

Factors Associated with Temporomandibular Disorders (TMD) Among University Team-Sport Athletes: A Cross-sectional Study



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INTRODUCTION

Temporomandibular disorders (TMD) are prevalent musculoskeletal conditions that affects mandibular function and quality of life. Their multifactorial origin—biomechanical, behavioral and psychosocial—makes them particularly relevant in athletes, who endure orofacial impacts and performance-related stress. Yet, evidence on TMD among university athletes in team sports remains scarce. This study aimed to investigate factors associated with TMD in this population, addressing an understudied intersection between oral health and competitive sports.

MATERIALS & METHODS

Study Design and Population

A cross-sectional analytical study was conducted among **203 university athletes** belonging to official university team sports in Lima Metropolitan Area during 2023. Eligible participants were actively competing athletes aged 18 years or older who provided informed consent.

Data Collection. Participants completed a structured questionnaire that included:

- **Fonseca Anamnestic Index** to assess presence and severity of TMD
- **DASS-21** to evaluate anxiety and stress levels
- Sleep habits assessed using **Sleep-EVAL**
- Sociodemographic data, academic variables, sports-related characteristics and daily consumption of alcohol, cigarettes and caffeine

Statistical Analysis

- Descriptive statistics were calculated using frequencies, percentages and medians (IQR).
- Bivariate associations were assessed using **Chi-square** and **Mann-Whitney U tests**.
- Multivariable analysis was performed using **Poisson regression with robust variance**, reporting prevalence ratios (PR) and 95% confidence intervals (CI).
- A **p-value < 0.05** was considered statistically significant.



TMD is the second most common injury associated with sports practice.

Elite athletes experience up to 5 times more traumatic injuries than recreational athletes

University athletes experience greater physical and emotional strain.

RESULTS

Participant Characteristics

- The median age of participants was 21 years with an interquartile range of 2 years. Most athletes were male and the most frequently represented sports were basketball volleyball soccer and futsal. Mouthguard use was reported by fewer than ten percent of participants. Approximately two thirds of athletes reported sleeping fewer than seven hours per night and more than half reported moderate to severe anxiety or stress levels.

Table 1. Sociodemographic, behavioral and psychosocial characteristics of university athletes

Variable	Category	n (%)
Sex	Male	133 (65.5)
	Female	70 (34.5)
Age (years)	Median (IQR)	21 (2)
Faculty	Design and Business	62 (30.5)
	Architecture and Engineering	53 (26.1)
	Health Sciences and Psychology	49 (24.1)
	Law and Communications	24 (11.8)
	Other	15 (7.4)
Academic year	1st–2nd	45 (22.2)
	3rd–4th	75 (36.9)
	5th or higher	84 (41.4)
Type of sport	Basketball/Volleyball	75 (36.9)
	Soccer/Futsal	72 (35.5)
	Rugby	16 (7.9)
	Other team sport	40 (19.7)
Mouthguard use	Yes	16 (7.9)
	No	187 (92.1)
Weekly training hours	0–8 h	50 (24.6)
	8–16 h	112 (55.2)
	≥16 h	41 (20.2)
Daily sleep duration	<7 h	134 (66.0)
	≥7 h	69 (34.0)

