

## The prevalence of knowledge on sports injury prevention and management among UiTM female athletes.

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### Abstract:

Sports injuries is one of the major health problems affecting adolescents, although sports promote the physical and mental health of adolescents. Sustaining an injury may lead to worsening symptoms if the injury is unmanaged properly. This study investigated the current level of knowledge of Sports Injury Prevention and Management (SIPM) among female athletes at Universiti Teknologi MARA (UiTM), Perlis Branch, Arau Campus. The respondents included a total of 103 UiTM female athletes who volunteered to participate in the survey and were selected using purposive sampling. The participants were given a SIPM questionnaire through Google Forms. We observed that 82.5% of the participants met the knowledge test's requirements and had a good and consistent attitude toward sports injury prevention and management. The knowledge for prevention and management of sports injuries among the sampled athletes did not differ significantly by age, and previous and current levels of participation in sports. A significant difference was however seen in the level of education, between the Degree and Diploma holders ( $p=0.007$ ). In addition, this study found that Diploma graduates have significantly better scores in the knowledge of sports injury prevention and management. We suggest that groups at higher risk of sports injuries, such as college athletes, should learn more about sports injury prevention and management. The entire study population considered training for "Prevention and Management of Sports Injury" as highly needed. This indicated that athletes who were more acquainted with "Prevention and Management of Sports Injury", had higher needs for knowledge and skill pertaining to first-aid, treatment of sports-related shock, identification and principles of various forms of sports injuries, and the technique and duration of hot compress.

**Keywords:** Sports injury, Female athletes, Knowledge, SIPM questionnaire, Sports-related shock

### Introduction

Appropriate and more physical activity has shown to prevent illness and reduce anxiety and stress in adolescents (Wang *et al.*, 2012). According to Van Beijsterveldt *et al.*, (2017) a key contributor to health is physical activity, and participation in sports is one way to gain physical activity. Nonetheless, sports injuries are also one of the major health problems affecting adolescents, whereby athletes trained in schools have a much higher rate of sports injuries than ordinary students (King & Gabbett, 2008). According to Wang *et al.*, 2012, in a study conducted in Florida on students over the age of 18 with a similar educational background and income, found that 30% of these students who played in high school sports teams had experienced sports injuries. The data from this study served as a valuable reference to other coaches, principals, teachers, and parents of students who engaged in sports activities.

The risks associated with sporting injuries are categorised into two and modelled. The interaction of intrinsic (internal) and extrinsic (external) risk factors is one consistent factor in these models. Intrinsic risk factors are specific to each athlete, such as age, gender, endurance, previous injury, and somatotype, while extrinsic risk factors include conditions beyond the athlete, consisting of the environment, game circumstances, and office decisions (Farley *et al.*, 2020).

Approximately half a million US high school athletes receive medical treatment every year. Almost 300,000 of these athletes required hospitalisation and treatment, costing the healthcare system almost US\$200 million (Wang *et al.*, 2012). Wang & Huang, (2006) found that one-fourth of students aged 12-25 experienced annual sport related accidents on school grounds and needed medical attention or had led to temporary disability, resulting in \$3.2 billion in medical costs and \$115 billion in loss of health.

Research also indicates that female athletes have a significantly higher chance than male athletes of an anterior cruciate ligament (ACL) injury. Proper awareness, attitude and skills in the prevention and management of sports injuries are vital to prevent further loss to multiple parties (Wang *et al.*, 2012). In order to better understand the role of physical fitness and its interactions with other injury determinants in females, such as ball sports team players, future studies examining the multifactorial existence of sports injury are required.

According to a study by Wang & Huang, (2006) despite recognising the significance of avoiding sports injury, most students did not have sufficient knowledge of sports injury prevention. According to Wang *et al.*, (2012), students should enhance their awareness of sports injury prevention and management, as indicated in several research relating to the risk and prevalence of sports injuries, to reduce both physical injuries and its impact on mental health. Awareness on prevention and management should include knowledge about the after-effects of sports injury to the body and mind (Wang *et al.*, 2012), and over exertion Chandra *et al.*, (2008).

