AJMB
eISSN: 2600-8173
https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb
PENERBIT
Universiti Sultan Zainal Abidin

Asian Journal of Medicine and Biomedicine

Incidence and Patterns of Injuries and Illnesses among Malaysian Athletes at the FISU World University Games 2025: A Prospective Surveillance Study

Muhammad Kashani Bin Mohd Kamil[1], Muhammad Harith Rosdi[2*], Arif Fikri bin Rahimi[3]

[1]Sports Medicine Department, Faculty of Medicine, University Malaya, 50603 Kuala Lumpur, Malaysia.
[2]IIUM Sports Medicine Clinic (ISMEC), Kulliyyah of Medicine, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, 25200 Kuantan, Pahang, Malaysia
[3]IIUM Sports Medicine Clinic (ISMEC), International Islamic University Malaysia, Jalan Sultan Ahmad Shah, 25200 Kuantan, Pahang, Malaysia

Corresponding author: harithrosdi@iium.edu.my

Received: 28th June 2026 **Accepted: 26th August 2026** **Published: 31st October 2026**

Abstract

Data on injuries and illnesses among Malaysian university athletes at international multisport events are scarce. These athletes balance academic demands with intensive training and competition, which may increase their health risks. This study aimed to determine the incidence and patterns of injuries and illnesses among Malaysian athletes during the FISU World University Games 2025, and to identify the body regions most affected, common injury types, and illness categories. A prospective surveillance study of all 64 Malaysian athletes was conducted during the FISU World University Games 2025 (16-27 July 2025, Rhine-Ruhr, Germany). Medical personnel conducted daily surveillance using standardised forms adapted from the International Olympic Committee (IOC) system and the 2020 IOC consensus statement. The unit of analysis was the injury or illness episode. Incidence per 100 athletes and per 1000 athlete-days was calculated with exact Poisson 95% confidence intervals (CI). Eighteen injury and illness episodes, arising from 21 medical encounters, were recorded among 64 athletes, giving an incidence of 28.1 episodes per 100 athletes (95% CI 16.7 to 44.4) and 23.4 per 1000 athlete-days (95% CI 13.9 to 37.0). Accounting for squad size, badminton had the highest rate at 58.3 per 100 athletes and archery the lowest at 8.3 per 100, despite identical squads of 12. This is the first injury and illness surveillance report for Malaysian athletes at the World University Games. Overuse injuries and respiratory illnesses predominated and few cases were severe. Adjusted for exposure, badminton was the highest-risk sport, and nearly half of all episodes were recurrent pre-existing complaints. These baseline data can guide medical planning, pre-departure screening and prevention for future contingents.

Keywords

Injuries, illness, sports, university athletes, world university games

https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb

Introduction

Malaysia has consistently participated in major international multisport events, including the Asian Games and the Southeast Asian (SEA) Games. However, data on injuries and illnesses among Malaysian athletes during such events remain limited. Studies from the Asian Games 2014 and the KL SEA Games 2017 showed that muscle strains and respiratory tract infections were the most common health problems, and most cases were mild in severity.[1,2]

At the university level, similar findings were reported during the Malaysian Higher Education Games (SUKIPT) 2018, where muscle strain was the leading injury and respiratory illness was the most frequent condition among student-athletes.[3] This suggests that health problems in Malaysian athletes follow a consistent pattern regardless of the level of competition.

University athletes represent a distinct population. Unlike professional athletes, they often balance intensive training and competition alongside academic demands, which may reduce recovery time and increase their vulnerability to both injury and illness. A recent study of first-year student-athletes reported an injury incidence of 54% over a single academic year, and found that a previous injury more than tripled the odds of sustaining a new one.[4] The FISU World University Games is one of the largest international competitions for this group, bringing together student-athletes from over 100 countries in a high-intensity sporting environment.