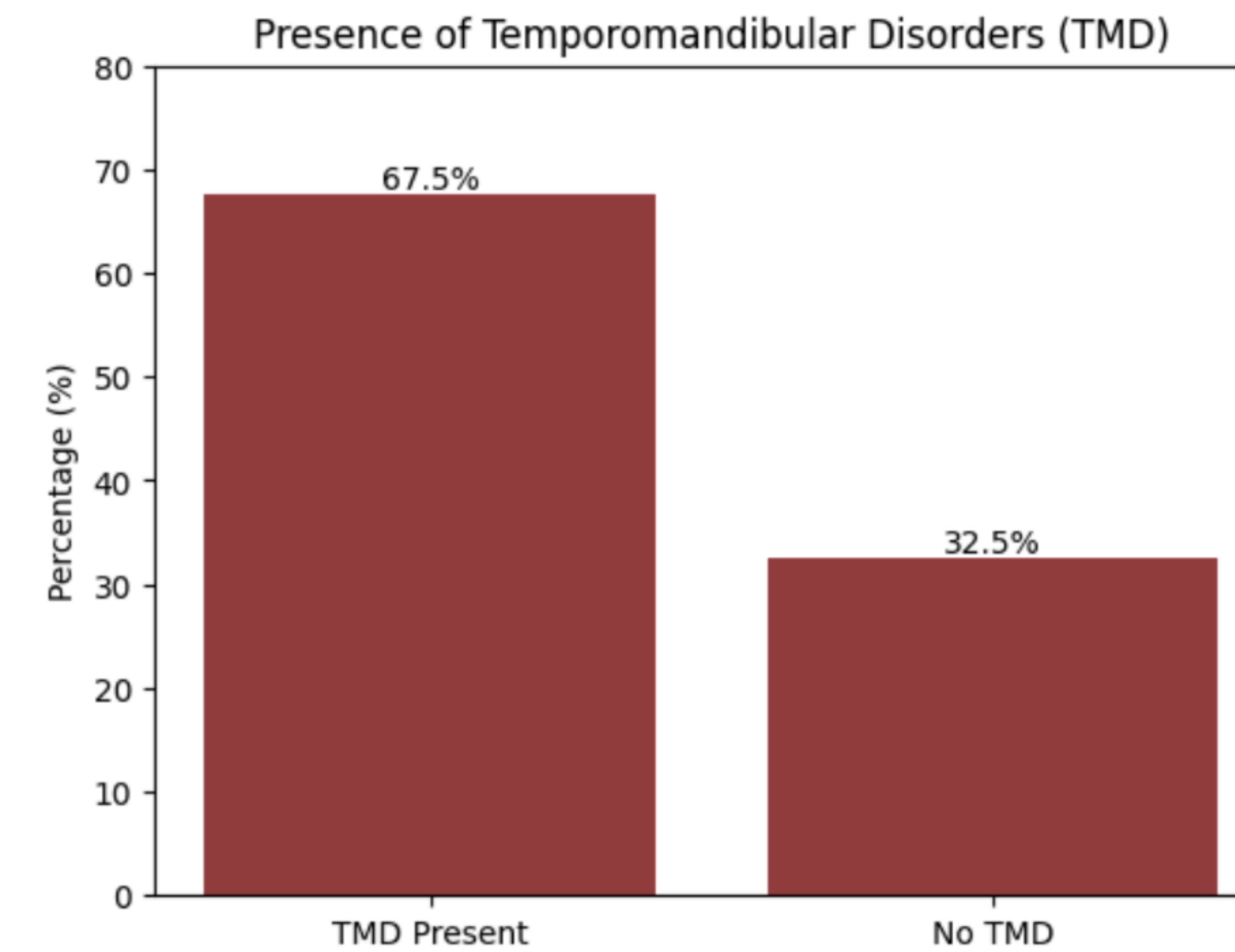


Fig 1A. Presence of temporomandibular disorders among university athletes

Prevalence of Temporomandibular Disorders

TMD was identified in 67.5 percent of university athletes, while 32.5 percent showed no signs of the disorder. This finding indicates that nearly two out of three athletes experience symptoms compatible with temporomandibular disorders.

