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Examining Lower Limb Injuries among Male Amateur Soccer Player

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Abstract

Amateur players far outnumbered professional athletes, but they are often under shadowed in literatures. Unlike professional athletes, amateur players may not possess the resources, knowledge or guidance in treating sports injuries. Soccer is one of the popular sports with fewer literatures addressing amateur players. Quantitative method was used for data collection and analysis. The practical contribution of this study lies in terms of the exploring of risks factors leading to lower limb injuries, most common type and area of injuries faced by amateur soccer players in contrast with professional players. Preventive measures were also discussed. The implications of these findings are valuable to coaches, physical therapists and governments for understanding amateur players and arouse public awareness on health and safety.

Keywords: Athletes; Sports injuries; Lower limb; Injuries

Introduction

Soccer is a popular sport; there are 240 million soccer players in the world. It is also one of the most popular sports among Hong Kong male citizens [1]. There are 145,780 unregistered soccer players and 4,176 registered soccer players in Hong Kong [2].

Many studies found that soccer has a high injury rate; it was reported to have the highest injury rate amongst all sports in Hong Kong [3]. Most of the injuries involved lower limbs [4-6]. Those injuries were mainly caused by tackling, running, being tackled, and shooting, twisting, turning, jumping and landing. Lack of training, inadequate rehabilitation; joint instability and muscle tightness contribute to most injuries in soccer, and the occurrence of injury for outdoor soccer was almost 2 times higher than that of indoor soccer [7,8].

Unlike professional players, amateur athletes in Hong Kong seldom play on grass pitches, and competitions are mainly held on the 180 outdoor 7-a-sidehard surfaced soccer pitches provided by the Leisure and Culture Services Department. Besides, amateur athletes tended to seek self-treatment rather than approaching a doctor when they got injured [3], it is believed that most of the amateur soccer players do not know how to prevent and deal with the injuries since they do not have designated physical therapist.

To reduce sports injury and better educate the public, understanding the risk factors is essential for prevention. There is lack of literature focus on amateurs; the current study is to examine the factors that lead lower limb injury and the most common types of injuries among amateur soccer players, which consists of a larger population than professional players. The results will also be compared with previous studies that focused mainly on professional players, preventive measures targeting the most common risks factors and injuries areas will then be discussed.

Literature Review

Lower limb injuries

Radelet et al. [9] defined injury as whenever a player needed any type of first aid during the event. Fuller et al. [10] refers injury as any physical complaint of a player due to soccer match or training, irrespective of the need for medical attention or time loss from football activities. An injury that results in a player receiving medical attention is referred to a 'medical attention' injury, and an injury that results in a player being unable to take part in future football training or match play as a 'time loss' injury [7-12].

Cluett [13] stated that lower limb refers to 'The part of body from the hip to toes' which includes hip, groin, thigh, knee, calf, ankle and foot [12]. Lower limb injuries are common in sports, Dick et al. [14] suggested that ankle, and knee and lower leg were the most common injury area in soccer, field hockey, basketball, and lacrosse athletes. Chan et al. [15] also explained that lower limb injuries are easier to be found in weight-bearing sports such as soccer, basketball and distance running, etc. It is because those sports required a lot of footwork such as running, turning and jumping.

Lower limb injuries in soccer

The majority of soccer injuries are acute injuries which caused by trauma [11]. There are a lot of studies found that soccer has a high injury rate and most of the injuries in soccer involve lower limbs [3,5,6]. Elias [4] suggested ankle sprains were the most frequent injury. Chan et al. [15] indicated that lower limb injuries made up 83.07% of all injuries in Hong Kong, knee and ankle were the most common areas.

Injury types can be divided into sprain, strain, contusion, tendinitis and fracture. Wong and Hong [12] concluded that sprains, strains, contusion and tendinitis were the commonest injury types in soccer. Junge et al. [11] indicated that most of the soccer injuries occurred during matches. Keller et al. [7] shown further information that ligament sprains are one of the commonest injury types in any age or intensity of competition. Besides, muscles strains were only popular

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in professional and senior players and not common in youth players. Alternatively, contusion was more common in youth players than in professional and senior players.

Amateur soccer player

Federation Internationale de Football Association (FIFA) [16] explained that 'Amateurs are players who play without receiving any remuneration'. Carter et al. [17] stated that 'they engage in soccer for pleasure rather than for financial benefit or professional reasons.'

