations and Barriers to the Study

The COVID-19 pandemic has affected two seasons for women's basketball student-athletes and the study looked at participants over the span of the 2020-2021 season, the summer of 2021, and the 2021-2022 season. Issues like the transfer portal, job turnover, athletes graduating, and sitting out and/or quitting the team all took place over the course of this study. The transfer portal gives student-athletes the opportunity to investigate leaving their current school and enrolling and playing at another institution. Prior to the pandemic, student-athletes had to sit out for a year if they transferred, unless they obtained a waiver. Recently, the NCAA gave immediate eligibility to those student-athletes who transfer, which increased the numbers of those that went into the portal (O'Brien, 2021). Over the course of this study, many coaches, administrators, and athletic trainers found new jobs at other institutions, were fired, and/or found

new jobs in different settings while due to increased demands of college athletics many did not have the time or energy to participate in any research studies. For all of these reasons, communication became difficult and ultimately there was a high dropout rate.

Threats to internal validity are important and worth mentioning. The extreme dropout rate/mortality (as mentioned previously), history/length of the study, maturation, selection, (lack of homogeneity of sample) are types of threats to internal validity of this study (Creswell & Creswell, 2018). This was an underpowered study, which was calculated anecdotally and via clinician expertise to obtain the minimum sample of participants. A higher number of participants would have certainly yielded a greater body of data on which to base our assumptions and findings. Additionally, the study relied completely on the word of the participants regarding their participation – that is, participants may have watched some, all, or none of the videos yet reported they watched the videos in their entirety. We did not differentiate if participants were either Division I or Division II women's basketball. There were ultimately a low number of Division II participants and there was no comparison between the two. This study did not utilize a control group. Due to the small sample size it would have been difficult to recruit and organize populations to put into two groups of equal and appropriate size. A meta-analysis of randomized and non-randomized control studies of a mindfulness intervention on regular college students confirmed they benefits to improving mental health (McConville et al., 2017) while another meta-analysis examined studies that did not have randomized controlled design, smaller samples, but still found mindfulness-based programs beneficial for mental health and especially stress (Sharma et al., 2014). Other mindfulness- based studies utilized control groups (Ajilchi et al., 2019; Dehghani et al., 2018; Galante et al., 2018; Glass et al., 2019; Goodman, 2014; Gulliver et al., 2012; Hoja & Jansen, 2019; Jones et al., 2020; Rothlin et al.,

2016; Seppala et al., 2020). Additionally, participants who self-select to be in the study, self-reporting answers, and the investigators deciding who completed the study brought bias to the study. The investigator emailed ADs, coaches, and athletic trainers with personal connections to gain a higher chance of getting student-athletes to fully participate in the study.

Even though there was a high dropout rate, demographics were still collected on 70 participants (Table 7 and Table 8). While there were initially more white participants than African-Americans, 8.5% more African-American completed the study than their white counterparts. Also, those who dropped out missed more time due to injury (31.5 more days), tested positive for COVID-19 (8.5%) and also quarantined (25.9%). Also, to note there was some that reported that they utilized mindfulness programming at their institution (6 participants) but still a majority did not know if their school had a mindfulness program (60%). Seemingly, those who dropped out had worse outcomes related to injuries, tested positive for COVID-19, and quarantine history than their counterparts that completed the study. There was a significant difference in quarantine history and COVID-19 isolation days between those who completed the study and those who did not complete the study. Student-athletes who did not complete the study were significantly more likely to have been quarantined in comparison to those who completed the study (81.4% and 55.6%, respectively). It is possible that being quarantined and isolated led to decreased motivation which affected study follow through. It has been reported that those who were college students during the COVID-19 pandemic had a decrease in autonomous types of motivation (Corpus et al., 2022). A lack of motivation could have lessened their interest in the study and completing tasks that could be personally meaningful, like practicing mindfulness.

