



Injury Profile of Ultimate Frisbee in University Athletes

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ABSTRACT: This study aimed to investigate the incident of injuries among university Frisbee athletes. The data from this injury is examined based on the three research questions; sites of injury, types of injury, and main reasons for injury among Frisbee athletes. This cross-sectional study involved 138 Frisbee players from Sultan Idris Education University. The results showed that the incidence of injuries happened more in the lower limb (49.30%). The finding showed that the most common type of injuries is muscle strains (28.53 %), followed by wound injuries (26.32 %) and sprain injuries (26.04 %). In conclusion, most of these injuries require on-site emergency treatment, and suggested that the intervention be introduced to reduce injuries' chances and severity.

Keywords: injury profile, ultimate Frisbee, flying disc, musculoskeletal injury

I. INTRODUCTION

Ultimate Frisbee is categorized as a non-contact or limited-contact sport due to the athletic actions required, such as endurance sprinting, cutting, pivoting, jumping, throwing, and even diving headfirst to catch with one outstretched hand (Swedler et al., 2015). Ultimate Frisbee is a sport in which two teams of seven players compete with a flying disc on a 70-yard-by-40-yard pitch. The thrower can take no steps, and the disc can only be tossed over, and the goal of the game is to accomplish the highest attainable goals. Ownership changes if the pass is incomplete and knocked down, intercepted, or lands outside the playing field. After gaining control, the player must turn and pass to a co-worker who runs off markers and attempts to catch the disc. Before the disc is released, the player has a stalling count of 10 seconds. When a player successfully passes the disc to a teammate in the attacking end zone, the goal is scored (Madueno et al., 2017).

The ultimate Frisbee is played without a referee, and this situation can increase the risk of injuries during competition. The injury incident rate during the competition was 43% higher than in practice (Swedler et al., 2015). The injuries occurred more frequently during the second half of games (Hess et al., 2020). The most common type of injury was a sprain, dislocations, and muscle strains (Kolodziej et al., 2018). The lower extremities are the most affected regions (72%), with ankles (19%), thigh (17%), and knee (14%) (Hess et al., 2020). Khoo et al. (2021) found that the hamstring and ankle injuries were the most reported lower extremity injuries, primarily to male athletes. On the other hand, Swedler et al. (2015) claimed that the most common injury location is the ankle, with an incidence rate of 2.54 per 1000. Kolodziej et al. (2018) emphasized that athletes with fewer experiences than 12 months of training are less likely to be injured. Besides, they reported that the leading injury was caused by incorrect technique (61.91%), intense training (25%), and lack of a proper warm-up (11.90%). This study aimed to investigate the incident of injuries among university Frisbee athletes.

II. Methodology

This cross-sectional study was a descriptive design study to investigate the injury profile of ultimate Frisbee in university athletes. One hundred thirty-eight athletes were the ultimate Frisbee athletes from Sultan Idris Education University. The questionnaires adopted from the previous study (Kolodziej, 2017) consist of three sections; Section A (sites of the injury), Section B (types of the injury), and Section C (factors contributing to the musculoskeletal injury). All data were analyzed using Statistical Package for Social Science (SPSS) version 22 using descriptive, inferential statistical analysis. The study's rationale and protocol were described to all available athletes, and their permission to participate in the study was gained and sought.

