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Factors Influencing Injuries in Amateur Basketball Players: The Role of Mental Factors and Sleep Quality

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Authors
Saeid Azadbakht[1], MSc
Ali Asghar Maleki [1*], MSc
Hassan Gharayagh Zandi [2], PhD

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ABSTRACT

Aims: Basketball's high intensity, multidirectional demands place players at considerable risk of musculoskeletal injury. While physical and biomechanical factors are well documented, the influence of psychological and behavioral variables—particularly obsessive passion for sport and sleep quality—remains underexplored in amateur populations. This study aimed to investigate the prevalence, location, and predictors of basketball-related injuries among Iranian amateur players, with a focus on mental factors and sleep quality.

Method and Materials: A cross-sectional survey was conducted among 488 amateur basketball players. Data on demographics, training characteristics, injury history (past six months), obsessive passion, and sleep quality were collected. Injury was defined as any basketball-related physical problem causing ≥1 week of training/match cessation, ≥2 weeks of modified load, or requiring medical consultation. Univariate and multivariable logistic regression analyses were done to predict the variables.

Findings: Overall, 54.5% of players (N=266) reported at least one injury in the previous six months, most commonly affecting the ankle (21%; N=62) and knee (19.6%; N=58). Obsessive passion (OR = 1.58, 95% CI: 1.12–2.23, p = 0.009), poorer sleep quality (OR = 1.10, 95% CI: 1.02–1.19, p = 0.015), and >5 years' experience (OR = 1.42, 95% CI: 1.01–2.00, p = 0.046) remained significant predictors, explaining 14% of the variance with 68% classification accuracy.

Conclusion: Injury risk among amateur basketball players is influenced not only by physical exposure but also by psychological commitment and recovery quality. Screening for obsessive passion and poor sleep may help identify at-risk athletes, enabling targeted interventions to optimize training load, recovery, and long-term participation.

Keywords: Basketball, Epidemiology, Risk Factors, Sleep Quality, Psychology, Athletic Injuries

[1] Department of Sport Injuries and Biomechanics, Faculty of Sport Sciences and Health, University of Tehran, Tehran, Iran.

[2] Department of Behavioral and Cognitive Sciences, Faculty of Sport Sciences and Health, University of Tehran, Tehran, Iran

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** Correspondence*
Department of Sport Injuries and Biomechanics, Faculty of Sport Sciences and Health, University of Tehran, Tehran, Iran
P.O. Box: 1417935840
Tel: 0098 21 88351720
Fax: 0098 21 88351720
E-mail ali.asghar.maleki@ut.ac.ir

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Introduction

Injury prevalence in basketball is influenced by the sport's unique biomechanical demands [1-3]. Frequent high-impact landings, abrupt accelerations and decelerations, and repeated pivoting movements place substantial stress on the lower extremities, particularly the knees and ankles [4, 5]. Upper body injuries, such as shoulder strains, are also common due to overhead passing [6], rebounding, and contact during defensive play [7]. Epidemiological studies have consistently identified ankle sprains, Anterior Cruciate Ligament (ACL) injuries, and patellar tendinopathy as leading causes of time lost from play in both amateur and elite basketball populations [6, 8]

While physical conditioning, movement mechanics, and training load are well-established contributors to injury risk, emerging evidence suggests that psychological and behavioral factors may be equally important [6, 9-11]. Athletes with high levels of obsessive passion for their sport may be more likely to ignore early signs of overuse or fatigue, continuing to train or compete despite discomfort [10, 12]. This persistence, while often celebrated as dedication, can increase the likelihood of both acute and chronic injuries [12].

Sleep quality is another critical yet often overlooked factor in basketball injury prevention. Poor sleep impairs neuromuscular coordination, reaction time, and decision-making, all of which are essential for safe and effective performance in a fast-paced, unpredictable game [10, 13, 14]. Inadequate recovery between

Training Inadequate recovery between training sessions or matches can also exacerbate muscle soreness, reduce tissue repair, and heighten susceptibility to overuse injuries [15, 16].

