Injury incidence in judokas at the Spanish National University Championship

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Manuscript Preparation
E Funds Collection

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Abstract

Background & Study Aim: Understanding injury incidence rates will be a great help with regards to preventing potential future damages. It is for this reason that this study suggests studying a large number of variables. The purpose of research is the relationship of events (empirical variables) that are usually taken into account in developing injury prevention programs during the battles and training in judo tournament.

Material & methods: In this research project, 57 male judokas taking part in the Spanish National University Championship in 2009 were asked to complete a retrospective questionnaire. We analysed the following events: the most commonly injured body regions, the medical diagnosis, how and when the injury happened, the type of injury, the side of the body and the type of medical attention received. For the statistical analysis, we used the SPSS statistics programme to apply the Chi-square test in order to determine the significance levels for non-parametric tests from $p<.05$.

Results: Significant differences were found in the most commonly injured body region, the shoulder/clavicle ($p<.05$), and in the most common diagnosis, the sprain ($p<.05$). Impact injuries ($p<.05$) are the most common and training ($p<.05$) is the most dangerous time. About the type of injury, 78.38% are new injuries ($p<.05$) and 69.05% affect the right hand side of the body ($p<.05$). Doctors are the most consulted specialists, but the physiotherapists obtained the best marks. Have been out due to injury for over 21 days 36.36% of the participants, but not for the entire season.

Conclusions: The most common diagnosis in university student judokas coincides with those of elite judokas, with the sprain being the most common. University student judokas have a higher rate of shoulder/clavicle injuries, while professional judokas are prone to a higher rate of knee injuries. Training is the most common moment in which injuries occur, both in university student judokas and professional judokas. New injuries are the most common types of injuries in university student judokas and, while doctors are the most consulted specialists, the physiotherapists obtained the best marks.

Key words: hurt • health promotion • injury prevention • martial arts • students

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INTRODUCTION

An injury is defined as damage that affects a part of the body and results in an inability to practice or compete normally [1]. Some sports have a high risk of injury, such as combat sports. As can be observed in the literature [2-7], those who practice judo suffer a variety of injuries. Most of these injuries occur as a result of direct contact with an opponent.

Despite the fact that judokas are well prepared for falls and collisions with the floor, they often experience serious injuries in these types of situations. Athletes can suffer injuries if they do not fall correctly due to a lack of control over the situation, which will inevitably cause certain damage to the body [8]. One of the advantages of judo is that those who practice this martial art not only learn how to fall properly, but are also taught to protect their partners during training and their rivals during combat [8]. In their study on injury rates in adult elite judoka, James & Pieter [4] conclude that the main injury mechanisms are delivering a throw and impact with the floor.

Ligament injuries are one of the most common injuries in this sport [9]. The execution of certain specific techniques in judo can produce different types of injuries, such as the ippon-seoi-nage technique (frequently used due to the number of points awarded). The research study conducted by Rukasz et al. in [6] aimed to demonstrate the risk of injury using this technique. The conclusions drawn from this study were that most of the injuries were knee sprains caused by a quick resumption of physical activity after the trauma experienced. Furthermore, most of the injuries were experienced by the attacking athletes and during training for competitions. Being attacked with o soto gari techniques is one of the main causes of anterior cruciate ligament injury [10], while medial collateral ligament injuries are also common in judo [11].

Japanese experts have found, however, that in the initial judo training 95% and more of the concussion of the brain is caused with imprecisely performed throws at the back. The o-soto-gari constituted 37% of all throws. As the cause of these injuries was also immature ukemiwaza [12]. Takeshi Kamitani as an effective prevention of brain damage suggested thoroughly leaning technique ukemi especially first 3 months, prohibition randori and backward throwing technique for the beginners, environmental improvement (headgear, mouthpiece, and mat) awareness of leadership [13].