Recommendations for Future Research

Since the beginning of the pandemic in March of 2020, and as it continues to shift to an endemic phase in many parts of the world, the need to focus on the re-normalization of student-athletes' lives has been and will continue to be of paramount importance. Pandemics and other stressful events in the world and in our country (i.e. wars, social events, etc.) may arise in the future, but the COVID-19 pandemic is unprecedented in many ways. The need for research directed at smaller colleges and with specific sports and genders including specific mindfulness-based interventions would benefit those with limited medical and mental health staffs while also examining Division III, NAIA, and junior colleges.

While our results saw many participants classified as “normal” as per the DASS-21, it would be beneficial to follow-up with the recommended pre-participation physical exams (Kaminski, 2016; Kroshus, 2016; Moreland et al., 2018; Sudano et al., 2017) and implement mindfulness-based interventions on those who have abnormal mental health screenings. This would provide more robust baseline data as well as aide in tracking data around changes to the clinical applicability of those who presented with more severe classifications on the DASS-21. Additionally, focusing on studies during the span of one season and being in-person to conduct all surveys and to supervise any web-based mindfulness-based interventions would help with alleviating participant dropouts, problems with maturation, and ensuring the participants complete the tasks associated with the study. Additionally, focusing on improving athletic performance may coincide with improved mental health. Future studies may add in measuring some type of athletics performance to see if there are changes with a mindfulness-based intervention during the course of an athletic season.

Conclusion

From March 2020 to March 2022, the COVID-19 pandemic has disrupted all of our lives and especially those that work and compete in collegiate athletics. The rise of the Omicron variant, vaccination status, additional chances of being self-isolated and/or quarantined, and the politicization of public health has contributed to more depression, anxiety, and stressors. The ever-evolving NCAA and institutional policies/procedures have contributed to the waning mental health of all student-athletes.

The purpose of this study was to determine if a mindfulness intervention provided to women's basketball student-athletes during the COVID-19 pandemic return to sport related activity would improve mental health as measured with the DASS-21 via subscale scores, subscale change scores, and severity based upon the DASS-21 subscale scores. The mindfulness videos were chosen to represent information from Jon Kabat-Zinn and 2 common mindfulness techniques. A mindfulness intervention was utilized and post- intervention stress subscale scores improved. Specifically, those that were quarantined had stress subscale scores improved while those that did not have a history of seeing a psychologist/sports psychologist also saw their stress subscale scores improve. There is a clear need for education on and implementation of mindfulness interventions – not only because of the results of our study, but because of how the results can potentially translate to the improvement of mental health of student-athletes within the bigger picture of college athletics. While larger NCAA conferences have developed stronger initiatives for mental health such as “Teammates for Mental Health” (ACC, 2021) many smaller NCAA conferences and schools still have limited mental health resources.

Unfortunately, we have seen an increase in not only mental health issues but self-harm in college athletics. Mindfulness interventions have the ability to help reduce mental health issues

in women's basketball student-athletes and other student-athletes, not only during a pandemic, but also during normal, less stressful times. These mindfulness interventions should be carefully selected and implemented by medical and mental health professionals and not primarily used in place of counseling. All of those working in college athletics should be buying-in and promoting mindfulness interventions. By having all of the constituents and stakeholders in college athletics educated and successfully implementing mindfulness interventions, we can confidently prevent mental health issues also becoming a pandemic.

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Table 1*Descriptive Statistics for Participant Demographics and COVID-19 History (N = 36)*

Demographics	N (%)
Race	
African-American	19 (52.8)
White	16 (44.4)
Other	1 (2.8)
Student Classification	
Freshman	7 (19.4)
Redshirt Freshman	0
Sophomore	11 (30.6)
Redshirt Sophomore	2 (5.6)
Junior	7 (19.4)
Redshirt Junior	2 (5.6)
Senior	4 (11.1)
Redshirt Senior	3 (8.3)
Injury History	
Yes	22 (61.1)
No	14 (38.9)
Psychologist History	
Yes	10 (27.8)
No	26 (72.2)

Mindfulness Program	
No	3 (8.3)
Never Used	4 (11.1)
Rarely	1 (2.8)
Unsure	28 (77.8)
COVID-19 History	
Yes	16 (44.4)
No	20 (55.6)
Quarantine History	
Yes	20 (55.6)
No	16 (44.4)

Table 2*Descriptive Statistics for Age and Missed Playing Days (N = 36)*

	<i>Mdn</i> (Min, Max)
Age (years)	20.5 (19, 23)
Injury History Missed Days	10.5 (2.5, 213)
COVID-19 Self-Isolation Days	10.0 (7, 14)
COVID-19 Quarantine Days	17.5 (7, 56)

Note. Min = minimum; Max = maximum.

