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Injuries in Collegiate Male Cheerleaders in the United States: A Descriptive Study

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ABSTRACT

As the popularity of cheerleading continues and the athleticism involved increases, understanding injuries among the participants is a key component in prevention. Most research to date has focused on injuries among females, but data about male cheerleader injuries is needed to fully understand and reduce injuries. The purpose of this study is to describe the injuries among male collegiate level cheerleaders.

Methods: A sample of 89 male collegiate cheerleaders completed an online survey to self-report injuries occurring within the last year. The participants had an average age of 21.98 years (s=3.21 years), 5.29 years (s=3.26 years) of cheerleading experience, and 3.71 (s=2.76) career injuries.

Results: Forty-eight (54%) of the participants were injured during the designated time frame accounting for a total of 85 different injuries incidents. Thirty-four (40%) of the injuries reported were to the lower body and 31 (36%) injuries reported were to the upper body. The type of injury reported most often was a strain or sprain (55%; 47/85). Stunting was most often the skill being attempted (48%; 41/85) and basing or spotting was the main cause of injury (41%; 35/85). Most injuries (86%; 73/85) occurred at practice, on a foam floor (55%; 47/85). Significant differences existed for the skill attempted and cause of injury depending on the primary skills performed by the participant.

Discussion: Similar types and cause of injuries occur among male cheerleaders when compared to previous research on female cheer injuries; however, male cheerleaders might be at an increased risk for upper body injuries. By understanding the injuries of all participants, preventative measures can be developed.

INTRODUCTION

Cheerleading has evolved from yelling and leading the crowd since the first cheer was led at a University of Minnesota in 1898 [1] to complex stunts and gymnastic like maneuvers displayed by current cheer squads. The athleticism involved in cheerleading has increased, and for some teams, competition has become the main focus [2]. The increased athleticism has led to more injuries occurring. According to data of the National Center for Catastrophic Sport Injury Research (NCCSIR), cheerleading accounts for more than half of the catastrophic sport injuries for females [2,3]. Injuries are not isolated to female cheerleaders; however, males also experience injuries from cheerleading. Since a report in 2003 highlighting catastrophic injuries in cheerleaders [1], cheerleading related injuries have attracted more media and research attention. While increasing in popularity, cheerleading is not recognized as a sport by the National Collegiate Athletic Association (NCAA) [3]. Due to the lack of recognition as a sport by the NCAA, no formal injury data reporting such as the Injury Surveillance System, is available to track injuries [3,4].

While the attention to cheerleading injuries has increased, many questions still remain. One area that still needs to be explored is injury information in male cheerleaders since previous research has primarily focused on injuries of females [1,4-11]. Males typically perform single-base stunts which require holding all of the weight of the top cheerleader. This is in contrast to all-girl teams that stunt with three bases holding one top person. Due to the extra weight and strain on the body while performing single base stunts, injuries in general, and shoulder and core injuries, may be more common among males [6,7]. In addition, the overall greater strength of males leads to more power, which may increase the difficulty of skills performed and increase injury risk.

Previous research that included male cheerleaders, demonstrated that the risk of injuries among males and females is similar, as well as the types of injuries sustained [6]. Additional research is warranted to identify types of injuries among male cheerleaders [5,6]. Identifying injuries among males can help understand the risk of injuries to all participants involved in cheerleading and help reduce risk through injury prevention training programs and rule changes. The purpose of this study was to describe the types of injuries reported by collegiate male cheerleaders.

METHODS

Participants

After obtaining IRB approval to conduct an online survey gathering self-report injury data from cheerleaders from different collegiate divisions, we contacted cheer coaches from Division I and II universities and Junior Colleges across the US. Through a combination of random and snowball sampling techniques, we emailed a total of 218 collegiate male cheerleaders requesting their participation. Our final sample size was 89 cheerleaders (40.8% response rate).

Instrument

We developed an online survey based on previous research on cheer and sport injury studies [5,9-13]. The questionnaire was divided into two sections – demographic information and injury history. Demographic information included participant characteristics, cheerleading experience and characteristics of his current team. Participants also reported the total number of injuries throughout their cheerleading career. The information we collected as part of injury history included body part injured, type of injury, circumstances of the injury, mechanism of injury and medical treatment received. A test retest analysis yielded a reliability of $r=0.778–0.996$, $p<0.05$.

Procedures

We sent emails to coaches or spirit advisors at the randomly selected institutions, requesting the email addresses of their athletes. If we did not receive an email response, we called telephone numbers listed on the schools' websites and left voicemails if a coach did not answer.