Pieter's revision in 2005 [14] of the epidemiology of different combat sports found a high rate of injuries to the knee, ankle and foot. Zetaruk et al. [15] compared the rate of injuries between the following martial arts: Shotokan karate, aikido, taekwondo, kung fu and tai chi. This study discovered that kung fu athletes also present a higher rate of injuries to their lower limbs, while Green et al. [5] found a higher injury rate in judokas, with upper limb injuries being the most common. In October 2006, Souza et al. [16] determined the morbidity of sport injuries among judokas from the Sao Paolo State Championship. This study concluded that sprains were the most common diagnosis, followed by contusions. The body regions that experienced the most damage were the knee, shoulder, fingers and ankle.

On the other hand, the study carried out in 2010 with child judo athletes by Salanne et al. [17] confirms that their injuries are different to those experienced by adults given that the distribution of the injuries with regards to the diagnosis were contusions, fractures, sprains, dislocation and cuts. The study also found that damage to the upper limbs was more frequent.

The most dangerous injuries are those that damage the knee, as these types of injuries have, at times, put an end to an athlete's sporting career. Physical recovery is particularly important during periods of intense training and competitions, as this is when most injuries occur [7]. Kujula et al. [18] discovered that the injury rate was higher during training than in competitions.

Years of experience of the judo expert and epidemiology of injuries documented by the scientific publications authorize the adoption of the following research assumptions: incidents involving injuries while fighting judo (training and tournament) considered in the broader context of events (injuries according to their body region, medical diagnosis, how and when the injury occurred, the type of injury, the side of the body, the type of medical attention received and the level of satisfaction, and the period of inactivity due to injury) provides a reasonable basis for effective prevention in the future.

The purpose of research is the relationship of events (empirical variables) that are usually taken into account in developing injury prevention programs during the battles and training in judo tournament.

MATERIAL AND METHODS

This research study used a retrospective questionnaire, which was completed by 57 male judokas of all categories and with an average age of 22.00±2.82 who

participated in the 2009 Spanish National University Championship, which took place at the Universidad de Alicante from 15th to 17th May. All of the subjects gave their written consent prior to beginning the study, which had previously been approved by the research ethics committee of the University of Alicante.

This research study used a retrospective questionnaire [1, 19-21] adapted from one that had been previously validated [22]. The athletes were asked to reflect their most significant injury as judokas.

The first part of the questionnaire refers to the body region of the injury. The second part refers to its location, on the one hand, and how it occurred (whether by impact, overuse or any other reason), on the other. This is followed by questions about when the injury occurred and the type of injury sustained, i.e. a new, recurring or increased injury. The third part of the questionnaire relates to the diagnosis, while the fourth refers to the intervention and treatment received for each of the injuries, i.e. the specialist and the level of satisfaction (marked on a scale from 1 to 10).

The subjects completed the questionnaire during the competition. The researchers interviewed the athletes, after receiving their consent, during their breaks. With regards to the more complex information received by the athletes in order to identify their injuries, they were informed that impact injuries are those caused by the collision with a rival or object.

They were also told that overuse injuries are those that reveal symptomatology but which athletes often have difficulty in remembering the exact moment in which they occurred (they can usually only remember the fact that it began to hurt) [1].

The software programme Statistical Package for the Social Sciences (SPSS, v.19) was used for the statistical analysis of the results. Descriptive statistics, comparison of averages and comparison of percentages were applied. The Chi-square test determined the significance levels for non-parametric tests from $p<.05$.

RESULTS

Out of all those who participated in this research study, 26.32% (15 subjects) confirmed that they had not suffered any injuries as judokas. Therefore, the data presented below corresponds to the remaining 76.68% (42 subjects) who have suffered injuries in this sport.

As can be seen in figure 1, shoulder/clavicle injuries, with 25.53%, and knee injuries, with 23.40%, are the most common. These are followed by ankle/foot injuries, with 14.89%, and elbow injuries, with 10.64%. The least common injuries are finger and leg injuries, with 6.38% each, toe and spine injuries, with 4.26% each, and hand and chest injuries, with 2.13% each. There are significant differences ($p<.05$) in shoulder/clavicle and knee injuries with regards to hand, finger, chest, spine, leg and toe injuries; and in ankle injuries with regards to hand and chest injuries.