Table 3*Pre-Intervention and Post-Intervention Comparisons By DASS-21 Subscale Scores (N = 36)*

DASS-21 Subscale	Pre-Intervention	Post-Intervention		
	<i>Mdn</i> (Min, Max)	<i>Mdn</i> (Min, Max)	<i>p</i>	<i>ES</i>
Depression	7.0 (0, 38)	4.0 (0, 30)	.085	.42
Anxiety	8.0 (0, 28)	4.0 (0, 36)	.922	.02
Stress	12.0 (0, 32)	7.0 (0, 24)	.019*	.57

Note: DASS-21 = Depression, Anxiety and Stress Scale-21; Min = minimum; Max = maximum;

ES = effect size.

* $p < .05$.

Table 4*Comparison of DASS-21 Subscales between Pre-intervention and Post-intervention (N = 36)*

	Pre-Intervention	Post-Intervention	
	<i>N</i> (%)	<i>N</i> (%)	<i>p</i>
Depression			.537
Normal	22 (61.1)	24 (66.7)	
Mild	5 (13.9)	4 (11.1)	
Moderate	4 (11.1)	4 (11.1)	
Severe	2 (5.6)	1 (2.8)	
Extremely Severe	3 (8.3)	3 (8.3)	
Anxiety			1.000
Normal	17 (47.2)	22 (61.1)	
Mild	8 (22.2)	1 (2.8)	
Moderate	7 (19.4)	6 (16.7)	
Severe	0 (0)	3 (8.3)	
Extremely Severe	4 (11.1)	4 (11.1)	
Stress			.157
Normal	25 (69.4)	28 (77.8)	
Mild	2 (5.6)	4 (11.1)	
Moderate	7 (19.4)	4 (11.1)	
Severe	2 (5.6)	0 (0)	
Extremely Severe	0 (0)	0 (0)	

Note. DASS-21 = Depression, Anxiety, and Stress Scale-21.

Table 5*Comparison of Participant Demographics and COVID-19 History by DASS-21 Subscale Change Score^a (N = 36)*

	Depression Change Score		Anxiety Change Score		Stress Change Score	
	<i>Mdn</i> (Min, Max)	<i>p</i>	<i>Mdn</i> (Min, Max)	<i>p</i>	<i>Mdn</i> (Min, Max)	<i>p</i>
Race		.710		.290		.207
African-American	0 (-18, 24)		1 (-10, 14)		5 (-10, 24)	
White	2 (-12, 22)		0 (-16, 8)		1 (-12, 16)	
Student Classification		.089		.147		.161
Non-redshirt	0 (-18, 12)		0 (-16, 12)		3 (-12, 22)	
Redshirt	4 (0, 24)		2 (-4, 14)		6 (-2, 24)	
Injury History		.576		.883		.182
Yes	0 (-12, 34)		0 (-16, 14)		5 (-12, 24)	
No	2 (-18, 6)		0 (-10, 22)		0 (-10, 22)	
Psychologist History		.174		.319		.032*
Yes	0 (-12, 2)		0 (-16, 2)		-2 (-10, 16)	
No	3 (-18, 24)		1 (-10, 14)		6 (-12, 24)	

COVID-19 Occurrence		.375		.471		.836
Yes	3 (-18, 24)		2 (-10, 14)		4 (-12, 16)	
No	0 (-12, 22)		0 (-16, 12)		1 (-10, 24)	
Quarantine History		.961		.305		.043*
Yes	0 (-14, 24)		2 (-16, 14)		5 (-10, 24)	
No	2 (-18, 12)		-1 (-10, 8)		-1 (-12, 24)	

Note. DASS-21 = Depression, Anxiety, and Stress Scale-21; Min = minimum; Max = maximum.

