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Profiling of Injuries Sustained During 2018 Football Tournament: An Observational Study

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Abstract

Objective: This study aims at documenting the incidences, nature and severity of injuries on the Kingdom of Swaziland football players. In addition, we investigate the association between injury incidence rates (IRs), players' age and playing positions.

Methods: Anthropometric characteristics, field-playing positions, match exposure injury occurrences were monitored in 24 teams (432 players). The teams were drawn from four main structures: Premier Soccer League (PSL), first division, super league and regional leagues (promotional league). The type, severity and duration of football-related injuries were documented following FIFA recommendations. Descriptive data was computed to characterize the injury profile using SPSS v23.0.

Results: There were no significant differences on age (p=0.234, body mass (p=0.898 and height (p=0.451) among all players. IR of 29.8 (CI: 27.4, 32.2) injuries per 1000 exposure hours were observed. A sum of 92 injuries were observed and recorded. Of these injuries, 3 out of 4 were classified as either minimal (31.5%) or mild (35.9%), while merely 1 out of 10 injuries (5.4%) necessitated absence from play of more than 28 days. Overuse and traumatic injuries accounted for 27.3% and 78.3% respectively.

Conclusions: The study reflected that the quantity and severity of injuries were not only associated with player's age but also different playing positions. The injury profile of this nature can also enhance the knowledge of injuries, identification of risk factors for the most prevalent differential diagnoses in Swaziland soccer. Therefore, assisting sport medical teams and physicians to plan and develop any injury intervention programs.

Keywords: Football; Injury; Incidence rate; Player; Trauma

Introduction

Soccer in Swaziland is the most and main traditional sport which is preferred by the country's largest population compared to other sports like athletics, swimming, golf and fustal. Soccer is an intermittent collide sport that requires participants to develop in aerobic endurance, speed, acceleration, muscular strength, stamina, agility and flexibility. There is a high prevalence of musculoskeletal injuries during training and match environments due to the number of tackles and physical impacts that are an integral part of the game. Among vigorous sporting activities, soccer has relatively high injury incidence with linear association between injury incidence and competition level at an average of between 17–24 injuries per 1000 playing hours compared with many other sports [1-3].

The Ingwenyama cup competition is recognized as the most gruelling competitions in the Kingdom of Swaziland with competing teams from different regions to the premier league. The cup is for "*His Majesty*", King Mswati III. The cup tournament was born in the year 2015. The current tournament was sponsored by the Swaziland Motor Vehicle Accident Fund (SMVAF). According to the local independent daily newspaper, Times of Swaziland, (2018), the Ingwenyama cup, is a growing tournament every year, uniting the nation through showcasing a good blend of football and culture [4]. The games are played on '*knock out*' basis from the country's promotional, regional, first division and premier league teams.

The Ingwenyama cup has continued to expand since its inception in 2015 and currently has at least 32 teams, 14 from premier league, the remainder from regional, promotion and super league. The cup fixtures were run parallel to the premier soccer league (PSL) calendar. The increased number of teams resulted in longer playing sessions and greater exposure to injury through higher match play demands [5,6]. The last 32 teams used the following stadiums; Mavuso Sports centre, King Sobhuza II memorial, Mayaluka and Somhlolo national.

Literature reveals that much was assessed in lower limb injuries in adolescents and professional soccer players, [1,3,7,8], but none since have measured the impact of increase of parallel tournaments in season and recovery, training and match demands through player injury surveillance studies. Despite that both Swazi men and women national teams are ranked 131 and 112 in International Federation of Football Associations' (FIFA) current world rankings (April 2018) [9], it is imperative that there is lack of information regarding the epidemiological data of pain and injury for the most sponsored games in the Kingdom. The current study aims at analyzing in-season

epidemiological injury data from the 32 football teams over the 2017/18 Ingwenyama cup to determine the impact of competition expansion and increase physical training and match demands on player injury rates.

Methodology

Design

This observational study consisted of in-season epidemiological injury data collected over the 2017/18 season. From the 32 teams only 24 teams were sampled. Observations were conducted to the teams which played at Mavuso sports centre and Somholo national stadium. Team medics assisted to observe and gather data. The type, severity and duration of football-related injuries were recorded using FIFA recommendations. Injury data were divided into contact or non-contact injuries depending upon mechanism, match or training-related depending on location, severity, anatomical site and playing position.