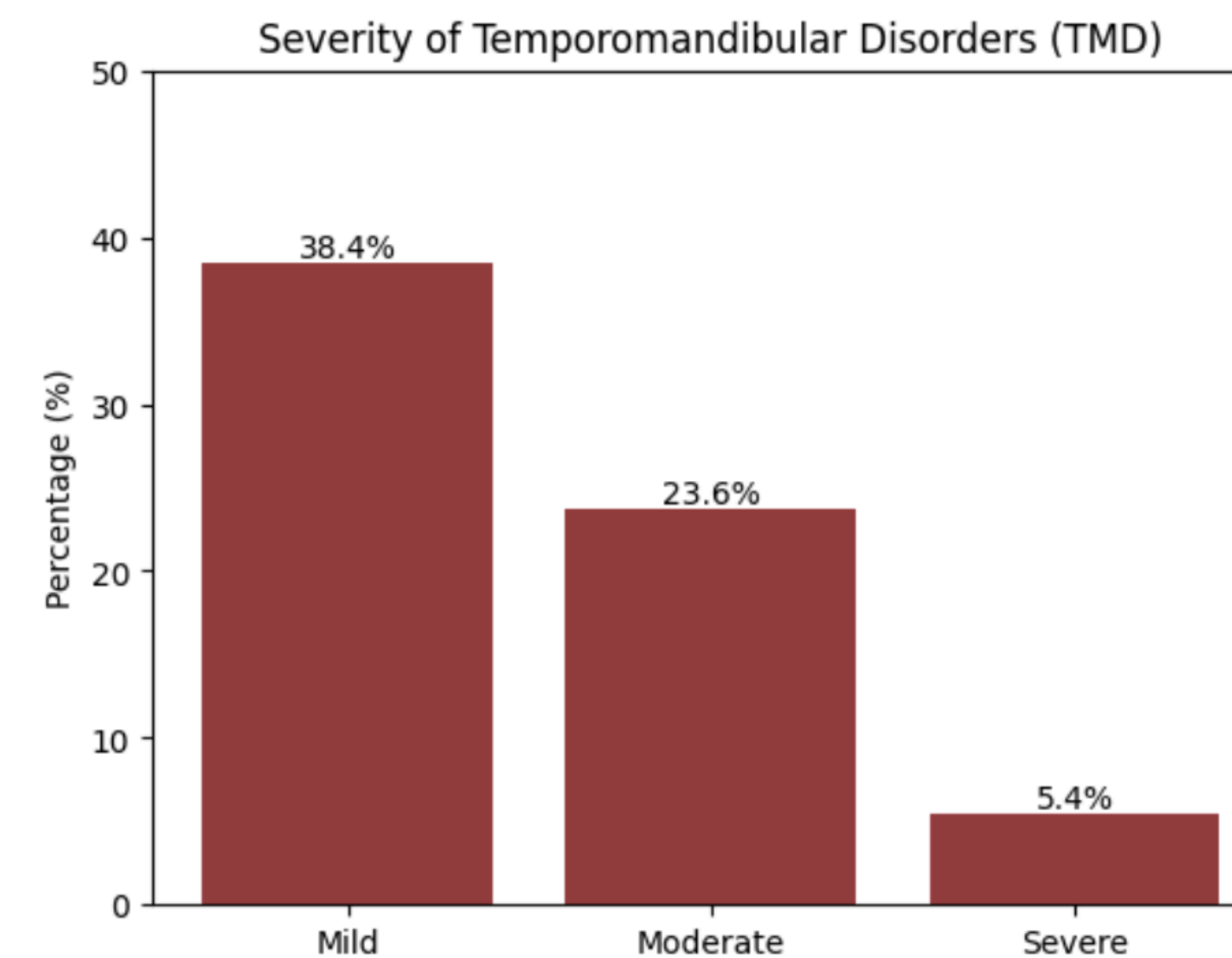


Fig 1B. Severity distribution of temporomandibular disorders

Severity of Temporomandibular Disorders

Regarding severity, 38.4 percent of athletes presented mild TMD, 23.6 percent moderate TMD and 5.4 percent severe TMD. Although severe cases were less frequent, more than one third of the population exhibited clinically relevant symptoms that may require monitoring or intervention.

