Journal of Sports Medicine and Allied Health Sciences: Official Journal of the Ohio Athletic Trainers Association

Volume 6
Issue 3 *JSMAHS Spring Issue 2021*

Article 1

June 2020

Examination of Anger Prevalence in NCAA Division I Student-Athletes

Robert Madden
University of South Carolina, Bobby.madden@centre.edu

Zachary K. Winkelmann
University of South Carolina, winkelz@mailbox.sc.edu

Samantha R. Weber
University of South Carolina, srweber@limestone.edu

Erin M. Moore
University of South Florida, emm6@usf.edu

Toni M. Torres-McGehee
University of South Carolina, torresmc@mailbox.sc.edu

Recommended Citation

Madden, Robert; Winkelmann, Zachary K.; Weber, Samantha R.; Moore, Erin M.; and Torres-McGehee, Toni M. (2020) "Examination of Anger Prevalence in NCAA Division I Student-Athletes," *Journal of Sports Medicine and Allied Health Sciences: Official Journal of the Ohio Athletic Trainers Association*: Vol. 6 : Iss. 3 , Article 1.
DOI: https://doi.org/10.25035/jsmahs.06.03.01
Available at: https://scholarworks.bgsu.edu/jsmahs/vol6/iss3/1

Examination of Anger Prevalence in NCAA Division I Student-Athletes

Cover Page Footnote

We would like to thank the University of South Carolina's Athletics Performance, Health, and Wellness Team for their collaboration with this study.

Examination of Anger Prevalence in NCAA Division I Student-Athletes

Robert Madden, MS, LAT, ATC[#]; Zachary K. Winkelmann, PhD, SCAT, ATC[#]; Samantha R. Weber, PhD, SCAT, ATC[#]; Erin M. Moore, PhD, LAT, ATC[*]; Toni M. Torres-McGehee, PhD, SCAT, ATC[#]
[#]University of South Carolina, [*]University of South Florida

Purpose: Anger associated with sports participation may affect inability to acutely process anger, may decrease performance and increase the likelihood of risk-taking behavior in collegiate athletes. Therefore, the purpose was to examine the prevalence of anger in collegiate student-athletes across sex, academic status, and sport type. **Methods**: A cross sectional study over a three-year period examined 759 NCAA Division I student-athletes at one institution (age=20±1 years; males: n=259; females: n=500) completed an optional pre-participation behavioral health screening questionnaire, personal demographic information and the Anger Index Self-Test. **Results:** Overall, 37.2% (n=282/759; males=127/259, 49.0%; females=155/500, 31.0%) of participants were at high-risk for anger. We identified a significant difference between the anger and sex [$\chi^2(2, N=759) = 28.1$, $P \leq 0.01$]. We also identified a significant difference between the anger and sport type [$\chi^2(8, N=759) = 32.1$, $P \leq 0.01$] with 55.2% (n=419/759) at moderate risk for anger despite sport type; with the highest percentages presenting high-risk for anger *within* power sports (n= 64/116, 55.2%) and ball sports (n=98/240, 40.8%). No significant differences were identified for anger risk and academic status ($P=0.66$). **Conclusions:** Female collegiate student-athletes demonstrated a higher prevalence of anger than male collegiate student-athletes, yet more males were high-risk. Most student-athletes displayed moderate-risk for anger across different sports. Anger across academic status was not significantly different implying that anger management and coping skills may need to be taught during their student-athlete tenure to mitigate the identified risk. A collegiate student-athlete's inability to process anger may affect sports performance and have negative consequences on their personal and social life. A primary prevention mechanism exists to explore proper coping mechanisms for anger during sport before the onset of mental health conditions that could exacerbate the experience for the individual. ***Keywords:*** *Aggression, Sports, Coping, Behavioral Health*

INTRODUCTION

Anger is one of the basic emotions experienced when an individual perceives a threat, injustice or inequity towards oneself when his or her plans, wishes and needs are obstructed, and is often classified based on subtypes of internal and external expression.[1] Anger subtypes are valuable for clinician assessments as they allow for the categorization of healthy and unhealthy expressions of anger in response to normal events. Development of anger may occur concurrently with extrinsic factors such as early childhood trauma, learned aggression in the home and a child's social environment.[2] Early childhood experiences are essential to an individual's development and a driving social determinant of health. Therefore, anger and aggressive behavior during childhood can create a trajectory for prominent displays later on in life if intervention does not occur.[2] From a behavioral medicine perspective, anger later in life is considered an intrinsic factor that increases one's risk of engaging in sexually compulsive behavior as well as substance misuse and abuse, specifically alcohol and opioid use.[3,4]

