Original Article

Study on Anxiety Following Sports Injury Using the Sports Injury Anxiety Scale

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Abstract

Background: Anxiety is a common emotional response among athletes, often exacerbated by the occurrence of sports injuries. ***Objective:*** To study anxiety among sports personnel following sports injuries and to explore the correlation of demographic and injury-related variables with Sports Injury Anxiety Scale (SIAS) scores. ***Methods:*** This cross-sectional study was conducted in the Northeastern region of India. Convenient sampling was employed to recruit sports personnel who sustained injuries during sports events or practice in this cross-sectional study. The SIAS questionnaire was utilized to quantify anxiety levels and demographic variables were correlated with anxiety scores. ***Results:*** Out of 97 cases, participants aged 20-30 with 6-10 years of experience reported 75% experiencing physical injuries. The most common injuries were contusions (31%) and fractures/dislocations (28%). Hospitalization occurred in 10% of cases, and 37% took a career break averaging 0-2 weeks. Factors like age, sex, and experience did not significantly affect anxiety levels, but athletes with fractures, longer career breaks, and less experience showed higher anxiety. Overall, 85% of athletes experienced anxiety, with 15% having severe anxiety, 70% average anxiety, and 15% no or borderline anxiety. ***Conclusion:*** The study's findings will contribute to a better understanding of the psychological challenges faced by athletes during injury rehabilitation and their eventual return to sports in the Northeastern region of India.

Keywords: Sports injury, Anxiety, Psychological challenges, Athlete rehabilitation, Sports Injury Anxiety Scale

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Introduction

Frequently, injuries incurred during sports can have significant adverse effects on the physical well-being of athletes[1,2]. Additionally, they possess the potential to induce various psychological challenges, including heightened anger, depression, anxiety, tension, fear, and diminished self-esteem[3,4]. The immediate aftermath of sports injuries often leads to a disruption in the lives of affected athletes, causing a loss of both physical health and the realization of athletic potential. In more severe instances, injuries can result in permanent disability or even fatalities[5,6]. The resulting functional impairment or the inability to continue participating in sports can be emotionally devastating, impeding the recovery process and influencing how athletes cope mentally with subsequent injuries[7-9]. When examining sports injuries in terms of their development, they are categorized into two main groups: acute and

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chronic. Acute injuries arise from excessive stress on tissue boundaries, leading to conditions such as sprains, strains, contusions, fractures, and similar occurrences. Conversely, chronic injuries typically stem from prolonged overuse, as noted by Altunhan & Ökmen in 2021[10]. In a more specific sense, it manifests as a state of fear and tension, accompanied by physiological changes like sweating, rapid heartbeat, and pallor, which are experienced even if not consciously recognized[11]. Anxiety, a crucial emotional state for an athlete's optimal performance, plays a pivotal role in ensuring accurate decision-making and proper utilization of skills during sports activities[12]. Hence, maintaining anxiety at an optimal level is of utmost importance for athletic success. However, while research has delved into the broader sphere of anxiety in sports, there remains a notable scarcity of studies examining anxiety specifically following sports injuries and its subsequent implications for athletes returning to sports. Particularly, there is an unaddressed gap in the Northeastern region of India, where no such research endeavours have been undertaken. This research aims to bridge this gap by conducting a comprehensive cross-sectional study on anxiety following sports injuries in this underexplored geographical context. The overarching goal of this study is to study anxiety among sports personnel who have experienced sports injuries; and secondly, to ascertain the correlation between demographic and injury-related variables and the scores obtained on the Sports Injury Anxiety Scale (SIAS)[13].

Methods

This is a cross-sectional study done at a Tertiary Care Medical Institute of North-Eastern India conducted for 3 months. The study included sports personnel who have sustained injuries either during sports events or practice sessions. Participants were recruited using convenient sampling, and their contact information was obtained through the state sports authority.

Upon obtaining informed consent from the study participants, trained co-investigators conducted interviews on demographic and injury related variables with the participants and handed questionnaires based on SIAS.

Variables studied: 1. Demographic Variables: Age (categorized as 10-20 years, 20-30 years, 30-40 years, 40-50 years), Sex (male/female), Years of experience (<5 years, 6-10 years, >10 years); 2. Injury-Related Variables: Time interval between last sports injury and interview (<1 week, 1-2 weeks, 2 weeks - 1 month, 1-2 months, >2 months), Type of injury (categorized as Scratch or Graze, Blood clot beneath the skin[contusion] [abrasion], Laceration or tear, Fracture or Dislocation, Penetrating wound or stab wound), Hospitalization required (Yes/No). Break in sports career after injury (Yes/No), and if yes, duration in days/months/years; and 3. Outcome Variable: Score on SIAS questionnaire.

