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Ecologic Determinants of Football Injuries : A Case Study of Lusaka Based FAZ Football Teams

By

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2012

DECLARATION

I**, Donald Mwandila,** do hereby declare that this dissertation is my own original work. It has been presented in accordance with the guidelines for MPH dissertation of the University of Zambia. It has not been submitted before for any degree or examination in any other University.

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I have read this dissertation and approved it for examination

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CERTIFICATE OF COMPLETION OF DISERTATION

I, **Donald Mwandila,** do hereby certify that this dissertation is the product of my own work and, in submitting it for my MPH programme further attest that it has not been submitted in part or in whole to another University.

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I, **Dr S. Nzala**, having read and submitted this dissertation, I am satisfied that this is the original work of the author under whose name it is being presented. I confirm that the work has been completed satisfactorily and is hereby for presentation to the examiners.

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CERTIFICATE OF APPROVAL

The University of Zambia approves this dissertation of **Donald Mwandila** in partial fulfillment of the requirement for the award of the Master of Public Health Degree by the University of Zambia.

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Examiner II

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Examiner III

Head of Department

Signatutre______________________Date_______________________

DEDICATION

To my understanding wife Vicky and my kids Given, Peace and Love for their patience in allowing me spend less time with them during the period I was working on this thesis.

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Without the gentle push, guidance and encouragement of my supervisor,

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CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS

AAOS…………………………..American Academy of Orthopedic Surgeons

ACL……………………………Anterior Cruciate Ligament

BMI…….………………………Body Mass Index

FA………………………………Football Association

FAZ…………………………….Football Association of Zambia

FIFA……………………………Federation of International Football Association

F-MARC……………………….FIFA- Medical Assessment Research Center

LCL…………………………….Lateral Collateral Ligament

MCL……………………………Medial Collateral Ligament

MPH……………………………Master of Public Health

NATAL…………………………National Athletic Training Association

PCL…………………………….Posterior Cruciate Ligament

PCMA………………………….Pre Competition Medical Assessment

ROM……………………………Range of Motion

SCD…………………………….Sudden Cardiac Death

Sr………………………………..Senior

TB………………………………Tuberculosis

U-19……………………………..Under 19

UEFA……………………………Union of European Football Associations

UK………………………………..United Kingdom

US………………………………..United States

UNZA……………………………University of Zambia

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ABSTRACT

Background: In Zambia, the rate of occurrence of injuries in the super division and division one teams, which are highly competitive leagues, have not been documented. Currently, there is a wide gap of information about football injuries because there is no routine injury surveillance system in place within FAZ that captures all time-loss injuries suffered by players.
Research questions: Based on the statement of the problem, this study sought to answer the following research questions: What is the prevalence of injuries in football teams affiliated to FAZ? What types of injuries are sustained by football players? In addition, what factors contribute to football injuries?
Methodology: This was a cross sectional exploratory and descriptive study involving seven teams or clubs in Super League and six in division one. Two hundred and seventeen players were randomly sampled. A survey questionnaire was administered to all eligible players. Univariate, bivariate analysis and multivariate analyses were done after recoding the data. Statistical analyses were performed with use of the Statistical Analysis System 6.03 edition (SAS Institute, Inc., Cary, North Carolina). The Wilcoxon test was used for comparison of median values when the distributions were not normal, as was the case for many of the variables examined (age, levels of education, level of playing football, experience, intrinsic and extrinsic factors). The chi-square and Fisher's exact test were used for comparisons of categorical data. Stepwise logistic regression analysis was used as an exploratory technique to determine whether baseline variables were associated with the occurrence of subsequent injury. A *p* value 0.05 was used to define statistical significance.
Results: n = 71 football players were on the injury list. Of these 71, n = 15 were from the super division and n = 56 were from the first division. Injury rate showed no statistical association between level of playing football (value = 0. 331, df = 1 and the observed p value was = 0.565. n = 170 (78.3%) had not suffered a similar injury before during training as compared to those who had suffered from any injury n = 47 (21.7%). Footballers sustained injuries afflicting nearly every organ or site. There was no significant difference in terms of type of injury sustained if we examined the level of playing be it super division and division I (*p* was 0.00, *t* was 61.77 at *df* 216).While footballers could be injured under various, contact mediated mechanisms n = 52 (24.0%) seemed to have a greater effect, than running n = 41 (18.9%) and collisions. Circumstances n = 36 (16.6%). All injury factors were not statistically significantly associated with football injuries within the teams. However, regression analyses show linear relationships between unsuitable equipment as well as unsuitable turf to be responsible for injuries in both the super league division and division leagues.
Conclusions: This study illustrates that the rate (32.7%) of self-reported and observed football injuries among super division and division I football teams is worrisome. Ecologic factors are not statistically associated with football injuries. This was the first study to evaluate the rate of football injuries and see how these are associated with ecological factors in this part of the world. Future studies may need to be extended to other towns and lower leagues to have a broader picture. There is need to address preventive and health promotional needs of football players.