The role anger plays in sports varies depending on the context in which it is employed. When manifested in response to competition, anger may affect performance through enhancement or disruption of variables such as attention, information-processing, decision-making, execution and control of actions.[5] However, anger has shown to have a positive correlation with an individual's aggressiveness and antisocial behavior toward both teammates and opponents.[5] Aggression in sports may be a reflection of an individual's poor performance or a reaction to the poor performance of teammates that is seen as a personal slight against the affected individual.[6] Measuring an individual's reaction to general, daily situations may help to gauge anger during and outside of sport participation. Using a tool such as the anger index serves this purpose well as it employs a Likert scale to gauge one's tendency to feel slighted by other's actions or their likelihood to react outwardly due to anger

initiating actions such as hitting inanimate objects. Overall, poor anger regulation and improper ineffective stress management is a predictive factor for anger across all areas of life including sport.[7]

As anger serves a role within sports, there is much consideration to which sports have the highest prevalence of anger and aggressive behavior. Previous research has identified that both contact and collision team sports, such as rugby, American football and hockey, have the highest prevalence of aggressive behavior, especially when compared to non-contact individual sports such as dance, gymnastics and swimming.[8] In contact and collision sports, a certain threshold of anger can heighten one's senses and decreases sensations of pain, thus aiding in performance. It is believed sports that allow for contact and collision attract those who already have an aggressive nature and view aggression in a manner that makes them more likely to engage in it, whether within or outside the rules of their sport.[8] While collision sports do allow for contact such as form tackling in football and rugby, and checking in hockey, extra-legal behavior such as fighting, and targeting are both common despite efforts that use punitive measures of varying severity to dissuade players from engaging in such acts. Anger in this realm is different from the way anger manifests in individual sports such as dance, gymnastics, and swimming. Individual sports that have a higher association with scores of perfectionisms and an association with anger often interact with other psychosocial responses, commonly overlapping with low self-esteem, anxiety, negative perception of oneself and other mental health comorbidities.[9]

Of specific interest are the differences that exist between male and female athletes. Historically, it is believed females are more likely to internalize anger as opposed to male counter parts who are socialized to serve as a "protector" and are thus more likely to externalize anger, increasing males' tendency to take risks and engage in substance abuse and violent behavior.[5,10] Despite differences in expression, it is believed females experience anger in a comparable fashion to males.[1] In addition to sex, another consideration is the role of development as it pertains to level of anger in sports and at what point athletes may transition in their career. One expectation is that athletes further along in their careers are expected to learn coping mechanisms that better teach them how to deal with anger and thus not outwardly express it through aggression.[11] However, the longer an athlete is exposed to sports that promote and allow for aggression, the more likely they are to be accepting of anger and aggressive behavior within the sport.[12]

As anger has a high involvement with other comorbidities such as substance use disorders, aggressiveness and anti-socialness with teammates, clinicians in the collegiate sports setting should be aware of how anger presents clinically, and which student-athletes are at the highest risk. Being able to properly identify high-risk individuals may allow for the clinician to intervene early after signs begin to manifest, ensuring that the student-athlete is able to receive assistance that emphasizes proper coping mechanisms. While all student-athletes have unique personal experiences and biological make-ups that can cause them to be an outlier, understanding the positive associations anger has with sport type, sex and age may greatly assist the clinician in the screening process. Therefore, the purpose of this study was to examine the overall prevalence of anger in National Collegiate Athletic Association (NCAA) Division I collegiate student-athletes; a secondary purpose examined differences between anger risk and sex, academic status (e.g., freshman, sophomore, etc.) and sport type (e.g., football, soccer, etc.).

METHODS

Study Design

This study was a retrospective, descriptive analysis of a cross-sectional survey. After acquiring appropriate institutional review board approval, 3 consecutive years of data were obtained from a secure online "optional" pre-participation behavioral health screening database used by one NCAA Division I institution. For the protection of the student-athletes, specific dates of screening are not disclosed; however, the 3 years of data obtained was within the last 5 years at the time of publication. Data analyzed for this study was part of a larger study; only partial data pertaining to anger and demographic information were used. Independent variables consisted of sex (2 levels: male, female), academic status (4 levels: freshman, sophomore, junior, senior), and sport type (5 levels: endurance, aesthetic, power, ball, and technical sports). Dependent variable was

anger risk (i.e., not at risk, moderate-risk, and high-risk) that was measured using the Anger Index Self-Test.

Participants

Pre-participation behavioral health screening surveys across a 3-year period were used for this study. Data consisted of 759 completed surveys from NCAA Division I student-athletes (age=20±1 year; males: n=259, height=184.3±7.6 cm, weight=90.1±19.1 kg; females: n=500, height=168.4±7.4 cm, weight=63.8±9.9 kg). To be included in the study, the student-athlete had to be on an active intercollegiate roster during the time of the screening and had to have completed all aspects to the pre-participation behavioral health screenings survey. All sports were categorized based off Hausenblas and Carron's recommendations for the following: 1) power: collision sports such football, hockey, and rugby in which individuals intentionally use their body to collide with an opposing player within the rules of sport, 2) ball: contact sports such as soccer, baseball and softball in which players may indirectly use their bodies for indirect contact, 3) endurance: sports that are dependent upon endurance capabilities such as swimming, rowing, and long distance running, 4) aesthetic: sports such as gymnastics and diving that emphasize upon leanness, and 5) technical: sports such as tennis that require technical skill and high levels of concentration.[9] Data was excluded from the analysis of 90 incomplete surveys and 131 duplicated surveys for participants that completed the screening assessment multiple times in any of the three years. This study was deemed exempt by the Institutional Review board, and no participant consent was required for the use of retrospective data.