After receiving contact information for the cheerleaders from the coaches, we sent the cheerleaders an email requesting voluntary participation in the research study. The email included a link to the online questionnaire. Two weeks after the initial email, follow-up emails were sent to every potential participant. We also sent Facebook messages to our "friends" who were potential participants and whose coach had not responded to the recruitment email.

Cheerleaders who wished to participate in the study followed the webpage link, and anonymously completed the online questionnaire. By completing the questionnaire, participants acknowledge their informed consent, as outlined in the email and on the home page of the website. A reportable injury had to meet all the following criteria: (a) it occurred during participation in cheerleading, (b) it prevented participation for at least the remainder of that event or longer, (c) and it required medical attention. Participants recorded injuries occurring over a one year period. Data were analyzed using descriptive statistics, Pearson correlation and chi-square test.

RESULTS

Forty-eight of the participants reported at least one injury during the designated time frame. Some participants reported more than one injury occurring over the course of the year, therefore, there were 85 total injury incidents reported. Injured cheerleaders had a mean age of 22.42 (s=3.27) years, slightly older than the overall sample (m=21.89; s=3.21). Junior and graduate students each accounted for 24.5% (n=12) of the injured cheerleaders yielding more injuries than the other class designations. The average years of cheerleading experience (m=5.35; s=3.39) was similar to that of the total sample (m=5.29; s=3.26), but 32.6% (n=15) of the participants injured last year had only one or two years of cheerleading experience. Most people (72.9%; 35/48) who were injured last year suffered from two injuries or more. Other responses were similar between those people injured last year and the total sample. **Table 1** provides frequency data for participant and team characteristics for both the sample and participants reporting an injury. Seventeen participants reported never being injured due to cheerleading participation.

Table 1. Characteristics of participants and team for total sample and injured participants only.

	Total Sample	Injured Last Year
	N=89 (SD)	n=48 (SD)
Age in years, mean (SD)	21.89 (± 3.21)	22.42 (± 3.27)

Year in school, n (%)		
Freshman	10 (11)	5 (10)
Sophomore	20 (23)	9 (19)
Junior	21 (24)	12 (25)
Senior	13 (15)	7 (15)
Fifth year or Graduate	25 (28)	15 (31)
Years of experience, n (%)		
Mean (SD)	5.29 (± 3.26)	5.35 (± 3.39)
1-3 years	33 (37)	19 (40)
4-6 years	25 (28)	11 (23)
7+ years	31 (35)	18 (38)
Skills, n (%)		
Stunts	40 (45)	19 (40)
Tumbling	15 (17)	9 (19)
Both	34 (38)	20 (42)
Career Injuries, mean (SD)	3.71 (± 2.76)	3.70 (± 2.80)
Injuries last year, n (%)		
0 injury	41 (46)	-
1 injury	13 (15)	13 (27)
2 injuries	28 (31)	28 (58)
3+ injuries	7 (1)	7 (13)
Athletic division, n (%)		
NCAA 1A	57 (64)	28 (58)
NCAA 1	20 (22)	12 (25)
NCAA 2, NJCAA, or NAIA	12 (13)	8 (17)
Off season, n (%)		
No	33 (37)	17 (35)
1 month	13 (15)	8 (17)
2 months	22 (25)	10 (21)
3+ months	19 (21)	13 (27)
Practices per week (%)		
2 days	7 (8)	4 (8)
3 days	41 (46)	24 (50)
4 days	27 (30)	14 (29)
5+ days	14 (15)	6 (12)
Practice length (%)		
1.5 to 2 h	18 (20)	12 (25)
2 to 2.5 h	45 (51)	21 (44)
2.5 to 3 h	26 (29)	15 (31)
Athletic trainer (%)		
Yes	49 (55)	23 (48)
No	40 (45)	25 (52)
Cheer company (%)		
NCA	67 (75)	36 (75)
UCA	18 (20)	11 (23)
Other	4 (4)	1 (2)

When taking into account the entire sample, a correlation was not found between the years of cheerleading experience and the number of career injuries. On the other hand, when looking at only cheerleaders who have ever been injured a positive correlation (r=0.243; N=72; p=0.039) was found between the number of years of cheerleading experience and the total number of injuries indicating that if a person has already been injured and continues to cheer, he will more than likely experience additional injuries. No other significant relationships were identified.