Scoring Method: Responses to various questions related to six different causes behind conditions were recorded numerically: Re-injury (RI), Being Perceived as Weak (BPW), Loss of Social Support (LSS), Loss of Athleticism (LA), Impaired Self Image (ISI), Letting Down Important Others (LDIO). The questionnaire used Likert's scale for responses (14). Disagreeing responses were marked negative, whereas neutral to strongly agreeing responses were given a score of 1-3. The SIAS for athletes was then evaluated as the sum of all those response scores with a heuristics weight assignment of 2 for LA and PAIN Responses, 3 for LDIO and LSS Responses and 1 for the rest. Anxiety scores for athletes were also calculated for each anxiety condition. Any score above the 75 percentiles of SIAS score was considered to have severe anxiety and any score below the 25 percentiles of SIAS score was considered to have borderline anxiety. Any score in between the interquartile range was considered average anxiety.

Data analysis: Data was analyzed using statistical software Python (v3.9), SciPy (v1.7.1) and statsmodels (v0.14.0)[15,16]. Descriptive statistics were used to summarize the demographic and injury-related variables. The primary statistical analysis involved Pearson correlation tests to explore the relationships between categorical demographic, injury-related variables and overall SIAS scores, and among the anxiety scores for different categories. The Kruskal Wallis Test, followed by Posthoc Dunn's test, was done on demographic and injury-related variables to find statistical differences amongst demographic and injury groups in terms of SIAS scores. Finally, an ordinary least squares regression on SIAS scores as the target variable to understand how these variables affect anxiety was performed.

Results

Out of 97 cases, the median age group of participants were 20-30 years. The average years of experience was 6-10 years. 47% of the participants were females. 75% of the respondents had experienced physical injuries. Out of the 6 types of injuries recorded in the questionnaire, 31% responded to had contusions, 28% had fractures/dislocations, 14% with lacerations or tears, 20% had scratches/grazes, 4% had penetrating/stab wounds, 3% had mixed injuries. 10% were hospitalized after the injuries. 37% of the respondents had a career break and the average break period was for 0-2 weeks. In our observed group, age, sex and years of experience did not have a significant effect on the SIAS as represented in Table 1. Previously hospitalized athletes were shown to have significantly higher anxiety levels than athletes who were not hospitalized. Interaction between causes behind anxiety was found to be BPW x LDIO (corr: 0.53, p-value:0.00), LDIO x LA (corr: 0.40, p-value:0.0001), LSS x ISI (corr: 0.45, p-value: 0.00) PAIN x RI (corr: 0.44, p-value:0.00), based on the Pearson correlation test, as depicted in Table 2-5. Those with Fracture/Dislocation injury had significantly higher SIAS than other injury groups. The group with no career break had significantly lower average SIAS than the other groups with few days to years of career break, which was checked with Post hoc Dunn's Test shown in Table 6. The significance levels of these groups were measured using the Kruskal Wallis H test as depicted in Table 7, followed by the Post-hoc Dunn's test, on variables with more than 2 categories, to find which groups exhibited the most difference. During Regression Analysis, people with fractures were observed to affect SIAS more than other injury types (coeff: 16.29, p-value = 0.003). A higher break period in career was also found to positively affect SIAS (coeff: 6.26, p-value = 0.002). However, a higher last sports injury period (coeff: -3.8, p-value: 0.02) and more experience (coeff: -8.4, p-value: 0.029) is shown to significantly lower SIAS in athletes. This indicates athletes with little to no break and relatively more experience in sports careers show lower anxiety levels. Athletes with scratch graze injury were also shown to have a positive effect on SIAS in the observed group, however, due to the lower representation of this injury group (19%) in the observed population, even with a p-value of 0.012, we decided to ignore its significance, as it is a mild injury. The coefficient and p-value > 0.05 for sex parameter reinforce the observation that sex did not significantly affect SIAS in the surveyed population as represented in Table 8. Over 81% of athletes showed some level of anxiety, with over 24% of athletes showing severe anxiety with an average SIAS of 60.1, 51% with average anxiety with SIAS ranging from 7-45, and the rest 25% athletes had no or borderline anxiety with an average of -6.03 SIAS.