Instruments

Demographic Information

All demographic data such as age, sex, self-reported height, weight, academic status, and sport type were used. Academic status was defined using freshman, sophomore, junior, and senior status for the collegiate student-athletes. Participants were coded as a senior if they were in their 4th or 5th year of participation. Sport type was classified using physical activity classifications by Hausenblas and Carron's recommendation[9,13] with grouping for endurance (i.e., swimming, cross country, track), aesthetic (i.e., cheerleading, dance, diving, equestrian), power (i.e., football), ball (i.e., basketball, softball, soccer, baseball, volleyball), and technical (i.e., golf, tennis,) sports.

Anger Index Self-Test

The Anger Index Self-Test was used to assess student-athletes anger, negativity, cynicism and hostility.[13] The index consists of 36 questions describing situations that a person may have experienced in their day-to-day life. If they have not experienced these situations, they answered the questions by how they imagined they would react to the situation. Participants used a 4-point Likert scale with two sets of anchors (0=often, 1=some of the time, 2=rarely, 3=never; 0=never, 1=rarely, 2=some of the time, 3=often). Sum scores on the tool that ranged from 0-18 were considered "not at risk" (they know themselves well and are able to handle their anger when it comes up in their day-to-day life); 19-40 were considered "moderate-risk" (they have some "danger point" where their anger has the potential to cause problems for them); and 41 points or higher are considered "high-risk" (they are likely to become anger and hostile frequently and need to find better ways to handle their anger and the thoughts and actions that it triggers).[13] Reliability for this study had a Cronbach alpha of 0.914 suggesting the measure was successful at measuring anger.

Study Procedures

The study was conducted at a large, Power 5 NCAA Division I institution in the Southeastern United States that identified as a predominately white institution. The intercollegiate athletics department had an integrated health and wellness team that includes athletic trainers, dieticians, mental health counselors, etc. On an annual basis, this team of providers implemented a pre-participation behavioral health screening for all student-athletes. The behavioral health screening included but was not limited to eating disorder risk, depression, anxiety, weight pressures, anger, etc. The data extrapolated for this study were limited to demographics and the Anger Index Self-Test. Since the study was optional, we estimated prevalence grouping of all student-athletes regardless of the data collection year they completed the study.

Data Analysis

We used SPSS statistical software (Version 26; SPSS Inc, Armonk, NY) with an alpha level set at $P < 0.05$ for all analyses. We used G*Power 3 software to calculate power.[14] Using an alpha of 0.05 and a small effect size, our power calculation indicated we needed a sample of 495 completed surveys to achieve an estimated power of 0.95.[14] We performed basic descriptive statistics to examine demographic information (e.g., weight, ideal weight, body mass index [BMI], age, sex, academic status, etc.). Chi-squared analyses were used to determine the differences between the anger index and sex, academic status, and sport type.

RESULTS

A total of 849 de-identified pre-participation behavioral health screening surveys were extrapolated out of a larger data set with 759 completed surveys used for the final analyses. Student-athletes within the study were from 22 different teams, which were categorized into endurance sports (n=222), aesthetic sports (n=136), power sports (n=116), ball sports (n=240), and technical sports (n=45). Demographics can be found in Table 1.

Results	**Females**	**Males**
Age	19.6 ± 1.3	19.7 ± 1.3
Body Anthropometrics		
Height (cm)	168.4 ± 7.4	184.3 ± 7.6
Weight (kg)	63.8 ± 10.0	90.1 ± 19.1
Body Mass Index	22.4 ± 2.8	26.3 ± 4.2
Ethnicity		
American Indian/Alaska Native	0.5 (4)	0.1 (1)
Asian	0.9 (7)	0.5 (4)
Black/African American	5.3 (40)	12.0 (91)
Hispanic/Latino/Spanish	1.6 (12)	0.8 (6)
White	55.2 (419)	20.0 (152)
Multi-Ethnic	2.4 (18)	0.7 (5)

Table 1. ***Demographic data for all student-athletes (n=759), females (n=500) and males (n=259). Values are categorized by mean ± standard deviation and percent% (sample size)***