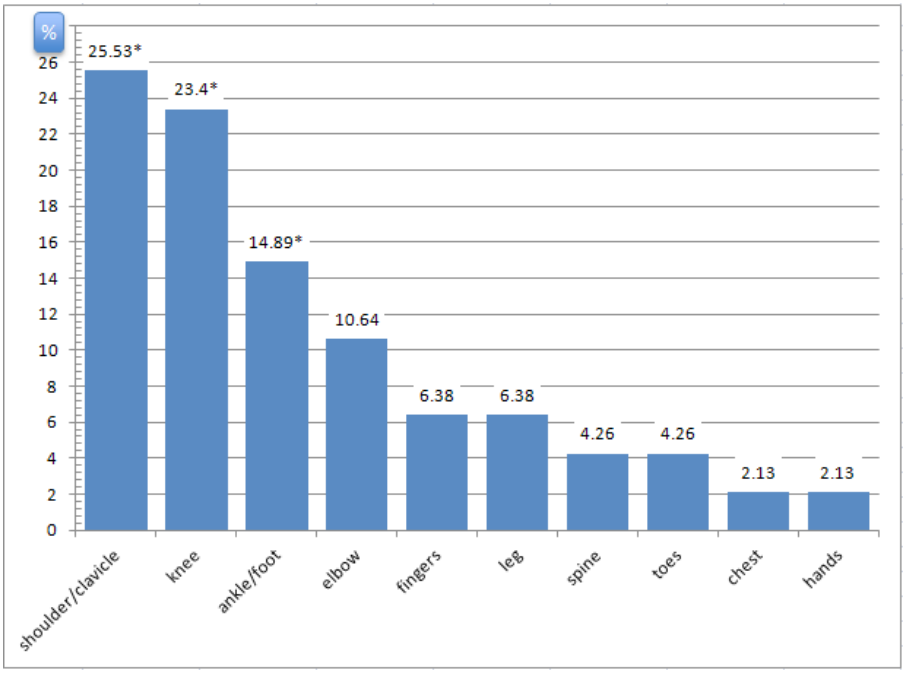

Figure 1. Injury incidence rate by body region. *p<0.05

Thus, 74.46% of injuries are located in the human body's most important joints: shoulder, knee, ankle and elbow.

With regards to the diagnosis of the above-mentioned injuries (figure 2), sprains, with 25.53%, and dislocations and fractures, with 21.28% each, are the most common. These are followed by tendinitis, with 10.64%, torn ligaments, with 8.51%, and muscle strains, with 6.38%. Contusions, low back pain and traumatic arthritis, with 2.13%, are the least common diagnosis.

There are significant differences (p<.05) in sprains with regards to contusions, muscle strains, torn ligaments, low back pain and traumatic arthritis; and in dislocations and fractures with regards to contusions, low back pain and traumatic arthritis.

As can be seen in figure 3, 47.5% of injuries are impact injuries, where we find significant differences (p<.05) with regards to overuse injuries, while 15% occur due to other reasons. The remaining 37.5% occur due to other different reasons.