^a Change score = post-intervention score minus pre-intervention score. Negative number means condition got worse.

* $p < .05$.

Table 6*Correlations of Age and Missed Playing Days with DASS-21 Subscale Change Scores^a (N = 36)*

	Depression Change Score		Anxiety Change Score		Stress Change Score	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Age (years)	.11	.533	.17	.316	.05	.792
Injury History Missed Days	.19	.272	.02	.911	.32	.048*
COVID-19 Self-Isolation Days	.28	.102	.22	.208	-.02	.917
COVID-19 Quarantine Days	-.03	.886	.09	.587	.30	.077

Note. DASS-21 = Depression, Anxiety, and Stress Scale-21.

^a Change score = post-intervention score minus pre-intervention score.

* $p < .05$.

Table 7

Comparison of Participant Demographics and COVID-19 History Between Participants Who Completed the Study and Those Who Did Not Complete the Study

	Completed Study <i>N</i> = 36	Did Not Complete Study <i>N</i> = 70	
	<i>N</i> (%)	<i>N</i> (%)	<i>p</i>
Race			.420
African-American	19 (52.8)	31 (44.3)	
White	17 (47.2)	39 (55.7)	
Student Classification			.377
Non-Redshirt	29 (80.6)	62 (88.6)	
Redshirt Athlete	7 (19.4)	8 (11.4)	
Injury History			1.000
Yes	22 (61.1)	44 (62.9)	
No	14 (38.9)	26 (37.1)	
Psychologist History			.323
Yes	10 (27.8)	13 (18.6)	
No	26 (72.2)	57 (81.4)	
Mindfulness Program			.304
No	3 (8.3)	3 (4.3)	
Never Used	4 (11.1)	17 (24.3)	
Rarely	1 (2.8)	1 (1.4)	
Sometimes	0 (0)	2 (2.9)	

Often	0 (0)	2 (2.9)	
Always	0 (0)	2 (2.9)	
Unsure	28 (77.8)	42 (60.0)	
COVID-19 History			.539
Yes	16 (44.4)	37 (52.9)	
No	20 (55.6)	33 (47.1)	
Quarantine History			.006*
Yes	20 (55.6)	57 (81.4)	
No	16 (44.4)	13 (18.6)	

* $p < .05$.

Table 8

Comparison of Participant Age and Missed Playing Days Between Participants Who Completed the Study and Those Who Did Not Complete the Study

	Completed Study <i>N</i> = 36	Did Not Complete Study <i>N</i> = 70	
	<i>Mdn</i> (Min, Max)	<i>Mdn</i> (Min, Max)	<i>p</i>
Age (years)	20.5 (19, 23)	20.0 (18, 24)	.886
Injury History Missed Days	10.5 (2.5, 213)	42.0 (1, 395)	.183
COVID-19 Self-Isolation Days	10.0 (7, 14)	10.0 (0, 19)	.044*
COVID-19 Quarantine Days	17.5 (7, 56)	14 (1, 60)	.703

Note. Min = minimum; Max = maximum.

* $p < .05$.

Appendix A

DASS₂₁

Name:

Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3

19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

Appendix B

Hello,

You are receiving this email to send the link(s) to survey(s) and mindfulness intervention videos to your women's basketball student-athletes on an intervention for mental health issues in college-student athletes during the COVID-19 pandemic.

My name is Erik Brown and I am a doctoral student at the University of Indianapolis and faculty in the Athletic Training Program at the University of Evansville. This doctoral research project is examining an intervention for mental health issues in college student-athletes during the COVID-19 pandemic. This research study is being conducted by Jessica Jochum, PhD, ATC and Erik Brown, MS, ATC

The purpose of this research study is to determine if a student-athlete focused mindfulness intervention can have an impact on mental health concerns during the COVID-19 pandemic return to sports. Specifically, this research study will address the following research question: Does a mental health intervention improve self-reported mental health concerns in NCAA Division 1 and Division 2 basketball student-athletes during their COVID-19 pandemic return to sport related activity? To answer the research question, the following objective will be addressed: To determine if a mindfulness intervention provided to basketball student-athletes during the COVID-19 pandemic return to sport related activity will improve mental health as measured with the Depression, Anxiety, and Stress Scale-21 (DASS-21).

