



Prevalence of football injuries in Egyptian children and adolescents and its correlation to anthropometric parameters

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Abstract

Purpose the study aims to survey the prevalence and incidence of football injuries at the age group from (10-15) years old to correlate the injuries to anthropometric measurements as body and the height and correlate injuries to the player's position in the field.

Methods 100 players were randomly selected their history of injuries and their positions were recorded and 12 measurements (weight, height, sitting height, lower extremity length, thigh length, arm length, head, waist, upper arm, thigh and calf circumferences and BMI) were calculated.

Results 23% players had been injured for only one injury within the recorded two seasons, 12% players and 5% players had been injured for two times and three times, respectively. with incidence 32% and prevalence 21%. Spearman's rho correlation was tested between the player position and injury both recent and previous. A moderate positive correlation (0.3-0.7) was found between the player position and both total and recent injuries with no significant correlation between the player position and their previous injuries. No significant correlation between the anthropometric measurements and injuries.

Conclusion players at (10-15) years old are highly suspected for injuries especially fractures, most of those injuries are contact injuries which occurs during the match. Anthropometric measurements cannot be used to predict the incidence of injuries. Defenders were the highly suspected for injuries.

Key words: football, childhood, adolescence, injuries, anthropometry

1.Introduction

Football is the most popular sport all over the world for any age especially children and youth as 265 million persons play it. football is characterized by highly intensive movements with short breaks over different periods of times during the matches which put the player in a high risk of injury (1). The injuries considered to be 0.5 to 5.6 injury per 1000 hour matches. Those injuries affect the player performance, which lead to missing several training sessions and

matches. Furthermore, it may affect the process of growing when it occurs at early age especially those which require surgical intervention and long period of rehabilitation (2). Football injuries may be traumatic that occur suddenly which usually seen at the match. On the other hand, it may be overuse injury caused by training or playing for a long period without or with minimal periods of rest. It was suggested that overuse injuries are more likely to be linked with early childhood injuries (1). The most common risk factors of football injuries are A) extrinsic factors that include

lack of protective equipment, rules, and regulation, playing surface character, and pressure from parents and B) Intrinsic factors that may be non-modifiable, such as sex, personality, age, skeletal maturity, or previous injury, or modifiable by prevention like muscle strength, joint stability, social factors, coping strategies, fitness level, coordination, and psychological factors (3,4).

Another common factors that considered to contribute the occurrence of injury is the anthropometric characteristic or the physical status of the player, body mass, height, BMI, and different circumference of the body (5). Furthermore, these characteristics provide some information about the player position for example A) mid-field players tend to be lighter to move through the space more efficiently and cover more distances in running, B) goalkeepers tend to be with long upper extremities and heavier to allow them reaching the ball to high extent, c) Defenders tend to be heavier and taller with less body fat, as their position requires them to be robust and strong in the tackle, and D) attackers, their body is of a different length (5,6).The coach integrates those physical characteristic with the players skills to put the player in the best position(5,6,7).

Studies that are concerned with young age and children injuries and its relation to different anthropometric characteristics are limited in addition to that each study differ in its definition of injury. However, to provide a safe future for the young players there was a necessity to know the incidence and nature of injuries and their relation to anthropometric characteristics to control it. (7)

The current study aims to.

- 1- find the prevalence rate of football injuries within the players from (10-15) years old.
- 2- find the incidence of football injuries within the player from (10-15) years old.
- 3- find a correlation between the player's anthropometric variables and player injuries and their position in the field.

2. Patients and Methods

2.1. This is a cross-sectional study which was conducted in accordance with the guidelines and approved by the local Ethics committee of the Faculty of Physical Therapy, Cairo University, Egypt.

Participants:

Hundred (100) male football players were recruited from two football clubs within Cairo city. Their ages ranged from (10-15) years' old.

Coaches, parents, and the participant's players were informed by the study, its purpose, and procedures. the study started in (1-1-2020) and ended in (10-4-2020)

2.2. Procedures:

2.2.1. Firstly, General information were collected from A) the coaches about the period of season,

number of matches per week, number or training hours per week, periods of rest during season and the type of playing ground.

