ORIGINAL ARTICLE

Awareness and Practices of Injury Prevention Strategies Among Ultimate Frisbee Players in Selangor, Malaysia

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ABSTRACT

Introduction: Among all club sports, Ultimate frisbee has one of the highest numbers of reported injuries. To reduce the overall burden of injury, developing and implementing effective, sport-specific injury prevention strategies should be a top priority. This study aimed to investigate the awareness on injury prevention strategies as well as commonly used injury prevention strategies among Ultimate frisbee players in Selangor, Malaysia. **Methods:** A cross-sectional study was conducted using an online self-administered questionnaire. Participants were recruited through various Ultimate frisbee clubs from social media via purposive sampling. **Results:** 211 eligible responses were obtained and over 72% of the players consider using proper technique in the game is important for preventing injuries. Over 50% of the participants were aware of factors such as proper technique (72.5%), stretching during warm-up (65.4%), warm-up (62.6%) and strength training as extremely important. Majority of participants practices injury prevention strategies such as stretching (82.9%), pre match general warm up (79.6%), fluid consumption following match (75.8%) and training session (73.9%). **Conclusion:** Hence, education for Ultimate frisbee players is recommended to promote the importance and benefits of different sports related injury prevention strategies to reduce the likelihood of injuries thus, enhancing sports performance.

Keywords: Ultimate frisbee, injuries, awareness, prevention

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INTRODUCTION

The sport of Ultimate frisbee is gaining popularity, yet little is known about it in medical literature (Krustrup & Mohr 2015). Ultimate frisbee is a minimal contact, fast paced, mixed team sport played with a flying disc. Ultimate frisbee includes aspects of soccer, football, and basketball, with players having to run, cut, guard, jump, throw, catch, and sometimes layout (dive laterally with an outstretched arm) for the disc. It is played on a field that is 100 meters by 37 meters big, where two teams comprised of seven players compete with the intention of scoring goals, which is accomplished when a player catches the disc in the end zone, which is 18 meters in depth. Only by being tossed through the air is the disc advanced as players are not allowed to run with it such as in netball (Reynolds & Halsmer 2006).

Although frisbee player is still a growing sport in Malaysia, its popularity has been increasing steadily over the years (Jo-Lyn, 2017). In order to advance the disc and score a goal, players have to run, cut, guard, jump, throw, catch, and dive in a fully outstretched position. Some possible risk factors for injury in frisbee players include constant cutting, physical contact, and jumping among other players. Risk for overuse injury is high as players can run up and down the field without any restrictions to play. Incidental contact and various impact forces predisposes the players to vast amounts of biomechanical stresses and therefore the players are at a considerable risk for injury (Akinbola et al., 2015).

Previous study by Akinbola et al. (2015), showed that the majority of injuries in Ultimate frisbee were to the lower extremities. Several studies have shown that techniques such as bracing, taping and neuromuscular exercises were beneficial in preventing injuries inteam sports. However, regardless of the evidence showing these benefits, there is lack of evidence pointing towards whether these techniques are regularly or even used at all among Ultimate frisbee players. Players with a high compliance rate towards preventive measures had a significantly lower injury risk than players with lower compliance rate (Soligard et al. 2010). Therefore, it is important to identify the practices

of injury prevention techniques such as protective equipment, nutrition intake, sleep, stretching during warm-up and cool-down, flexibility training used in Ultimate frisbee players.

As a result, future injury prevention plans should concentrate more on improving players' compliance with evidence-based injury prevention strategies. To the author's best knowledge, there is no previous study reported on the Ultimate frisbee player's strategies in injury prevention. Thus, through this study we are able to identify the awareness and practices of injury prevention in Ultimate frisbee players in Selangor, Malaysia and understand the need to increase both awareness and promote practice of injury prevention strategies among Ultimate frisbee players.

METHODS

Study design and duration

This is a quantitative cross-sectional study conducted from January 2021 till April 2021, for three months period.

Sampling design and strategy

The main sampling technique used is purposive sampling, as the questionnaire was sent via direct messages to the social media pages (Instagram and Facebook) of several Ultimate clubs based in Selangor, namely City Gliders, Gl Ultimate, Impact Ultimate, Sate Ultimate, Serdang Stingers, Silverback Ultimate, Tintreach Ultimate, Badgers Ultimate, Monash Ultimate, Taylors Ultimate, MCKL Ultimate, Sunway Ultimate, and Ultimate Malaysia.

Sample size calculation

The required number of participants based on Cochran's formula for smaller population was 322. Population size of 2000 was based of the estimated amount of Ultimate frisbee players in Malaysia (Jo-Lyn, 2017). The response rate was 72.36%, however, 22 of them were excluded as they did not meet the inclusion criteria.

Inclusion and exclusion criteria

The inclusion criteria of the players include (1) Ultimate frisbee players from Selangor state, (2) aged between 18 to 45 years, (3) played at least one tournament at any level. Participants were excluded (1) if they do not understand English and (2) participated in other competitive sports.

Online self-administered questionnaire

This study used online self-administered questionnaire adapted from previous study by Hawkins and Fuller (1998) which requires only 10 to 15 minutes to complete.

Questionnaire subsection

Questionnaire consists of four sections namely: information sheet and informed consent, demographics information (three items), awareness of injury prevention (11 items) strategies, and practices of injury prevention strategies (13 items).

Scoring responses

Awareness of injury prevention were rated based on 5-point Likert scale ranging from extremely important to not important while 11 items on practices of injury prevention strategies were rated based on 5-point Likert scale ranging from always to never. Only two items were given the multiple-choice options.

Scoring interpretation

Interpretation is based on the percentage of responses on each item in the Likert scale. Higher percentage indicates higher awareness and practices of injury prevention strategies similar to the study by Bakhtiar et al. (2021).

Ethical clearance

Participants were informed about the study purpose, researcher's contact information, procedure and the anonymity of responses. Informed consent was obtained and participants was informed that they had the freedom to withdraw from the study at any point in time. The questionnaire was validated by two lecturers from Faculty of Health Sciences from a private university with sound research background. The ethical clearance was obtained from Research and Ethics Committee of INTI International University with ethical registration number, INTI- IU/FHLS-RC/BPHTI/7NY12020/018.

Data analysis

Data were analysed using the SPSS version 20.0. Descriptive statistics were used to analyse the awareness and practice of injury prevention strategies among Ultimate frisbee player and results were reported as frequency and percentage.

RESULTS

Table I: Sociodemographic and training characteristics of the Ultimate frisbee player

	Frequency (n = 211)	Percentage (%)
Age (years)		
18 – 30	205	97.2
31 – 43	6	2.8
Injury players		
Yes	207	98.1
No	4	1.9
Training characteristics		**Mean ± SD**
Number of tournaments		11 ± 6
Number of injuries		5 ± 3
Flexibility training per week		3.4 ± 2.3
Strength training per week		3.5 ± 2.3
Technique training per week		4 ± 2
Sleep (hours) per night		6.6 ± 1.1

A total of 233 participants filled out the questionnaire but 22 of them were excluded as they were below 18 years old or played competitive sports. Table I represents the sociodemographic information of the participants. From 211 eligible participants, majority (97.2%) are aged between 18-30 years with 98.1% of participants presented with history of injury during their training and competition. Table II reports the level of awareness of participants on injury prevention strategies. More than 50% of the participants reports factors such as proper technique (72.5%), stretching during warm-up (65.4%), warm-up (62.6%) and strength training to be extremely important. However, few participants considered usage of protective equipment (28%), nutrition intake (12.3%), sleep (4.3%), stretching during warm-up and cool-down (3.8%), flexibility training (3.3%) to be not important.

