Prevalence of Injuries in Wushu Competition during the 1st Asian Martial Arts Games 2009

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Objective: *To determine the prevalence and characteristic of injuries in Wushu Competition during the 1st Asian Martial Arts Games 2009.*

Material and Method: *Sixty international athletes (38 males) participating in Wushu Competition during the 1st Asian Martial Arts Games 2009. Injuries were recorded on injury report forms to document any injuries seen and treatment provided by tournament physician during competitions. The injury forms described the athlete's causes, type, site, and severity of the injuries.*

Results: *There were 60 international athletes the average age were 22.49±3.75 years. The prevalence of injuries was 228.07/1,000 athlete exposure (AE). The prevalence in males and females was 161.76/1,000 AE and 326.09/1,000 AE, respectively. The most common injured body parts in males were lower extremities 102.94/1,000 AE, followed by head and face injuries 58.82/1,000 AE. The most common injured body parts in females were lower extremities 282.61/1,000 AE. The most common types of injuries in males were contusions 58.82/1,000 AE, concussion 29.41/1,000 AE and strain-sprain 29.41/1,000 AE. In females the most common type of injury were contusion 195.65/1,000 AE followed by strain-sprain 130.43/1,000 AE. The most common mechanism of injury in males were receiving a punch 58.82/1,000 AE, receiving a kick 44.12/1,000 AE and delivering a kick 44.12/1,000 AE. Meanwhile, in females common mechanisms were receiving a kick 152.17/1,000 AE followed by delivering a kick 130.43/1,000 AE.*

Conclusion: *High prevalence of injuries in Wushu competition during the 1st Asian Martial Arts Games 2009 revealed female injuries were higher than male and had a higher prevalence compared with Muay Thai or Taekwondo competitions.*

Keywords: *Wushu, injury, athletes*

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"Wushu" is a Chinese martial art sport, which is well known throughout the world of self-defenses or combat sport, which has protective gear such as headgear, gum shield, boxing gloves, and protective body gear. The scoring methods are delivering a punch or a kick at the opponents several body regions and smashing or pressing the opponents down on the ground. Using elbows, knees or breaking joints including attacking the opponent's spine and groin are prohibited.

There had been no earlier studies on the prevalence of injuries in Wushu competition at the international level before but there were other studies of the similar martial arts. For example, the records and reports of sports injury in Muay thai athletes in England in 2001[1] showed that the most received injured parts of the beginner level athletes were 75% in the lower extremities, 15.9% on the body, 6.8% in the upper extremities and for the head the rate 2.3%. The most common type of injured parts of both the amateur level and professional levels were 64% and 53%, respectively. Ranked at second were the head injuries. The common injuries found in every group were soft tissue and laceration injuries.

The second most identified injuries at beginner-level athletes and amateur level athletes were sprains and strains, while at the professional level they were bone fractures. Another similar study was a study of injuries at a Canadian National Taekwondo Championships, 1997[3]. That study found that the rate of injuries per 1,000 Athlete Exposure (AE) was 79.9/1,000 AE and 25.3/1,000 AE in male and female athletes, respectively. The most received injuries in male athletes were in lower extremities 32.0/1,000 AE, followed in

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second place by the head injuries 18.3/1,000 AE and third place is spine injuries 13.8/1,000 AE. The most common type of injuries was sprain 22.8/1,000 AE, joint dysfunctional 13.7/1,000 AE, and concussions 6.9/1,000 AE. The most common type of injuries in females was contusion at the lower extremities 15.2/1,000 AE, while a study of the injuries of Thailand Taekwondo Championship, 2005[4] found that the rates of injuries were 39.47/1,000 AE in male and 32.41/1,000 AE in females. The most received injuries at lower extremities in males were 26.3/1,000 AE, followed by upper extremities 9.87/1,000 AE and 3.29/1,000 AE on the face. The contusion was found at the same rate as sprain injuries 13.89/1,000 AE followed by contusions from receiving a kick were also at the same rate as delivering a kick which were 9.26/1,000 AE. The authors aimed to study the prevalence of injuries, injured body regions, types, and mechanisms of injuries in Wushu Competition during the 1st Asian Martial Arts Games 2009.