Furthermore, the interplay between mental factors and sleep quality may create a compounding effect. For example, a player with obsessive passion may train excessively, leading to physical fatigue and disrupted sleep, which in turn further elevates injury risk. Understanding these interrelationships is essential for developing holistic prevention strategies that address not only physical preparation but also psychological resilience and recovery habits.

Method and Materials

This cross-sectional study investigated the prevalence of injuries among amateur basketball players and examined potential risk factors, including mental factors and sleep quality. Data were collected via an online survey distributed to participants over a six-week period.

A total of 500 Iranian amateur basketball players (292 men, 208 women; age range 18–40 years, mean ± SD: 26 ± 6 years) were recruited based on an a priori power analysis using G*Power. The analysis indicated that a minimum of 480 participants was required to achieve 80% power at $\alpha = 0.05$ for detecting small-to-moderate effect sizes in multivariable logistic regression, assuming an injury prevalence of approximately 54% and modest correlations among predictors. The final sample size was increased to 500 to account for potential exclusions due to incomplete or inconsistent responses.

Recruitment was conducted through social media platforms, university sports departments, local basketball clubs, community gyms, and sports equipment stores.

For the purposes of this study, an amateur basketball player was defined as an individual who had been regularly participating in basketball training and games for at least nine months prior to the survey, with a minimum frequency of two to three sessions per week, but without professional or semi-professional competition status.

For data collection, a Farsi-language questionnaire was developed using Google Forms and distributed via Instagram, Telegram, and WhatsApp to collect study data. The survey comprised two main sections: the first section was about personal and training characteristics, including age, height, weight, playing position, years of basketball experience, weekly training frequency, session duration, presence of a coach, structured training program, warm-up and cool-down practices, and participation in other sports. The second section addressed injury history, asking participants to report any injuries sustained during basketball training or games in the previous six months. To aid reporting, a human body diagram divided into 82 anatomical regions was provided for marking the location(s) of pain, discomfort, or new musculoskeletal problems. For the purposes of this study, an injury was defined as any basketball-related physical problem that resulted in complete cessation of training or games for at least one week, modification of training load, intensity, or type for at least two weeks, or consultation with a healthcare professional.

Obsessive passion was measured using the Passion Scale developed by Vallerand et al. (2003) [17], validated in Farsi (Cronbach's $\alpha = 0.86$). The scale includes six items (e.g., "I have an almost obsessive feeling for playing basketball"), rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). Higher scores indicate greater obsessive passion [17].

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) [10], validated in Farsi (Cronbach's $\alpha = 0.78$). The PSQI evaluates seven components of sleep, producing a global score from 0 to 21, with higher scores indicating poorer sleep quality [10].

Data analysis was performed using IBM SPSS Statistics v26. Continuous variables were expressed as mean ± SD, and categorical variables as frequencies and percentages. Normality was assessed, and due to non-normal distribution, Mann–Whitney U tests and Chi-square tests were used for group comparisons.

Univariate logistic regression was conducted

to examine associations between each variable and injury occurrence. Variables with $p < 0.20$ in univariate analysis were entered into a multivariable logistic regression model using backward elimination, retaining variables with $p < 0.05$ [18]. Only modifiable factors were included in the final model. Multicollinearity was assessed via the Variance Inflation Factor (VIF), with all values < 1.5 indicating no collinearity concerns. Results are presented as Odds Ratios (OR) with 95% Confidence Intervals (CI).

Findings

Of the 500 amateur basketball players surveyed, 12 were excluded due to incomplete or inconsistent responses, leaving a final sample of 488 participants (292 men, 196 women; mean ± SD age: 26 ± 6 years). Table 1 compares the characteristics of players with and without a reported injury in the past six months. Injured players demonstrated significantly higher obsessive passion for basketball (5.3 ± 0.9 vs. 4.9 ± 0.9, $p < 0.001$) and poorer sleep quality (PSQI: 10.8 ± 4.8 vs. 9.1 ± 4.6, $p = 0.002$) than uninjured players. Male athletes were more frequently injured, had greater basketball experience (6.0 ± 1.1 vs. 4.0 ± 1.0 years), and trained more often per week (4.0 ± 1.0 vs. 3.0 ± 1.2 sessions). No significant group differences were observed for BMI category, training duration, practice time, or age. Table 1. Shows other data.