Anger Index Self-Test

Average raw scores, standard deviations, and the mode of each question for the Anger Index Self-Test are provided in Table 2. Overall, 37.2% (n=282/759) of student-athletes were classified as high-risk, 55.2% (n=419)/759 as moderate-risk, and 7.6% (n=58/759) were not at risk for anger behaviors. Chi-squared analysis revealed a significant difference between the anger index and sex [$\chi^2(2, N=759) = 28.1$, $P \leq 0.01$], with females (20.4%) reporting an overall higher risk than males (16.7%). However, when independently examining sex within the male group, 49.0% (n=127/259) of participants were classified as high-risk compared to the 31.0% of the female group (n=155/500). No significant differences were identified for anger risk and academic status [$\chi^2(6, n=759) = 4.09$, $P= 0.664$, Table 3], with sophomores (n=75/193, 38.9%) and freshman (n=84/218, 38.5%) reporting the highest anger risk. Chi-squared analysis revealed a significant difference between the anger index and sport type [$\chi^2(8, n=759) = 32.1$, $P \leq 0.01$]. Overall, 37.2% (n=282/759; males=127/259, 49.0%; females=155/500, 31.0%) of participants were at high-risk for anger with the highest percentages reporting high-risk for anger within power sports (n= 64/116, 55.2%) and ball sports (n=98/240, 40.8%). When examining anger with sex and sport type, there were no significant differences between females and sport type [$\chi^2(6, n=759) = 6.8$, $P= 0.339$], however female ball sports (n=64/173; 36.4%) and aesthetic sports (n=40/133, 30.1%) reported high-risk for anger. A significant difference was also found for male student-athlete's anger risk and sport type [$\chi^2(8, n=259) = 16.1$, $P=0.041$], with the highest risk in power sports (n=64/116, 55.2%) followed by ball sports at (n=98/240, 40.8%). Distribution between sex and sport type is provided in Table 4.

Prompt: The statements below describe situations that you may have experienced in your day-to-day living. If you have not experienced it, try to imagine how you might react in the situation. Use the scoring scale to identify the response you are most likely to have in that scenario. Take whatever time you need to decide, but keep in mind that your first reaction will generally most accurately represent how you would really respond.		
	Mean ± SD	**Mode**
1. I have high expectations for myself and others.	2.49 ± 0.76	3
2. I think that people who make mistakes should be reprimanded and clearly told they did something wrong.	2.01 ± 0.72	2
3. I get really upset with myself when I make a mistake or do not do something well.	1.76 ± 0.81	2
4. I feel impatient when I have to wait in a line.	1.70 ± 0.80	2
5. I think that most people are just out for themselves and you would better not get in their way.	1.51 ± 0.74	2
6. I generally believe that people would be dishonest if they could actually get away with it.	1.41 ± 0.96	2
7. When I think about something that bothered me in the past, I can get very angry about it all over again.	1.40 ± 0.91	1
8. If someone hurts or offends me, I end up thinking about it a lot and have a hard time letting it go.	1.38 ± 0.95	1
9. If I'm doing a project around home or at work and I start to get frustrated, I lay it aside for a while and come back to it when I'm calmed down and can think more clearly about how to handle it.	1.35 ± 0.95	1
10. If someone cancels on me at the last minute, I tend to think about how rude he or she is.	1.34 ± 0.87	1
11. *I work hard to think about and understand why I react the way I do when I get angry.*	1.33 ± 0.95	2
12. When someone disagrees with me, I work hard to make sure they know that they are wrong.	1.30 ± 0.81	1
13. I believe that, if children misbehave, it is okay for their parents to scare them into behaving properly.	1.25 ± 0.94	1
14. When another driver tailgates me or cuts in front of me, I tend to react and honk my horn or flash my lights.	1.20 ± 0.97	1
15. I cannot stand it if things do not go the way I want them to go.	1.15 ± 0.86	1
16. When I hear about rapes or murders in the news, I would like to get back at the person who did the crime.	1.14 ± 0.93	1
17. I think that most people are basically trustworthy.	1.14 ± 0.82	1
18. When I am around people I do not like, they will get that message one way or another from me.	1.08 ± 0.88	1
19. When someone criticizes me, I listen to what they say and then try to assess whether it really makes sense for me.	0.94 ± 0.78	1
20. I think I have a "thin skin" and am easily affected by what others say and do.	0.93 ± 0.94	0
21. When I see someone who is overweight, I start to think about how little self-discipline he or she has.	0.91 ± 0.89	0
22. I do not like how I act when I get angry and I end up feeling bad about what I said or did.	0.78 ± 0.95	0
23. *I think people can be forgiven for what they do even if it hurts others.*	0.78 ± 0.74	1
24. I want to jump in and interrupt other people rather than listen when I have something important to say.	0.75 ± 0.83	0
25. When someone treats me poorly, I start to think about ways to get even with them.	0.73 ± 0.84	0
26. When I am angry, other people seem to shy away from me or be afraid of me.	0.66 ± 0.89	0
27. If I am really mad at other people, I'm likely to put them down and swear at them.	0.65 ± 0.82	0
28. *When people I know are having difficult times in their lives, I try to understand what is going on for them and help them out if I can.*	0.64 ± 0.84	0
29. My anger has gotten me into trouble at work.	0.62 ± 0.88	0
30. My anger overwhelms me at times, and I seem to lose control.	0.56 ± 0.83	0
31. When I get really angry, I throw, hit, or break things.	0.55 ± 0.81	0
32. *I try to focus on the good things that I have going in my life.*	0.55 ± 0.74	0
33. I have been so mad that I grabbed or pushed another person.	0.51 ± 0.84	0