Material and Method

Sixty international athletes (38 males) participating in Wushu Competition during the 1st Asian Martial Arts Games 2009. The authors observed injuries at the competition together with the tournament physician then recorded all data using the injuries report form. The form collected general information such as name, gender, age, team, nationality and injury-related information including location of injuries, types, severity, diagnosis, mechanisms, diagnoses, treatment and recommendations to the athlete as to whether they should or should not continue participating in the game. The tournament physician, who had been the national team physician for several years, diagnosed injuries. Minor injuries were treated at ringside and the more severe injured were transferred to the tournament hospital by the medical service systems. Every new injury was recorded by the authors. The first author was the only person who kept the injuries forms and entered the data. Consent was obtained from Thailand National Olympic Committee. Inclusion criteria were Wushu athletes, which were injured in Wushu competition during the 1st Asian Martial Arts Games 2009 and exclusion criteria were non-competitive injuries during the tournament. Statistical analyses were calculated on basic injuries rate formula: (Injuries/athlete exposure) x 1,000 = injuries per 1,000 athlete exposure (AE).

Results

There were 60 (38 males) international athletes the average age were 22.49±3.75 years. The total prevalence of injuries was 228.07/1,000 AE. The prevalence in males and females were 161.76/1,000 AE and 326.09/1,000 AE, respectively. Table 1 displays the injury data and rate for the international Wushu athletes. The lower extremities were the most commonly injured body parts of both males and female, the prevalence was 102.94/1,000 AE and 282.61/1,000 AE, respectively. The most common types of injuries in males were contusions 58.82/1,000 AE, concussion 29.41/1,000 AE and strain-sprain 29.41/1,000 AE. In females, the most common type of injuries were contusions 195.65/1,000 AE followed by strain-sprain 130.43/1,000 AE. Table 2 displays body parts of injuries and Table 3 show type of injury.

The most common mechanism of injuries in males were receiving a punch 58.82/1,000 AE, receiving a kick 44.12/1,000 AE and delivering a kick 44.12/1,000 AE. Meanwhile, in females most common mechanisms were receiving a kick 152.17/1,000 AE followed by delivering a kick 130.43/1,000 AE. Table 4 displays mechanisms of injuries.

In this tournament, there were five athletes (4 males) that were unable to continue the competition. Two males received a punch on their face, which caused concussion then loss of consciousness by a knockout. Three athletes were forced to stop competing by the tournament physician's judgment given their conditions

Table 1. Injuries rate in Wushu competition during the 1st Asian martial arts games 2009

	Male	Female	Total
Number of athletes	38	22	60
Number of reported injuries	11	15	26
Number of athlete-exposure (AE)	68	46	114
Injuries rate			
1,000 times chance of injury (95% CI)	161.76 (30.17-175.71)	326.09 (189.12-463.05)	228.07 (120.21-265.74)

Table 2. Injuries body part per 1,000 athlete exposures

Body part	Male		Female	
	Number	Rate	Number	Rate
Head	2	29.41	0	0
Eyes	0	0	1	21.74
Nose	1	14.71	0	0
Teeth	1	14.71	0	0
Neck	0	0	1	21.74
Thigh	3	44.12	3	65.22
Knee	1	14.71	4	86.96
Shin	0	0	4	86.96
Ankle	3	44.12	1	21.74
Foot	0	0	1	21.74
Total	11	161.76	15	326.09

Table 3. Injuries type per 1,000 athlete exposures

Injury type	Male		Female	
	Number	Rate	Number	Rate
Contusion	4	58.82	9	195.65
Sprain/strain	2	29.41	6	130.43
Concussion	2	29.41	0	0
Laceration	1	14.71	0	0
Broken teeth	1	14.71	0	0
Epistaxis	1	14.71	0	0
Total	11	161.76	15	326.09

such as receiving a punch on the nose, which caused a nosebleed that would not stop. Another one received a kick on the thigh, which also caused a severe contusion. Only one female had a contusion on the neck by receiving a kick and eye contusion by receiving a punch.