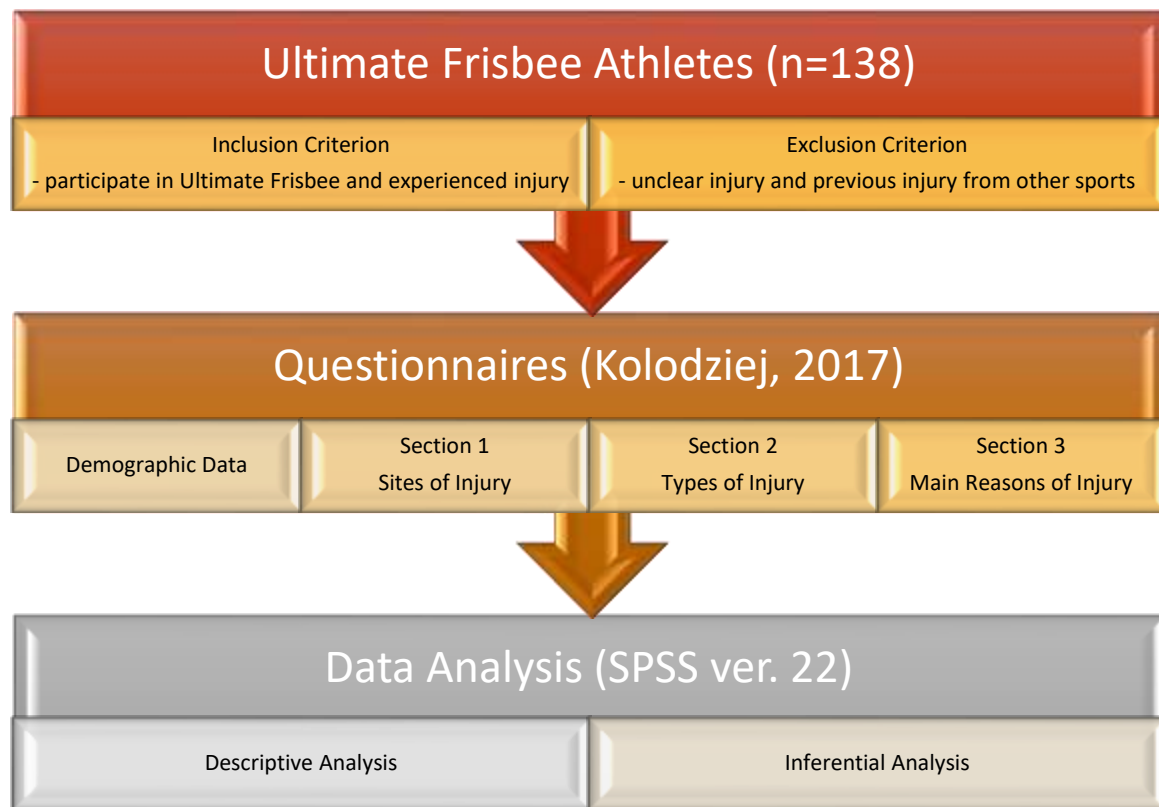


Figure 1: Flowchart of the research design

III. Results and Discussion

Table 1 shows the demographic data for ultimate Frisbee athletes, consisting of 42.03% female and 57.97% male athletes. One hundred thirty-eight athletes participated in the study, and all athletes respond regarding injuries. The athlete's mean height for female and male was 158.83 ± 5.50 cm and 172.32 ± 4.52 cm, respectively. On the other hand, the mean weight was 56.35 ± 18.23 kg for female and 68.33 ± 13.20 kg for male.

Table 1: Demographic data of university ultimate Frisbee athletes

Variable	Female (n=58)	Male (n=80)
Age (years)	22.24 \pm 2.37	23.63 \pm 3.08
Weight (kg)	56.35 \pm 18.23	68.33 \pm 13.20
Height (cm)	158.83 \pm 5.50	172.32 \pm 4.52