34. When I get angry, I have experienced chest pain, headaches, or other physical symptoms.	0.51 ± 0.82	0
35. Other people express concerns to me about what happens when I get angry or how often I get mad.	0.44 ± 0.79	0
36. My anger has gotten me into trouble with the law.	0.24 ± 0.66	0
Note: For items that are italicized, scoring was 0=often, 1=some of the time, 2=rarely, 3=never. All other items (not italicized) were scored used the following scale: 0=never, 1=rarely, 2=some of the time, 3=often.		

Table. 2 Response Measures by Item on the Anger Index Score

	Not at Risk	**Moderate Risk**	**High Risk**	**P Value**
All Student-Athletes	7.6 (58)	55.2 (419)	37.2 (282)	.664
Freshman (n=218)	6.9 (15)	54.6 (119)	38.5 (84)	
Sophomore (n=193)	7.8 (15)	53.4 (103)	38.9 (75)	
Junior (n=189)	5.8 (11)	57.1 (108)	37.0 (70)	
Senior (n=159)	10.7 (17)	56.0 (89)	33.3 (53)	
Females*				.535
All Females (n=500)	9.8 (49)	59.2 (296)	31.0 (155)	
Freshman (n=131)	8.4 (11)	61.1 (80)	30.5 (40)	
Sophomore (n=132)	9.8 (13)	56.1 (74)	34.1 (45)	
Junior (n=122)	9.0 (11)	59.0 (72)	32.0 (39)	
Senior (n=115)	12.2 (14)	60.9 (70)	27.0 (31)	
Males*				.664
All Males (n=259)	3.5 (9)	47.5 (123)	49.0 (127)	
Freshman (n=87)	4.6 (4)	44.8 (39)	50.5 (44)	
Sophomore (n=61)	3.3 (2)	45.7 (29)	49.2 (30)	
Junior (n=67)	0 (0)	53.7 (36)	46.3 (31)	
Senior (n=44)	6.8 (3)	43.2 (19)	50.0 (22)	

Table 3. Anger risk among all student-athletes (n=759), females (n=500) and males (n=259), and within academic status and sex. Values are categorized by Risk% (sample size).
**Data is presented for each sex and then percent and samples size are within each sex.*

	Not at Risk	**Moderate Risk**	**High Risk**	**P Value**
All Student-Athletes	7.6 (58)	55.2 (419)	37.2 (282)	<.001
Endurance Sports (n=222)	9.9 (22)	59.5(132)	30.6 (68)	
Aesthetic Sports (n=136)	9.6 (13)	61.0 (83)	29.4 (40)	
Power Sports (n=116)	1.7 (2)	43.1 (50)	55.2 (64)	
Ball Sports (n=240)	6.3 (15)	52.9 (127)	40.8 (98)	
Technical Sports (n=45)	13.3 (6)	60.0 (27)	26.7 (12)	
Females				
All Females (n=163)	9.8 (49)	59.2 (296)	31.0 (155)	.399
Endurance Sports (n=133)	11.7 (19)	60.1 (98)	28.2 (46)	
Aesthetic Sports (n=133)	9.0 (12)	60.9 (81)	30.1 (40)	
Ball Sports (n=173)	7.5 (13)	56.1 (97)	36.4 (63)	
Technical Sports (n=31)	16.1 (5)	64.5 (20)	19.4 (6)	
Males				
All Males	3.5 (9)	47.5 (123)	49.0 (127)	.041
Endurance Sports (n=59)	5.1 (3)	57.6 (34)	37.3 (22)	
Aesthetic Sports (n=3)	33.3 (1)	66.7 (2)	0 (0)	
Power Sports (n=116)	1.7 (2)	43.1 (50)	55.2 (64)	
Ball Sports (n=67)	3.0 (2)	44.8 (30)	52.2 (35)	
Technical Sports (n=14)	7.1 (1)	50.0 (7)	42.9 (6)	

Table 4. Anger risk among all student-athletes (n=759), females (n=500) and males (n=259), and within sport type and sex. Values are categorized by Risk% (sample size).