Internationally, injury and illness surveillance at major multisport events has been well documented. A study of the 2021 Summer Universiade (Chengdu, held in 2023 following pandemic-related postponement) reported 9.5 injury-related clinic visits per 100 athletes, with lower limb injuries and respiratory illnesses being the most common findings.[5] Similar patterns have been reported in regional competitions, including the SEA Games, where lower limb injuries and respiratory conditions consistently dominated the medical workload.[6] Respiratory illnesses in particular are well recognised as a major health concern for athletes at international competitions, influenced by travel, environmental changes, and the physiological stress of competition.[7]

Systematic injury and illness surveillance is the first step in developing effective prevention strategies.[8] Despite Malaysia's regular participation in international multisport events, no study has examined the health profile of Malaysian athletes specifically at the World University Games. This study therefore aimed to determine the incidence and patterns of injuries and illnesses among Malaysian athletes during the FISU World University Games 2025, and to provide baseline data to guide future medical planning and prevention efforts.

Materials and Methods

Study design and study population

This was a prospective observational surveillance study conducted during the FISU World University Games 2025 (Rhine-Ruhr, Germany) from 16 to 27 July 2025, covering a 12-day competition period. A defined cohort was followed daily throughout the competition period and rates were expressed per unit of athlete exposure time.

https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb

All 64 Malaysian athletes officially registered to compete in the Games were included as a complete cohort. No formal sample size calculation was required as the study captured the entire Malaysian contingent. The cohort comprised 39 male and 25 female athletes competing across six sports: athletics (n=24), badminton (n=12), archery (n=12), taekwondo (n=8), swimming (n=6) and gymnastics (n=2). The wider contingent comprised 94 individuals in total: 64 athletes, 22 officials and coaches, 4 secretariats, 2 medical personnel and 2 media.

Data Collection

A coordination briefing was held with all medical personnel attached to the Malaysian contingent prior to the opening ceremony. Standardised injury and illness reporting forms, adapted from the International Olympic Committee (IOC) injury and illness surveillance system for multisport events, were used throughout the competition period. Surveillance methods, case definitions and reporting followed the 2020 IOC consensus statement on methods for recording and reporting of epidemiological data on injury and illness in sport.[9] Daily surveillances was conducted by qualified medical personnel, comprising a team physician and a physiotherapist. Reports were submitted electronically via a secure online platform.

Each report recorded the following: athlete sport and role (athlete or official), date of occurrence, type of injury or illness, anatomical location, mechanism of injury, whether the case was new or recurrent, and severity based on time-loss from training or competition. The swimming events were held in Berlin, geographically separate from the main Rhine-Ruhr venues, and no contingent medical officer was present at that venue. Medical care for the 6 swimmers based in Berlin was facilitated through the team manager's contacts, and no cases were reported from this group. Athletes under active on-site surveillance therefore numbered 58 of the 64 registered.

Case definitions and unit of analysis

An injury was defined as any physical complaint sustained during competition or training that required medical attention. An illness was defined as any non-injury health complaint reported to the medical team. Severity was classified as no time-loss, mild (1-7 days), moderate (more than one week), or severe (more than one month out of play).

In accordance with the 2020 IOC consensus statement, the unit of analysis was the injury or illness episode rather than the medical encounter.[9] Repeat consultations for the same complaint in the same anatomical location within the competition period were counted as a single episode, and the number of encounters is reported separately.

Cases were classified according to the working diagnosis recorded by the treating clinician. Where a working diagnosis was not recorded, the nature of injury field was used. Muscle cramp or spasm was defined as a transient involuntary contraction without evidence of structural injury and was reported as a musculoskeletal category distinct from muscle strain or tear. All cases in this category had an identified anatomical site and were classified as injuries. Two investigators independently recoded all records against these definitions and disagreements were resolved by discussion.

https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb

Data analysis

Descriptive statistics were used to analyse the frequency and distribution of injuries and illnesses. Incidence rates were calculated per 100 athletes and per 1000 athlete-days, with total athlete-days determined by multiplying the number of athletes by the duration of the competition period (64 athletes x 12 days = 768 athlete-days). Exact Poisson 95% confidence intervals (CI) were calculated for all rates. Sport-specific rates were calculated using the number of registered athletes in each sport as the denominator. A sensitivity analysis was performed restricting the denominator to the 58 athletes under active on-site surveillance (696 athlete-days). Cases among non-athlete contingent members were analysed separately using a denominator of 30 non-athlete members, and were not pooled with athlete data. Categorical data were summarised as frequencies and percentages; percentages were not reported for categories with fewer than five cases.