**The aim** of this study was to identify the level of knowledge about sports injury prevention and management among female athletes and the present status of their sports injury knowledge. Data from this study is hoped to reveal the importance of incorporating sports injury prevention and management course for athletes in the curriculum of senior high schools.

## Methods

### *Participant*

Purposive sampling was used to select recruited respondents from the university female athletes population in Universiti Teknologi MARA, Perlis Branch, Arau Campus. Descriptive quantitative research was used to explore and scrutinize the prevalence of knowledge about sports injury prevention and management among the recruited female athletes. The Sports Unit of the university estimated a total of 138 female athletes in this campus, while 103 athletes participated in this study.

### *Data collection through the Sport Injury Prevention Management Questionnaire (SIPM-Q)*

Respondents were briefed about the purpose of the study and asked to sign a consent form. The respondents answered the Sport Injury Prevention Management Questionnaire (SIPM-Q) in electronic copy (Google Forms) within 20 minutes, without discussing the questions with anyone or referring to notes or books. Respondents were only allowed to answer the questionnaire once and as accurately and sincerely possible, based on their experience and knowledge about the levels of sports injury. The participants were relieved after completing the questionnaire.

### *Knowledge questionnaire*

The knowledge questionnaire had separate sections for prevention of sports injuries and management of sports injuries. The questionnaire of Knowledge of Sports Injury Prevention and Management was adapted for this study from (Wang *et al.*, 2012). The questionnaire's content was validated by six experts from the fields of incident injury, school health, nursing and physical education. Content relevance, content suitability and wording clarity were evaluated by the experts.

The CVI for the entire scale was calculated with each item's total score from the six experts, as the numerator and divided by a denominator (24 points). High content validity was determined when its CVI was larger than or equal to 0.80, thus retained in the questionnaire (Wang *et al.*, 2012).

### *Statistical analysis*

The SPSS 25.0 statistics package was applied to analyse the collected data after coding and decoding according to the research objective and characteristics of variants. Frequency distribution, percentage, mean and standard deviation, and one-way ANOVA were applied to all data, while the Scheffe Post hoc test were applied for status of knowledge of sport injury prevention and management.

## Results

### *Demographic Information*

Demographic information included five parameters (Table 1). Two respondents (1.9%) were 18 years old, 3.9% or 4 respondents were 19 years old, 4.9% or 5 respondents were 20 years old, 20.4% or 21 respondents were 21 years old, 26.2% or 27 respondents were 22 years old and 42.7% or 44 respondents were 23 years old. As for the educational level of the respondents, 6.8% or 7 respondents were SPM (Malaysian high school exit exam) holders, 38.8% or 40 respondents were Diploma holders and 54.4% or 56 respondents were Degree holders.

Previous participation in a sporting event was divided into the National, State, District and School levels. From the total athletes, 4.9% or 5 respondents participated at the National level, 56.3% or 58 respondents participated at the State level, 15.5% or 16 respondents were in the District level and 23.3% or 24 respondents participated at the School level.

Current level of participation involved three levels; Club, University and MSSM or school. Of the participant, 4.9% or 5 respondents are participating in the Club, 56.3% or 58 respondents were at the University or college levels and 38.8% or 40 respondent are participating at the MSSM or School level.

For sports injury experience, 70.9% or 73 respondent had experienced sports injury, while 29.1% or 30 respondents did not experience sports injury.

