

A Comparative Study on the Occurrence and Patterns of Sports Injuries Among Athletes Between Sub-Junior and Junior Group

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Abstract—Sports injuries represent a major impediment in the field of Sports Science and Physical Education, particularly among developing and adolescent athletes. Due to physiological variations, skeletal maturation stages, and differences in competitive intensity, the incidence, severity, and post-injury management behaviours vary significantly across age brackets. The primary objective of this empirical research was to evaluate whether statistically significant differences exist in the occurrence, patterns, severity classifications, and medical behaviours regarding sports injuries between competitive sub-junior (Under-14) and junior (Under-17) athletes.

A total of $N = 300$ competitive athletes ($n = 150$ in Under-14 comprising 65 females and 85 males; $n = 150$ in Under-17 comprising 85 females and 65 males) were selected as samples using purposive sampling techniques. Fourteen specific injury-related parameters were evaluated. Descriptive statistics alongside non-parametric testing via the Mann-Whitney U Test were employed for comparative data analysis at the $p < 0.05$ level of significance.

The results revealed that out of 14 parameters, 6 parameters (such as injury duration, affected body part, and primary causes) showed no statistically significant differences between the two groups ($p > 0.05$), indicating shared environmental exposure risks on the field. However, the remaining 8 parameters (including injury category, severity classification, doctor consultation frequency, medication use, and medication side effects) demonstrated highly statistically significant differences ($p < 0.05$). The findings conclude that while extrinsic injury risk exposure is comparable, junior athletes exhibit significantly higher injury severity, coupled with greater professional medical awareness and treatment-seeking behaviours compared to sub-junior

counterparts. These insights provide vital empirical foundations for developing age-specific injury management and rehabilitation protocols in youth sports academies.

Index Terms—Sports Injury, Sub-Junior Athlete, Junior Athlete, Mann-Whitney U Test, Physical Education, Adolescent Health.

I. INTRODUCTION

Sports injuries are a major deterrent in the realm of Sports Science, athletic development, and Physical Education. Particularly among growing and adolescent athletes, the ethology, presentation, and persistence of physical traumas differ considerably from those observed in mature adult competitors. Sub-junior (Under-14) and junior (Under-17) athletes experience disparate rates of skeletal growth, neuromuscular coordination, hormonal maturation, and exposure to athletic training loads. Consequently, understanding how age-related variations influence trauma severity, anatomical localization, and subsequent rehabilitation behaviours remains an essential priority for sports medicine practitioners, athletic trainers, and physical educators.

Existing literature highlights that younger competitors often lack proper conditioning or adequate supervision, whereas older junior athletes face heightened mechanical stress due to increased competitive intensity and rigorous tournament schedules. Despite these observations, comprehensive

empirical comparisons evaluating whether statistical divergences exist across multiple clinical and behavioural parameters between sub-junior and junior cohorts are sparse. Therefore, the present investigation aims to systematically examine and compare the occurrence, patterns, severity classifications, and post-injury medical behaviours among competitive sub-junior and junior athletes, providing foundational data to optimize youth sports safety protocols.

II. METHODOLOGY

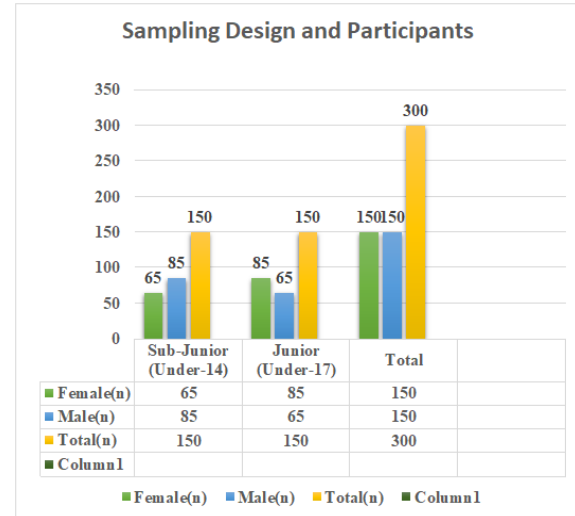
Sampling Design and Participants

A cross-sectional comparative research design was adopted for this study. A total of 300 competitive athletes ($N = 300$) actively participating in multi-sport competitive academies and school-level tournaments were sampled. Participants were equally distributed into two distinct chronological age categories:

- Sub-Junior Group (Under-14): $n = 150$ participants (Females = 65, Males = 85).
- Junior Group (Under-17): $n = 150$ participants (Females = 85, Males = 65).