Materials and Method

Quantitative method was used to conduct this research. Questionnaire was selected for collecting data from the male amateur soccer players in Hong Kong. It is a reliable and valid method that obtains the data directly from the respondents. Apart from that, using questionnaire can collect a large number of data in short period and increase the representation of this research [18]. Besides, it is a more scientific and objective than other research method when the data has been quantified [19].

A questionnaire was constructed based on the objectives of the study. It is divided into 2 parts and there are 23 items in total. There are 7 items in Part A which collect the demographic information of the respondents such as age, weight, height, the information can also act as a tool for screening purposes. There are 16 items in Part B measuring the practices when the respondents play soccer and their injury experiences. For example, respondents were asked the duration of warm up, frequency of playing soccer and years of experience in playing soccer. The list of items were reduced to avoid redundancy after the pilot study, the questionnaire was also translated into Cantonese to prevent language barrier.

According to The Chinese University of Hong Kong [1], people who are 20-29 years old love to play sports in the evening and people who are 40 years old or above love to play sports in the morning. Respondents were recruited in three rounds from 3 7-a-side hard-surfaced soccer pitches in Hong Kong. The first round was on 11th-13th March 2016 at Fa Hui Park. The second round was on 18th-20th March 2016 at Kwai Chung Football Field. The third round was on 25th-27th March 2016 at Victoria Park. Survey was conducted from 9:00-10:00 and 17:00-19:00.

Male soccer players, aged 18 or above, reside in Hong Kong, playing at amateur or recreational level are eligible for inclusion. They generally had 1 year or more experiences in playing soccer, and had playing at least 1 practice session every month. A total of 150 subjects were successfully recruited for this study.

The statistical procedures were performed with SPSS (Version 21). Pearson Correlation and Chi-Square test were used for analyzing the data. The independent variables of this research are those factors that associated with lower limb injury prevalence of HK male amateur soccer player. The dependent variables are the injury prevalence of those factors.

Results

There are 150 subjects in total and all the subjects are male (weight 66.4 ± 6.5 kg, height 174.5 ± 4.4 cm). There are 88 subjects aged 18-29 year old, 38 subjects aged 30-54 year old and 24 subjects aged 55-64 year old. 4 subjects have played soccer for 1-2 years, 21 subjects have played soccer for 3-5 years, 29 subjects have played soccer for 6-9 years and 96 subjects have played soccer for 10 years or above.

The correlation between lower limb injury and other variables are shown in Table 1.

Referring to Table 1, there are positive correlation between lower limb injury and time of warm up (r=0.398) since the p-value=0.00<0.01 (2-tailed). It means that player is when the time of warm up increases, the tendency to suffer lower limb injury decreases.

The result of Chi-square test between lower limb injury and other variables are shown in Table 2.

Referring to Table 2, those variables have no relation with lower limb injury since all the p-values>0.05.

The lower limb injury rate and common lower limb injuries in soccer are shown in Tables 3 and 4.

Referring to Tables 3 and 4, there are 76.7% (115 subjects) of the

	Not having lower limb injury Pearson Correlation	p-value
Having Warm up	-0.32	0.696
Time of Warm up	0.398**	0.000
Frequency of Playing Soccer (1 month)	0.12	0.144
Having Play Other Sport	0.88	0.286
Having worn Shin guards	0.052	0.574
Still Play Soccer when Exhausted	0.73	0.374
Age	-0.064	0.434
Income	0.048	0.564
Experience in player soccer	-0.107	0.192

**Correlation is significant at the 0.01 level (2-tailed)

Table 1: Correlation between lower limb injury and other variables (N=115).

	Chi-square Value	p-value
Education Attainment	0.56	0.456
Occupation	0.66	0.882
Type of Warm up	3.245	0.197
Type of Game	0.327	0.849
Weather	1.898	0.387
Type of Pitch	0.671	0.715

Table 2: Results of Chi-square test between lower limb injury and other variables (N=115).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Yes**	115	76.7	76.7	76.7
	No	35	23.3	23.3	100.0
	Total	150	100.0	100.0	