DISCUSSION

Overall Risk

The aim of this study was to establish the prevalence of anger among student-athletes at a Division I NCAA institution and examine the differences with regards to sex, academic status, and sport type. Most student-athletes (>92%) were either at moderate-risk or high-risk for anger as identified by self-report on the Anger Index Self-Test. In the general population, the exact prevalence of anger has not been identified, but it is believed that nearly all people experience anger as a regular emotion and that anger has a higher prevalence in those suffering from mental health illnesses.[15] Although the literature has not investigated the overall prevalence of student-athletes, there are common themes that provide insight as to why the prevalence of anger risk is high among the participants who completed the survey. Anger is one of the most commonly experienced feelings in sports and is often driven by competition regardless of the sport type.[16] The anger response in sports has been best summarized by the concepts of goal relevance and goal congruence, in which athletes become emotionally driven to defeat an opponent and often look to use anger as a performance enhancer, consciously or subconsciously.[17] By nature, emotions such as anger are central to sports due to their involvement with performance and personal well-being.[18] Although perceived negative emotions such as anger have been linked to negative outcomes, such emotions may have a positive impact on sports performance depending on the individual and the circumstances.[18] On the individual level, the literature often identifies sports as being attractive to individuals who regularly experience anger as sports provide a combination of rules that allow for aggressive physical behavior as well as the legal capacity in which acts of aggression can occur.[17] Regardless of if anger is driven by a response to the stimulus of competition, a general sense of anger with oneself or their teammates for poor performance or acts of aggression from an opponent, is an inherent part of competitive athletics.

Comparison of Risk by Sex

When comparing the risk by sex, there was a significant difference with female student athletes having a greater prevalence of anger than male student-athletes. However, independent examination of the both sexes displayed a similar risk with an overall prevalence of >90% for moderate-risk and high-risk combined. The comparable prevalence in both sexes contests the traditional premise that females do not experience anger in a similar fashion to males based on biological differences as well as the way society socializes females to be more compassionate.[2] While some subclasses of anger and the expression of aggression have been noted to have a greater prevalence in males, it is believed that the shared experience of anger can be credited to the nature of sports as competition is a common theme, regardless of the sex of those who are participating.[1]

Although both males and females had a comparable risk of anger, independently more males (49%) were considered high-risk than females (31%). In the literature, males have been identified as being more likely to express anger and engage in acts of aggression than females, even if the experience of anger is similar.[5] The cause for this increased high-risk among males has been debated over the years and has been attributed to a wide array of causes stemming from individual biology to socialization of the sexes.[10] Contrary to males, females tend to be more effective at managing risks through their ability to process and cope with anger opposed to males who are generally more likely to engage in risky behaviors such as sexual compulsivity and have a higher prevalence of alcohol and tobacco use as a suspected result of poor coping capabilities.[3] The possible rationale is females possess greater communication skills through verbal interaction opposed to males who are more likely to use anger expression.[10] It is also of note that males are less likely to seek out mental health assistance than are females due to hegemonic masculinity, a social

concept that causes males to believe they are superior to females and non-athletes, and therefore more likely to internalize emotions.[19]

Both males and females experience anger but there is less variance in the manner that females express anger outwardly opposed to males who are more likely to engage in acts of aggression such as hitting objects or other individuals.[5] Males who are exposed to anger or experience anger for a longer duration due to prolonged involvement in sports, especially contact and collision sports, also tend to be more accepting of acts of aggression and view such actions as acceptable at a higher rate than females also engaged in sports.[12] Due to the sense of normalcy associated with anger, it can be reasoned that male athletes may not learn the same coping mechanisms as females or feel the need to control their anger within sports.

Comparison of Risk by Academic Status

The analyses of anger prevalence across academic status displayed no significant difference across any of the levels examined (freshman, sophomore, junior, senior). The literature states older individuals will tend to experience anger to a lesser extent than younger individuals due to coping mechanisms learned throughout the course of one's life.[11] However, collegiate student-athletes are a unique population because they will likely have prolonged exposure to aggression within sports.[12] If coping skills have not been introduced during their time as an adolescent athlete, the acceptance of anger and aggressive behavior may tend to become more intense rather than getting better with time. A student-athlete's concept of identity with a sport that promotes anger is compounded by the current state of mental health in collegiate student-athletes.[19] As a whole, rates of emotional health in freshman collegiate student-athletes is at its lowest rate in 3 decades, serving as a cause for concern when examining how consistent scores on the anger index self-test are across all classes.[19]

Anger Risk Associated with Type of Sport Participation

The analyses between sports displayed a significant difference in anger prevalence among different types of sports with power sports displaying greatest percentage of high-risk student-athletes. As power sports allow for intentional aggression to occur, they likely attract individuals who already have a propensity for anger and are thus willing to engage in a sport that will allow them to engage in legal acts of aggression.[8] Due to the constant physical aggression experienced during power sports, it is not uncommon that anger transitions from a performance enhancer to a performance inhibitor when aggression by an opponent is sensed to be wrongful, causing a loss of attention and focus on the competition itself.[17] In this case, anger rumination may take over and past experiences of aggression and the emotional response associated become the primary focus of an individual, often creating a desire to obtain vengeance against whoever it was that aggressed against them.[11]

Among male and female student-athletes, ball sports had the second overall greatest percentage of student-athletes in the high-risk category. Not unlike the manner in which anger increases performance during collision sports, anger in soccer has been shown to increase performance through the stimulation of adrenaline and increase in peak power output during competition.[20] The similarities between males and females in ball sports highlight males and females may both experience anger in a comparable manner, especially when engaged in similar or the same sports such as baseball and softball, basketball and soccer.[18]