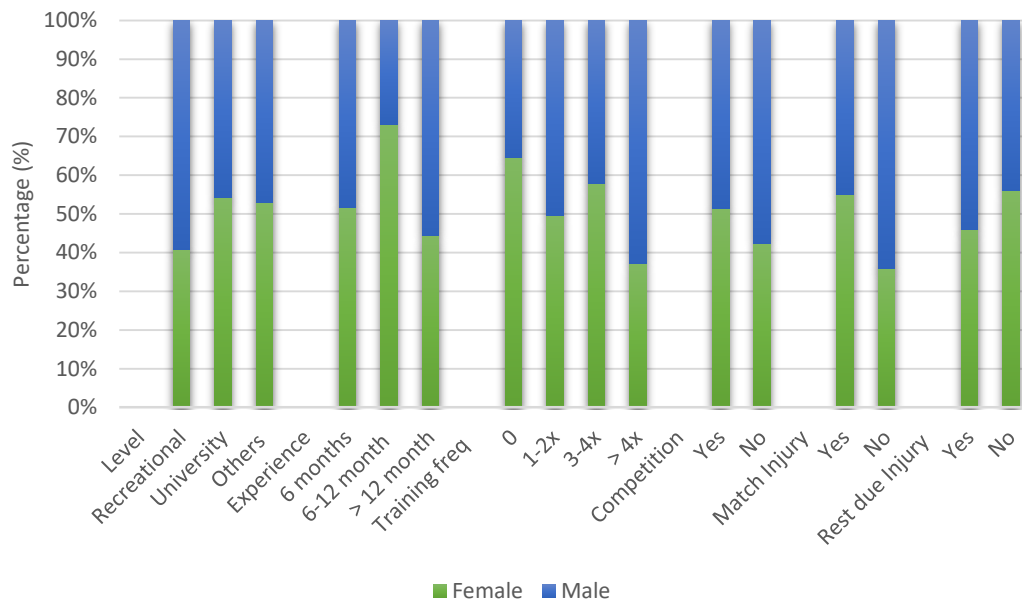


Figure 2: Ultimate Frisbee athletes profile based on gender

Figure 2 shows the ultimate Frisbee participation level, experience, training frequency, competition, and injury. Most participated at the university level, with females (53.4%) and males (45%). Most respondents were involved in ultimate Frisbee for more than one year, with female (56.9%) and male (71.3%). They mainly train one to two days per week (43%) and participate in competitions (>80%). The result also stated that most respondents had injuries during matches with females (81%) and males (66.3%). Others who required rest after injury showed female (55.2%) and male (65%).

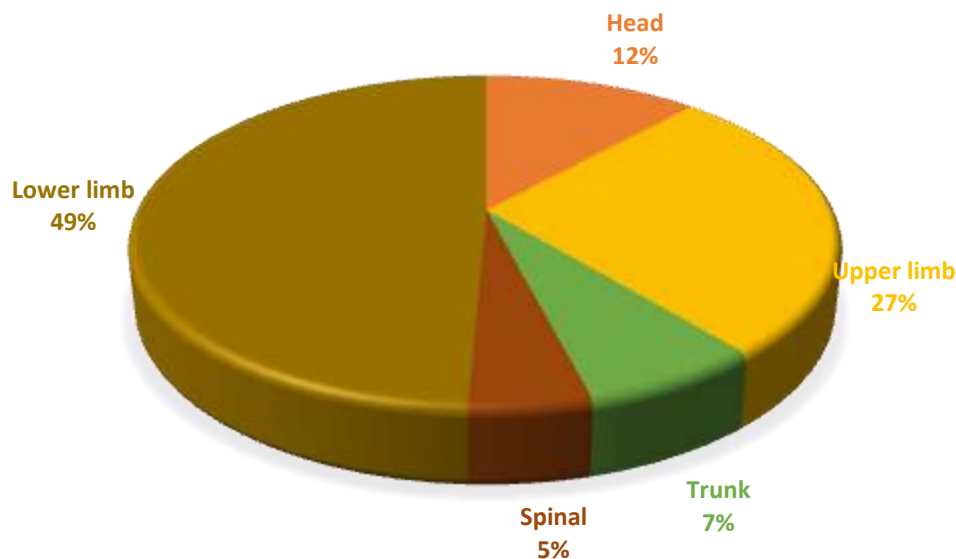


Figure 3: Ultimate Frisbee athlete's sites of injury

Figure 3 shows the percentage of injuries suffered by Ultimate Frisbee players in various body areas. Lower limb injuries were the most common (49%), followed by upper limb (27%), head (12%), trunk (7%), and spinal injuries being the least common (5%). Hess et al. (2020) supported our results, which stated that lower extremities (72%) were the most common injury location in non-contact sports. Similarly, Yen et al. (2010) colleagues discovered that lower extremity injuries accounted for most injury time-outs. Based on our study, ultimate Frisbee athletes had a high rate of ankle and knee injuries in non-contact sports. The injuries found in this study were comparable to those found by Reynolds & Halsmer (2006), who found that knee and ankle

injuries were the most common. Hewett et al. (2006) state that the anterior cruciate ligament (ACL) is frequently injured while participating in sports, particularly jumping, turning, cutting, or changing directions. Tsui et al. (2007) also found that any weight-bearing sport that requires participants to run, turn, change direction, and jump may frequently result in lower extremity injury, particularly in the knee and ankle region. The area around the ankle and knee, surrounded by multiple ligaments, is where the most common lower limb injuries occur. It usually takes at least half a year for these injuries to recover and return to normal strength.

Thus, athletes should wear supportive equipment. Ankle bracing and taping would reduce the incidence of ankle sprain re-injury by 71% among previously injured youth athletes (Dizon & Reyes, 2010). However, the evidence in adolescent sports does not support the preventative efficacy of ankle bracing/taping or knee bracing as a critical method to prevent ankle and knee injuries (Mickel et al., 2006; Walden et al., 2012). Surve et al. (1994) revealed that several measures reduce ankle sprains among soccer players. These include heel cord stretching exercises, appropriate warming, and external support to reduce the ankle joint's inversion and eversion range of motion.