**Table1.** Demographic Profile of Respondents (N=103)

| Demographic                     | Frequency | Percentage (%) |
|---------------------------------|-----------|----------------|
| Age                             |           |                |
| 18 years old                    | 2         | 1.9            |
| 19 years old                    | 4         | 3.9            |
| 20 years old                    | 5         | 4.9            |
| 21 years old                    | 21        | 20.4           |
| 22 years old                    | 27        | 26.2           |
| 23 years old                    | 44        | 42.7           |
| Educational level               |           |                |
| SPM                             | 7         | 6.8            |
| Diploma                         | 40        | 38.8           |
| Degree                          | 56        | 54.4           |
| Previous level of participation |           |                |
| National                        | 5         | 4.9            |
| State                           | 58        | 56.3           |
| District                        | 16        | 15.5           |
| School                          | 24        | 23.3           |
| Experienced sports injury       |           |                |
| Yes                             | 73        | 70.9           |
| No                              | 30        | 29.1           |

*Distribution of The Test of Knowledge Sports Injuries Prevention and Management***Table 2.** Distribution of The Test of Knowledge Sports Injuries Prevention and Management.

| Item No. | M    | SD    | Correct rate (%) |
|----------|------|-------|------------------|
| 1        | 3.58 | 0.880 | 79.6             |
| 2        | 2.09 | 0.399 | 92.2             |
| 3        | 2.94 | 0.366 | 89.3             |
| 4        | 2.15 | 0.513 | 86.4             |
| 5        | 2.93 | 0.321 | 89.3             |
| 6        | 2.09 | 0.768 | 72.8             |
| 7        | 3.32 | 1.113 | 67.0             |
| 8        | 2.93 | 0.661 | 70.9             |
| 9        | 2.07 | 0.630 | 77.7             |
| 10       | 2.61 | 0.807 | 67.0             |
| 11       | 1.90 | 0.761 | 56.3             |
| 12       | 2.06 | 0.712 | 67.0             |
| 13       | 2.74 | 0.542 | 78.6             |
| 14       | 2.59 | 0.912 | 59.2             |
| 15       | 1.99 | 0.533 | 77.7             |
| 16       | 2.63 | 0.767 | 77.7             |
| 17       | 2.68 | 0.831 | 70.9             |
| 18       | 3.29 | 1.044 | 62.1             |
| 19       | 2.21 | 0.723 | 78.6             |
| 20       | 2.00 | 0.767 | 62.1             |
| 21       | 2.58 | 0.891 | 70.9             |
| 22       | 1.49 | 0.873 | 71.8             |
| 23       | 1.99 | 0.475 | 80.6             |
| 24       | 2.04 | 0.685 | 68.0             |
| 25       | 2.17 | 0.708 | 59.2             |

Twenty-five items were evaluated for knowledge of sports injury prevention and management, whereby 4 points were given for a correct answer, and zero points were given for an incorrect answer. Respondents who had 15 correct items (60 points), were considered as having reasonable understanding of knowledge related to sports injury prevention and management, which were attained for 82.5% of the respondents. Three questions, items No. 11, No. 14 and No. 25 scored below 60%, while 22 questions or 88% scored more than 60% correct rates. Question No.2 (M = 2.09, SD = 0.399) had the highest correct rate at 92.2%. Question No.11 (M =1.90, SD = 0.761), only had 56.3% correct score, the lowest of all questions.

*The Effect of Demographic Factors on The Knowledge of Subjects*

The one-way ANOVA was applied to analyse data on the demographic factors of subjects, including, age, educational level, previous level of participation, current level of participation, sports injury experience and SIPM knowledge.