CHAPTER ONE - BACKGROUND

1.0 Introduction

Football is one of the most popular sports in the world, with an estimated 240 million to 265 million players participating in the game and this number may be higher by almost a quarter now. The sport involves intermittent walking, jogging, running and sprinting, and has a higher incidence of injuries than rugby, volleyball, field hockey, cycling, boxing, swimming and basketball. It was reported in 2001 football was reported to have injury rates of 1,000 times higher than industrial occupations. Ferguson and Collins (2010) generally regarded this as a high-risk occupation. It is a high-risk occupation because the player is exposed to both intrinsic and extrinsic forces that make him highly susceptible to injury.

The ever-increasing number of active players in turn leads to increased frequency of injuries, with the resultant cost of treatment and loss of playing time, all of which point to the need for an injury prevention program (FIFA, 2009).

Injuries in football have been the subject of increasing interest, and several studies have been published during the last two decades. These studies have looked at injury patterns (Inklaar, 1994; Dvorak and Junge, 2000; Ekstrand, 1982; Tysvaer and Lochen, 1991; Tysvaer, 1992; Inklaar, 1994a; Chomiak et al., 2000; Dvorak and Junge, 2000). Other studies have focussed on skill-level differences (Poulsen et al., 1991; Junge et al., 2000; Peterson et al., 2000). For instance, injury pattern studies documented by Inklaar (1994a, b) and Dvorak and Junge (2000) concluded that injury incidence is higher during game time (7.4–37.2 injuries/1000 h) than during practice (1.5–7.6 injuries/ 1000 h). Other researchers observed that 60–90% of all injuries occur in the lower extremities and that incidence of injury increases with age (Engstrom et al., 1991; Tysvaer and Lochen, 1991; Tysvaer, 1992; Inklaar, 1994a; Chomiak et al., 2000; Dvorak and Junge, 2000; Ostenberg and Roos, 2000; Soderman et al., 2001).

The incidence of football injuries is estimated to be 1.5–7.6/ 1000 h of training and 12–35/1000 h of matches.

Football injuries may be classified into two categories .i.e. minor injuries and major injuries. Minor injuries require care but usually do not interrupt the player's practice or game schedules. However, if not properly treated, they on occasion, progress to become major injuries, for example a simple laceration, improperly treated may become infected and life threatening (Samaranch, 1990).

In most cases, research studies differ on their basic definition of injury. However, according to Professor Fuller (2007), a football injury is any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football activities. He further explains that severity of an injury can be determined by the number of days that have elapsed from the date of injury to the date of the player's return to full participation in team training and availability for match selection.