Table 3: Lower limb injury rate in soccer (N=150).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Ankle sprain**	58	38.7	49.6	49.6
	Thigh muscle strain	27	18.0	23.1	72.6
	ACL Rupture	5	3.3	4.3	76.9
	Calf strain	7	4.7	6.0	82.9
	Displaced meniscus	2	1.3	1.7	84.6
	Hamstring strain	18	12.0	15.4	100.0
	Total	117	78.0	100.0	
Missing	**System**	33	22.0		
Total		150	100.0		

Table 4: Common lower limb injuries in soccer (N=150).

respondents reported that they have suffered from lower limb injury in 2015. 58 of them have suffered from ankle sprain, 27 subjects suffered from thigh muscle strain, 18 subjects suffered from hamstring strain, 7 subjects suffered from calf strain, 5 subjects suffered from ACL rupture and 2 subjects suffered from displaced meniscus.

Discussion

Determinants of physical activity [20-22] and sport participation [23-27] have been extensively examined as it can influence both psychological [28,29] and physical well-being [30-32]. In particular, sport participation has been growing in recent years due to increased health awareness of people. Consequently, prevention of sport injuries has been attracting attention in the community.

Time of warm up was the only factor found in this study that is associated with lower limb injuries among male amateur soccer player in HK. There was positive correlation between lower limb injury and time of warm up. It means that player is less likely to suffer lower limb injury when they have a longer duration for warm up.

The results give new insights to Keller et al.'s [7] findings, just like professional players, warm up could reduce the risk of suffering lower limb injury among amateur players, since it can improve the flexibility of the players. Player who has poor flexibility would easily cause muscle strain and tendinitis. Thus, having a proper warm up in appropriate length of time could reduce the rate of lower limb injury.

Besides, the result of the study also supported Keller et al. [7] that soccer injuries are equally distributed between practice and match situation that the type of game would not affect the injury rate, both practice and match could have the probability to cause injury. It might be because soccer players in the same level are facing similar aggression and pressure in match or training. However, the severity of the injuries between amateur and professional players might be different.

The lower limb injury rate for soccer players in this study was 76.7% and the most common lower limb injury was ankle sprain (49.6%), followed by thigh muscle strain (23.1%), hamstring strain, which has similar ranking as National Collegiate Athletic Association's findings in 1993. But the result contradicts with Chan et al [3], who suggested that the most common injured area was knee (50.47%) followed, by ankle. The possible reason of having different result is that the subjects were recruiting from different places. Subjects were recruited from football pitches in this study and subjects were recruited from the Sports Injury Clinic in the study conducted by Chan et al [3]. Recruiting subjects from the Sports Injury Clinic could have higher possibility of excluding players who suffered injury such as the grade 1 ankle sprain. Also, the amateur players, who would choose to attend bone-setter rather than doctor if they suffered minor injury [15].

In contrast to Keller et al. [7], the result in this study could not find significant correlation between weather or pitch type and lower limb injuries. It might be because most of the amateur soccer players in Hong Kong are playing on hard-surfaced pitch but not turf-surfaced pitch. Besides, most of the amateur soccer players can avoid playing soccer during bad weather.

To prevent injury in playing soccer Keller et al. [7] suggested warm-up and cool-down should be implemented before and after the game. Proprioceptive neuromuscular facilitation (PNF) stretching should be introduced to the warm-up and cool-down session, which is more effective to prevent injury than static stretching. It was found that ankle sprains occur more often in players who suffered ankle injury before, therefore, for these players, it was highly recommended to tape their ankles before playing soccer. Arnason et al. [33] found that inadequate muscle strength, imbalance in the hamstring to quadriceps strength ratio and side-to-side imbalances could cause hamstring strains. Hence, the eccentric strength training can improve the strength of hamstring for preventing injury. Alentorn-Geli et al. [34] suggested modifying the landing technique of the player could help to prevent ACL injuries. Training should include drills that familiarize players with making unanticipated changes of direction.

This study has several limitations. The frequency and types of injuries were assessed using questionnaire alone in which the validity and reliability are not confirmed since this is a pilot study. The body of evidence suggests that objective measures are important in a study design [20,35-41]. Besides, the data collected was limited and may not be able to generalize amateur soccer players in other places with other local habits.

Conclusion

The findings of the study could contribute to the society by arousing public's awareness and identifying possibly lower limb injuries of amateur soccer players; effective preventive measures targeting specific injuries are also examined as apart from understanding the injury mechanism, understanding what factors associated with lower limb injuries is also important for preventing lower limb injuries [42].

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