RESULTS

Factors Associated with TMD

TMD prevalence was significantly higher among female athletes and those reporting short sleep duration. Psychological variables showed strong associations with TMD, with a clear dose response pattern observed across increasing anxiety and stress severity levels. Lifestyle behaviors, including daily caffeine, alcohol and cigarette consumption, were also associated with increased TMD prevalence.

Table 2. Crude and adjusted Poisson regression models for temporomandibular disorders (TMD) among university athletes

Variable	Crude PR (95% CI)	p-value	Adjusted PR (95% CI)	p-value
Sex				
Female vs Male	1.31 (1.09–1.57)*	0.003	1.14 (0.93–1.40)	0.201
Type of sport				
Other team sport vs Rugby	1.27 (0.89–1.80)	0.179	0.95 (0.66–1.37)	0.813
Mouthguard use				
Yes vs No		0.72 (0.43–1.19)	0.208	0.51 (0.28–0.93)*
Sleep duration				
≥7 h vs <7 h		0.80 (0.63–1.00)	0.055	0.87 (0.70–1.09)
Anxiety level				
Moderate vs None	1.59 (1.18–2.13)*	0.002*	1.44 (1.06–1.96)*	0.020*
Severe vs None	1.84 (1.40–2.42)*	<0.001*	1.28 (0.94–1.75)	0.111
Stress level				
Mild vs None	1.35 (1.05–1.73)*	0.016*	1.18 (0.90–1.54)	0.226
Moderate vs None	1.44 (1.16–1.78)*	0.001*	1.17 (0.88–1.55)	0.264
Cigarette consumption				
<20/day vs None	1.55 (1.36–1.78)*	<0.001*	1.33 (1.07–1.66)*	0.008*
≥20/day vs None	1.61 (1.43–1.81)*	<0.001*	2.71 (1.18–6.24)*	0.018*
Alcohol consumption				
1–2 glasses/day vs None	1.27 (1.04–1.54)*	0.014*	0.92 (0.71–1.20)	0.574
≥3 glasses/day vs None	1.58 (1.40–1.77)*	<0.001*	1.26 (0.82–1.95)	0.282
Caffeine intake				
3–5 cups/day vs None	1.64 (1.34–2.00)*	<0.001*	1.08 (0.83–1.39)	0.544
≥6 cups/day vs None	1.73 (1.46–2.05)*	<0.001*	1.24 (0.94–1.63)	0.116

Note. Data were analyzed using Poisson regression with robust variance estimation. Crude models were adjusted individually, and multivariate models were adjusted for age, sex, faculty, academic year, sport type, training hours, sleep duration, mouthguard use, anxiety and stress levels, and daily consumption of alcohol, cigarettes, and caffeine.

Significant at $p < 0.05$. PR = prevalence ratio; CI = confidence interval.

In the **adjusted model**, moderate anxiety remained independently associated with TMD, while daily cigarette consumption showed a strong dose dependent relationship. Mouthguard use was inversely associated with TMD, suggesting a protective effect.

DISCUSSION

This study shows a high prevalence of temporomandibular disorders among university team sport athletes, highlighting an often overlooked health issue. The predominance of mild and moderate TMD suggests early stage symptoms that may progress without intervention.

The strong association between psychological distress and TMD supports a biopsychosocial framework and emphasizes the importance of mental health screening in athletic settings. Sleep deprivation and stimulant use may further increase neuromuscular strain.

The protective association observed with mouthguard use suggests a potential role in reducing masticatory muscle overload and supports its inclusion in comprehensive athlete care strategies.

CONCLUSION

Temporomandibular disorders are common among university team sport athletes and are influenced by multiple factors, including anxiety, smoking and the use of protective equipment. Mouthguard use appears to reduce TMD risk, while psychological and behavioral factors increase susceptibility. Integrating early screening, mental health support and preventive oral health strategies may help reduce TMD risk and support athlete well being and performance.

REFERENCES

References and source links used in this work can be accessed through the QR code:

