

ORIGINAL ARTICLE

PREVALENCE OF MUSCULOSKELETAL INJURIES AMONG TAEKWONDO PLAYERS IN MALAYSIA

Mohammed Abdulrazzaq Jabbar¹, Jayesh Chandran², Ong Yi Yuan¹ and Retneswari Masilamani¹

¹ Faculty of Medicine and Health Sciences. Universiti Tunku Abdul Rahman. 43000 Kajang. Malaysia.

² Faculty of Physiotherapy. Rajiv Gandhi University of Health Sciences. 560041 Bengaluru. India

¹ Faculty of Medicine and Health Sciences. Universiti Tunku Abdul Rahman. 43000 Kajang. Malaysia.

¹ Faculty of Medicine and Health Sciences. Universiti Tunku Abdul Rahman. 43000 Kajang. Malaysia.

Corresponding Author: Mohammed Abdulrazzaq Jabbar

Email: jabbar@utar.edu.my

ABSTRACT

To determine the rate and types of musculoskeletal injuries among Taekwondo players from Taekwondo clubs in Malaysia. A total of 490 Taekwondo players from various clubs in Malaysia were involved in a cross-sectional study using a self-response questionnaire adopted from different studies and validated before the commencement of the study. The players were recruited from various clubs in different states of Malaysia. The number of players suffered from injuries was 300 as compared to 190 with no injuries. Males players suffered from musculoskeletal injuries more than females ($p = 0.019$). Also, males complained of multiple injuries more than females ($p = 0.019$). The rate of the injuries among black belt holders was higher as compared to the colour belt ($p < 0.001$) and black belt holders more liable for multiple injuries ($p < 0.001$). The semi-professional players complained of sport injuries more than others ($p = 0.021$). The longer the experience the higher rate of injuries ($p < 0.001$). Most of Taekwondo players have suffered from injuries, these injuries sometimes are dangerous. These injuries are more common among male and semi-professional players. Coaches and players must emphasize on warming-up and stretching before the training/ competitions and cooling-down after, that will help to reduce the rate and severity of the injuries. In addition to that, awareness compaign among the players will help the palyers to become more careful during training and competitions sessions.

Keywords: prevalence, musculoskeletal injuries, taekwondo, players, Malaysia

INTRODUCTION

Taekwondo is a traditional Korean martial art dating back more than 2000 years, the phrase Taekwondo means the “way of kicking and punching”, it was initially viewed as a form of military training. Currently, Taekwondo is a worldwide common traditional form of martial art. The ‘Tae’ means foot, ‘Kwon’ is hand and ‘Do’ is the art and It is an energetic, speedy sport which requires high explosive power to strike their opponents using kicks within the rules of the sport ¹. In Malaysia, there are about 401954 Taekwondo practitioners who are registered under Taekwondo Malaysia, 392000 of them are colour belt practitioners and 9000 of black belt practitioners. There are 395 of qualified Taekwondo coaches, 477 qualified referees and 82 qualified examiners in Taekwondo Malaysia ². Scientific evidence implies many health advantages are linked with sport participation. However, high-intensity participation may be related to an increased risk of musculoskeletal injuries ³.

In Taekwondo, as physical demands and forces are required in full contact sparring, risk of musculoskeletal injuries must be addressed ⁴.

Taekwondo sparring rules were updated a few years ago and allowing players to target a higher point when they kick to the head, the rate of head injury increased significantly ⁵. Literature has reported the most common site of musculoskeletal injuries in Taekwondo is knee injury followed by foot, ankle and shoulder injuries repectively. Most of the injuries occurred during training rather than competition sessions ⁶. The associated factors with Taekwondo injuries are gender as males report fewer injuries as compared to females but female, especially juniors, had a higher time-loss injury rate. Body weight is associated with body injury rate among Taekwondo athletes as the injury rate is proportional with bodyweight ⁵. A longitudinal study over nine years on Taekwondo injuries, reported 904 injury reports among 664 competitors and the three most common injuries reported were head, foot, and thigh injuries. Colour belt cotestants were more likely to sustain injuries as compared to black belt contestants possibly due to more aggressive tactics and less controlled strikes. It has also been reported that younger athletes sustained more injuries than older athletes for the same above reasons. The majority of injuries were due to either receiving a kick or delivering one since

this is a martial art of the lower limb being the defensive and primary weapon⁴.

Athletes who had spent more years in tournaments along with high-frequency and long-duration training were associated with greater risk for injuries and prevention strategies and adjustment to the athletes' training and tournament schedules would decrease the risk for injury. Thus it was recommended that coaches and instructors should remember to observe and adjust the athletes' training schedules and exposure time to significantly decrease the rate of Taekwondo related musculoskeletal injuries among athletes⁷. The aim of this study is to determine the rate, types, the bodily sites and the risk factors of musculoskeletal injuries among Taekwondo players.

METHODOLOGY

Participants

A total of 490 participants were involved in a cross-sectional study. The consent form was sent to management of all Taekwondo clubs registered under Taekwondo Malaysia and only those who were willing to participate and have signed the consent form were involved. Sampling method was a convenient sampling by using self-response online questionnaire. The questionnaire was a valid questionnaire that adopted from different studies⁴⁻⁸. The sample size required for this study was 520. The sample size was calculated based on the prevalence of musculoskeletal injuries rates among taekwondo players. Due to the time frame, the sampling method was voluntary sampling based on self-selection of players who were officially registered in a Taekwondo club in Malaysia and showed interest in the study. Written consent was obtained from participants of the study regardless of their skill levels, experiences, and gender.

Research Tools

The questionnaire comprised of 3 sections. Section A, comprised of demographic data of the subjects (club name, state & city, gender, age group) and habits of training (stretching, warm-up, cool-down, headgear and vest, and full gear), level of the skill

(amateur, semi-professional, and professional), type of player (Poomsae, sparring or both), frequency of practice per week, sessions of training per day, duration of training per session and experience in Taekwondo. Section B covered the characteristics of injury (the type of injury, site of injuries, number of injuries, and recurrence of the injury). Section C addressed methods to manage the injuries such as absent from training, using over the counter medication, or receive treatment.

Data Collection and Statistical Analysis

An information sheet on the aim of the study, ensuring confidentiality of the participants and study setting were provided to the participants. A consent form together with the questionnaire were distributed to the subjects. The proposal to this study was reviewed and approved by the Scientific and Ethical Review Committee of Universiti Tunku Abdul Rahman (UTAR). The period of data collection continued for 4 months from August to December 2019. Descriptive and analytical statistical tests were conducted using Statistical Package for the Social Sciences (SPSS) version 22.

RESULTS

A total of 490 Taekwondo players were involved in the study giving a response rate of 94%, most of them were in the age group 15- 19 (38.4%) and the least was 35-39 (1.2%). Most of the respondents were males leading the female respondents by 20.4%. There were more black belt respondents (59.4%) in this study as compared to colour belt (white, green, yellow and brown) respondents (40.6%). Majority of the respondents were amateur Taekwondo practitioners (65.1%), followed by semi-professional players (24.1%) and professional Taekwondo players (10.8%). There were more sparring players (51.6%) as compared to poomsae players (25.1%). The athletes reported an average training period of for more than two years (68.4%) with average training sessions per week of 1-2 days (58%) and most of them (66.7%) were training for 1-2 hours in one session.

Table 1: Characteristics of the participants (n=490)

Characteristics	Frequency n	Percentage (%)
Age		
< 15	74	15.1
15-19	188	38.4
20-24	165	33.7
25-29	24	4.9
30-34	17	3.5
35-39	6	1.2
≥40	16	3.3
Gender		
Female	195	39.8
Male	295	60.2
Belt color		
Color belt	199	40.6
Black belt	291	59.4
Level of Skill		
Amateur	319	65.1
Semi-professional	118	24.1
Professional	53	10.8
Player type		
Poomsae	123	25.1
Sparring	253	51.6
Both	114	23.3
Training Frequency per week		
1-2	284	58.0
3-5	158	32.2
>5	48	9.8
No. of Sessions per day		
One	336	68.6
Two	106	21.6
Three	27	5.5
>three	21	4.3
Duration of each session		
< 1 hour	35	7.1
1-2 hour	327	66.7
>2 hours	128	26.1
Experience in years		
< one year	79	16.1
1-2 year	76	15.5
>2 years	335	68.4

Table 2 shows 154 (31.4%) of the respondents were from the state of Selangor, 109 (22.2%) from Kuala Lumpur, 71 (14.4%) from Johor, 34 (6.9 %) from Sarawak, and the others (24.8%), comprised of respondents from all other states of Malaysia. The respondents were training in different Taekwondo

clubs around Malaysia. Majority of the respondents were training at Wenwu club (74 athletes), Muhibah (43 athletes), APU (37 athletes), Tar UC (35 athletes), UTAR (21 athletes), and others were training in 70 different taekwondo clubs.

Table 2: The distribution of the respondents in different States (n=490)

State / District	Number of respondents	State / District	Number of respondents
Selangor	154	Kedah	9
Kuala Lumpur	109	Melaka	8
Johor	71	Penang	5
Negeri Sembilan	25	Kelantan	8
Putrajaya	3	Kuantan	1
Sabah	15	Pahang	9
Terengganu	5	Perlis	1
Perak	29	Jeddah	1
Sarawak	34	Missing	2

The training habits of the respondents are summarized in Table 3 over a 5 point likert's scale of never, occasionally, sometimes, often and always ; majority of the respondents reported always practiced stretching (58.2%) and warming up

exercise (62%), sometimes practiced cool-down (32.2%) and only headgear and vest 32.2%). However, most of them (25.9%) were not training full gear and 13.1% always training full gear.

Table 3: The training habits of the respondents (n=490)

Exercise	Never n (%)	Occasionally n (%)	Sometimes n (%)	Often n (%)	Always n (%)
Stretching	7 (1.4)	20 (4.1)	75 (15.3)	103 (21.0)	285 (58.2)
Warm-up	4 (8)	13 (2.7)	66 (13.5)	103(21.0)	304 (62.0)
Cool- down	23 (4.7)	62 (12.7)	158 (32.2)	110 (22.4)	137 (28.0)
Head gear and vest	90 (18.4)	105 (21.4)	158 (32.2)	87 (17.8)	50 (10.2)
Full gear	127(25.9)	121(24.7)	107(21.8)	71(14.5)	64(13.1)

Among the respondents, 61% had suffered from musculoskeletal injuries; 22% sustained injury at least once and 37.1% of suffered multiple musculoskeletal injures, as seen in Table 4. The most common type of injury the players suffered from was contusion (52.9%) and the least was dislocation (3.4%). The most common body sites suffered from injuries were Ankle joint, Knee joint, Legs, and hands with rates 15%, 11%, 10.6%, and 10.2% respectively. The lowest site of injury was

groin (1.1%). Figure 1 shows that defensive and offensive kicking collectively contributed most to the injuries as compared to punching. The most prevalent mechanism of injury was due to direct impact, as the respondents obtained injury after clashing with an opponent during the Taekwondo competitions. The second commonest mechanism of injury was offensive kick and defensive kick and the least common mechanism of injury was offensive punch and defensive punch.

Table 4: Characteristics of the Taekwondo related injuries (n=490)

Characteristics	Frequency n	Percentage (%)
Injury		
No	190	38.8
Yes	300	61.2
Number of injuries		
No injury	190	38.8
Single	118	24.1
Multiple	182	37.1
Type of injuries		
Sprain	280	22.7
Dislocation	42	3.4
Contusion	651	52.9
Tear	93	7.6
Fracture	53	4.3
Others	112	9.1
Injury by body region		
Head and neck	71	5.8
Upper limb	390	32.0
Lower limb	705	57.9
Torso	52	4.3
Location of injuries		
Head	30	2.5
Neck	41	3.4
Trunk	38	3.1
Shoulder	74	6.1
Arm	82	6.7
Elbow	50	4.1
Forearm	60	4.9
Hand	124	10.2
Hip	93	7.6
Thigh	88	7.2
Knee	134	11.0
Leg	129	10.6
Foot	78	6.4
Ankle	183	15.0
Groin	14	1.1

Some of the athletes suffered from multiple injuries.

Table 5 shows that 83.3% of the participants within the age group 35-39 suffered from musculoskeletal injury and lowest rate of injuries was among participants within 20-24 years of age (57%) and age of respondent was not statistically associated with training related injuries. The gender of participants showed a statistically significant association with the rate of injuries as 65.4% of the male participants suffered from musculoskeletal injury/s as compared to 54.9% of female respondents. The results depicted that more black belt respondents suffered an injury (71.5%) as compared to colour belt respondents (46.2%); the colour of belt of respondents showed statistically significant association with training related injuries. The level

of Taekwondo skill reported a statistically significant association with training related injuries where 72% of the semi-professional Taekwondo practitioners got injured, compared to the Amateur players and professional players. Respondents who reported experience of more than 2 years as Taekwondo practitioners reported more injuries compared to those between 1-2 years or less than 1 year; statistically significant with training related injuries. Other factors such as player type, frequency of training per week, number of sessions per day and duration of each session were not significantly associated with training related injuries.

Table 5: Association of musculoskeletal Injury and characteristics of the respondents (n=490)

Characteristics	Taekwondo Training Injury		p value
	Yes (300) n (%)	No (190) n (%)	
Age			
< 15	42 (56.8)	32 (43.2)	0.601
15-19	119 (63.3)	69 (36.7)	
20-24	94 (57.0)	71 (43.0)	
25-29	17 (70.8)	7 (29.2)	
30-34	10 (58.8)	7 (41.2)	
35-39	5 (83.3)	1 (16.7)	
>40	13 (81.2)	3 (18.8)	
Gender			
Female	107 (54.9)	88 (45.1)	0.019*
Male	193 (65.4)	102 (34.6)	
Belt color			
Color belt	92 (46.2)	107 (53.8)	< 0.001*
Black belt	208 (71.5)	83 (28.5)	
Level of skill			
Amateur	185 (58.0)	134 (42.0)	0.021*
Semi-professional	85 (72.0)	33 (28.0)	
Professional	30 (56.6)	23 (43.4)	
Player type			
Poomsae	65 (52.8)	58 (47.2)	0.086
Sparring	161 (63.6)	92 (36.4)	
Both	74(64.9)	40 (35.1)	
Training Frequency per week			
1-2	164 (57.7)	120 (42.3)	0.174
3-5	105 (66.5)	53 (33.5)	
>5	31 (64.6)	17 (35.4)	
No. of Sessions per day			
One	211 (62.8)	125 (37.2)	0.319
Two	63 (59.4)	43 (40.6)	
Three	17 (63.0)	10 (37.0)	
>three	9 (42.9)	12 (57.1)	
Duration of each session			
< 1 hour	17 (48.6)	18 (51.4)	0.264
1-2 hour	205 (62.7)	122 (37.3)	
>2 hours	78 (60.9)	50 (39.1)	
Experience			
< one year	21 (26.6)	58 (73.4)	< 0.001*
1-2 year	45 (59.2)	31 (40.8)	
>2 years	234 (69.9)	101 (30.1)	

The statistically significant characteristics of respondents associated with the number of injuries (single, multiple or none) were gender; p-value = 0.019 with 22.0% males with single and 43.4% males with multiple injuries compared to 23.6% of single and 31.3% multiple injuries among females respectively, belt colour; p-value < 0.001 with black belt players sustained 24.4% single and 47.1% multiple injuries compared to 20.1% and 26.1% single and multiple injuries respectively, player

type; p-value = 0.032 where the sparring players sustained 20.2% single and 43.5% multiple injuries, compared to both types of players sustaining 24.6% single and 40.4% multiple injuries while poomsae players had 26% single and 26.8% multiple injuries, number of sessions per day; p-value = 0.011 and experience; p-value < 0.001. The other factors, age, level of skill, frequency of training per week and duration of each session were not associated with number of injuries.

Table 6: Association of number of musculoskeletal injuries and the characteristics of the respondents

Characteristics	Single (111) n (%)	Multiple (189) n (%)	No injury (190) n (%)	p value
Age				
< 15	21 (28.4)	21 (28.4)	32 (43.2)	0.178
15-19	42 (22.3)	77 (41.0)	69 (36.7)	
20-24	30 (18.2)	64 (38.8)	71 (43.0)	
25-29	4 (16.7)	13 (54.2)	7 (29.2)	
30-34	4 (23.5)	6 (35.3)	7 (41.2)	
35-39	3 (50.0)	2 (33.3)	1 (16.7)	
>40	7 (43.8)	6 (37.5)	3 (18.8)	
Gender				
Female	46 (23.6)	61 (31.3)	88 (45.1)	0.019*
Male	65 (22.0)	128 (43.4)	102 (34.6)	
Belt color				
Color belt	40 (20.1)	52 (26.1)	107 (53.8)	< 0.001*
Black belt	71 (24.4)	137 (47.1)	83 (28.5)	
Level of skill				
Amateur	72 (22.6)	113 (35.4)	134 (42.9)	0.070
Semi-professional	28 (23.7)	57 (48.3)	33 (28.0)	
Professional	11 (20.8)	19 (35.8)	23 (43.4)	
Player type				
Poomsae	32 (26.0)	33 (26.8)	58 (47.2)	0.032*
Sparring	51 (20.2)	110 (43.5)	92 (36.4)	
Both	28 (24.6)	46 (40.4)	40 (35.1)	
Frequency of training per week				
1-2	69 (24.3)	95 (33.5)	120 (42.3)	0.107
3-5	32 (20.3)	73 (46.2)	53 (33.5)	
>5	10 (20.8)	21 (43.8)	17 (35.4)	
No. of Sessions per day				
One	76 (22.6)	135 (40.2)	125 (37.2)	0.011*
Two	20 (18.9)	43 (40.6)	43 (40.6)	
Three	13 (48.1)	4 (14.8)	10 (37.0)	
>three	2 (9.5)	7 (33.3)	12 (57.1)	
Duration of each session				
< 1 hour	10 (28.6)	7 (20.0)	18 (51.4)	0.224
1-2 hour	74 (22.6)	131 (40.1)	122 (37.3)	
>2 hours	27 (21.7)	51 (39.8)	50 (39.1)	
Experience				
< one year	9 (11.4)	12 (15.2)	58 (73.4)	< 0.001*
1-3 year	19 (25.0)	26 (34.2)	31 (40.8)	
>2 years	83 (24.8)	151 (45.1)	101 (30.1)	

Chi-square test, level of significance <0.05

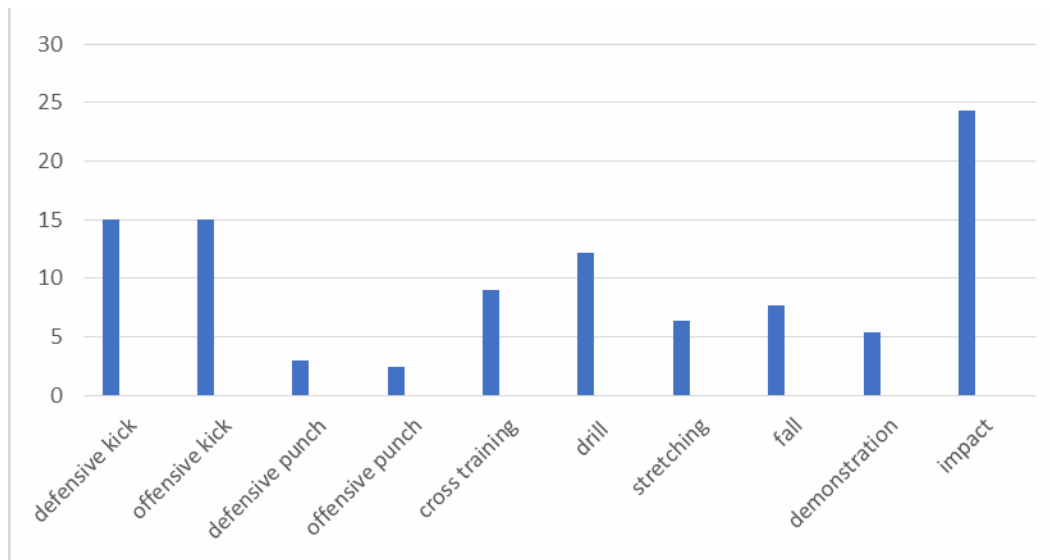


Figure 1: Mechanism of Injury among Taekwondo players

Almost half of the participants have suffered from a recurrence of musculoskeletal injuries. The methods the participants used to manage the injuries were being absent from one day to 2 weeks

(77.3%) and sought Traditional Chinese Medicine (24.7%), though 36.7% took no treatment while for medication, 25.3% used relaxants and 38.3% took no medication as seen in Table 7.