Injury Sustained

Participants injuring more than one body part or sustaining more than one type of injury during the same incident reported it as only one injury, but included all body parts injured and types of injuries sustained. As a result, the number of body parts injured and type of injury may actually be greater than the total number of injury events reported from last year. A total of 85 injury incidents were reported.

For each incident, the participants reported body part(s) injured and type(s) of injury sustained. Body parts are classified into body regions for reporting results. Upper extremity injuries include any injuries from the shoulder to the fingers. Lower extremity injuries are classified as injuries occurring from the hip to the toes. Trunk injuries include the back and abdomen. Head/neck injuries include any injury to the head, neck, or face. Thirty-four (40%; 34/85) of the injuries were to the lower extremities, with

most (n=16) of the injuries being classified as ankle injuries. Upper extremity injuries were reported 31 (36%; 31/85) times. The most common type of upper extremity reported was an injury to the shoulder (n=9) and hand/finger injuries (n=9). Trunk injuries were reported in 15 (18%; 15/85) injury occurrences – 14 back injuries and 1 abdomen injury. Injuries involving the head, neck, and face also accounted for 15 (18%; 15/85) injuries.

The type of injury reported most often was a strain or sprain. A total of 47 (55%; 47/85) strains or sprains were reported by participants as part of their injuries occurring last year. The second most prevalent type of injury was overuse injuries, which was reported for 26% (22/85) of the total reported injuries.

Injury Circumstances

About 86% (73/85) of the injuries occurred during a practice. Injuries occurring while cheering at other athletic events accounted for 9% (8/85) of the incidents last year. At the time of injury, the skill being attempted most often (48%; 41/85) was partner stunting. Running tumbling was being performed when the cheerleader was injured for 19% (16/85) of the injuries. About 13% (11/85) of the injuries were sustained while attempting standing tumbling. When combined, injuries occurring during both standing and running tumbling skills are still lower than the number occurring from partner stunts.

Not only was stunting the skill most commonly being performed at time of injury, but the main cause of injury reported by 41% (35/85) of those injured was basing or spotting. Similarly, the second most often reported cause of injury was tumbling (20%; 17/85). Failure to complete the skill being attempted and slipping or twisting a body part was each listed as the cause for 9% (8/85) of injuries from last year. Six cheerleaders (7%; 6/85) cited "other" as the cause of injury listing items such as miscommunication and recurring issue.

Most injuries (55%; 47/85) occurred while on a foam floor, which is the standard surface for collegiate cheerleading practice and competition. Sixteen injuries (19%; 16/85) were suffered when the cheerleader was practicing or performing on a spring floor. All other injuries occurred on either wood floor, artificial turf or an extra mat.

Spotters were not being used during 45% (38/85) of the injury incidents. In 12% (10/85) of the cases two additional spotters were being used and more than two spotters were present in 13% (11/85) of the injuries.

Skill Based Differences

There were significant differences identified in the most common skills practiced and performed by an individual and the skill attempted at the time of injury, $\chi^2(10, N=48)=27.161$, $p=0.002$. In other words, a person who primarily does tumbling skills is more likely to get injured while tumbling than during stunting. Using chi square values, no difference was found in the number of injuries occurring last year for those individuals who competed and those who did not, however, the number of participants who did not compete was very low. Significant differences were not identified in the number of injuries last year and the competition format either.

Treatment

Participants reported all methods of treatment received following the injury. A certified athletic trainer provided treatment for the greatest number of injury incidents (68%, 58/85). Thirty-three incidents (39%, 33/85) involved treatment done by a doctor. In 13% (11/85) of the cases, participants received medical treatment at the hospital and 7 (8.2%; 7/85) incidents resulted in participants visiting the emergency room. Ten (12%, 10/85) of the injuries occurring within the last year required surgery. The average number of days missed by participants due to injury was 17 (+40), but the median was 5 days and the mode was zero additional days missed.

DISCUSSION

To our knowledge this is the first study to focus specifically on injuries among male cheerleaders. Males have been included in other research studies concerning cheerleading injuries, but were only a small portion of the overall sample [5-7,9-11]. The findings of previous studies have challenged the claim that cheerleading is the most dangerous sport for female athletes; however, the danger of the sport cannot be fully evaluated without including all classes of participants. The lack of data regarding male cheerleading injuries has been identified as an area of future research by both Shields and Smith [6] and Jacobson et al. [5].