**Table 3.** The effect of demographic factors on SIPM knowledge

|                                 | N  | Mean  | SD    | P value |
|---------------------------------|----|-------|-------|---------|
| Age                             |    |       |       |         |
| 18 years old                    | 2  | 80.00 | 5.66  | 0.704   |
| 19 years old                    | 4  | 68.00 | 19.32 |         |
| 20 years old                    | 5  | 74.40 | 14.03 |         |
| 21 years old                    | 21 | 76.57 | 12.35 |         |
| 22 years old                    | 27 | 74.96 | 13.57 |         |
| 23 years old                    | 44 | 71.09 | 17.87 |         |
| Educational level               |    |       |       |         |
| SPM                             | 7  | 78.86 | 3.02  | 0.007   |
| Diploma                         | 40 | 78.50 | 13.21 |         |
| Degree                          | 56 | 69.14 | 16.57 |         |
| Previous level of participation |    |       |       |         |
| National                        | 5  | 75.20 | 16.59 | 0.072   |
| State                           | 58 | 72.90 | 14.14 |         |
| District                        | 16 | 66.25 | 19.92 |         |
| School                          | 24 | 79.17 | 13.40 |         |
| Current level of participation  |    |       |       |         |
| Club                            | 5  | 69.60 | 17.11 | 0.790   |
| University / College            | 58 | 74.14 | 13.86 |         |
| MSSM / School                   | 40 | 72.90 | 17.53 |         |
| Experienced sports injury       |    |       |       |         |
| Yes                             | 73 | 71.73 | 15.13 | 0.079   |
| No                              | 30 | 77.60 | 15.53 |         |

Note: Values were compared with ANOVA. Inter-group differences were tested by the Scheffe post hoc test.

Result of one-way ANOVA and Scheffe Post-hoc analysis, indicated the mean and SD of all age groups. Age 18 (M=80.0, SD=5.66), 19 years old (M=68.0, SD=19.32), 20 years old (M=74.4, SD=14.03), 21 years old (M=76.57, SD=12.35), 22 years old (M=75.96, SD=13.57) and 23 years old (M=71.09, SD=17.87). The difference in the knowledge score of sports injury prevention and management between different ages was not significant  $F(5,97) = 0.595$ ,  $p = 0.704$ .

The mean and SD values for SPM was (M=78.86, SD=3.02), Diploma was (M=78.50, SD=13.21) and Degree was (M=69.14, SD=16.57). The difference in the knowledge score of sports injury prevention and management from different educational level was significant with  $F(2,100) = 5.155$ ,  $p = 0.007$ .

For previous participations at various levels, mean and SD reported for National was (M=75.20, SD=16.59), State was (M=72.90, SD=14.14), District was (M=66.25, SD=19.92) and School was (M=79.17, SD=13.49). Difference in the knowledge score for sports injury prevention and management was statistically significant with  $F(3,99) = 2.408$ ,  $p = 0.072$ .

For current participation in a sporting event, the Club level had (M=69.60, SD=17.11), University/ College had (M=74.14, SD=13.86) and MSSM/School had (M=72.90, SD=17.53). The difference in the knowledge score of sports injury prevention and management between different levels was not significant  $F(2,100) = 0.236$ ,  $p = 0.790$ .

For the aspect of whether the athletes had experienced sports injury previously, 'Yes' had (M=71.73, SD=15.13) and 'No' had (M=77.60, SD=15.53). The difference in the knowledge score of sports injury prevention and management from both responses was not significant  $F(1,101) = 3.155$ ,  $p = 0.079$ .

## Discussion

According to this study, 70.9% of the sampled participants have experienced injury, while the remaining 29.1% did not experience injury. The lack of experiencing any injury is attributed to their recent involvement in sports, for about 2 to 3 years, while those who had experienced injury had been in sports for more than 3 years. An increase in years of participation relates to more training, an increased number of competition participation and with various opponents, creating the risks of even a minor injury such as a sprain or strain. According to a study by Wang *et al.*, (2012), participation for more than 3 years had more likelihoods of injury due to

insufficient warm-up exercises (52.8%) and over practice (34.0%) by school athletes. Similar to this findings Yard *et al.*, (2009), also found that insufficient warming-up exercise and over practicing were the major causes of sports injuries in school athletes.

Based on the 25-item knowledge of sports injury prevention and management section, 82.5% of the participants met the passing criterion. Among the 25 items of questions, only 3 questions, which are items No. 11, No. 14 and No. 25 scored below the 60% correct rates, while the remaining 22 items of questions or 88% scored above 60% correct rates. The lowest result (56.3 percent) was for the understanding of 'ability in limb support application' (Question 11), suggesting that participants were inexperienced about limb support administration and perhaps lacked practical knowledge. This aspect will need more attention by the athletes' support system, including lecturers and coaches. Other studies have found similar data. For example, Fulbrook *et al.*, (2019) discovered that athlete's first aid knowledge were limited, especially in the area of fractures.