1.1 Statement of the Problem

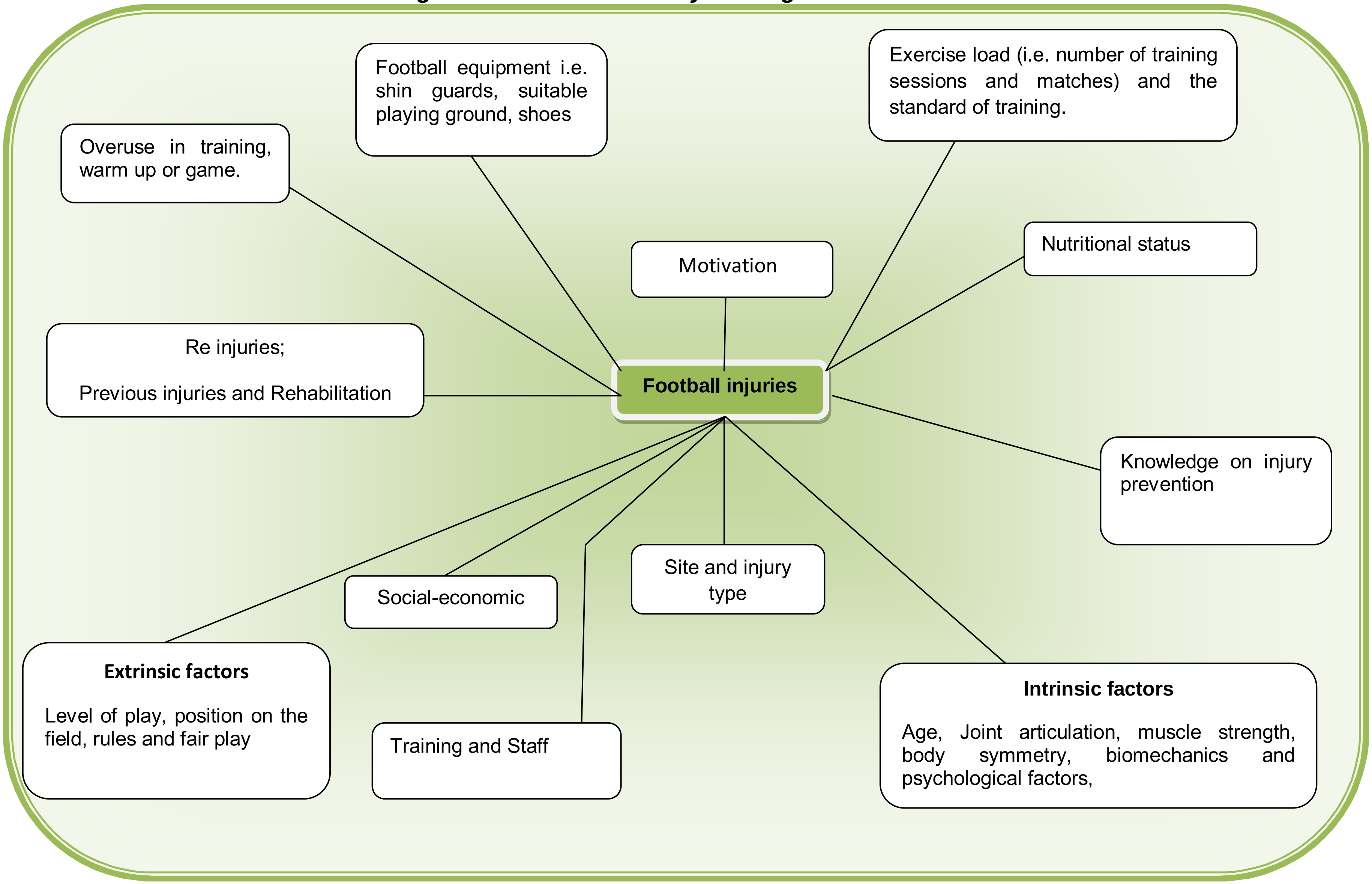
Football has become more and more popular over the years and the game is constantly developing with increasing speed and intensity. In Zambia, the rate of occurrence of injuries in the super division and division I teams which are highly competitive leagues has not been documented. Currently, there is a wide gap of information about football injuries because there is no routine injury surveillance system in place within FAZ that captures all time-loss injuries suffered by players.

1.2 Assumptions and Problem Analysis

The conceptual model used in this study provides insight into a complex scenario of trauma by showing all the potential risk factors influencing the occurrence of football injuries. Such complexity requires tools that enable the exploration of the hierarchical importance of these risk factors. The causes of injury are believed to be multi-factorial, such as intrinsic factors, e.g., joint instability, muscle strength, muscle tightness, body asymmetry, biomechanics, psychological factors, as well as extrinsic factors, e.g., level of play, position on the field, amount and standard of practice/game, equipment, pitch conditions, rules and fair play. In addition, there are many confounding risk factors to consider (Meeuwisse, 1994; Bahr and Holme, 2003; Ekstrand et al., 2009). Previous injuries and inadequate rehabilitation are also factors to account for (Inklaar, 1994; Chomiak et al., 2000; Dvorak and Junge, 2000; Dvorak et al., 2000). Factors that may influence the incidence of injury in football include the level of play, exercise load (i.e. number of training sessions and matches) and the standard of training. High-level players have reported more risk injuries during matches than low-level players (Nielsen and Yde, 1989; Ekstrand and Tropp, 1990; Inklaar et al., 1996), whereas in training the outcome appears to be the opposite (Nielsen and Yde, 1989; Ekstrand and Tropp, 1990).