Discussion

The injuries in Wushu competition during the 1st Asian martial arts games 2009 compared with other martial arts fighting[2-4] found that the Wushu competition had the highest injury rates, twice higher than the injury rates of professional Muay thai athletes in Australia; four times higher than the injuries recorded in Canadian National Taekwondo Championships; and six times higher than injuries found in Thailand Taekwondo Championship (Table 5).

The present study found concussion in two male athletes and then loss of consciousness by a knockout that was a very serious injury. These were similar to injuries of Muay Thai athletes at the professional and amateur levels in England[1]. Even though the athletes with concussion usually make a full recovery, head injuries can cause severe damage and might lead to death. The recommendation is using high quality headgear protection and tournament medical services must have proper treatment for head injuries.

The prevalence of injuries is high because of the nature of the sport is a combat sport and the Wushu athletes that attended this competition were all very highly skilled Wushu athletes. The highly skilled athletes might have many less injuries than the skilled. Moreover, with the rules that every athlete has to use protective headgear and body gear which also allows the athletes to attack any part of their opponents to receive a score. That is why most athletes decided to attack their opponents at the region of the body that do not have protective gear such as thighs and face so they can knockout the opponents. Unlike in Taekwondo,

Table 4. Injuries mechanism per 1,000 athlete exposures

Injury mechanism	Male		Female	
	Number	Rate	Number	Rate
Receiving a kick	3	44.12	7	152.17
Delivering a kick	3	44.12	6	130.43
Simultaneous kicks	0	0	1	21.74
Receiving a punch	4	58.82	0	0
Receiving a throw	0	0	1	21.74
Not record	1	14.71	0	0
Total	11	161.76	15	326.09

Table 5. Comparative injuries rate per 1,000 AE of injury in adult martial arts athletes

Sport/study	Rate
Wushu (this study)	228.07
Muay thai (2)	109.70
Taekwondo (3)	62.90
Taekwondo (4)	36.54

which does not allow a punch in the face. Athletes also must kick at the protective body gear only in order for them to score a point. That is the reason why the Taekwondo athletes receive less injuries[3-5]. When comparing this study with injuries in martial arts, five styles (Karate, Taekwondo, Ikido, Kungfu and Tai Chi), M N Zetaruk and Co[6] found that Wushu has higher injury rates than other martial arts.

The most commonly injured body region in both male and female athletes were lower extremities and the most common type of injuries were contusions follow by sprain/strains, which was similar to the study of other martial arts[1-5]. Within the lower extremities, the thigh and foot were most often the injured body part because most athletes chose to deliver a kick to the opponent's thigh, which causes contusions on the receiver of a kick and sprain/strains on whom delivering a kick.

The comparisons between males and females athletes identified that female athletes had two times higher injuries than male athletes. Female athletes have less lean body mass than males; this might be the reason why females have less impact strength, which leads to receiving injuries more easily.

Further study should be about materials that can withstand impact, or a follow-up study on long-term neurological symptoms in athletes, or study of prevention of the head injury in athletes, such as how to avoid the opponent's attack or use of arms to block the attack to reduce the injury rate. However, there were no severe injuries such as broken bones found in the present study, unlike the study's result found in other sports especially in Muay thai.

The limitation of the present study is that there were few Wushu athletes in the competition compared to the present studies of other martial arts. This made the injury rates in the present study seem higher than it should be. In the future, the authors need to study another Wushu competition that has a larger number of athletes, or gather information from past competitions including the standard indicator to diagnose the data.