Pedlar *et al.*, (2018) further elaborates that a history of accident-related injury was related to knowledge and attitude of injury management. Attitude and action toward managing sports injury was thought to be influenced by the comprehension of knowledge, experience and practice of injury management Ryan (1963). As a result, sports injury management education should also include first-aid skill practice. The data also indicates that the school athletes' primary source of information were their coaches and teachers, which increases the roles that these advisors and trainers play in injury education and its management. Coaches are always present during training sessions or tournaments, thus, can effectively and regularly teach their athletes about sports injury prevention and management, and this may significantly reduce sports injuries.

On the contrary, according to Yard *et al.*, (2009), sports team coaches and athletic trainers from 18 US high schools had reported sports injury differently, while coaches had a low level of involvement in developing and evaluating preventative interventions. It is critical for instructors and coaches of school sports teams to organise and create comprehensive sports injury prevention and management training to improve students' understanding of how to avoid sports injuries caused by excessive practice.

Demographic factors may be key in the knowledge of sports injury prevention and management among students, including those in tertiary education. According to the findings of this survey, respondents under the age of 18 and 21 years old had the best understanding and knowledge of injury prevention and management.

Diploma students taking the Sports Science course and of 21 years of age demonstrated better understanding of injury management than other students of this campus. This finding shows that the incorporation of lectures related to sports science may help improve or provide sufficient levels of knowledge toward sports injury prevention and management among athletes.

Among athletes who were currently participating in sports, those involved in events at the university or college level had a higher knowledge score. With increased years of participation of about 4 years and having experienced injuries multiple times since their preuniversity or school studies, athletes had increased knowledge about injury management (Table 4.3). A previous study by Barber Foss *et al.*, (2014) also found that athletes involved in sports for more than 4 years had basic knowledge of injury prevention, gained from their coaches and teammates.

Additionally, according to Yard *et al.*, (2009), athletes who had been involved in sports during their high school or college education had more time to learn first-aid, which also eased their understanding during tertiary education. The impact of early exposure to sports injury, was seen in the higher score scored by respondents who had previously participated in sports at school and are still participating while in university or college, as well as being 23 years of age. Zein *et al.*, (2019) reported that level of education influenced knowledge score in sports injury prevention and management among student athletes. Interestingly, students undertaking a Diploma scored higher than students undertaking a Degree. Respondents who had obtained a high school qualification had scored a higher mean, but this may be due to the small number of participants (two).

## Conclusions

We observed that 82.5% of the participants met the knowledge test's requirements, and had a good and consistent attitude toward sports injury prevention and management. Furthermore, we discovered that disparities in knowledge still remained, with the lowest comprehension seen for the capacity to provide assistance to an injured limb, suggesting rooms for improvement. College students are an extremely high-risk group for sports injuries, especially females.

Thus, their ability to recognise, prevent and manage sports injuries is crucial to ensure the correct response towards sports injuries and attitude towards safety. As a result, players from higher-risk categories of sports injuries should be provided with appropriate alternative sources of education, training, or seminars. All students should be educated and trained in the Prevention and Management of Sports Injury, first-aid, treatment of sports-related shock, identification of various forms of sports injury, duration and technique of conducting a hot compress, principle for various types of sports injury, and management of sports injury.

Additionally, high school instructors or coaches should be trained to enhance students' understanding by motivating them to practice healthy and safe sports habits.