Table 7: The methods to manage the consequences of the injury (n=490)

Methods	Frequency n	Percentage (%)
Recurrence of injury		
Yes	139	46.3
No	161	53.7
Absent due to injury		
0-2 week	232	77.3
3-4week	25	8.3
1-3months	20	6.7
3-6 months	13	4.3
6-12months	3	1
>12 months	7	2.3
Medicine		
Pain killer	60	20
Relaxant	76	25.3
Other	49	16.3
No	115	38.3
Treatment		
Physiotherapy	50	16.7
TCM	74	24.7
Medical doctor	41	13.7
Other	25	8.3
No treatment	110	36.7

DISCUSSION

The purpose of the study was to explore the prevalence and types of musculoskeletal injuries among taekwondo players in Malaysia in addition to

determining the associated factors for these injuries. A total of 490 Taekwondo practitioners were recruited for this study. The 490 Taekwondo players were practising in 75 Taekwondo clubs at various states in Malaysia. The majority of the

respondents suffered from musculoskeletal injuries due to practising Taekwondo and most of them have reported multiple musculoskeletal injuries. A similar study was recently conducted and reported the prevalence of musculoskeletal injury among young Taekwondo athletes was 48%^{6,9}.

The most common type of musculoskeletal injuries among Taekwondo athletes was contusion followed by sprain as the chances of collision during combat is very high in taekwondo. These results are similar to a study conducted a few years ago that concluded contusion as the most common episode of injury¹⁰. Another study reported contusion and sprain as the most prevalent type of injuries among taekwondo players¹¹. The most common sprain was an ankle sprain among all locations of the sprain. The factor behind is footwork that plays an important role in Taekwondo. Therefore, it is recommended that players practice more on footwork following the right technique of practicing to cope in the tournaments since Taekwondo is a quick and tough sport. Other studies have concluded similar findings that lower extremities are the most frequently injured locations^{11,12}. This is not surprising due to the use of the lower limb as the primary striking weapon in Taekwondo.

This study depicted that number of injuries were higher during training as compared to the competition. The reason for this result could be explained by the fact that majority of the respondents were amateur players who seldom participated in a tournament as compared to semi-professional or professional players. Another reason could be due to these player spent more time in training than the competition⁴. These findings provide a rationale for the trainers and coaches to observe the players and interfere to prevent musculoskeletal injuries during the training sessions.

Mechanism of injury is one of the interesting parts in this study since every sports practice different skills, thus the mechanism of injury will be different. As seen in Figure 1, the kicking (defensive and offensive) contributed more to the injuries as compared to punching as Taekwondo emphasizes more on kicks and legs, unlike Karate that emphasizes on upper extremities. Another researcher¹³ has described the different kicking techniques depicting the dominance of kicking as compared to punching in taekwondo where he described the types of kicks; roundhouse kick, axe kick, back kick, swing kick and tornado kick while for the hand techniques, only punches are used. Usually, high force exerted on lower extremities while performing the kicks especially the tornado kick (360 turning kick) lead to a high chance of injury during the demonstration. The most

dangerous type of injury reported was the head injury¹⁴.

Table 1 shows the majority of the respondents practising Taekwondo are age 15-19 and 20-24 and the least were between age 35-39. As mentioned in Table 5, the highest rate of injury was within the age group 35-39, followed by age group > 40, 25-29 and age group 15-19 and the numbers were very small in these age groups of 35-39 and > 40 as compared to other age groups. However, the tendency to sustain an injury was higher as compared to younger players⁴. Most of the Taekwondo practitioners responded to this survey were males and were liable to injury (Table 5) compared to female. Greater rates of injury among male Taekwondo players due to increased force generation and aggression^{4,15}.