Table II: Awareness of injury prevention strategies among Ultimate frisbee player

	Awareness	Frequency (n)	Percentage (%)
Protective equipment	Extremely important	27	12.8
	Very important	16	7.6
	Important	5	2.4
	Somewhat important	104	49.3
	Not important	59	28.0
Nutrition intake	Extremely important	48	22.7
	Very important	52	24.6
	Important	25	11.8
	Somewhat important	60	28.4
	Not important	26	12.3
Hydration	Extremely important	117	55.5
	Very important	52	24.6
	Important	17	8.1
	Somewhat important	25	11.8
	Not important	0	0.0
Warm-up	Extremely important	132	62.6
	Very important	36	17.1
	Important	43	20.4
	Somewhat important	0	0.0
	Not important	0	0.0
Cool-down	Extremely important	75	35.5
	Very important	60	28.4
	Important	51	24.2
	Somewhat important	25	11.8
	Not important	0	0.0
Stretching during warm-up	Extremely important	138	65.4
	Very important	34	16.1
	Important	23	10.9
	Somewhat important	8	3.8
	Not important	8	3.8
Stretching during cool-down	Extremely important	85	40.3
	Very important	53	25.1
	Important	51	24.2
	Somewhat important	14	6.6
	Not important	8	3.8
Flexibility training	Extremely important	75	35.5
	Very important	52	24.6
	Important	33	15.6
	Somewhat important	44	20.9
	Not important	7	3.3
Strength training	Extremely important	107	50.7
	Very important	60	28.4
	Important	36	17.1
	Somewhat important	8	3.8
	Not important	0	0.0
Proper training technique	Extremely important	153	72.5
	Very important	33	15.6
	Important	16	7.6
	Somewhat important	9	4.3
	Not important	0	0.0
Sleep duration	Extremely important	77	36.5
	Very important	75	35.5
	Important	34	16.1
	Somewhat important	16	7.6
	Not important	9	4.3

Table III: Practices of injury prevention strategies among Ultimate frisbee player

	Practice	Frequency (n)	Percentage (%)
Wear protective equipment during training	Always (100% of the time)	8	3.8
	Very often (75% of the time)	11	5.2
	Often (50% of the time)	9	4.3
	Sometimes (25% of the time)	76	36.0
	Never (0% of the time)	107	50.7
Wear protective equipment during matches	Always (100% of the time)	8	3.8
	Very often (75% of the time)	19	9.0
	Often (50% of the time)	17	8.1
	Sometimes (25% of the time)	88	41.7
	Never (0% of the time)	79	37.4
Consume pre-training carbohydrates	Always (100% of the time)	69	32.1
	Very often (75% of the time)	50	23.7
	Often (50% of the time)	49	23.2
	Sometimes (25% of the time)	25	11.8
	Never (0% of the time)	18	8.5
Consume post-training carbohydrates	Always (100% of the time)	95	45.0
	Very often (75% of the time)	68	32.2
	Often (50% of the time)	25	11.8
	Sometimes (25% of the time)	9	4.3
	Never (0% of the time)	14	6.6
Pre-training fluids consumption	Always (100% of the time)	120	56.9
	Very often (75% of the time)	35	16.6
	Often (50% of the time)	38	18.0
	Sometimes (25% of the time)	8	3.8
	Never (0% of the time)	10	4.7
Post-training fluids consumption	Always (100% of the time)	156	73.9
	Very often (75% of the time)	24	11.4
	Often (50% of the time)	15	7.1
	Sometimes (25% of the time)	8	3.8
	Never (0% of the time)	8	3.8
Perform warm-up before training	Always (100% of the time)	133	63.0
	Very often (75% of the time)	69	32.7
	Often (50% of the time)	9	4.3
	Sometimes (25% of the time)	0	0.0
	Never (0% of the time)	0	0.0
Perform cool-down after training	Always (100% of the time)	63	29.9
	Very often (75% of the time)	33	15.6
	Often (50% of the time)	34	16.1
	Sometimes (25% of the time)	81	38.4
	Never (0% of the time)	0	0.0
Perform cool-down after matches	Always (100% of the time)	98	46.4
	Very often (75% of the time)	48	22.7
	Often (50% of the time)	48	22.7
	Sometimes (25% of the time)	17	8.1
	Never (0% of the time)	0	0.0
Stretch as warm-up pre-training	Always (100% of the time)	145	68.7
	Very often (75% of the time)	25	11.8
	Often (50% of the time)	32	15.2
	Sometimes (25% of the time)	0	0
	Never (0% of the time)	9	4.3
Stretch as warm-up pre-match	Always (100% of the time)	175	82.9
	Very often (75% of the time)	15	7.1
	Often (50% of the time)	11	5.2
	Sometimes (25% of the time)	0	0.0
	Never (0% of the time)	10	4.7
Stretch as cool-down post-training	Always (100% of the time)	54	25.6
	Very often (75% of the time)	39	18.5
	Often (50% of the time)	43	20.4
	Sometimes (25% of the time)	64	30.3
	Never (0% of the time)	11	5.2
Stretch as cool-down post-match	Always (100% of the time)	116	55.0
	Very often (75% of the time)	26	12.3
	Often (50% of the time)	31	14.7
	Sometimes (25% of the time)	27	12.8
	Never (0% of the time)	11	5.2