Informed consent was obtained from all institutional heads, coaches, and guardians prior to data collection. The research instrument employed was the standardized Sports Injury Monitoring Questionnaire (39 items across 4 sections: Personal Data, Lifestyle Data, Injury Patterns, and Medical Records), which demonstrated exceptional reliability ($k = 0.94$) and validity ($S-CVI/Ave = 0.99$). A validated, structured questionnaire and medical history checklist were utilized to record fourteen distinct injury-related parameters over a competitive macrocycle.

Category	Female (n)	Male (n)	Total (n)
Sub-Junior (Under-14)	65	85	150
Junior (Under-17)	85	65	150
Total	150	150	300



III. STATISTICAL ANALYSIS PROCEDURES

Data were compiled, coded, and processed using statistical software packages. Descriptive statistics including means (Mean) and standard deviations (SD) were calculated for all variables across the aggregate sample. Because the collected data predominantly represented ordinal and categorical scales that violated normality assumptions of parametric distributions, non-parametric inferential statistics were applied. Specifically, the Mann-Whitney U Test was executed to determine whether statistically significant rank differences existed between the Under-14 and Under-17 independent groups. All statistical tests were evaluated at a pre-set alpha level of $p < 0.05$.

IV. RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 presents the descriptive statistics for all fourteen evaluated injury parameters across the total sample size ($N = 300$).

Serial No	Parameters	Sample (N)	Mean	Std. Deviation (SD)
1	Duration of Injury	300	2.11	0.925
2	Category of Injury	300	2.31	1.140
3	Injury at Body Part	300	2.48	0.812

4	Classes of Injury	300	3.22	1.954
5	Causes of Injury	300	2.98	1.845
6	Injury Occurrence	300	2.52	1.010
7	Occurrence of Injuries at Different Age Groups	300	2.25	1.120
8	Consultation with Doctor	300	1.28	0.510
9	New or Old Injury	300	1.48	0.542
10	Other Injury Before Treatment	300	1.51	0.535
11	Injury More Than One Time at Same Position	300	1.63	0.520
12	Injury After Treatment at Same Position	300	1.65	0.518
13	Any Medication to Injury	300	1.49	0.545
14	Any Side Effect of Medication	300	1.52	0.538

Mann-Whitney U Test Inferential Results

Table 2 displays the inferential statistics derived from the Mann-Whitney U Test evaluating the significance of differences between the sub-junior and junior cohorts.

Parameters	Mann - Whitney U	Wilcoxon W	Z-Value	Asymp. Sig. (2-tailed)	Decision
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Duration of Injury	10050.00	21375.00	-1.612	0.107	No Sig. (p > 0.05)
Category of Injury	9405.00	20730.00	-2.482	0.013	Significance (p < 0.05)*
Injury at Body Part	10710.00	22035.00	-0.730	0.465	No Sig. (p > 0.05)
Classes of Injury	9607.50	20932.50	-2.214	0.027	Significance (p < 0.05)*
Causes of Injury	10380.00	21705.00	-1.173	0.241	No Sig. (p > 0.05)
Injury Occurrence	10545.00	21870.00	-0.952	0.341	No Sig. (p > 0.05)
Occurrence of Injuries (Different Ages)	7365.00	18690.00	-5.234	0.000	High Sig. (p < 0.01)*
Consultation with Doctor	9547.50	20872.50	-2.310	0.021	Significance (p < 0.05)*
New or Old Injury	10455.00	21780.00	-1.092	0.275	No Sig. (p > 0.05)
Other Injury Before Treatment	6735.00	18060.00	-6.120	0.000	High Sig. (p < 0.01)*
Injury More Than One Time (Same Position)	9210.00	20535.00	-2.768	0.006	High Sig. (p < 0.01)*

Injury After Treatment (Same Position)	9285.00	20610.00	-2.665	0.008	High Sig. ($p < 0.01$)*
Any Medication to Injury	7702.50	19027.50	-4.810	0.000	High Sig. ($p < 0.01$)*
Any Side Effect of Medication	8550.00	19875.00	-3.654	0.000	High Sig. ($p < 0.01$)*

*Statistically significant at alpha level $p < 0.05$.