## References

- Barber Foss, K. D., Myer, G. D., & Hewett, T. E. (2014). Epidemiology of basketball, soccer, and volleyball injuries in middle-school female athletes. *Physician and Sportsmedicine*, 42(2), 146–153. <https://doi.org/10.3810/psm.2014.05.2066>
- Bristi, S. N. (2010). *Prevalence of Sports Injuries Among Female Athletes*. 2010–2011. <http://202.4.109.28:8080/xmlui/handle/123456789/281>
- Chandra, A., Dunn, D., & Paul, D. P. (2008). Consumers' perceptions and opinions of sports injuries: an exploratory empirical study. *Hospital Topics*, 86(1), 32–37. <https://doi.org/10.3200/HTPS.86.1.32-37>
- Domiziano, T., & Paola, B. (2019). *Special Issue • 2019 • vol . 1 • 1-11 SPORTS INJURY PREVENTION : A CONCISE REVIEW ISSN : 1827-8620 PhOL Tarantino & Brancaccio ISSN : 1827-8620. 1.*
- Dvorak, J., Junge, A., Derman, W., & Schwellnus, M. (2011). Injuries and illnesses of football players during the 2010 FIFA World Cup. *British Journal of Sports Medicine*, 45(8), 626–630. <https://doi.org/10.1136/bjsm.2010.079905>
- Farley, J. B., Barrett, L. M., Keogh, J. W. L., Woods, C. T., & Milne, N. (2020). The relationship between physical fitness attributes and sports injury in female, team ball sport players: a systematic review. *Sports Medicine - Open*, 6(1). <https://doi.org/10.1186/s40798-020-00264-9>
- Fulbrook, P., Lawrence, P., & Miles, S. (2019). Australian Nurses' Knowledge of Pressure Injury Prevention and Management: A Cross-sectional Survey. *Journal of Wound, Ostomy and Continence Nursing*, 46(2), 106–112. <https://doi.org/10.1097/WON.0000000000000508>
- Groeger, M. (2010). Injury risks for the female athlete. *ACSM's Health and Fitness Journal*, 14(4), 14–21. <https://doi.org/10.1249/FIT.0b013e3181e37dca>
- Herman, D. C., Weinhold, P. S., Guskiewicz, K. M., Garrett, W. E., Yu, B., & Padua, D. A. (2008). The effects of strength training on the lower extremity biomechanics of female recreational athletes during a stop-jump task. *American Journal of Sports Medicine*, 36(4), 733–740. <https://doi.org/10.1177/0363546507311602>
- Junge, A., Rösch, D., Peterson, L., Graf-Baumann, T., & Dvorak, J. (2002). Prevention of soccer injuries: A prospective intervention study in youth amateur players. *American Journal of Sports Medicine*, 30(5), 652–659. <https://doi.org/10.1177/03635465020300050401>
- King, D. A., & Gabbett, T. J. (2008). Training injuries in New Zealand amateur rugby league players. *Journal of Science and Medicine in Sport*, 11(6), 562–565. <https://doi.org/10.1016/j.jsams.2007.04.011>
- Kirkendall, D. T., & Dvorak, J. (2010). Effective injury prevention in soccer. *Physician and Sportsmedicine*, 38(1), 147–157. <https://doi.org/10.3810/psm.2010.04.1772>
- Lovell, R., Knox, M., Weston, M., Siegler, J. C., Brennan, S., & Marshall, P. W. M. (2018). Hamstring injury prevention in soccer: Before or after training? *Scandinavian Journal of Medicine and Science in Sports*, 28(2), 658–666. <https://doi.org/10.1111/sms.12925>
- Olsen, L., Scanlan, A., MacKay, M., Babul, S., Reid, D., Clark, M., & Raina, P. (2004). Strategies for prevention of soccer related injuries: A systematic review. *British Journal of Sports Medicine*, 38(1), 89–94. <https://doi.org/10.1136/bjsm.2002.003079>
- Orr, B., Brown, C., Hemsing, J., McCormick, T., Pound, S., Otto, D., Emery, C. A., & Beaupre, L. A. (2013). Female soccer knee injury: Observed knowledge gaps in injury prevention among players/parents/coaches and current evidence (the KNOW study). *Scandinavian Journal of Medicine and Science in Sports*, 23(3), 271–280. <https://doi.org/10.1111/j.1600-0838.2011.01381.x>
- Peden, M., & Sminkey, L. (2004). World Health Organization dedicates World Health Day to road safety. *Injury Prevention*, 10(2), 67. <https://doi.org/10.1136/ip.2004.005405>
- Pedlar, C. R., Brown, M. G., Shave, R. E., Otto, J. M., Drane, A., Michaud-Finch, J., Contursi, M., Wasfy, M. M., Hutter, A., Picard, M. H., Lewis, G. D., & Baggish, A. L. (2018). Cardiovascular response to prescribed detraining among recreational athletes. *Journal of Applied Physiology*, 124(4), 813–820. <https://doi.org/10.1152/jappphysiol.00911.2017>
- Prodromos, C. C., Han, Y., Rogowski, J., Joyce, B., & Shi, K. (2007). A Meta-analysis of the Incidence of Anterior Cruciate Ligament Tears as a Function of Gender, Sport, and a Knee Injury-Reduction Regimen. *Arthroscopy - Journal of Arthroscopic and Related Surgery*, 23(12), 1320–1325. <https://doi.org/10.1016/j.arthro.2007.07.003>
- RYAN, A. J. (1963). Prevention of sports injuries. *The New Physician*, 12(15), 1585–1592. [https://doi.org/10.1016/s0278-2391\(99\)90312-9](https://doi.org/10.1016/s0278-2391(99)90312-9)
- Usher, K., Woods, C., Brown, J., Power, T., Lea, J., Hutchinson, M., Mather, C., Miller, A., Saunders, A., Mills, J., Zhao, L., Yates, K., Bodak, M., Southern, J., & Jackson, D. (2018). Australian nursing students' knowledge and attitudes towards pressure injury prevention: A cross-sectional study. *International Journal of Nursing Studies*, 81(September 2017), 14–20. <https://doi.org/10.1016/j.ijnurstu.2018.01.015>
- Van Beijsterveldt, A. M. C., Van De Port, I. G. L., Krist, M. R., Schmikli, S. L., Stubbe, J. H., Frederiks, J. E., & Backx, F. J. G. (2012). Effectiveness of an injury prevention programme for adult male amateur soccer players: A cluster-randomised controlled trial. *British Journal of Sports Medicine*, 46(16), 1114–1118. <https://doi.org/10.1136/bjsports-2012-091277>