The injury pattern in ultimate is comparable to that of other team sports involving high-intensity running and active use of the upper limbs and other flying disc sports like flying disc golf (Fajardo Pulido & Lystad, 2020). Shoulder injuries are prevalent in team sports that combine high-intensity running and active use of the upper limb, such as ultimate Frisbee. Shoulder and wrist injuries are possible due to the player's desire to catch a fast-moving hard plastic disc. A wrist injury can also occur when athletes overuse their wrists when catching and throwing discs. The vital thing to all athletes is to avoid injuries from happening by wearing the appropriate shoes and gloves.

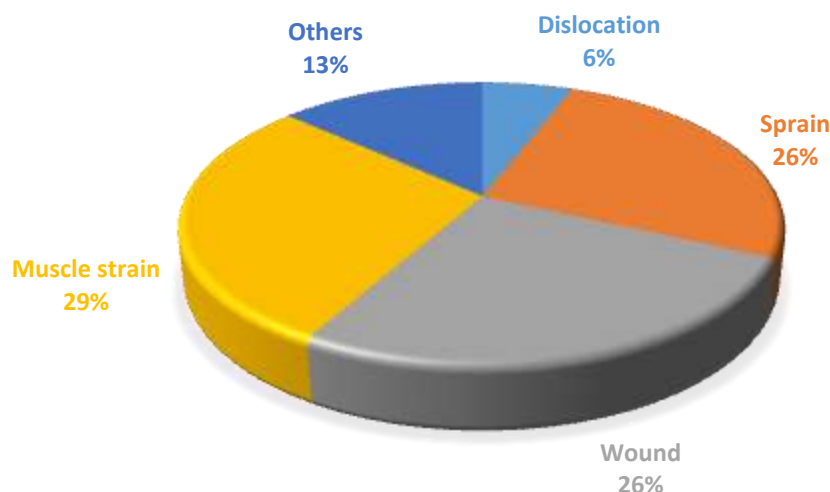


Figure 4: Ultimate Frisbee athlete's types of injury

Figure 4 shows the types of injury among ultimate Frisbee athletes. Muscle strain were the primary injury sustained (29%), followed by wound (26%), sprains (26%), and other (13%). Lastly, athletes sustained the dislocation injury at least (6%). Swedler et al. (2015) supported our results that the most common injury was muscle/tendon strain (IR: 3.06 per 1000 AEs). Similarly, Hess et al. (2020) also stated that muscle/tendon strains (29%) and ligament sprains (19%) were the most prevalent injury determinations. Sprains and muscular strains are common injuries sustained while engaging in sports, particularly those that entail jumping, turning, cutting, or changing directions. Lee & Lee (2018) mentioned that the participants progress in a dynamic and fast-changing environment, where the high frequency of jumping, sprinting, and pivoting can cause soft tissue strains and sprains.

Yu et al. (2017) found that sports with high-speed running, such as American football, Australian football, basketball, soccer, rugby, and track & field, account for hamstring muscle strain injuries. Brooks et al. (2006) stated that 68% of hamstring muscle strain injuries in rugby happened when running, excluding turning

and scrimmaging. The nature of the game will eventually result in lower limb muscle strains. This study found that wounds (26.32%) are the most common injuries in ultimate Frisbee athletes. Damage to the skin is typical in sport, but the proportion of friction burns in ultimate is high (68%) (Marfleet, 1991). An effort to grab a hard plastic disc at high speed will likely result in various injuries, including a skin wound on the hand.

Non-contact injuries, such as running, laying out, and jumping, were the most common. Intermittent running and sudden jumping can affect athletes' cardiovascular loading, potentially increasing fatigue and injury risk without a collision (Krustrup & Mohr, 2015). This pattern has also been observed in other competitive team sports, with an increased risk of injury while running in defensive or offensive positions and jumping. The prevention of these injuries includes proper stretching during warm-up and cooling down after sports activity. A good warm-up can improve training performance and reduce sports injuries (Padua et al., 2019). Coach also must educate the athletes on proper landing techniques to make sure the athlete is not injured during landing while jumping to catch the disc.

Emery et al. (2015) state that sports injury prevention programs can also help reduce the number of injuries and their severity and extent. Through neuromuscular exercise interventions, coaches responsible for developing training methods focus on modifiable intrinsic risk variables such as strength, endurance, and balance. Besides, rule changes and equipment techniques focus on target extrinsic risk. Coaches must also ensure that athletes have enough time to relax and heal before moving on to the next tournament. Rest and recovery will also help to lessen the chances of becoming injured. The medical team should also ensure that injured athletes receive proper rehabilitation before returning to play so that they do not return to play before fully recovering from their injuries, resulting in re-injury. The rehabilitation program should be tailored to these findings and implemented accordingly.