And from B) the participants about any injury related to football playing that occurred in the current season within the following period (1-8-2019 :31-3-2020) or in the last season within the following period (1-8-2018: 30-4-2019), if there was an injury information's about its site, timing and period of treatment were collected.

2.2.2. Secondly, an anthropometric measurement was taken for all participants for the following parameters:

- 1- body weight
- 2-standing length
- 3-sitting length
- 4-upper arm length
- 5-lower extremity length
- 6-thigh length
- 7-BMI
- 8-head circumference
- 9-waist circumference
- 10-upper arm circumference
- 11-thigh circumference
- 12-calf circumference

Every measure was taken three times and the average was calculated.

1.Body weight was measured by a digital (PROmed) scale the player took off his shoes and stand erect on the scale, his eyes forwards (8)

Selected lengths: these lengths were measured by traditional tape.

2. standing height: the participant stood against a standardized tape fixed on a wall and a horizontal piece placed on the top of participant's head and the measure recorded (9)

3. sitting height: the player sits on a chair with his back erect and his arms asides, measurements were taken by a traditional tape from the lower point of the back to the top of the head (8)

4. arm length: the distance between the end of the spine of the scapula to the posterior aspect of the elbow was measured (10)

5. lower extremity length: the distance from anterior superior iliac spine to the floor during standing with shoes off. (11).

6. thigh length: the participant was asked to sit on chair with knees 90 flexed, the examiner identify the tip of patella on anterior thigh, then asked the participant to stood up and measure the distance up to inguinal creases (10).

The selected circumferences were measured by a traditional tape in the following way:

7. Head circumference: the rounded measure from the frontal bone above eyes brows to the protuberance of the skull was recorded, the tape was moved above and down then the largest rounded measurement was taken

(10).

8. waist circumference: the examiner took a point midway between lower ribs and the hip bone with the participant standing then asked him to take his breath out gently the tape was put around and the measurement recorded (10).

9. upper arm circumference: the round measurement midway between the end of the spine of the scapula and the posterior aspect of the elbow was recorded (10).

10. thigh circumference: measured by a tape not loose nor tight midway between inguinal creases and the patellar tip from standing position (11).

11. calf circumference: the tape was placed around the calf not too tight nor too loose and was moved along the length of the calf to obtain the maximal circumference (12).

Finally, the body mass index (BMI) was calculated $BMI = \text{kg}/\text{m}^2$ where kg is a person's weight in kilograms and m² is their height in meters squared (13)

2.3. Statistical analysis

- Statistical analysis was performed using IBM SPSS statistics version 20 (SPSS Inc., Chicago, IL, USA).

- Quantitative variables will be presented in terms of means, SD

- Significance will be set at 0.05.

3. Results

This study was done on 100 football players within the age of (10-15) years old. The study surveys their injuries related to football playing within two seasons the first from (1-8-2018; 30-4-2019) and injury here considered to be previous injury, the second one from (1-8-2019; 31-3-2020) and the injury here considered to be recent injury, in addition to that the study measured 12 anthropometric parameters and check if there is correlation between the injuries and parameters or not considering the player's position in the ground. The frequency distribution of the players according to their age and time of injuries are illustrated in table 1 and 2.

Table 1: Frequency distribution of players according to their age

	Frequency	Percent
10	8	8%
11	14	14%
12	18	18%
13	21	21%
14	19	19%
15	20	20%
Total	100	100%

23 players had been injured for only one injury within the recorded two seasons. Furthermore, 12 players and

5 players had been injured for two times and three times respectively, within the recorded time. The number of injuries and their percentage were illustrated in table 2

Table 2: number of total injuries (recent & previous) within the players

	Frequency	Percent	
Total injuries	1(one injury)	23	23%
	2(twice injury)	12	12%
	3(triple injury)	5	5%
	Total	40	40%
	0	60	60%
Total	100	100%	

The incidence of recent injury in the reported season was found to be 32% in which 27 players were injured once and five players were injured twice as shown in table 3

Table 3: number and percentage of recent injuries

	Frequency	Percent	
Recent injury	1(one injury)	27	27%
	2(twice injury)	5	5%
	Total	32	32%
0	68	68%	
Total	100.0	100%	

The prevalence of injury in the previous season was found to be 21% in which 17 players was injured once and 4 players were injured twice as shown in table 4.