The level of play is an important risk factor for football injuries (Inklaar, 1994; Inklaar et al., 1996), with injury rates increasing with the level of competition (Hawkins and Fuller, 1998; Hawkins and Fuller, 1999; Hägglund et al., 2005a; Walde´n et al., 2005b; Hägglund et al., 2008). However, at all levels of competition the risk of injury during training is similar (Nielsen and Yde, 1989; Ekstrand et al., 1990; Inklaar et al., 1996) but is lower than the risk observed during matches (Ekstrand et al., 1983).

Figure 1.2.1 Problem Analysis Diagram



CHAPTER TWO - LITERATURE REVIEW

2.0 Introduction

A review of peer reviewed articles showed that most of the studies have been done in the West, Australia and some parts of Asia. There were no peer-reviewed studies about Africa. For instance, the Football Association of Zambia has information about Europe only and these are in form of reports or bulletins.

2.1 Injuries in Football

In order to appreciate the rate of football injuries, their incidences are presented in the following two headings.

2.1.1– A Global View

The incidence of injuries world over has been increasing gradually due to an increase in the number of women participating in elite football. FIFA's records show that in the last 10 years, women's participation in football has increased by 210% in the USA, by 250% in Switzerland and by 160% in Germany. Many other countries have shown similar explosive growth in women's football. With such a growth, the world expects a different picture about the prevalence of football injuries. According to Kirkendall (2007), a total number of 387 injuries were reported on 174 women's matches from seven international tournaments during the FIFA women's world Cup (1999, 2003), Olympics (2000, 2004) and youth championships (U-19 2002, 2004; U-20 2006). His research showed that the prevalence of football injuries was 2.2 injuries per match in women while for men it was 2.7. The literature on difference in injury prevalence shows that football injuries are high in men as compared to women and in both gender injuries are higher in the youths. The researcher agrees with Kirkendall (2007) that perhaps younger players are simply less experienced at such a high level of play or maybe they are playing harder in an attempt to gain attention so that they may be picked for more matches that are senior. Dvorak et al (2000) explains incidence of football injury as mostly defined as the number of injuries occurring during a period when there was a risk of injury. Consequently, the incidence of football injuries has most frequently been calculated based on hours played during games and training.

Different studies on incidence of football injuries showed that incidence varies between match play and training, gender age and in-and outdoor play and in all these studies a similar assumption is that the majority of injuries occur to the lower extremities, mainly in the knees and ankles.

Head injuries account for 4–22% of all football injuries (Dvorak and Junge, 2000). Different injury rates and distribution of injuries have been shown among football players (Nilsson and Roaas, 1978; Ekstrand, 1982). Risk factors for stress fractures have been proposed as being repetitive stress (Warden et al., 2007), rapid changes of load or changes of surface (Ekstrand and Gillquist, 1983a, b; Ekstrand and Nigg, 1989; Warden et al., 2007) and negative catabolism due to low energy availability (Torstveit and Sundgot- Borgen, 2005; Sundgot-Borgen and Torstveit, 2007). Stress fractures are more common in younger players than old players (Dameron, 1975; Kavanaugh et al., 1978; Maquirriain and Ghisi, 2006). Re-injury rates are especially high for pelvic and tibia stress fractures and lower for fifth metatarsal fractures. The reason might be that treatment and rehabilitation procedures are better established for fifth metatarsal fractures (Kavanaugh et al., 1978; Mindrebo et al., 1993) than for pelvic and tibia stress fractures, which are considered to be difficult-to-treat injuries (Varner et al., 2005; Verrall et al., 2008).

The prevalence of football injuries in different countries is listed in Table 2.1.1 Irrespective of the different definitions of injury used in the literature; it is believed that the risk of injury in football is high compared with other sports. In general, the risk of injuries in football varies according to the definition of injury, the research design and a number of characteristics of players, such as age and skill with respect to level of play. Professional adult football players have a risk of injuries that is incomparably higher than that observed in employees in most other occupations.