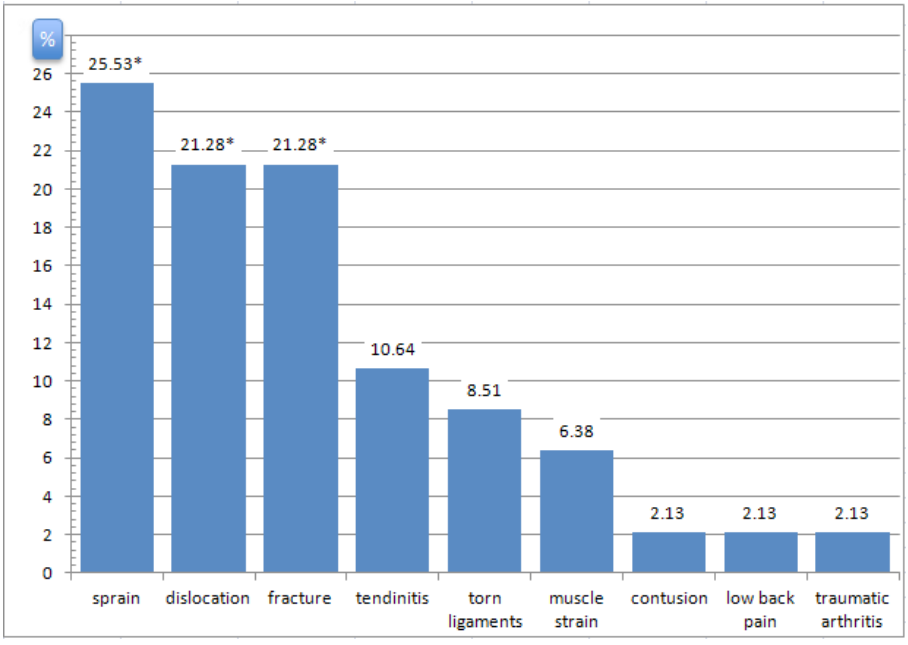

Figure 2. Injury incidence rate by type of diagnosis. *p<0.05

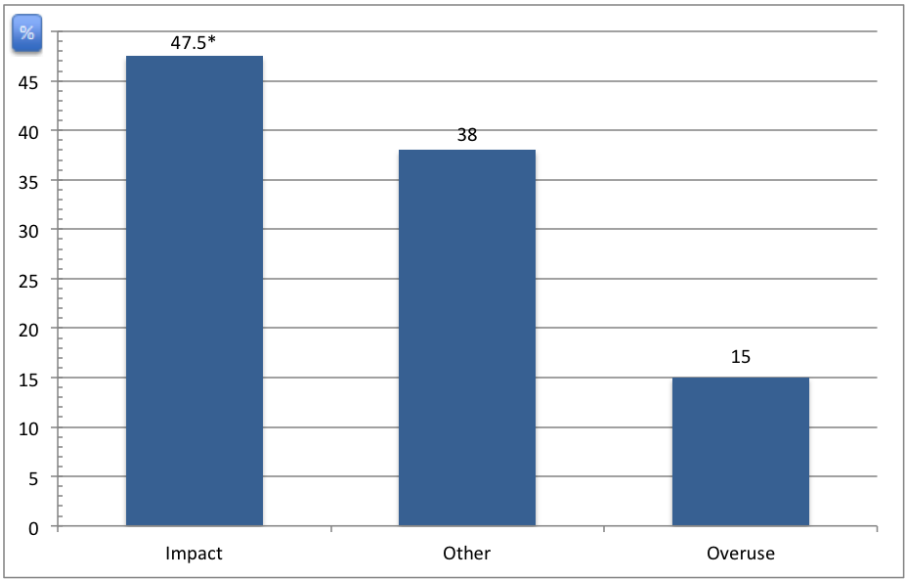

Figure 3. Injury incidence rate according to how the injury occurred. *p<0.05

Figure 4 shows that most injuries, 57.14%, occur during training and 33.33% occur during competitions. Both present significant differences (p<.05) with regards to warm-ups, with 7.14%, and other non-defined moments, with 2.38%.

Figure 5 shows the significant differences (p<.05) of new injuries, with 78.38%, with regards to recurring injuries, with 16.22%, and increased injuries, with 5.41%.

As can be seen in figure 6, the right side of the body suffers the most injuries, with 69.05%. There are significant differences (p<.05) with regards to the left and centre of the body, followed by the left side with 28.57% which also differs significantly with regards to the centre of the body. The centre of the body has an injury incidence rate of 2.38%.

With regards to the specialist that treated the injury (figure 7), most injured athletes, 45.24%, consulted a doctor. 26.19%, in addition to consulting a doctor, also went to the physiotherapist, while 21.43% were only treated by a physiotherapist. The remaining 7.14% preferred to be seen by another specialist. Physiotherapists were marked the highest by those who have suffered injuries, scoring 8.43 out of 10, followed by doctors, who scored 7.94. The subjects treated by a doctor and