Table 4: number and percentage of previous injuries

	frequency	Percent
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Pervious injury	1(one injury)	17	17%
	2(twice injury)	4	4%
	Total	21	21%
	0	79	79%
	Total	100	100%

Spearman's rho correlation was tested between the player position and injury both recent and previous as shown in table 5. A moderate positive correlation (0.3-0.7) was found between the player position and both total and recent injuries with no significant correlation between the player position and their previous injuries. No significant correlations were found between BMI and both recent and previous injuries as illustrated in table 6. Moreover, no significant correlations were found between measured anthropometric measures and both recent and previous injuries as shown in table 6.

No significant correlation between the anthropometric measurements and injuries as shown in table 7.

Some players have a recent fracture (humeral head fracture, metatarsal bone fracture and lower forearm fractures), others have a recent strain injury (quadriceps contusion and adductors strain) and another player has a recent sprain injury (lateral ankle ligaments sprain). Table 8 shows 16 players have a recent fracture, 8 players have a recent strain injury, and 3 players have a recent sprain injury.

Table 8: number of recent injuries according to the type of injury

	Frequency	Percent
1 (fractures)	16	16%
2 (strain injury)	8	8%
3 (sprain injury)	8	8%
Total	32	32%
0	68	68%
Total	100	100%

Some players have previous fracture (humeral head fracture, tibial fracture, forearm fracture and tarsal bone fracture), others have previous strain injury

(hamstrings strain and adductor strain), and another has a previous sprain injury (lateral collateral ligaments sprain and knee ligaments sprain).

Table 9 shows 8 players have previous fracture, 6 players have previous strain injury, and 7 players have previous sprain injury.

Table 9: number of previous injuries according to the type of injury

	Frequency	Percent
1(fractures)	8	8%
2(strain injury)	6	6%
3(sprain injury)	7	7%
Total	21	21%
0	79	79%
Total	100	100%

4. Discussion

The study mainly aims to record and survey the number of football sport injuries within the childhood and adolescent period specially from (10-15 years old). The injury was defined in the current study as football-related trauma or overload that led to pain and/or dysfunction that in turn prevent the child or the adolescent from participating in training or matches during at least one week, thus being time-loss injuries (14).

The study surveyed randomly 100 players from two different clubs inside Cairo city. The players were selected by the coaches from different teams. It was intended to recruit a greater number of players, but it was too hard in accordance with quarantine to avoid COVID-19 infection.

Totally from the 100 players 40% were injured, 23% injured only once, 12% developed twice injury and 5% developed a third one. Out of the 40%, (23% were recent injuries and 21% were previous injuries).

The injury types differ among the participants as 16% of the developed recent and 8% of the previous injuries were fractures in the humeral head, forearm, and foot tarsal bone. This type of injury occurred as a contact injury during the match, considering the impulsive behavior of the participant and their willingness to win. The second common injury was muscles strain as 8% of the recent injuries and 6% of the previous injuries were quadriceps contusion.

Table 5 Correlation between the player position and the injuries

		Correlations				
			players position	recent injury	pervious injury	Total injury
Spearman's rho	players position	Correlation Coefficient	1.000	.446*	.166	.398*
		Sig. (2-tailed)	.	.011	.473	.011
		N	100	32	21	40
	recent injury	Correlation Coefficient	.446*	1.000	-.234	.445*
		Sig. (2-tailed)	.011	.	.443	.011
		N	32	32	13	32
	pervious injury	Correlation Coefficient	.166	-.234	1.000	.536*
		Sig. (2-tailed)	.473	.443	.	.012
		N	21	13	21	21
	Total injury	Correlation Coefficient	.398*	.445*	.536*	1.000
		Sig. (2-tailed)	.011	.011	.012	.
		N	40	32	21	40

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6: BMI correlation with the injuries