Participants

The study involved voluntarily participation of 432 male subjects. The football board of Swaziland has the four main structures: Premier Soccer League (PSL), first division, super league and regional leagues (promotional league). This study focused on the last 32 teams from the knockouts preparing for the last batch of teams for Ingwenyama cup trophy. Players were categorized into five playing position groups: forwards, consisting of centre forwards, left and right wingers; midfielders; backs consisting of centre backs, left and right backs; and goalkeepers. Matches were played weekly and sometimes twice per week; Thursdays and Sundays. During the season, each player participated in three to four on-field training sessions per week, and one to two strength and conditioning gym based weight sessions and on field conditioning sessions per week. Injury data were collected for each match in-season only.

Ethical considerations

Ethics approval for this study was obtained from the National Football Association of Swaziland (NFAS). Informed consent was obtained from each of the study subjects. Subjects verbally consented and voluntarily participated in this study. The researcher kept subjects' identity anonymous and confidential.

Data analysis

All results were presented and expressed as M ± SD and 95% confidence intervals (CI). Descriptive data was computed using Statistical packaging social science (SPSS) version 23.0. Match player-hours for each team playing a match was calculated as 1.33 × 18 players (4 match player-hours). The total match player-hours for a team were calculated as 20 × the number of match days for a team. In addition, injury data was expressed as the number of player-hours for a player until an injury occurred (1 injury per number of player-hours).

Results

The study population's demographic data was depicted by Table 1. There were no significant differences on age (p=0.234), body mass (p=0.898) and height (p=0.451) among all players from the 8 teams (Table 1).

Team	No. of players	Age	Body mass	Height	BMI (kg/m²)
Teams A	18	24.0 ± 3.6	88.0 ± 10.1	1.83 ±0.09	26.2 ± 2.3
Teams B	18	26.1 ± 3.3	83.4 ± 6.1	1.88 ± 0.06	23.6 ± 2.1
Teams C	18	27.0 ± 3.1	89.2 ± 10.4	1.86 ± 0.07	25.7 ± 3.2
Teams D	18	24.2 ± 3.0	84.0 ± 9.7	1.85 ± 0.09	24.5 ± 3.0
Teams E	18	25.6 ± 3.4	87.4 ± 10.2	1.88 ± 0.07	24.7 ± 2.7
Teams F	18	26.2 ± 4.1	90.0 ± 11.3	1.83 ± 0.06	26.8 ± 2.4
Teams G	18	23.5 ± 3.2	89.6 ± 11.1	1.84 ± 0.07	26.5 ± 2.5
Teams H	18	27.1 ± 2.7	85.0 ± 9.6	1.86 ± 0.09	24.6 ± 1.6
		p=0.234	p=0.898	p=0.451	
By positions					
Forwards	57	25.2 ± 3.6	80.2 ± 7.1	1.84 ± 0.07	23.7 ± 2.1
Midfielders	41	26.1 ± 3.3	85.9 ±10.0	1.85 ± 0.06	25.1 ± 3.3
Defenders	48	27.3 ± 3.7	91.3 ± 10.4	1.87 ±0.07	26.1 ± 3.2
Goalkeepers	16	23.4 ± 2.2	87.8 ± 6.9	1.86 ± 0.03	25.4 ± 2.4

Table 1: Demographic data for teams that reached quarter finals (n=162).

Player position	No. of time loss injuries	Player hours	Incidence of injuries 1000 player hours	95% CI
Forwards	70	812	92	71.4-114.5
Midfielders	56	703	74.5	58.2-99.2
Defenders	62	810	86.4	69.8-108.3
Goalkeepers	53	804	72.3	52.6-96.0

Table 2: Incidence of match injuries (injuries per 1000 player hours (95% CI) in all players.

Table 2 shows the total number of player-hours in all matches for all teams basing on player positions; forwards, midfielders, defenders and goalkeepers (Table 2). Most of the players showed that they had incurred injuries more than once, hence making a total of 92 injuries found. The highest incidences of injuries were during qualifying round with (36/92) 39.1% (Table 3).

Playing position	Qualifiers' round	Quarter finals	Semi finals	Finals	Totals
Forwards	12	9	8	6	35
Midfielders	8	5	3	2	18
Defenders	10	6	3	4	23
Goalkeepers	6	4	3	3	16
	36	24	17	15	92

Table 3: Injury counts according to playing positions per match level.