Independent analyses within sex displayed differences in prevalence based on sports type within both the male and female population. Within the female population, prevalence of high-risk sports in descending order was ball sports, aesthetic sports, endurance sports and technical sports.[18] While ball sports are understood to have a high prevalence of anger

in both sexes due to the overlap with contact occurring, females are unique in that aesthetic sports have the next highest prevalence. Aesthetic sports have an emphasis on leanness, scores of perfectionism and a high association with eating disorders and disordered eating.[9] The overlap of athletic competition with the social and personal stressors specific to aesthetic sports have the potential to cause a greater degree of mental strain in female student-athletes, inducing scores of anger, anxiety and other mental health challenges.[9] In female endurance sports, anger may play a role in competition by decreasing the level of discomfort felt, allowing student-athletes to compete without physical limitations attributed to physical fatigue.[17] Female technical sports had the lowest prevalence and although there may be a number of reasons for this, the literature has displayed anger as more of an inhibiting factor in technical sports due to a loss of concentration and potential breakdown in form in technique.[12] Technical sports student-athletes may have either developed the ability to cope with anger in a more efficient way for performance reasons or they may be drawn to such sports because of their less aggressive nature.[12]

Following power sports, the prevalence of high-risk sports in descending order for males was ball sports, endurance sports, technical sports, and aesthetic sports. Ball sports having the second highest prevalence is shared by both males and females but the largest difference between intra-sex analyses came in that aesthetic sports had the lowest prevalence for males. This is likely due to the nature that most aesthetic sports target female athletes. While there are stressors associated with the male student-athlete identity, there is a greater emphasis for males to portray conventional masculinity through power and ball sports that allow for contact.[21] Aesthetic sports in the male population may stress an individual to portray a lean physical frame but males appear less likely to face social pressure to maintain a stereotypical physique in aesthetic sports than are female student-athletes. In technical sports, anger and other mood disorders often lead to a decrease in athletic performance secondary to a decrease in concentration as highlighted by the NCAA student-athletes' mental health issues document and may cause for enhanced coping skills such as well as serving as an attraction to males with decreased levels of anger and aggression.[12,20]

Limitations and Future Research

When interpreting the findings of this study, it is important to note the data is self-reported and is dependent upon honest answers by the participants. Individuals may have been reluctant to give truthful answers due to the stigma associated with mental health. Additionally, this study was limited to participants at a NCAA Division I institution and therefore the experiences of participants may not be reflective of all collegiate student-athletes, including at other conferences in Division I and other tiers of collegiate athletics. It is also important to note that there were no females represented in the power sport category. Based on the findings, we suggest that future research explore anger reduction interventions early on in a collegiate student-athlete's career for the purpose of teaching effective coping mechanisms.

Clinical Implications

Mental health is one of the most important health and safety issues facing our student-athletes. It is suggested institutions utilize a multi-disciplinary approach to support student-athletes' mental health and wellness. First, institutions should develop a mental health interdisciplinary team, which may consist of an athletic trainer, team physician, sport psychologist, psychiatrist, dietitian, strength and conditioning specialist, and/or academic advisor. It is recommended the mental health interdisciplinary team use a collaborative process to identify all pertinent mental health resources available both from the campus and in the community (e.g., sports medicine team, campus health and wellness, counseling services, disability services, life-skills coordinator, local social work partners,

etc.). Second, it is the team's responsibility to develop and integrate a screening plan for assessing mental health risk. Specifically, this study highlights the importance of the consideration to add questions for anger as part of an institution's mental health assessment plan. However, it is key that the institution also creates a "next step" process following the screening. The data identified a critical need to help first-year students who had the highest anger risk. We suggest that the interdisciplinary team takes action to promote healthy coping mechanisms paired with anger reduction strategies beginning in the first year that eventually creates a culture in athletic team focused on encouraging mental wellness. Finally, we suggest that institutions promote mental health awareness to student-athletes, coaches, academic advisors, and faculty athletics representatives who play a critical role in creating an environment that supports the mental health and well-being of student-athletes. Promoting health and wellness for student-athletes will support resiliency and destigmatize those help-seeking for mental health concerns.