		Correlations				
			BMI	recent injury	pervious injury	Total injury
Spearman's rho	BMI	Correlation Coefficient	1.000	-.145	-.101	-.106
		Sig. (2-tailed)	.	.428	.665	.514
		N	99	32	21	40
	recent injury	Correlation Coefficient	-.145	1.000	-.234	.445*
		Sig. (2-tailed)	.428	.	.443	.011
		N	32	32	13	32
	pervious injury	Correlation Coefficient	-.101	-.234	1.000	.536*
		Sig. (2-tailed)	.665	.443	.	.012
		N	21	13	21	21
	Total injury	Correlation Coefficient	-.106	.445*	.536*	1.000
		Sig. (2-tailed)	.514	.011	.012	.
		N	40	32	21	40

*. Correlation is significant at the 0.05 level (2-tailed).

Table7: Anthropometric parameters correlation with the injuries

		Correlations	
Spearman's rho	stand height	Correlation Coefficient	-.159
		Sig. (2-tailed)	.327
	sitting height	Correlation Coefficient	-.139
		Sig. (2-tailed)	.393
	right thigh length	Correlation Coefficient	-.142
		Sig. (2-tailed)	.384
	left thigh length	Correlation Coefficient	-.142
		Sig. (2-tailed)	.384
	right arm length	Correlation Coefficient	-.157
		Sig. (2-tailed)	.333
	left arm length	Correlation Coefficient	-.157
		Sig. (2-tailed)	.333
	head circumference	Correlation Coefficient	-.222
		Sig. (2-tailed)	.168
	waist circumference	Correlation Coefficient	-.077
	Sig. (2-tailed)	.635	
right arm circumference	Correlation Coefficient	-.275	
	Sig. (2-tailed)	.086	
left arm circumference	Correlation Coefficient	-.234	
	Sig. (2-tailed)	.146	
right thigh circumference	Correlation Coefficient	-.164	
	Sig. (2-tailed)	.311	
left thigh circumference	Correlation Coefficient	-.157	
	Sig. (2-tailed)	.334	
right calf circumference	Correlation Coefficient	-.077	
	Sig. (2-tailed)	.638	
calf circumference	Correlation Coefficient	-.066	
	Sig. (2-tailed)	.688	
leg length	Correlation Coefficient	-.109	
	Sig. (2-tailed)	.501	
	N		40

which occurred as direct contact injury in the match. Hamstrings and adductors strain sometimes occurred during the match with the over running and others were developed as overstretch excessing during the training sessions.

In the third-place sprain injuries developing as 8% of the recent injuries and 7% of the pervious injuries were in form of ankle ligament sprain that developed during running and fighting on the ball.

Possible explanation for the frequent fractures at the early age may be skeletal immaturity and incomplete coordination (15,16)

The study results hard to be compared with other studies as this type of studies varied according to several factors as definition of injury, the period of the study, the nation of the players and the different physical shape, but it similar to number of studies which concluded that fracture injuries are more frequent in this age (15,16,17) also some studies agreed that most of injuries in this age are contact ,collision injuries which occurred in the match not in the training times (18,19,20,21,22)

From the screening for five different player's positions in this study (defenders, attackers,

goalkeepers, mid field, and the strikers).it was observed more incidence of injury within the defenders followed by attackers and goalkeepers and the least incidence within the stickers and mid field players. As mentioned before the fractures still the most frequent injury followed by strains and sprains. The anthropometric measurements that was measured in this study show that there were no significant correlations with the recorded injuries, it was suggested that the absence of correlation was due to the limited sample size as a number of studies suggest that there was a correlation between higher BMI and increased the risk of injury (9,23,24,25,26), according to another study lower extremity circumference was considered as risk factor for football injury as high thigh circumference increase risk of injury especially if the calf circumference was low (27) the study results were like some studies which also did not show a correlation between the parameters and the injury (8,28). But others suggested that combination between anthropometric parameters as height and body weight with movement screening tests might be associated with increased lower limb risk of injury (29,30).

5. Conclusion

players at (10-15) years old are highly suspected for injuries especially fractures, most of those injuries are contact injuries which occurs during the match. Anthropometric measurements cannot be used to predict the incidence of injuries. Defenders were the highly suspected for injuries.

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Conflict of Interest

The authors declare no conflict of interest.

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