Table 1: Pearson's Correlation and effect sizes of demographic variables and SIAS

Variable	Correlation	P-Value	Cohen's d
Age Group	-0.066	0.5209	0.05
Sex	-0.088	0.393	0.89
Years Of Experience In Sports	-0.151	0.1405	0.87
Last Sports Injury	0.181	0.0761	0.80
Type Of Injury	0.151	0.1394	0.82
Hospitalisation	-0.239	0.0185	0.89
Break In Sports Career	-0.318	0.0015	0.89
Break Period Years	-0.174	0.0876	0.77

Table 2: Pearson's Correlation of Being Perceived as Weak Cause of Anxiety

Variable	Correlation	P-Value	Cohen's d
LSS	0.32	0.001	0.15
LDIO	0.53	0.00	-0.25
LA	0.23	0.023	-0.28
PAIN	0.29	0.004	-0.44
RI	0.23	0.023	-0.34
ISI	0.17	0.094	-0.05

Table 3: Pearson's Correlation of LDIO Cause of Anxiety

Variable	Correlation	P-Value	Cohen's d
LSS	0.211	0.038	0.430
LA	0.397	0.000	-0.016
BPW	0.526	0.000	0.255
PAIN	0.415	0.000	-0.130
RI	0.513	0.000	-0.067
ISI	0.214	0.035	0.234

Table 4: Pearson's correlation of Losing Social Support cause of anxiety

Variable	Correlation	P-Value	Cohen's d
LDIO	0.211	0.038	-0.430
LA	0.136	0.183	-0.469
BPW	0.323	0.001	-0.150
PAIN	0.237	0.019	-0.676
RI	0.106	0.302	-0.546
ISI	0.447	0.000	-0.234

Table 5: Pearson's correlation of Pain cause of anxiety

Variable	Correlation	P-Value	Cohen's d
LSS	0.237	0.019	0.676
LDIO	0.415	0.000	0.130
LA	0.417	0.000	0.118
BPW	0.288	0.004	0.436
RI	0.446	0.000	0.061
ISI	0.303	0.003	0.439

Table 6: Posthoc Dunn's Test for Break Period Groups to determine intra group differences

Days	Weeks	Months	Years	Not Applicable
1	0.716	0.716	1	0.027
0.716	1	1	1	1
0.716	1	1	1	1
1	1	1	1	0.716
0.027	1	1	0.716	1

Table 7: Kruskal Wallis H-Test of SIAS score among intra-demographic categories.

Variable	KW H-Statistic	P-Value
Age in years	7.693	0.053
Sex	0.531	0.466
Years of experience in sports	5.543	0.063
Last sports injury	12.771	0.012
Type of injury	14.951	0.011
Hospitalisation	5.977	0.014
Break in sports career	8.972	0.003
Break period years	12.345	0.015

Discussion

Commonly described as "an unfavourable psychological condition resulting from perceived stress related to performing a task under pressure," anxiety is a prevalent emotional state encountered by athletes across different performance levels[17]. Broadly, anxiety comprises cognitive elements such as worrying thoughts and apprehensions, as well as somatic components like the degree of physical activation. It can appear as a stable aspect of one's personality referred to as trait anxiety or as a transient, adaptable, situation-specific state known as state anxiety[18]. Within the realm of sports, anxiety is frequently seen as a typical reaction to situations where an athlete's skills are being assessed[19]. More so, after there's a sports-related injury. Fear of getting injured, with its psychosocial implications for athletes, holds crucial significance in both the recovery phase post-injury and the successful resumption of sporting activities[20]. Anxiety can adversely affect various facets of anxiety, such as the fear of skill deterioration, fear of misperception, fear of suffering, fear of disappointment, fear of losing social support, fear of re-injury, etc., and even among athletes attempting to maintain composure in the face of injury[21]. To attain optimal anxiety levels when confronted with sports injuries, athletes must actively work to mitigate injury-related anxiety[22].

In our study, we found an 81% prevalence of anxiety conditions majorly among athletes who had a break in career period uniformly across various age, experience and sex groups. The scratch/graze injury group showed highest anxiety levels in fear of re-injury (RI) condition. It suggests further exploring the effect of mild injuries in athletes for anxiety conditions. We didn't find any study where types of injury were analysed for SIAS, however, in one study, 34.8% of the participants reported no history of injuries, 28.2% experienced one injury, 22.2% encountered two injuries, 9.6% faced three injuries, 5.1% sustained four or more injuries within a single year. Their T-test results for the Sports Injury Anxiety Scale and participants' gender variable revealed statistically significant distinctions favouring female participants (mean = 3.58) in the specific subdimension of anxiety related to suffering[23]. In a study by Lök et al. in 2008, the anxiety levels of candidates undergoing a special talent test for admission to the School of Physical Education