Prior to analysis, the data set was checked for internal consistency. Two records carried a data entry error in the year of occurrence (1995 instead of 2025) and were corrected. Records in which the mechanism field and the anatomical location field were mutually inconsistent were reviewed against the recorded cause and working diagnosis and recoded accordingly.

Ethical consideration

Ethical approval for this study was obtained from the IIUM Research Ethics Committee (IREC-2025-230). Surveillance data were collected by the attending medical team in the course of routine clinical care and were de-identified by the research team before analysis. Ethical approval covered the secondary use of these routinely collected clinical records. Athlete care was not affected by participation in the study. The de-identified data set is available from the corresponding author on reasonable request, subject to ethics committee approval.

Results

A total of 18 injury and illness episodes, arising from 21 medical encounters, were recorded among the 64 Malaysian athletes over the 12-day competition period. Three encounters were follow-up consultations for two ongoing injuries. This yielded an overall incidence of 28.1 episodes per 100 athletes (95% CI 16.7 to 44.4) and 23.4 episodes per 1000 athlete-days (95% CI 13.9 to 37.0). Of these, 11 episodes (61%) were injuries and 7 (39%) were illnesses (Table 1). Ten episodes (56%) were new presentations and 8 (44%) were recurrent presentations of pre-existing complaints.

A further 7 episodes were recorded among non-athlete contingent members, occurring in 7 different individuals, giving 23.3 episodes per 100 non-athlete members (95% CI 9.4 to 48.1). Five were musculoskeletal presentations and two were illnesses. Three of these, a chronic ankle sprain, a chronic medial collateral ligament injury and knee osteoarthritis, were pre-existing conditions rather than incident injuries, and the non-athlete rate is therefore not directly comparable with the athlete rate.

AJMB
eISSN: 2600-8173
https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb
PENERBIT
Universiti Sultan Zainal Abidin

Table 1: Overall incidence of injuries and illnesses among athletes

Variable	Value
Registered athletes	64
Athletes under active on-site surveillance	58
Total athlete-days	768
Medical encounters	21
Injury and illness episodes	18
Injuries	11 (61%)
Illnesses	7 (39%)
Incidence per 100 athletes (95% CI)	28.1 (16.7 to 44.4)
Incidence per 1000 athlete-days (95% CI)	23.4 (13.9 to 37.0)

Distribution by sport

Accounting for the number of athletes registered in each sport, badminton recorded the highest incidence at 58.3 episodes per 100 athletes, followed by gymnastics, taekwondo, athletics and archery (Table 2). Badminton and archery fielded identical squads of 12 athletes, yet badminton generated seven times as many episodes.

Table 2: Episodes and incidence by sport

Sport	Registered athletes	Episodes	Encounters	Episodes per 100 athletes (95% CI)
Badminton	12	7	9	58.3 (23.5 to 120.2)
Gymnastics	2	1	1	50.0 (1.3 to 278.6)
Taekwondo	8	3	3	37.5 (7.7 to 109.6)
Athletics	24	6	7	25.0 (9.2 to 54.4)
Archery	12	1	1	8.3 (0.2 to 46.4)
Swimming	6	Not surveilled	Not surveilled	Not calculable
All athletes	64	18	21	28.1 (16.7 to 44.4)

Anatomical location

The posterior thigh was the most commonly affected region with three episodes, followed by the wrist and the lower back or lumbar spine with two episodes each. Single episodes were recorded at the anterior thigh, foot or toe, buttock or pelvis or sacrum, and Achilles or ankle. Seven episodes had no specific anatomical location, corresponding to the illness cases (Table 3).