Overall, the current data indicated that occurrence of cheerleading injuries among males are similar to occurrences in females. Injury rates were not able to be calculated in the present study, but 80.9% of the participants reported being injured at some point in their cheerleading career. Jacobson et al. [5], found a similar number (78%) of respondents having ever been injured when looking at NCAA Division 1A female collegiate cheerleaders. Similar to the findings in other studies of cheerleading injuries [4-6,8,9], we found that lower extremity injuries were the most common followed by upper extremity injuries, the ankle was the most injured body part, strains and sprains were the most common type of injury, and stunting and tumbling resulted in the largest number of injuries. The current study found a greater percent of upper extremity injuries (36%) than found in studies with

a majority female sample (19-26%) [2,4-6,12], suggesting that males might be at higher risk for upper extremity injuries. Shoulder and hand injuries accounted for the largest number of upper extremity injuries. In a research study examining shoulder injuries in high school athletes of all sports, Bonza et al. [14] concluded that males were more at risk for shoulder injuries overall and in sex-comparable sports. As mentioned previously, on coed teams the males are typically responsible for holding the top girl above their head without help. On the other hand, all girl teams typically utilize three individuals to hold the top girl up in stunts. Being the primary support of the top girl's weight can put the male at more risk of injury simply due to muscular fatigue. Additionally, the greater strength in general of males compared to females can lead to higher tosses resulting in more force landing on the male bases. Potentially, these factors could contribute to the higher percentage overall of upper extremity injuries (36%) seen in the males of this study compared to results from other studies focusing on females. Following ankle injuries, back and knee injuries accounted for the body part injured reported most often by participants. When performing single base stunts, the base supports all the weight of the top person, which could place increase strain on the core and lead to more back injuries among male cheerleaders. This additionally supports the findings by Shields and Smith [11] that males were more prone to back injuries than females.

The percentage of injuries resulting from stunting was similar to the findings of other researchers. When looking specifically at college teams, 50% of the injuries were due to stunting in the research completed by Shields and Smith [6]. According to the present results, stunting and pyramiding (connected stunts) accounted for 47.1% and 11.8% of the injuries respectively. Similarly, in a study by Schulz et al. [9] stunting and pyramiding combined to account for 56% of the injuries. Shields et al. [10] found that bases and spotters were more likely to be injured when performing stunts compared to the tops, suggesting that males are actually more at risk for injury than females while stunting because they are the base or spotter. Again, this could be because they alone are responsible for supporting the weight of the top girl.

Males often become the extra spotters, instead of the females, on co-ed teams when learning new skills. When falling, the top girls can often hit their bases with their elbows, knees or other body parts. Although not resulting from falls like for female cheerleaders, the participants in the current study still reported about 5% of the injuries resulting in a concussion. Results by Schulz et al. [9] and Shields et al. [10] reported concussions also accounting for only about 5% of injuries sustained in samples consisting of mostly female participants. Additional research is needed to identify the main cause of concussions among all cheerleaders so that preventative measures can be recommended.

A common suggestion to reduce the incidence of cheerleading injuries is for cheerleading to be recognized as a sport at the high school and collegiate levels [3,15]. This would hold cheerleading to the same guidelines and benefits as other sports including off-season regulations and athletic trainers at practices. Interestingly, over half the participants in this study did not have an off season, which might increase the risk of injury due to overtraining. Most of the participants also reported their teams practicing three to four times a week for an hour and a half to three hours. For male athletes, they are spending the entire practice throwing, catching, or holding their female teammates. This would be like lifting weights for the entire practice period. Tumbling skills, on the other hand, mimic plyometric exercises. Repeated performance of either without adequate rest can lead to fatigue and injury. We found that the second most prevalent type of injury report was overtraining injuries. Increased regulations could potentially decrease injuries due to overtraining by limiting length and frequency of practice session.

Other researchers have suggested that increasing the presence of certified athletic trainers at practices would help to prevent injuries and properly treat injuries [6]. The number of participants with an athletic trainer at each practice suffering an injury was very similar to the participants without an athletic trainer also suffering an injury. More research needs to be conducted to identify if the athletic trainers engage in preventative rehab, which may be more beneficial at reducing injuries. Greater access to team doctors and athletic trainers at the collegiate level most likely resulted in less participants being sent to the emergency room than in research studies involving mostly high school cheerleaders.