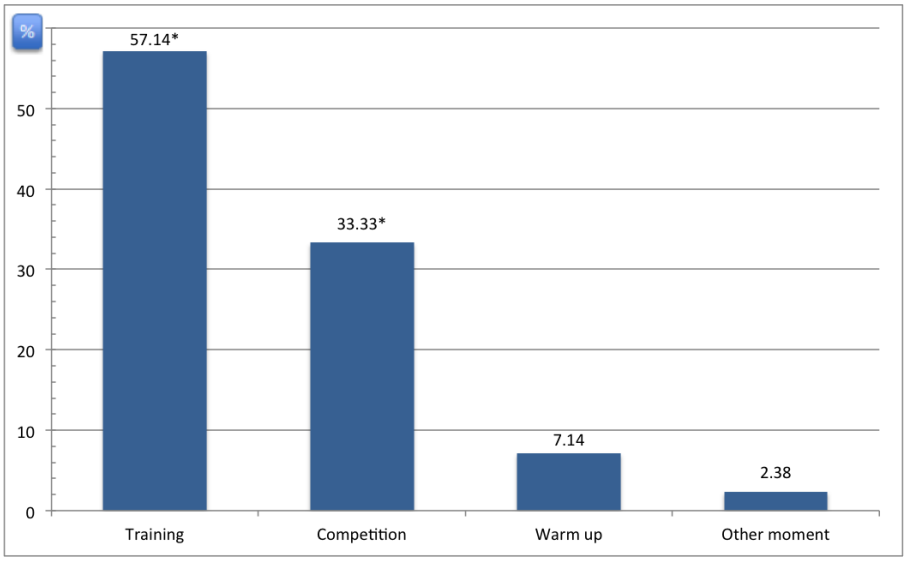

Figure 4. Injury incidence rate according to when the injury occurred. *p<0.05

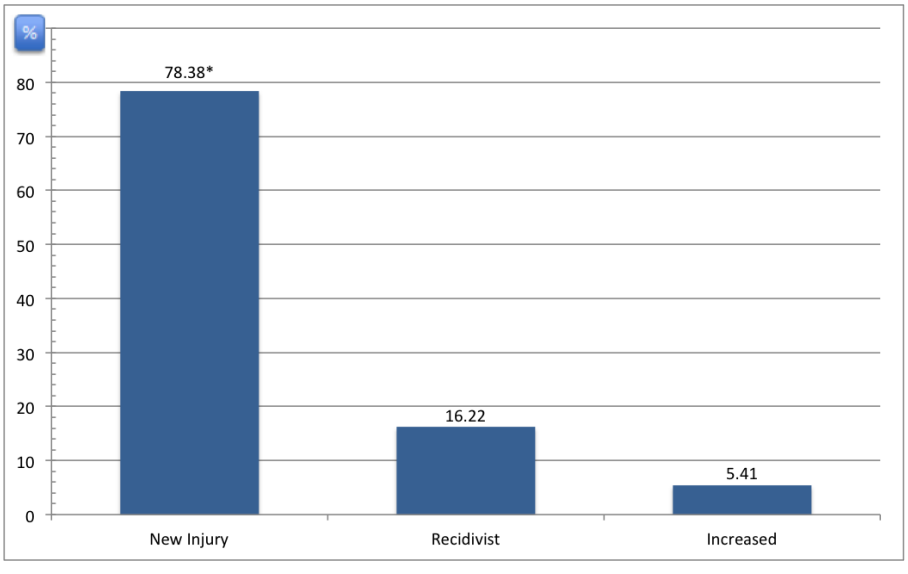

Figure 5. Injury incidence rate by type of injury. *p<0.05

physiotherapist gave a mark of 7.73, while other specialists obtained lower scores, scoring 7 out of 10.

Figure 8 shows that most injuries have caused the athletes to be out for over 21 days (36'36%), while 15.91% have been out for the entire season. The second most common period of time is 8 to 21 days, with 25%, while 15.91% have never been out due to injury, 4.55% have only been out from 1 to 3 days and 2.27% between 4 and 7 days.

DISCUSSION

There is an empirical basis, which indicates that injuries in judo must be especially related to the quality of the teaching methodology [8].

The research study conducted by Witkowski et al. [7] on the causes and location of injuries in young female judokas concludes that most injuries occur during periods of intense training and competitions. This data coincides with this study, which found that 57.14% were injured during training and 33.33% during competitions.