Table 2: Episodes and incidence by sport

Body region	Episodes
Not applicable (illness)	7
Posterior thigh	3
Wrist	2
Lower back / Lumbar spine	2
Anterior thigh	1
Foot / Toe	1
Buttock / Pelvis / Sacrum	1
Achilles / Ankle	1

AJMB
eISSN: 2600-8173
https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb
PENERBIT
Universiti Sultan Zainal Abidin

Type of injury and illness

Muscle strain or tear and respiratory illness were the most common diagnoses, each accounting for four episodes. Muscle cramp or spasm accounted for three episodes and headache for two. Single episodes of intervertebral disc lesion, ligament sprain, fasciitis or aponeurosis injury, dental condition and skin laceration were recorded (Table 4). Taken together, muscle injuries comprising strain or tear and cramp or spasm accounted for 7 of the 11 injury episodes. The seven illness episodes comprised four upper respiratory presentations, two headache presentations and one dental presentation.

Table 4: Type of injury and illness

Diagnosis / Condition	Episodes
Muscle strain / tear	4
Respiratory illness	4
Muscle cramp / spasm	3
Headache	2
Intervertebral disc lesion	1
Ligament sprain	1
Fasciitis / aponeurosis injury	1
Dental condition	1
Skin laceration	1

Mechanism and severity

Among the 11 injury episodes, overuse was the predominant mechanism, accounting for nine episodes (82%). One episode resulted from acute trauma and one from environmental conditions during running. Mechanism was not applicable to the seven illness episodes. The majority of all episodes (n=14, 78%) resulted in no time-loss from competition, while four episodes led to short-term time-loss of 1 to 7 days. No moderate or severe cases were recorded (Table 5).

Table 5: Mechanism of injury and severity of all episodes

Variable	Episodes
Mechanism	
Overuse	9
Acute trauma	1
Environmental	1
Not applicable (illness)	7
Severity	
No time-loss	14
Mild (1-7 days)	4
Moderate (>1 week)	0
Severe (>1 month)	0

Sensitivity analysis

Restricting the denominator to the 58 athletes under active on-site surveillance, and excluding the unsurveilled swimming squad, gave an incidence of 31.0 episodes per 100 athletes (95% CI 18.4 to 49.0) and 25.9 episodes per 1000 athlete-days (95% CI 15.3 to 40.9).

https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb

Discussion

This study described the incidence and patterns of injuries and illnesses among Malaysian athletes during the FISU World University Games 2025. Eighteen episodes were recorded among 64 athletes over 12 days, with injuries accounting for slightly more than half of all episodes. Most episodes were mild and did not result in time-loss. Overuse was the dominant injury mechanism, lower limb muscles were the most affected region, and respiratory illness was the most common illness. Nearly half of all episodes were recurrent presentations of pre-existing complaints. These findings provide the first injury and illness surveillance data for Malaysian athletes at the World University Games and establish a baseline for future medical planning.

The pattern seen in this study is consistent with previous Malaysian research. During the Asian Games 2014, muscle strain and tear were the most common injuries, respiratory infection was the leading illness, and most cases were mild.[1] Similar findings were reported at the KL SEA Games 2017, where muscle injuries and respiratory illnesses dominated the medical workload.[2] The present study follows the same trend, suggesting that musculoskeletal injuries and respiratory illnesses remain the primary health concerns for Malaysian athletes regardless of the competition setting.

Comparison of absolute rates with other events requires caution. The 2021 Summer Universiade reported 9.5 injury-related visits per 100 athletes, substantially lower than the rate observed here.[5] Two methodological differences explain much of this gap. First, that study was a retrospective review of presentations to the Athletes' Village polyclinic, whereas the present study used prospective, team-embedded daily surveillance, which captures minor complaints that would never reach a central polyclinic. Second, our confidence interval is wide, ranging from 16.7 to 44.4 per 100 athletes, reflecting the small size of the Malaysian contingent. The difference between the two figures should therefore not be interpreted as a difference in underlying risk. The pattern of findings, rather than the absolute rate, is the more meaningful comparison, and in that respect our results align with both the Universiade data and regional SEA Games findings, where lower limb injuries and respiratory conditions consistently dominated.[5,6]

Expressing cases per registered athlete changed the interpretation of our own data. On raw counts, badminton and athletics together accounted for most episodes, which would suggest both as priorities for prevention. Once squad size was accounted for, athletics, with the largest squad of 24 athletes, recorded 25.0 episodes per 100 athletes, below the cohort average; its case count reflected exposure rather than elevated risk. Badminton, with half as many athletes, recorded 58.3 per 100, and generated seven times as many episodes as archery despite an identical squad size. Badminton should therefore be the priority for sport-specific prevention in future contingents, with attention to wrist and shoulder loading and to lower limb overuse. This also illustrates a broader methodological point: raw case counts from small contingents can be actively misleading without exposure denominators.