Also, over 50% of participants reported other than extremely important or not important for nutrition intake (65.8%), flexibility (61.1%), protective equipment, sleeping (59.3%), followed by stretching during cool-down (55.9%).

Based on Table III, participants practice stretching as warm up (82.9%), general warm up (79.6%) before the match. Similarly, the percentage of participants consuming fluid after the match and training session are (75.8%) and (73.9%) respectively. Our study results also show that proportion of participants were not using protective equipment during training (50.7%) and match (37.4%) respectively.

DISCUSSION

The objective of current study is to determine the awareness and practices of injury prevention strategies among Ultimate frisbee players in Malaysia. Current study showed 207 out of 211 Ultimate athletes experienced injury from training or competitive matches at least once over their lifetime, with a lifetime prevalence of injury as high as 98.1%. There is similar to a systematic review by Pulido and Lystad (2020) which reported the lifetime prevalence of injury among this population to be 100%. Ultimate athletes experience biomechanical strain and highly exposed to risk of injury due to unintentional contact and diverse impact forces (Akinbola et al. 2015).

Injury prevention strategies in current study is classified into protective equipment, nutrition, hydration, warm up, cool down, stretching during warm up and cool down, flexibility and strength training, proper technique, and sleep. Most respondents showed high awareness of proper technique (72.5%) as one of the injury prevention strategy similar to a study by Rahbek and Nielsen (2016) which concludes that players may predispose themselves to injury without proper technical guidance.

Stretching during warm up as a form of flexibility training is also regarded as key injury prevention strategy with almost 66% respondent classifying it as extremely important even though approximately 4% of respondents classified it as not important. This is similar to the previous studies (Patil et al., 2017) that stretching can effectively reduce injury risks among athletes. Stretching programs can alter the viscosity of the tendon and make it more compliant, which is vital for injury prevention when a sport requires high-intensity stretch-shortening cycles (Witvrouw et al. 2004).

No studies however had evaluated the awareness of warm up as a sports related injury prevention strategy. Practice of stretching as warm up (82.9%) and general warm up (79.6%) before the match is also high in current study. A study by Nair et al. (2018) on soccer players showed practices of warm-up prior to training, warm-up prior to matches, cool-down after training sand cool-down after matches were 85%, 89%, 79% and 51% respectively. This demonstrates that warm-up and cool-down are less common among Ultimate players in current studies compared to soccer players.

Nair and co researchers (2018) also concluded football athletes manifested lack of awareness in the importance of resistance training in preventing sports-related harm to the athletes as only 51% regarded strength training as an essential component in sports-related injury prevention. General strength training may be beneficial for increasing body mass, reducing the risk of soft-tissue injuries, and strengthening core stability (Young, 2006). Frisbee players requires strength training as an essential tournament preparation. This game involves movements like jumping, running, cutting and pivoting, hence the strength of lower limb muscles is essential to generating power in sprinting and jumping. A recent study by Pang et al. (2021) reported high prevalence of lower limb injuries (61.6%), hence emphasized the importance of strength training. Similarly, current study recorded only 50.7% of respondents acknowledging strength training as an extremely important component for injury prevention among athletes.