As confirmed by James & Pieter [4], the main injury mechanisms in men are delivering a throw and impact with the floor. Rukasz et al. analysed the causes and types of injuries during an ippon-seoi-nage throw [6] and found that most of the injuries were knee sprains. This data coincides with Kujula et al. [18] and with the research carried out by Witkowski et al. [7] and this study, which found that most injuries occur during

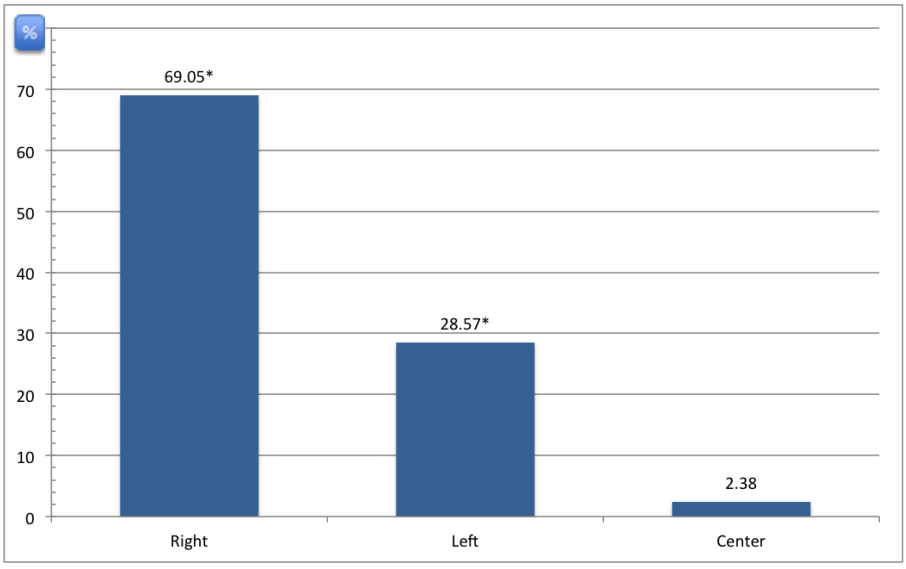

Figure 6. Injury incidence rate according to the side of the body. *p<0.05

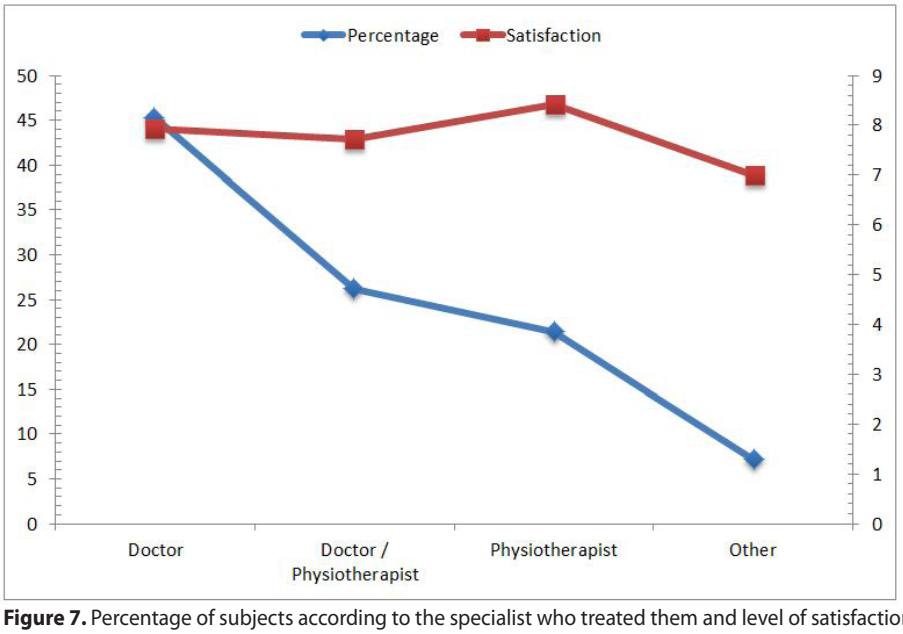

Figure 7. Percentage of subjects according to the specialist who treated them and level of satisfaction

training. The research conducted by Witak & Sturm [2] found that 72% of injuries occurred during figth.