The predominance of overuse injuries in this study warrants attention. Overuse injuries arise from repetitive mechanical loading without adequate recovery, and can affect performance even when they do not cause time-loss.[8] University athletes face a particular challenge in this regard, as the demands of academic life may reduce recovery time and compound the physical stress of competition.[4] Early

https://doi.org/10.37231/ajmb.2026.10.2.971
https://journal.unisza.edu.my/ajmb

identification and management of overuse injuries through structured load monitoring and targeted recovery strategies are therefore essential for this population.

Respiratory illness accounted for a substantial proportion of episodes, consistent with the broader literature on athlete health at international competitions. Travel across time zones, exposure to new environments, and the physiological stress of competition are recognised contributors to illness in athletes attending major games.[7] Preventive measures such as influenza vaccination, hand hygiene protocols, and adequate rest during travel periods may help reduce the illness burden in future contingents.

The most actionable finding of this study is that 8 of 18 episodes (44%) were recurrent presentations of complaints the athletes arrived with. Nearly half of the medical workload at these Games therefore concerned pre-existing problems rather than injuries sustained in competition. This is consistent with evidence from student-athlete populations, where a previous injury more than triples the odds of a new injury and prior overuse injury is a particularly strong predictor.[4] It points to a specific and low-cost intervention: pre-departure medical screening with documented clearance of existing injuries, and a rehabilitation plan carried into the competition period for any athlete not fully resolved at departure. For a contingent of this size, such screening is feasible and would address a larger share of the medical workload than any in-competition measure.

Recommendation for future contingent surveillance

Three constraints encountered in this study share a common origin in surveillance capacity and form design, and each suggests a concrete remedy for future contingents. First, the swimming squad competed at a venue several hundred kilometres from the main cluster with no attached medical officer, and reported no cases; at least one medical officer should be assigned to every geographically separated squad. Two medical personnel covered a 94-member contingent across separate venues, which is the underlying limitation. Second, the reporting form did not capture athlete sex, preventing sex-stratified analysis despite sex being an established modifier of injury risk; sex should be a mandatory field at the point of case entry. Third, severity was recorded only in ordinal time-loss bands, preventing calculation of burden in days lost per 1000 athlete-days, which is now recommended as a primary outcome alongside incidence;[8,9] return-to-play date should be a mandatory field. Finally, registering the contingent denominator by sport before departure would allow sport-specific rates to be computed during the Games rather than reconstructed afterwards.

Strength and limitations

This study has several strengths. It is the first prospective injury and illness surveillance study of Malaysian athletes at the World University Games, providing new and original data for this population. Data were collected using a standardised form adapted from the IOC surveillance system and analysed in accordance with the 2020 IOC consensus statement, ensuring consistency and comparability with other studies.[9] Both injuries and illnesses were captured, giving a more complete picture of the medical workload during the Games, and the entire registered contingent was included, avoiding sampling bias.

Several limitations should be acknowledged. The absence of an on-site medical officer for the swimming squad in Berlin means the true incidence is underestimated; the sensitivity analysis restricting the

denominator to surveilled athletes gave a higher rate of 31.0 per 100 athletes, and the zero count for swimming reflects the surveillance gap rather than an absence of health problems in that sport.

Sex-specific incidence could not be calculated. The surveillance form recorded athlete name, age, sport and role, but not sex, which is a material limitation given that sex is an established modifier of injury risk. The cohort comprised 39 male and 25 female athletes with the distribution varying considerably by sport. This limitation reflects an omission in the design of the reporting form rather than a restriction on data access. Injury and illness burden could not be calculated. Severity was recorded only as ordinal time-loss categories rather than exact days lost, so burden expressed as days lost per 1000 athlete-days is not available, and the severity distribution should be read as a lower-resolution proxy. Burden was not estimated from category midpoints, as with only four time-loss episodes such an estimate would not be informative.