CONCLUSION

The present study sought to establish the prevalence of anger among NCAA Division I collegiate student-athletes and the risk factors associated with different sex, sport type and academic status. Overall, regardless of academic status, males and females displayed significant levels of high and moderate risk for anger. Type of sport plays a role in the anger risk, with power sports and ball sports having the largest impact on student-athletes' anger risk with a high prevalence between sexes. Our data suggest there were differences in prevalence based on sports type between sexes; however, there are no established prevalence rates in the general population or college students to compare the data. The differences may be attributed to both intrinsic and social factors that will impact individual student-athletes in a unique manner based on their life experiences and biological make-up. The lack of a difference in anger prevalence across academic status may indicate that there are not enough intervention strategies in place for collegiate student-athletes to assist with proper coping mechanisms for anger

REFERENCES

1. *Certel Z, Bahadir Z, Karabulut EO. Evaluation of trait anger-anger expression in team and individual sports according to gender and sport experience Ovidius University Annals, Series Physical Education & Sport/Science, Movement & Health. 2013;13:576-581.*
2. *Tremblay RE, Cote SM. Sex differences in the development of physical aggression: An intergenerational perspective and implications for preventive interventions. Infant Mental Health Journal. 2019;40(1):129-140.*
3. *Brown MJ, Serovich JM, Kimberly JA. Vengeance, sexual compulsivity and self-efficacy among men who have sex with men living with HIV. AIDS Care. 2018;30(3):325-329.*
4. *Gilam G, Sturgeon JA, You DS, Wasan AD, Darnall BD, Mackey SC. Negative Affect-Related Factors Have the Strongest Association with Prescription Opioid Misuse in a Cross-Sectional Cohort of Patients with Chronic Pain. Pain Medicine. 2020;21(2):e127-e138.*
5. *Bartlett ML, Abrams M, Byrd M, Treankler AS, Houston-Norton R. Advancing the Assessment of Anger in Sports: Gender Differences and STAXI-2 Normative Data for College Athletes. Journal of Clinical Sport Psychology 2018;12(2):114-128.*
6. *Grugan MC, Jowett GE, Mallinson-Howard SH, Hall HK. The relationships between perfectionism, angry reactions, and antisocial behavior in team sport. Sport, Exercise, and Performance Psychology. 2019.*
7. *Maisto SA, Xie FC, Witkiewitz K, et al. How Chronic Self-Regulatory Stress, Poor Anger Regulation, and Momentary Affect Undermine Treatment for Alcohol Use Disorder: Integrating Social Action Theory with the Dynamic Model of Relapse. Journal of Social & Clinical Psychology. 2017;36(3):238-263.*
8. *Dubihlela J, Surujlal J. Aggressive behaviour in sport: An application of the Aggression Questionnaire (AQ) to South African university student-athletes. African Journal for Physical, Health Education, Recreation & Dance. 2011:15-30.*
9. *Hausenblas HA, Carron AV. Assessing Eating Disorder Symptoms in Sport Groups: A Critique with Recommendations for Future Research. International Sports Journal. 2002;6(1):65.*
10. *Ferrer RA, Maclay A, Litvak PM, Lerner JS. Revisiting the Effects of Anger on Risk-Taking: Empirical and Meta-Analytic Evidence for Differences Between Males and Females. Journal of Behavioral Decision Making. 2017;30(2):516-526.*
11. *Sofia R, Cruz JFA. Unveiling anger and aggression in sports: The effects of type of sport, competitive category and success level. Revista de Psicología del Deporte. 2017;26(2):21-28.*
12. *Tucker LW, Parks JB. Effects of Gender and Sport Type on Intercollegiate Athletes' Perceptions of the Legitimacy of Aggressive Behaviors in Sport. Sociology of Sport Journal. 2001;18(4):403-413.*
13. *Decker D. Anger index self-test. Anger Resources. Tools Web site. Published 1987. Accessed 04/07, 2020.*
14. *Faul F, Erdfelder E, Lang A-G, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods. 2007;39(2):175-191.*

15. *Barrett EL, Mills KL, Teesson M. Mental health correlates of anger in the general population: Findings from the 2007 National Survey of Mental Health and Wellbeing. Australian & New Zealand Journal of Psychiatry. 2013;47(5):470-476.*
16. *Dubihlela JOB, Chinomona R. The prevalence of athlete hostility, anger, verbal and physical aggression within South African sport. African Journal for Physical, Health Education, Recreation & Dance. 2014;20(1):89-105.*
17. *Sofia R, Cruz JFA. Exploring individual differences in the experience of anger in sport competition: The importance of cognitive, emotional, and motivational variables. Journal of Applied Sport Psychology. 2016;28(3):350-366.*
18. *Cece V, Guillet-Descas E, Nicaise V, Lienhart N, Martinent G. Longitudinal trajectories of emotions among young athletes involving in intense training centres: Do emotional intelligence and emotional regulation matter? Journal of Sport & Exercise Psychology. 2019;43:128-136.*
19. *Ryan H, Gayles JG, Bell L. Student-Athletes and Mental Health Experiences. New Directions for Student Services. 2018;2018(163):67-79.*
20. *Woodman T, Davis PA, Hardy L, et al. Emotions and sport performance: an exploration of happiness, hope, and anger. Journal of Sport & Exercise Psychology. 2009;31(2):169-188.*
21. *Visek AJ, Watson JC, Hurst JR, Maxwell JP, Harris BS. Athletic identity and aggressiveness: a cross-cultural analysis of the athletic identity maintenance model. Journal of Sport & Exercise Psychology. 2010;8(2):99-116.*