All injuries occurred and their characteristics were categorized into traumatic and overuse injuries (see Table 4). The incidence of match time-loss injuries (per 1000 player-hours) by specific anatomical structure for all players is shown (Table 5).

Characteristics	Attributes	No.	%
Mechanism			
	Traumatic	20	21.7
	Overuse	72	78.3
Recurrence			
	Non-recurrence	79	85.9
	Early	8	8.7
	Late	5	5.4
Contact		18	19.6
Non-contact		74	80.4

Table 4: Characteristics of injuries.

Anatomical position		n	IR	95% CI	%
Head/Neck	Head/Face	8	4.1	6.6	14.7
	Neck/Cervical spine	2	-	-	-
Upper limb	Shoulder/Clavicle	5	3.1	2.3	11.5
	Upper arm/Fore arm/Elbow	6	5.2	3.1	12
	Hand/Wrist/Fingers	9	6	3.7	12.8
Trunk	Upper trunk/Chest	3	-	-	-
	Thorax/Ribs	4	-	-	-
	Lower back/Pelvis	2	-	-	-
	Abdomen	1	-	-	-
Lower limb	Hip/Groin	6	4.8	1.2	3.3
	Thigh	8	5.8	3.2	11.4
	Knee	12	7.1	4.5	13.2
	Shank/Achilles tendon	8	5.8	3.2	11.4
	Ankle	13	7.8	4.7	13.3
	Foot/Toe	5	3.4	0.7	2.4

Note: n: Number of injuries; IR-Incidence rate per 1000 player-hours; Incidence rate and 95% CI are only reported for n ≥ 5

Table 5: The incidence of match time-loss injuries (1000 player-hours) by specific anatomical position.

The specific anatomical structure with the highest incidence of all match injuries (per 1000 match player-hours) was in the following order; ankle (7.8), knee (7.1), thigh and Achilles tendon with (5.8). The breakdown of injuries by location and severity is summarized on Table 6. Regarding to injuries, muscle strains (23.9%), ligament sprains (13%), abrasion (13%) and tendon injuries were the most frequently reported. Table 6 shows that the majority of match injuries were of minimal to mild severity with a 67.4% compared to moderate and severe which accounted for respectively 32.6% (Table 6).

Injury type	Minimal	Mild	Moderate severe	Severe	Total
	1-3 days	4-7 days	8-28 days	≥ 28 days	
Concussion	2 (2.2%)	4 (4.3%)	-	-	6 (6.5%)
Dental	2 (2.2%)	-	-	-	2 (2.2%)
Muscle injury/ Strain	8 (8.7%)	9 (9.8%)	3 (3.3%)	2 (2.2%)	22 (23.9%
Ligament injury/ Sprain	-	7 (7.6%)	5 (5.4%)	-	12 (13.0%)
Meniscus/ Cartilage	-	-	6 (6.5%)	2 (2.2%)	8 (8.7%)
Abrasion	10 (10.9%)	2 (2.2%)	-	-	12 (13.0%)
Tendon	-	4 (4.3%)	7 (7.6%)	-	11 (12.0%)
Bruise	6 (6.5%)	3 (3.3%)	-	-	9 (9.8%)
Fracture	1 (1.1%)	-	2 (2.2%)	1 (1.1%)	4 (4.3%)
Laceration	-	4 (4.3%)	2 (2.2%)	-	6 (6.5%)

Table 6: Injury by type and severity.

Discussion

This study represents the first epidemiological survey into football-related injuries in the Kingdom of Swaziland. With approximately 10 000 exposure hours of 114 players in 8 clubs from the four main structures PSL, first division, super league and regional leagues that played quarter finals, a total of 92 injuries were observed. These findings concur with match injury IR of 29.8 (CI: 27.4, 32.2) injuries per 1000 exposure hours. Of these injuries, 3 out of 4 were classified as either minimal (31.5%) or mild (35.9%), while merely 1 out of 10 injuries (5.4%) necessitated absence from play of more than 28 days. It can be noted that the comparably warm environmental conditions during the football season in the Kingdom of Swaziland would protect players against certain types of non-contact injuries like muscle strain.