Finally, the sample was limited to one national contingent over a single competition period, which restricts generalisability, and the small number of episodes produces wide confidence intervals around all rates. Surveillance covered only the competition period, so injuries or illnesses occurring outside this window were not captured.

Conclusion

This study provides the first epidemiological data on injuries and illnesses among Malaysian athletes at the FISU World University Games. Overuse injuries involving the lower limb and respiratory illnesses were the most common findings, and the majority of episodes were mild with no time-loss from competition. Once exposure was accounted for, badminton emerged as the highest-risk sport, and nearly half of all episodes were recurrent presentations of pre-existing complaints. These patterns are broadly consistent with previous Malaysian and international multisport surveillance studies. The findings serve as baseline data to guide injury prevention programmes, support pre-departure medical screening, improve medical preparedness, and strengthen contingent health planning for future World University Games participation.

List of abbreviations

CI - Confidence interval
FISU - Federation Internationale du Sport Universitaire
IIUM - International Islamic University Malaysia
IOC - International Olympic Committee
IREC - IIUM Research Ethics Committee
SEA - Southeast Asian
SUKIPT - Sukan Institusi Pengajian Tinggi (Malaysian Higher Education Games)

Funding

This study received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Conflict of Interest Disclosure

None to declare.

Acknowledgements

The authors would like to thank the Ministry of Higher Education Malaysia and the Malaysian contingent management of the FISU World University Games 2025 for their support and cooperation throughout the study.

References

1. Hamid AMS, Puji A, Salleh Z, Jamalullail Z, Hussein KH. Patterns of injuries and illness among Malaysian athletes during the XVII Asian Games 2014. Sains Malaysiana. 2016;45(10):1531-1536. Accessed October 18, 2026. https://ukm.my/jsm/english_journals/vol45num10_2016/vol45num10_2016p1531-1536.htm
2. Salim AMH, Hamid AMS, Hussein KH, Puji A. Patterns of injuries and illness among Malaysian contingents during the Kuala Lumpur South East Asia (KL SEA) Games 2017. Int J Hum Health Sci. 2021;5(3):347-354. doi:10.31344/ijhhs.v5i3.286
3. Rosdi MH, Hamid AMS. Incidence, patterns and risk factors of injury and illness among athletes during the Malaysian Higher Education Games (SUKIPT) 2018. J Health Transl Med. 2019;22(2):13-23. doi:10.22452/jummec.vol22no2.3
4. Flatholm E, Tengman E, Tervo T. Injuries among students combining academic studies and elite sports. Front Sports Act Living. 2025;7:1561279. doi:10.3389/fspor.2025.1561279
5. Li Z, Li S, Liu Z, et al. Sports injury and illness incidence at the 2021 Summer Universiade: a retrospective study of 6,500 athletes from 113 countries/regions. Front Public Health. 2025;13:1532849. doi:10.3389/fpubh.2025.1532849
6. Jumroenketpratheep K, Zayar H, Kaewkul K, Chaijenkij K. Sports injury and illness epidemiology: Thailand team surveillance during the 30th Southeast Asian Games. Asian J Sports Med. 2022;13(1):e116382. doi:10.5812/asjsm.116382
7. Schwellnus M, Adami PE, Bougault V, et al. International Olympic Committee (IOC) consensus statement on acute respiratory illness in athletes part 1: acute respiratory infections. Br J Sports Med. 2022;56(19):1066-1088. doi:10.1136/bjsports-2022-105759
8. Bahr R, Clarsen B, Ekstrand J. Why we should focus on the burden of injuries and illnesses, not just their incidence. Br J Sports Med. 2020;54(2):58-59. doi:10.1136/bjsports-2019-101098
9. Bahr R, Clarsen B, Derman W, et al. International Olympic Committee consensus statement: methods for recording and reporting of epidemiological data on injury and illness in sport 2020 (including STROBE Extension for Sport Injury and Illness Surveillance (STROBE-SIIS)). Br J Sports Med. 2020;54(7):372-389. doi:10.1136/bjsports-2019-101969