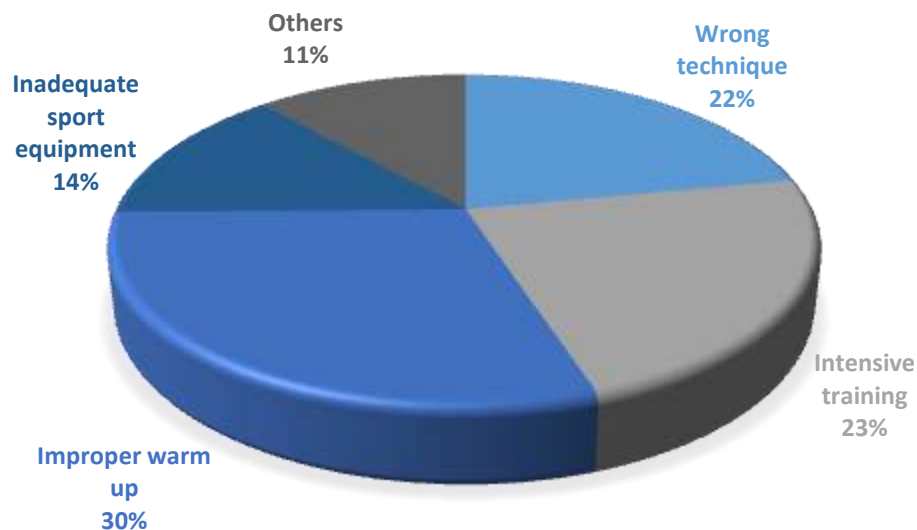


Figure 5: Ultimate Frisbee athlete's main reasons for injury

Figure 5 shows the main reasons for injury among ultimate Frisbee athletes. The improper warm-up was the main reason for injury (30%), followed by intensive training (23%), the wrong technique of play (22%), inadequate sports equipment (14 %), and other main reasons (11 %). Dvorak et al. (2000) stated that inadequate preparation, such as insufficient training, insufficient warm-up, and inappropriate or non-existent ankle tape, has been proven to influence the occurrence of injury. Improper body warming makes the body more prone to injury, and improper body warming will make it easier for the body to suffer injuries such as sprains, muscle strains, and muscle cramps.

Fradkin et al. (2006) emphasized that warm-up exercises may help avoid sports-related injuries. Aerobic warm-up activity can be used to progressively boost metabolic processes, raise the temperature in working muscles, and so promote muscle extensibility. The length of the warm-up exercise may appear to be crucial, and research has indicated that at least 10-20 minutes of submaximal exercise is required to attain a

temperature plateau in the muscles. As a result, it is possible to hypothesize that a moderate aerobic warm-up phase before intense eccentric activity will lessen DOMS by minimizing the level of muscle injury (Olsen et al., 2012).

Intensive training is another reason for injury indicated in this study. Intensive training with a high training volume at an early age may predispose young athletes to overuse injuries (Difiori et al., 2014). Athletes may expose their neuromuscular systems and musculoskeletal tissues to only one set of motor patterns in specific sports, such as throwing or serving, and are thus more likely to develop muscle imbalances and repetitively load similar structures, putting them at risk for injury. Athletes may also be more likely to push themselves harder and play despite the pain to reach their goals. Coaches play a significant role in ensuring that all athletes warm up before any training or competition to minimize the leading causes of injuries, such as a lack of sufficient warm-up and overly intensive training. Coaches must also develop a good training program that is structured and customized to the athlete's abilities. Athletes will be able to avoid all of the significant sources of injury due to this.

IV. CONCLUSION

Muscle strains and joint sprains to the knee, thigh, ankle, and shoulder are the most common injuries in ultimate Frisbee, as they are in other team sports involving high intensity sprinting and continuous use of the upper extremities. Injuries to the lower extremities were the most common in Ultimate Frisbee. Most of these injuries are serious, necessitating on-site emergency treatment and causing time loss. Due to the importance of future injury prevention strategies, this information will be helpful for the sport's government in identifying Frisbee athletes who are at risk of sports injury in order to provide appropriate rehabilitation and prevention strategies in order to help athletes maintain their health at an optimum level, resulting in improved sports performance. As a result, it aids in the reduction of government healthcare costs associated with avoidable injury.

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