There was almost equivalent number of the color belt and black belt players recruited to this study (Table 1). Black belt Taekwondo practitioners reported a significantly higher rate of injuries (Table 5) and significantly more multiple injuries as compared to the color belt (Table 6). A Taekwondo practitioner requires two to three years to become 1st Poom or 1st Dan black belt holder. Therefore, a black belt holder normally spends more years training in Taekwondo as compared to colour belt holder and more involvement in the tournaments, explaining the above findings (Kazemi 2011) though . black belt practitioners are awareness of precautions and correct methods to tackle such injuries^{16,17}.

The rate of injury among Semi-professional Taekwondo practitioners was higher (statistically significantly) as compared to amateur players and professional players (Table 5). It can be explained that amateur players suffered from an injury due to lack of defensive skill and lack of control whereas semi-professional and professional players sustained an injury due to their attempts to apply the fancy and difficult skill or the fundamental skill with extra speed and power in the ring during tournament and training¹².

There are two types of players in Taekwondo, sparring and Poomsae. Sparring is a combat game while Poomsae is more likely a demonstration-style in Taekwondo. Poomsae players focus more on the pose, flexibility, balance, and muscle conditioning while sparring players focus on agility, aggressiveness, fitness, muscle conditioning and also flexibility as the pointer of a head score is higher than a trunk score based on the rules of Taekwondo sparring. There were more sparring players recruited to this study than poomsae players. As shown in Table 5&6, sparring players got an increased rate of injury and a significantly higher

rate of multiple injuries due to there is a collision between players⁶. Most of the Taekwondo practitioners (Table 1) in this study practised 1-2 days a week (58%), one session per day (68.6%) and 1-2 hours per session (66.7%). Respondents who practised more days per week (3-5) showed the highest rate of injury and almost half of them suffered from multiple injuries. This can be explained by the fact that practitioners can master the skills better if they train more, resulting in more injuries. It has been reported that Taekwondo members who trained three times per day had an increased rate of injury due to fatigue. Accumulation of fatigue can result in overtraining, which has a significant negative impact on performance. When athletes do not receive adequate time to recover between training and competition, fatigue will accumulate, compromise key aspects of performance and result in an increased risk of injury and illness to the athlete⁷.

Training habit has an impact on the rate of sports injuries among Taekwondo players. Table 3 shows most of the respondents practice warming up and stretching always but cooling down exercise sometimes only. Plausibly some of the athletes overlooked the importance of cooling down exercise. Warm-up exercise prepares the body for exercises by gradually increasing the heart rate and circulation, loosening the joints and increasing the blood flow to the muscles while doing cooling down exercise after training will optimize the process of recovery and recover heart rate and blood pressure from exercise state to resting state¹⁸⁻²². After an injury, depending on severity, the athlete may have to rest before they return to their training. However, most of the athletes being very keen on sports, return to their training during the recovery stage. This may lead to the recurrence of injuries. Among 300 injured respondents, 46.6% reported recurrence of injury. Thus, the method to manage the injuries playing important rule to prevent the recurrence of injuries. The most popular medicine/treatment taken by Taekwondo athletes in Malaysia were muscle relaxant, Chinese herbal treatment, and pain killers.

The limitations of study a cross-sectional design does not allow cause effect relationships. Other limitations being, voluntary sampling methods, a few Taekwondo clubs hadn't provided the consent to participate in this study, therefore, a sample from a few states in Malaysia are missing. As well, Biomechanics of the kicks and the severity of injuries were not assessed in this study and the magnitude of exposure to Musculoskeletal injuries were was not calculated, which the authors recommend to include in future studies. The strength of the study, the response rate was very high, a few articles were published to cover the

injuries among Taekwondo players in Malaysia, the results of this study is generalized to all Malaysia as the participants form most of the Malaysians states were participated.

CONCLUSION

The Taekwondo players are highly susceptible to different types of musculoskeletal injuries most commonly are contusions, sprains and even fractures. Sometimes, these injuries are very dangerous as head injuries when they target the opponents' head during practicing or competitions seeking for higher points. The most common sites of injuries are ankle, knee, leg, and forearm. The color belt (not black) and the least experience players are the risk factors of injuries. Therefore, it's crucial to protect the Taekwondo players, particularly the new players with no experience, from Musculoskeletal injuries by enhancing the awareness between the players and their coaches regarding these injuries to be more careful and cautious during training and competitions.

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