Table 8: Linear Regression between demographic variables and SIAS

Variable	Parameter Estimate	Std. Error	t-Value	P > |t|	CI0.025	CI0.975
Age	-0.9968	0.815	-1.223	0.225	-2.618	0.625
Years of Experience	-8.4968	3.815	-2.227	0.029	-16.083	-0.91
Last Sports Injury	-3.8827	1.614	-2.405	0.018	-7.093	-0.672
Hospitalisation	12.0431	8.659	1.391	0.168	-5.175	29.261
Break Period (Years)	6.2642	1.969	3.181	0.002	2.348	10.181
Contusion	1.6744	4.984	0.336	0.738	-8.237	11.586
Fracture/Dislocation	16.2964	5.245	3.107	0.003	5.866	26.727
Laceration/Tear	-3.3231	6.513	-0.51	0.611	-16.274	9.628
Mixed Injury Type	12.6675	11.825	1.071	0.287	-10.848	36.183
Piercing Wound Injury	-1.7993	10.098	-0.178	0.859	-21.88	18.282
Scratch Graze Injury	15.2	5.949	2.555	0.012	3.371	27.029
Sex (Female=1, Male=0)	-4.2275	4.927	-0.858	0.393	-14.026	5.571

and Sports were investigated. The study involved 253 athletes and indicated that anxiety scores were statistically higher among individuals under the age of 19 compared to those in other age groups[24]. Kahya & Küçükkibiş investigated anxiety levels and optimal performance mood in sports with 985 participants and concluded that female athletes exhibit higher anxiety levels compared to their male counterparts, aligning with the findings of our current study[25]. However, Çakır & Kısa explored anxiety in taekwondo players facing sports injuries, involving 617 athletes concerning pain anxiety and fear of re-injury and found male athletes had significantly higher anxiety scores than female athletes[26]. The cross anxiety causes analysis in our study suggests that one cause of anxiety can lead to, or, aggravate other kinds of anxiety conditions, being perceived as weak (BPW) anxiety levels along with fear of letting down important others (LDIO), and loss of athletic ability (LA). Likewise, impaired self-image (ISI) is observed with loss of social support (LSS) and co-existence of fear of re-injury (RI) along with pain. On demography, years of experience in sports solely doesn't strongly represent the SIAS in observed population, statistically indicating that the condition affects all age groups the same. However, athletes with <6 years of experience were found to have higher SIAS than the other groups of 6-10 and >10 years of experience. Arıkan & Çimen focused on sports injuries in university candidates, with 321 participants from various sports and found that male athletes had significantly higher anxiety levels in suffering anxiety, disappointment anxiety, and anxiety of loss of social support, while no significant gender differences were observed in pain anxiety and fear of re-injury subdimensions among female athletes in the Sports Injuries Anxiety Scale[27]. Understanding the psychological challenges that athletes face following sports injuries is crucial for designing effective rehabilitation programs. Athletes not only need physical healing but also emotional support to overcome anxiety. The findings suggest that interventions addressing anxiety should be tailored to different demographic groups and injury types. Sports personnel with a higher propensity for anxiety, such as younger athletes and those with more severe injuries, might benefit from specialized psychological support during their recovery process. The implications also extend to the return-to-play phase. Athletes experiencing anxiety may struggle to regain their pre-injury performance levels due to psychological hindrances. Anxiety about re-injury, self-doubt, and concerns about meeting expectations might hinder athletes' ability to perform optimally. Thus, comprehensive rehabilitation programs should incorporate psychological support to enhance athletes' confidence and mental resilience.

Limitations

While this study provides valuable insights, it has some limitations. The use of a convenient sampling method might introduce selection bias, as participants who agreed to be part of the study

might have inherently different psychological profiles from those who declined. Additionally, the study's cross-sectional design restricts the ability to establish causal relationships between variables. Future research could utilize longitudinal designs to better understand the trajectory of anxiety following sports injuries. Moreover, qualitative investigations could provide deeper insights into the emotional experiences of injured athletes, shedding light on their coping mechanisms and psychological needs.

Conclusion

This study underscores the need for a holistic approach to athlete well-being, recognizing the interplay between physical and psychological health. By tailoring rehabilitation programs to address anxiety and its determinants, sports organizations and healthcare professionals can support athletes in their journey toward recovery and successful reintegration into competitive sports.

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