Musculoskeletal variations mainly occur during matches due to great demand and intense players' physical contact. Literature reveals that football-related injuries have been investigated and performed in various major football leagues [2,3,7,8,10-12]. The present study's

findings of match injury IR of 29.8 (CI: 27.4, 32.2) injuries per 1000 exposure hours are in line with literature from other countries: Shalaj et al. [3], Kosovo (IR=35.4; CI: 32.0, 39.1); Hagglund et al. [13], Sweden (IR=25.9; CI: 22.8, 29.2), Walden et al. [14], UEFA CL (IR=30.5; CI: 29.4, 31.6). The high incidence rate was a result of matches played among teams from varied hierarchical football league levels, exposure, physical fitness, non-financial benefits and monetary value award of the tournament cup. Of paramount importance, players were exposed to a number of matches played within one season parallel to their main leagues. To accommodate the tournaments and league matches, a team played matches twice per week (Thursday night and Sunday afternoon) therefore this directly affecting recovery times between competitions.

There is still a gap in literature [7,15-18] to draw a conclusion about association and influence of playing position, injury rates; injury type and the severity of injury. Some researchers concluded that forwards were prone to injuries while others are of the view that defenders are the most exposed to injuries [7,15]. However, results from this study showed that forwards and defenders suffered more injury compared to midfielders and goalkeepers. These were in agreement with other researchers who found the greatest injury rates in forwards [16,17]. Furthermore, it was observed that defenders suffered more minimal and severe injuries, whereas forwards had more moderate and severe injuries. This may have resulted from the tactical patterns of current soccer, which is characterized by backside players performing defensive and attacking roles within short specified periods. Moreover, moderate injuries observed in forwards may be related to the higher demand for sprints, dribbling and evasive runs with greater distances attained, higher work compared to rest/recovery ratios and increased high-intensity activities performed by this field position. Also, there is more time spent in resulting in overloading the muscle and tendon tissues, which could predispose them to injuries.

The most reported kind of injury was the muscle strains and ligament sprains, and was in agreement to the findings by Waldén et al. [14]. These were different from Silva et al. [18] and Mohib et al. [19] who found that the most anatomical positions affected were the thigh, the knee and the ankle among young soccer players of both sexes. The results showed that the majority of the injuries occurred on the lower limb, mainly muscular and ligament. When fatigued players continuously become exposed to competitions, lower limb injuries occur due to high demand, hence making them more vulnerable to injury.

Most injuries observed occurred due to overuse (78.3%). Also, most injuries reported in our study were non-recurrent and non-contact. The recurrence (early+late) rate of 14.1% was lower than what is reported in the literature [2,3,20,21]. Results were in agreement with other research findings on the predominance of non-contact injuries (80.4%) which were directly related to the higher rate of overuse injuries compared to traumatic injuries [2,20,21]. This suggests that soccer game maneuvers and actions such as short runs, sharp turns, dribbling and cutting place high demand on the musculoskeletal system resulting in large number of non-contact-overuse injuries. Independent of causal factors this, therefore support the need to implement recovery and preventive programs for soccer players.

Conclusion

This study profiled incidence of injuries in football in Swaziland. This study had similarities (approximately 3/4 injuries were classified as traumatic) and differences (substantial fewer highly competitive matches for Southern Africa players) with other reported profiles of teams from other countries. Several injuries such strains, sprains and ruptures of thigh muscles, ligamentous injuries of the knee, meniscus and cartilage tears represented the most frequent differential diagnosis. The quantity and severity of injuries were not only associated with different playing positions but rather due to the movements imposed to the players during matches. Since this is the first ever epidemiological study investigating football injuries in the Kingdom of Swaziland, it will provide novel data about the incidence, type and severity of injuries. Current data will be the base for future studies on identifying risk factors for the most prevalent differential diagnoses. The epidemiological studies of this nature can also enhance the knowledge of injuries in Swaziland soccer and help sports physical therapists and physicians to plan and develop any injury intervention programs.

Strengths of the Current Study

The main strengths of this study are:

a) It stands for a large potential group study (cohort) in National Football Association that was conducted in a main tournament of a long duration played by teams from varied league levels,

b) Team medics recorded daily data with a very high compliance rate, and

c) Incidence rates for matches were well documented.

Limitations

The incidence rates for training were not documented creating a gap in all calculations of the incidence rates (per 1000 player-hours). It should also be acknowledged that only 18 players appearing on the team card consented to participate in the study. This was taken into account. Finally, the location specific incidence rates can at most be considered as preliminary and this would require further investigation.

Conflict of Interest

None declared.

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