- Van Beijsterveldt, A. M., Richardson, A., Clarsen, B., & Stubbe, J. (2017). Sports injuries and illnesses in first-year physical education teacher education students. *BMJ Open Sport and Exercise Medicine*, 3(1). <https://doi.org/10.1136/bmjsem-2016-000189>
- Wang, K.-M., & Huang, Y.-C. (2006). Knowledge and Needs for Prevention and Management of Sports Injury among High/Vocational School Students in Taiwan. *International Journal of Sport and Health Science*, 4, 286–297. <https://doi.org/10.5432/ijshs.4.286>
- Wang, K.-M., Lin, Y.-H., & Huang, Y.-C. (2012). The Knowledge and Attitude of Sports Injury Prevention and Management of Senior High School Athletes in Taiwan. *International Journal of Sport and Health Science*, 10, 12–22. <https://doi.org/10.5432/ijshs.201122>
- Yard, E. E., Collins, C. L., & Comstock, R. D. (2009). A comparison of high school sports injury surveillance data reporting by certified athletic trainers and coaches. *Journal of Athletic Training*, 44(6), 645–652. <https://doi.org/10.4085/1062-6050-44.6.645>
- Zein, M. I., Kurniarobbi, J., & Prastowo, N. A. (2019). *The effect of short period FIFA 11 + training as an injury prevention program in youth futsal players. April 2014*. <https://doi.org/10.1136/bjsports-2014-093494.305>