Table 1) Characteristics of amateur basketball players with and without injury in the past six months. Values are mean ± SD for continuous variables and n (%) for categorical variables

Variable		Injured (n = 266)	Uninjured (n = 222)	p-value
Age (years), mean ± SD		26.2 ± 6.1	25.8 ± 5.9	0.48
Sex (male), N (%)		172 (64.7%)	120 (54.1)	0.02*
Sex (Female), N (%)		94 (35.3%)	102 (45.9)	0.27
BMI (kg/m^2), mean ± SD		22 (4)	21(6)	0.98
Normal, N (%)		178 (66.9)	152 (68.5)	0.88
Overweight, N (%)		70 (26.3)	56 (25.2)	
Obese,n (%)		18 (6.8)	14 (6.3)	
Basketball experience		6 (1,1)	4 (1)	0.05*
Up to 2, N (%)		10 (3.4)	14 (6.3)	0.07
Between 2 & 5, N (%)		64 (24.1)	48 (21.6)	
Over 5, n (%)		192 (72.2)	160 (72.1)	
Training frequency		4 (1)	3 (1.2)	0.04*
Up to 3, N (%)q		108 (40.6)	112 (50.2)	0.03*
Over 3, N (%)		158 (59.4)	110 (49.5)	
Training duration (min/session)		90 (15)	85 (10)	0.67
Up to 60, N(%)		134 (50.4)	97 (43.7)	0.78
Over 60, N (%)		132 (49.6)	125 (56.3)	
warm-up	Yes, N (%)	250 (94.0)	208 (93.7)	0.91
	No, N (%)	16 (6%)	14 (6.3%)	
cool-down	Yes, N (%)	221(83.1)	198 (85.3)	0.86
	No, N (%)	45 (16.9)	34 (14.7)	
obsessive passion score		5.3 ± 0.9	4.9 ± 0.9	<0.001*
Sleep quality (PSQI score)		10.8 ± 4.8	9.1 ± 4.6	0.002*
Practice time, N (%)				
morning		22 (8.3)	16 (7.2)	0.123
afternoon		189 (71.1)	167 (75.2)	
night		55 (20.7)	39 (17.6%)	

*Statistically significant at $p < 0.05$.

The ankle was the most frequently injured site (21%; N= 62), followed by knee injuries (including ACL and meniscus tears; 19.6%; N= 58), finger/hand injuries (14.9%; N=0), and lower back pain (9.5%) (Table2).

Table 2) Basketball injury location

Location of injury	Total N (%)
Ankle	62 (21.0)
Knee	58 (19.6)
Finger/hand	44 (14.9)
Lower back	28 (9.5)
Thigh/hamstring	26 (8.8)

Shoulder	24 (8.1)
Foot/toe	18 (6.1)
Wrist	14 (4.7)
Hip/groin	12 (4.1)
Elbow	8 (2.7)
Chest/ribs	6 (2.0)
Neck	4 (1.4)
Abdomen	3 (1.0)

Both male and female players showed elevated rates of ankle and knee injuries (Table 3).

This study shows that ankle was the most prevalent location of the body which was injured and abdomen was the least prevalent location. Other data in this regard were shown in Table 3.

Table 3) Injury location description by gender

Injury location	Female	Male
Ankle	24 (20.3)	38 (21.5)
Knee	22 (18.6)	36 (20.3)
Finger/hand	18 (15.3)	26 (14.7)
Lower back	12 (10.2)	16 (9.0)
Thigh/hamstring	10 (8.5)	16 (9.0)
Shoulder	8 (6.8)	16 (9.0)
Foot/toe	8 (6.8)	10 (5.6)
Wrist	6 (5.1)	8 (4.5)
Hip/groin	6 (5.1)	6 (3.4)
Elbow	4 (3.4)	4 (2.3)
Chest/ribs	2 (1.7)	4 (2.3)
Neck	2 (1.7)	2 (1.1)
Abdomen	2 (1.7)	1 (0.6)

In the univariate logistic regression analysis, higher levels of obsessive passion (OR = 1.55, 95% CI: 1.20–2.01, p = 0.001), poorer sleep quality (OR = 1.24, 95% CI: 1.03–1.45, p = 0.002), more than five years of playing experience (OR = 1.89, 95% CI: 0.88–2.50, p = 0.020), and training more than three sessions per week (OR = 1.68, 95% CI: 0.89–2.16, p = 0.040) were each significantly associated with a higher likelihood of injury (Table 4).