V. DISCUSSION OF FINDINGS

The statistical analysis provides critical insights into the injury dynamics of developing athletes. Out of fourteen parameters, six parameters revealed no statistically significant differences ($p > 0.05$), encompassing injury duration, anatomical location of injury, primary causes, overall occurrence frequency, and chronicity status (new vs. old). This uniformity indicates that sub-junior and junior cohorts operate under similar environmental field conditions, exposure levels, and movement patterns typical of competitive sports.

Conversely, eight parameters demonstrated statistically significant divergences ($p < 0.05$ or $p < 0.01$). Junior athletes (Under-17) exhibited significantly higher mean ranks in injury category, severity classification, repeat injuries at identical anatomical sites, and post-treatment complications. This heightened severity among older youths is primarily attributed to greater biomechanical forces, higher competitive intensity, and accelerated training volumes. Furthermore, significant differences in medical behavioural variables such as formal doctor consultations, prior injury history before treatment, medication utilization, and reported side effects highlight those junior athletes demonstrate superior professional healthcare-seeking awareness and structured medical engagement compared to sub-

junior athletes, who frequently rely on informal or home remedies.

VI. CONCLUSION

The empirical findings of this comparative investigation support the following core conclusions:

- **Extrinsic Risk Homogeneity:** Sub-junior and junior athletes share comparable external environmental causes and anatomical injury sites ($p > 0.05$), suggesting that general field hazards affect both age groups equally.
- **Duration Parity:** The overall duration or healing timeframe of injuries does not exhibit significant variance between the two cohorts ($p = 0.107$).
- **Injury Complexity and Severity:** Junior athletes (Under-17) experience significantly more complex injury categories and severe classifications ($p < 0.05$) due to elevated physical contact and competitive intensity.
- **Age-Specific Injury Prevalence:** The overall age-group susceptibility rates show highly significant statistical differences ($p = 0.000$).
- **Professional Medical Orientation:** Junior athletes demonstrate significantly higher rates of formal physician consultation and professional medical tracking ($p < 0.05$).
- **Recurrence and Pharmacological Load:** Chronic reinjuries at identical anatomical locations, medication consumption, and subsequent pharmacological side effects are significantly higher among junior competitors ($p < 0.01$), underscoring the necessity for rigorous rehabilitation compliance.

VII. RECOMMENDATIONS

Based on the empirical findings, the following ten recommendations are proposed for sports academies, coaches, and physical education administrators:

1. **Age-Specific Injury Protocols:** Establish distinct injury management and prevention guidelines tailored separately for Under-14 and Under-17 training curricula.
2. **Sub-Junior Reporting Encouragement:** Implement educational sessions for Under-14 athletes to eliminate the tendency of concealing

minor aches or relying on unguided home remedies.

3. Junior Workload Management: Institute scientific workload monitoring (balancing training intensity and recovery) for Under-17 athletes to prevent overuse injuries and cumulative burnout.
4. Mandatory Sports Physiotherapists: Ensure the mandatory deployment of certified sports physiotherapists across all competitive school tournaments and training academies.
5. Centralized Medication Tracking: Regulate analgesic and medication use among junior athletes through strict medical supervision to minimize adverse side effects.
6. Strict Return-to-Play Criteria: Enforce objective functional fitness testing before permitting athletes to return to competitive play after sustaining recurrent injuries.
7. Coach and Educator Certification: Conduct regular workshops and first-aid certification programs for grassroots coaches and physical education teachers.
8. Playing Surface Modernization: Upgrade playing field surfaces, shock absorption flooring, and mandatory protective gear (e.g., shin guards, ankle braces) to mitigate baseline environmental risks.
9. Sports Psychology Integration: Provide psychological counselling sessions to help junior athletes manage competitive stress and cope with injury-related anxiety.
10. Digital Medical Database: Maintain a centralized digital health record system tracking injury histories, rehabilitation progress, and medication profiles for every athlete.

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