There are no risks of discomforts associated with this research study. By participating in this research study, student-athletes might improve their mental health and athletic performance, use an intervention that could be a resource for athletic department personnel, and use an intervention that could be effective in less stressful times.

The first survey will take 10-15 minutes. After 2 weeks, participants will click on a link that will take them to a Qualtrics survey that contains a Google form survey that contains the first two videos. They will have 1 week to watch an explanation of mindfulness that is around 2 minutes in length and an intervention video that is around 3 minutes in length. After 1 week, the link for the second intervention will become active. They will click on the link that will take them to another Qualtrics survey that contains a Google form survey and they will re-watch the 1st intervention video watch the 2nd video that is around 10 minutes. After 1 week to complete this, they will have 2 weeks to complete the 10-15 minutes post-intervention survey. Survey questions will include demographics, information requesting information about injuries, utilizing a psychologist/sports psychologist, and COVID-19 information. Also, questions about depression, anxiety, and stress will be asked.

Responses will be confidential and anonymous. Data will be stored and secured in a computer file and kept for a minimum of 3 years.

Participation in this research study is voluntary and participants can withdrawal at any time. If you have any questions about this research study, you can contact the researcher below:

Erik Brown, MS, LAT, ATC, CES, PES
Doctoral Student
University of Indianapolis
brown001@uindy.edu
812-630-5768

Here is the link to the informed consent and first survey:
https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_ewGT8gfJ1olffFP

Hello,

You are receiving this email to send the link(s) to survey(s) and mindfulness intervention videos to your women's basketball student-athletes on an intervention for mental health issues in college-student athletes during the COVID-19 pandemic.

Please click on the following link that will take participants to a Qualtrics survey that contains a Google form survey that contains the first two videos. Participants will have 1 week to watch an explanation of mindfulness that is around 2 minutes in length and an intervention video that is around 3 minutes in length.

Here is the link to the second survey:

https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_dpbdGSosQBLpPb8

Thanks,

Erik Brown, MS, LAT, ATC, CES, PES
Doctoral Student
University of Indianapolis
brown001@uindy.edu
812-630-5768

Hello,

You are receiving this email to send the link(s) to survey(s) and mindfulness intervention videos to your women's basketball student-athletes on an intervention for mental health issues in college-student athletes during the COVID-19 pandemic.

Please click on the following link that will take participants to another Qualtrics survey that contains a Google form survey where participants will re-watch the 1st intervention video watch the 2nd video that is around 10 minutes.

Here is the link to the third survey:

https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_ekzSB4bAkXnodPn

Thanks,

Erik Brown, MS, LAT, ATC, CES, PES
Doctoral Student
University of Indianapolis
browne001@uindy.edu
812-630-5768

Hello,

You are receiving this email to send the link(s) to survey(s) and mindfulness intervention videos to your women's basketball student-athletes on an intervention for mental health issues in college-student athletes during the COVID-19 pandemic.

Please click on the following link that will take participants to the final survey. Participants will have 2 weeks to complete the 10-15 minutes post-intervention survey.