Table 4) Findings of the univariate logistic regression analysis comparing basketball players with injuries to those without.

Variable	OR (95% CI)	p-value
Sex (Female = Ref)	1.42 (0.92–2.18)	0.110
Age	1.03 (1.00–1.07)	0.048
Obsessive passion	1.55 (1.20–2.01)	0.001
Sleep quality	1.24 (1.11–1.45)	0.002
Playing experience (years)		
Up to 2 (Ref)		
Between 2 & 5	1.12 (0.65–1.92)	0.680
Over 5	1.89 (1.48–2.50)	0.02
Weekly training sessions		
Up to 3 (Ref)		
Over 3	1.68 (1.23–2.16)	0.04
Session duration (min)		
Up to 90 (Ref)		
Over 90	1.33 (0.85–2.08)	0.210
Practice time		
Morning (Ref)		
Afternoon	0.36 (0.18–1.11)	0.098
Night	0.58 (0.29–1.16)	0.120
BMI		
Normal (Ref)		
Overweight	0.92 (0.58–1.48)	0.740
Obese	1.10 (0.50–2.43)	0.810

In the multivariable model, obsessive passion (OR = 1.58, 95% CI: 1.12–2.23, p = 0.009), poorer sleep quality (OR = 1.10, 95% CI: 1.02–1.19, p = 0.015), and playing experience exceeding five years (OR = 1.42, 95% CI: 1.01–2.00, p = 0.046) remained significant independent predictors of injury occurrence. Collectively, these variables accounted for approximately 14% of the variance in injury risk (Nagelkerke $R^2 = 0.14$) and yielded a classification accuracy of 68% (Table 5).

Table 5) Final multivariable logistic regression model for factors associated with injury occurrence in amateur basketball players

Variable	Injuries	Ankle	Knee	Finger/Hand
Obsessive passion	1.58 (1.12 – 2.23) P=0.009	1.44 (1.05 – 1.97) P=0.024	1.62 (1.12 – 2.34) P=0.011	1.55 (1.03 – 2.33) P=0.036
Poor sleep quality	1.10 (1.02 – 1.19) P=0.015	1.12 (1.03 – 1.22) P=0.008	1.09 (1.01 – 1.18) P=0.029	1.11 (1.02 – 1.21) P=0.015
experience Over 5	1.42 (1.01 – 2.00) P=0.046		1.51 (1.02 – 2.24) P=0.041	
training sessions Over 3			1.40 (1.01 – 1.95) P=0.046	
Nagelkerke R2 (%)	14	15	12	14
Classification accuracy (%)	68	75	66	69

Discussion

This study found that more than half of Iranian amateur basketball players (54.5%; N= 266) reported at least one injury in the past six months, with the ankle and knee being the most frequently affected sites. These findings are consistent with previous epidemiological studies in both amateur and elite basketball populations, which have reported injury prevalence ranging from 49% to 65% depending on definitions and recall periods [6, 19]. The predominance of ankle sprains and knee injuries aligns with systematic reviews highlighting the biomechanical demands of basketball—frequent jumping, landing, and pivoting movements place substantial stress on the lower extremities [4, 8]. Interestingly, finger and hand injuries also emerged as common, reflecting the sport's high level of ball-handling and contact during play, which has been similarly reported in collegiate and professional cohorts [20].

A novel contribution of this study is the identification of obsessive passion and poor sleep quality as independent predictors of injury. Players with higher obsessive passion scores were approximately 1.6 times more likely to sustain injuries, supporting the dualistic model of passion proposed by Vallerand et al. (2003)[17]. This model distinguishes between harmonious passion, which fosters balanced engagement, and obsessive passion, which can drive athletes to persist despite pain or fatigue. Comparable associations have been reported in endurance sports and collegiate athletes, where obsessive passion has been linked to overtraining, delayed injury recognition, and burnout [10, 18, 21-23].