Shields and Smith [6] found the highest injury rates in collegiate cheerleaders and suggested that cheerleaders have more experience at the college level thus are performing more difficult skills. Unfortunately, that is not always the case, especially with male cheerleaders. Many male cheerleaders played other sports throughout high school only to start cheering in college. According to the results of this study, about one-third of the participants (37%) have three or less years of cheerleading experience. Additionally, about one-third of the participants suffering an injury last year were in their first or second year of cheerleading. Rules and regulations set by the American Association of Cheerleading Coaches and Administrators (AACCA) allow the most difficult skills to be performed at the collegiate level [16]. This includes flipping into stunts and pyramids, two and a half high pyramids, and flipping in basket tosses [16], potentially leading to a greater risk of injury for both the newer cheerleader and their teammates by performing skills they are not yet ready to try. Even though many of the male cheerleaders have very little experience, they are often expected to execute these more difficult skills. Recognizing cheerleading as a sport may promote more male participation prior to college, which will provide more training before doing the elite skills allowed at the college level.

Since many males start cheerleading in college, they often focus their training on either tumbling or stunting skills. This is much like playing a position in any other sport. If a male has a background in tumbling and is of a smaller stature, he will more

likely spend most of his practice time tumbling. On the other hand, a larger male with no tumbling experience will more than likely focus on stunting during practices. It makes sense that our results showed that injuries occur while doing the skill that is performed most often by each male. Some males do perform both tumbling and stunting skills, however, were not statistically at risk of injury due to one skill over the other.

Furthermore, cheerleading is not held to the same four-year eligibility requirements as other National Collegiate Athletic Association (NCAA) athletes, therefore, participation into a fifth year or during graduate school is not uncommon. A positive correlation was found among years of cheerleading experience and number of career injuries. Obviously, longevity in the sport increases the risk of injury frequency and severity. New guidelines limiting an athlete's eligibility to five years may lower the prevalence of injuries by decreasing the overall athletic exposures [3]. The regulation of cheerleading by the NCAA or other athletic association would provide the same benefit. Only about half of the participants stated that an athletic trainer is present at each practice. Without an athletic trainer present to monitor return to play, re-injury may be a greater factor for cheerleaders. Having an athletic trainer at each practice, like other sports, may be important in preventing injuries, specifically re-injuries.

Rule changes made by the American Association of Cheerleading Coaches and Administrators (AACCA) limited the skills that could be performed on certain surfaces in 2009. More specifically, baskets toss, two and a half high pyramids, and twisting in tumbling skills can only be performed on matted or grass/artificial turf surfaces [16]. It is important to note that most of the injuries (86%) occurred on a mat (foam or spring floor) or turf, indicating that the rule changes may be effective at preventing skills being attempted or performed on harder surfaces.

The number of respondents should be considered a limiting factor of this study since this represents a small portion of the total co-ed teams at the collegiate level. While the sample is diverse, it may not represent all male cheerleaders and the results may not be generalizable to the male members of every collegiate cheer team. The sample characteristics, however, were similar to the sample used by Jacobson et al. [5] when looking at cheerleading injuries in D1 universities. Secondly, data was obtained via self-report and required recalling injuries occurring up to a year ago, both which could have increased the chance of recall error. Thirdly, due to the one-time data gathering, injury rates were not able to be calculated. In addition, all injuries occurring to an individual at the same time were reported as a single injury event; therefore, the body parts and types of injuries sustained were greater than the number of injuries incidents reported. Furthermore, the severity of injury was not considered if it met the provide criteria for being considered an injury.

CONCLUSION

Despite the limitations, this is the first study to specifically report on injuries in male cheerleaders. Many similarities were found between the results of this study and results from previous studies on cheerleading injuries using primarily female participants. Our results suggest male cheerleaders are also at risk for ankle injuries; however, they appear to also be at an increased risk for core and upper extremity injuries compared to females. Stunting, specifically basing or spotting, was identified as a major source of injury for collegiate male cheerleaders. Additional research comparing female bases and male bases specifically would be useful in determining if there are similar injury risk and types. Furthermore, the participants indicating a specific role and skill set on their team were more likely to be injured while performing those skills. Morphological differences may be a contributing factor and should be considered in future research. Additional research should be done to establish injury rates for male cheerleaders and for a larger sample size.

Recognizing cheerleading as a sport could play an important role in understanding and preventing injuries through better tracking and imposed regulations. This may include the presence of athletic trainers to monitor return to play, team members participating in strength and conditioning programs, and limits on total participation time. The risk of re-injury and overuse injuries could be decreased through these methods. The recent regulations and rule changes for permitted skill and surface areas already suggest a positive effect on injuries among participants. While it appears the understanding and prevention of injuries have increased in recent years, additional research is still needed.

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