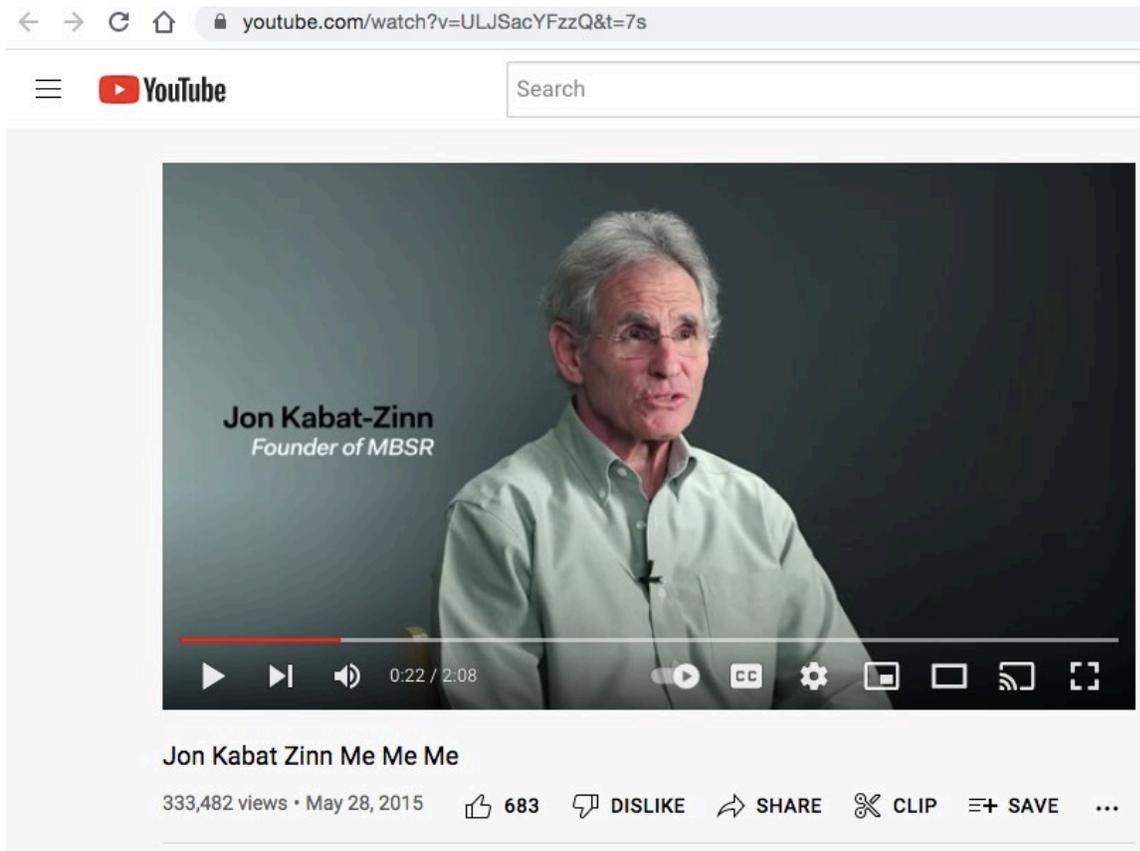
Here is the link to the final survey:

https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_1GjoX6Xjl0sNmHX

Thanks,

Erik Brown, MS, LAT, ATC, CES, PES
Doctoral Student
University of Indianapolis
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812-630-5768

Appendix C



The image is a screenshot of a YouTube video player. At the top, the browser address bar shows the URL: youtube.com/watch?v=ULJSacYFzzQ&t=7s. Below the address bar is the YouTube logo and a search bar. The video player itself shows a man with grey hair and glasses, wearing a light green shirt, speaking. Text on the left side of the video frame identifies him as "Jon Kabat-Zinn" and "Founder of MBSR". The video progress bar is visible at the bottom of the frame, showing a play button, a skip forward button, a volume icon, and a time indicator of "0:22 / 2:08". Below the video player, the video title "Jon Kabat Zinn Me Me Me" is displayed, along with "333,482 views • May 28, 2015". At the bottom, there are icons for "683" likes, "DISLIKE", "SHARE", "CLIP", "SAVE", and a menu icon.

← → ↻ 🏠 youtube.com/watch?v=ZToicYcHI0U

☰ **YouTube**



Daily Calm | 10 Minute Mindfulness Meditation | Be Present

12,525,315 views...  158K  DISLIKE  SHARE  CLIP  SAVE ...

← → ↻ 🏠 youtube.com/watch?v=wPoj5log_7M

☰ YouTube Search

📷 Capture

MINDFUL BREATHING

STOP BREATHE & THINK

3 minute Mindful Breathing Meditation Relieve Stress

6,903 views... 👍 87 🗨 DISLIKE ➦ SHARE ⬇ DOWNLOAD ✂ CLIP ⌵ SAVE ...