Protective equipment is reported as not important by 28% of respondents with only 12.8% reported it as extremely important. The practice of protective equipment is also relatively low as current study reported proportion of respondents not using protective equipment during training (50.7%) and match (37.4%). To the best of our knowledge, no study examined the awareness and practices towards use of protective equipment among Ultimate athletes. Thus, it is suggested wearing protective equipment like ankle brace, knee guard, compression, taping and gloves are important in preventing injuries and the habit of wearing protective equipment has to be strongly recommended.

Current study reported almost 88% of Ultimate players perceived nutrition as an essential component to prevent injuries with practice of carbohydrate consumption pre (32.1%) and post training (45%), pre (33.6%) and post (57.8%) competitive matches as relatively moderate. Carbohydrate intake is almost entirely responsible for muscle glycogen storage. Because the body's ability to store muscle glycogen is limited, and muscle glycogen is the primary source of energy during moderate to high-intensity exercise, the nutritional focus should be on carbohydrate consumption. The pattern of glycogen depletion and replenishment after the match and during recovery was linked to myofibrillar injury healing (Schlabach, 1994). Sharma et al. (2016) reported 74% of female teen football players assumed carbohydrate plays a significant role in sports nutrition. This demonstrates that players are well aware of the importance of nutrition as a strategy for avoiding sports-related issues. It can be summarized that Ultimate athletes are well aware of and practice optimal nutrition intake as a means of avoiding injury.

According to a study conducted by Ashadi et al. (2018), 100% of adolescent soccer participants are aware of the importance of hydration in sports. Similar to current study which reported 100% of Ultimate players deemed proper hydration as a crucial component in preventing injuries. This demonstrates that maintaining sufficient hydration is an extremely effective method for preventing injuries in Ultimate athletes. Hence, current study deduced Ultimate players are very aware of the importance of proper hydration in order to avoid injury. Dehydration leads to heat related injuries hence it can be prevented through pre- and post-match rehydration. Physiologically, it maintains fluid balance which prevents the deterioration of the performance (Shirreffs et al. 2006). Athletes should consume the beverages slowly at least four hours pre training in the estimation of five to seven milliliters per kilogram of body weight (Sawka et al. 2007). Noakes and et al. (2003) in their guidelines emphasized that the optimal rates of fluid consumption during exercise varies on individual and environmental factors, hence it is not advised to provide a blanket recommendation for all athletes during training.

Ultimate athletes slept an average of 6.6 hours per night, according to current study. Another study discovered that elite athletes sleep for an average of 6.55 hours per night (Leeder et al., 2012). This could be related to elite athletes' high training volume, which could negatively impact their sleep quality (Hausswirth et al. 2014). According to the National Sleep Foundation, an adult should sleep for 7-9 hours per night on average (Hirshkowitz et al. 2015). As a result, it is clear that Ultimate athletes do not get enough sleep per night to accomplish maximum recovery and avoid sport injuries.

Small sample size and lower response rate due to online distribution of questionnaire were a few of the limitation of current study. Besides, majority of participants were of younger age group hence it affects the generalizability of the study finding. This could be due to the fact that older age population are less active on social media and less likely to participate in online surveys (Aerny-Perreten et al. 2015). Current study serves as a pilot study for future studies to evaluate the effectiveness of various sports related injury prevention strategies on reducing injuries sustained in Ultimate players. Future studies may determine the correlation of the level of awareness and sport related injury prevention strategies, and may also include questionnaire in dual language. This will create the basis for clinical reasoning on the lack of practice on certain injury prevention strategies.

CONCLUSION

Ultimate players in Selangor, Malaysia generally have a moderate to good awareness on the various sports related injury prevention strategies. The practice of these injury prevention strategies is based on good practice according to the current available evidence. Despite the usage of protective equipment and practice of cool-down session are not strongly supported by evidence in reducing sports related injuries, most Ultimate athletes practice them. Benefits of adequate sleep needs to be educated to the athletes as the majority is lacking good appropriate sleep duration. Physiotherapists may provide education for athletes especially Ultimate players and coaches, to promote the importance and benefits of different sports-related injury prevention strategies to reduce the likelihood of injuries, thus enhancing sports performance.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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