Poor sleep quality also significantly increased injury risk, with each one-point increase in PSQI score associated with a 10% rise in injury odds. This finding corroborates prior research showing that inadequate sleep impairs neuromuscular coordination, reaction time, and cognitive performance, thereby elevating susceptibility to both acute and overuse injuries [24-26]. Similar results have been observed in adolescent athletes, where chronic sleep deprivation was associated with higher injury incidence [23, 27]. The interplay between obsessive passion and poor sleep may be particularly detrimental, as excessive training behaviors can disrupt recovery cycles, creating a feedback loop that heightens injury risk.

Players with more than five years of basketball experience were at greater risk of injury, possibly reflecting cumulative exposure to repetitive biomechanical stresses. While greater experience often correlates with improved technical proficiency, it may also coincide with increased training volumes and competitive intensity, both of which are established risk factors in basketball injury epidemiology [20]. Although training frequency (>3 sessions/week) was significant in univariate analysis, it did not remain in the final model, suggesting that its effect may be mediated by psychological and recovery-related variables. This highlights the

importance of considering not only physical workload but also behavioral and mental factors when evaluating injury risk [28-30].

These findings highlight the importance of integrating psychological and behavioral assessments into injury prevention frameworks for amateur basketball players. Screening for obsessive passion profiles and poor sleep quality could help identify at-risk athletes, enabling targeted interventions such as load management education, sleep hygiene programs, and mental skills training to promote adaptive passion and self-regulation [23, 31-33]. Coaches and sports medicine practitioners should be aware that injury prevention is not solely a matter of physical conditioning but also of managing the psychological drivers that influence training behaviors [34, 35].

This study's strengths include a large, adequately powered sample, validated measures for psychological and sleep variables, and the use of multivariable modeling to control for confounding; however, several limitations must be acknowledged, including reliance on self-reported data for injury history and sleep quality, which may introduce recall bias or subjective misclassification, the cross-sectional design that prevents establishing temporal or causal relationships, the restriction of the sample to Iranian amateur players that may limit generalizability to other cultural or competitive contexts, and the absence of objective measures such as clinical verification of injuries or actigraphy-based assessment of sleep quality; together, these limitations highlight the need for longitudinal and experimental studies across diverse populations to confirm causal pathways and evaluate the effectiveness of interventions targeting psychological and recovery-related factors.

Future research should employ prospective designs to examine whether modifying obsessive passion and improving sleep quality can reduce injury incidence. Intervention studies—such as randomized trials of sleep optimization programs or psychological skills training—would provide stronger evidence for causality. Expanding research to include diverse cultural and competitive contexts will also enhance generalizability and inform global injury prevention strategies.

Conclusion

This study identified obsessive passion for basketball, poorer sleep quality, and more than five years of playing experience as significant independent predictors of injury among Iranian amateur basketball players. These findings underscore the importance of addressing not only physical and technical preparation but also psychological and behavioral factors in injury prevention strategies. Integrating routine screening for passion profiles and sleep quality into athlete monitoring systems may help identify individuals at elevated risk, enabling targeted interventions to optimize recovery, regulate training load, and promote sustainable participation. Future longitudinal and intervention-based research is warranted to confirm these associations and evaluate the effectiveness of multifaceted prevention programs that combine physical, psychological, and recovery-focused components.

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Authors' Contribution

All authors contributed to the conception and design of the study. Their roles included developing the methodology, collecting data, drafting the initial manuscript, revising and editing the text, preparing data visualizations, supervising the research process, and managing administrative tasks. Each author has read and approved the final version of the manuscript for submission.

Conflicts of Interest

The authors stated that they have no conflicts of interest.

Ethical Permission

Ethical issues such as informed consent, plagiarism, data fabrication, falsification, misconduct, duplicate submission, and redundancy were carefully addressed. The study was conducted in accordance with the principles of the Declaration of Helsinki, and the written informed consent was obtained

from all participants for inclusion in the study and publication of the findings. The protocol received approval from the Research Ethics Committee of the Faculty of Physical Education and Sport Sciences, University of Tehran.

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