Conclusion

There was a high prevalence of injuries in the Wushu competition during the 1st Asian Martial Arts Games 2009 with two male athletes sustaining concussions. The female athletes sustained more injuries than male athletes did. The types and mechanism of the injuries are similar in both male and female athletes. The most common injuries are from receiving a kick or delivering a kick in the lower extremities, followed by sprain/strain.

However, my suggestions for further investigation are concern in preventing injuries of the head and neck as well as the lower extremities, the effectiveness of protective equipment, changes the rule should be considered to use protective leg gear and recommendations are established for an injury surveillance system in all contact sports such as Wushu and other martial arts competition.

Potential conflicts of interest

None.

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การศึกษาความชุกการบาดเจ็บของนักกีฬาวูซูระหว่างการแข่งขันศิลปะการต่อสู้ชิงชนะเลิศ แห่งเอเชียครั้งที่ 1 ปี พ.ศ. 2552

พิเชษฐ์ เยี่ยมศิริ, อมรินทร์ วรรณะวัลย์

วัตถุประสงค์: *เพื่อหาความชุก สาเหตุและลักษณะการบาดเจ็บของนักกีฬาวูซูระหว่างการแข่งขันศิลปะการต่อสู้ ชิงชนะเลิศแห่งเอเชียครั้งที่ 1 ปี พ.ศ. 2552*

วัสดุและวิธีการ: *นักกีฬาวูซูนานาชาติจำนวน 60 ราย (เพศชาย 38 ราย) ที่เข้าร่วมการแข่งขันศิลปะการต่อสู้ ชิงชนะเลิศแห่งเอเชียครั้งที่ 1 ปี พ.ศ. 2552 รวบรวมข้อมูลการบาดเจ็บจากบันทึกการรักษาพยาบาลของแพทย์สนาม และวิเคราะห์หาความชุก สาเหตุและลักษณะการบาดเจ็บของนักกีฬาขณะแข่งขัน*

ผลการศึกษา: *นักกีฬาวูซูนานาชาติจำนวน 60 ราย อายุเฉลี่ย 22.49±3.75 ปี มีความชุกการบาดเจ็บ ต่อโอกาสเกิดการบาดเจ็บ 1,000 ครั้ง (athlete exposure (AE)) เท่ากับ 228.07/1,000 AE เพศชายเท่ากับ 161.76/1,000 AE เพศหญิงเท่ากับ 326.09/1,000 AE ทั้งเพศชายบาดเจ็บที่ยางค์ล่างมากที่สุด 102.94/1,000 AE บาดเจ็บที่ศีรษะและใบหน้า 58.82/1,000 AE เพศหญิงบาดเจ็บที่ยางค์ล่างมากที่สุดเช่นกัน 282.61/1,000 AE เพศชายพบการบาดเจ็บชนิดบวมช้ำมากที่สุด รองลงมาคือสมองกระทบกระเทือน 29.41/1,000 AE และเส้นเอ็นเคลื่อน 29.41/1,000 AE เพศหญิงพบการบาดเจ็บชนิดบวมช้ำมากที่สุด 195.65/1,000 AE และเส้นเอ็นเคลื่อน 130.43/1,000 AE เพศชายพบว่าสาเหตุการบาดเจ็บเกิดจากถูกชกมากที่สุด 58.82/1,000 AE รองลงมาคือ ถูกเตะ 44.12/1,000 AE และบาดเจ็บจากการเตะเอง 44.12/1,000 AE เพศหญิงบาดเจ็บจากถูกเตะ 152.17/1,000 AE และเป็นคนเตะเอง 130.43/1,000 AE*

สรุป: *ความชุกการบาดเจ็บของนักกีฬาวูซูระหว่างการแข่งขันศิลปะการต่อสู้ชิงชนะเลิศแห่งเอเชียครั้งที่ 1 ปี พ.ศ. 2552 พบได้สูงโดยเฉพาะเพศหญิงบาดเจ็บมากกว่าเพศชาย วูซูมีอัตราบาดเจ็บสูงกว่าเมื่อเปรียบเทียบกับเทควันโดหรือมวยไทย*