It is important for trainers and other specialists to pay particular attention to, and analyse, the fights in both periods. Witkowski et al. [7] also discovered the factors that influence injuries, such as aggressiveness during combat (27%), pressure during training (22%) and a premature return to the sport after injury (17%).

One of the advantages of judo is that those who practice this martial art not only learn how to fall properly, but are also taught to protect their partners during training and/or combat [8]. Despite the fact that judokas are well prepared for falls and impacts with the floor, they tend to experience a number of serious injuries in these types of situations [7]. This is not surprising given that, during combat, athletes tend to be more focused on executing an ippon than on not hurting their rivals [8].

This research study found that sprains were the most common injury, with 25.53%, followed by dislocations and fractures, with 21.28% each. In addition, although knee injuries [9-11] have a high recurrence rate, with 23.40%, the shoulder/clavicle is the most common, with 25.53%. The research study conducted by Souza et al. [16] also found that sprains were the most recurring diagnosis, although their data stated that the knee was the most injured body region, followed by the shoulder, fingers and ankle. However, Salanne et al. [17] in his study "Judo injuries in children" demonstrated that contusion is the most common diagnosis followed by fracture, sprain and dislocation.Green et al. [5], on the other hand, found a higher injury incidence rate in upper limbs in judokas in their study. Pieter's revision in 2005 [14] of the epidemiology of different combat sports found a high rate of injuries to the knee, ankle and foot.

CONCLUSIONS

The most recurring diagnosis in university student judokas coincides with those suffered by elite judokas: sprains. But not with child judokas, contusion and fracture. Impact injuries are the most common when it comes to the way in which the injury occurred.

There is a higher rate of shoulder/clavicle injuries in university student judokas, given their lower level of fitness, than in elite athletes, who suffer from a higher rate of knee injuries.

It is important to pay attention to training and competitions as this is when most injuries occur, both in university student judokas and in professional athletes.

New injuries, as opposed to recurring and increased injuries, are more common in university student judokas, which highlights the importance of appropriate training methodologies and treatment for such athletes, taking into account that the years of competitions is lower for university student judokas than for elite athletes.

There is a larger number of right-handed judokas in the university category given that the right side of the body suffers a significantly higher number of injuries.

Doctors are the most consulted specialists among university student judokas, but the physiotherapists obtained the best marks. More than 21 days, but not the entire season, is the most common period of time in which athletes have been out due to injury.

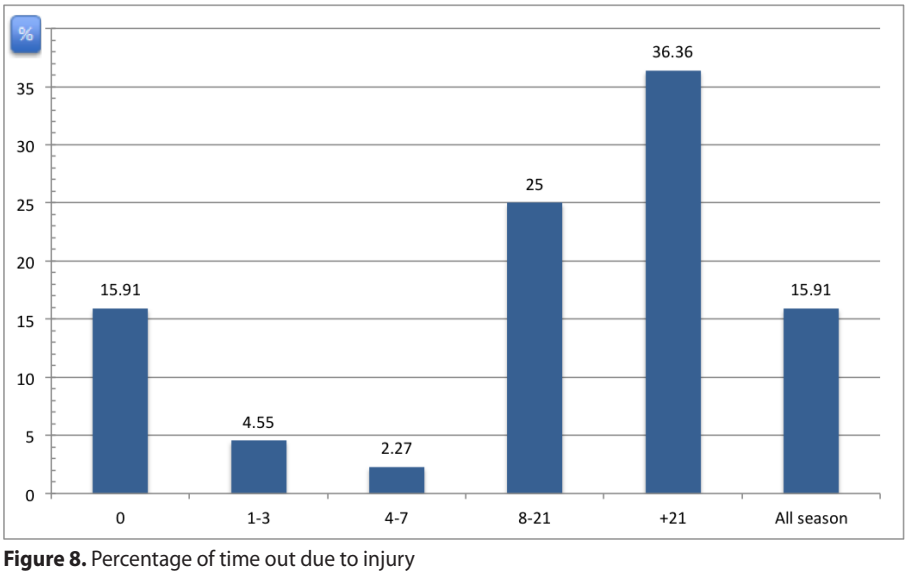

Figure 8. Percentage of time out due to injury

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