Table 2.1.1 prevalence of football injuries in different countries (Wong and Hong, 2005)

Country	Level of play	Injuries	
		Injuries per game per 1000 Hours	Injuries per training per 1000 hours
MALES			
Iceland	National elite, first league	24.6	2.1
Sweden	Sr. National team	30.3	6.5
Sweden	National top division	25.9	5.2
US	MLS professionals	35.5	2.9
UK	Premier League, 1st and 2nd division	25.9	3.4
Finland	Highest national league	25.9	3.4
Sweden	1st division	21.8	4.6
	2nd division	18.7	5.1
	3rd division	16.9	7.6
	6th division	14.6	7.5
Denmark	2nd division (high)	18.5	2.3
	Series (low)	11.9	5.6
FEMALES			
Sweden	Senior players, various skill levels	14.3	3.7
	Premier, 2nd division	24	7

The injury incidence in adult male players ranges from 12 to 35 injuries per 1 000 hours of match play and 1.5-7.6 injuries per 1 000 hours of exposure. On average, every elite male football player incurs approximately 1 performance-limiting injury each year. The incidence of match injuries is on average 3-6 times higher than the incidence of injuries during training. Data on injury incidence and risk factors in youth and adolescent players are scarce and inconsistent. An earlier study found that male senior players sustain more injuries than youth players, based on incidence of football injuries per 1 000 hours of match play. A review of epidemiological data in 2005 classified youth football as a relatively safe sport with an injury incidence ranging from 2.3 per 1 000 practice hours to 14.8 per 1 000 match hours.

A Swedish study of 1,800 players aged 13-16 years recorded injury rates of 2.4 to 6.8 injuries per 1,000 playing hours. In a prospective epidemiological study of youth academy players over two seasons, the Football Association in England (FA) observed a higher risk of injury in the age group of 17-19 years compared with players aged 9-16 years. A cohort study in French elite youth players observed an injury rate of 4.8 per 1 000 hours exposure time with no significant difference between the age groups of 14, 15 and 16 years. As seen in adults, too, injury rates in training were lower compared with matches (11.2 per 1 000 hrs). Studies elsewhere in Europe also indicate that most injuries in youth players occur at the lower extremities (Torstveit and Sundgot- Borgen, 2005; Sundgot-Borgen and Torstveit, 2007). Ankle sprains are the most common injury, with contusions and strains being the most frequent types of injury. Head injuries in youth football seem rare. Fractures and dislocations account for approximately 3-12% of injuries. In adult football, there is broad evidence that a previous injury represents an important risk factor for another injury. This also seems to apply to youth players (Constantinou, 2010).

2.1.2 Regional and Local Review of Football Injuries

There has been little publication in the African region on prevalence of football injuries and there is no publication of any research conducted in Zambia on prevalence of football injuries. However, the general trend of types of injuries and prevalence of injuries as reviewed from other countries is explained below in 2.2 to 2.9.

2.2 Types of Injuries Sustained By Football Players

Research has shown that there are high incidences of overuse injury to the spine. Both changes of surface and weak trunk muscles in combination with hormonal fluctuations and premenstrual symptoms have been areas of discussion (Moller-Nielsen and Hammar, 1989, 1991; Brynhildsen et al., 1990, 1997a, b). Proper prevention programs such as special lower back and trunk stabilizing training programs might prevent these lower back pain problems.

In another study by Soderman et al. (2001), there were high levels of re-injuries. Over half of the injured players reported an injury to the same body part occurring within 2 months of the initial injury. One out of four injuries was a re-injury at the same location, which is lower than that reported by Soderman et al. (2001). A re-injury could be a result of insufficient rehabilitation after an earlier injury. Overuse injuries seem to be more common during preseason and at the beginning of the spring season. These findings agree with Engstrom et al. (1991). The aetiology of overuse injuries is more complicated as they depend on both intrinsic as well as extrinsic factors.

A Sprain is a stretch or tear of a ligament, the band of connective tissues that joins the end of one bone with another. trauma such as a fall or blow to the body that knocks a joint out of position tends to cause sprain and, in the worst case, there are ruptures to supporting ligaments. Sprains can range from first degree (minimally stretched ligament) to third degree (a complete tear). Areas of the body most vulnerable to sprains are ankles, knees, and wrists. Signs of a sprain include varying degrees of tenderness or pain, bruising, inflammation, swelling, inability to move a limb or joint or joint looseness, laxity, or instability (NIAMS, 2009).

The American Academy of Orthopedic Surgeons (AAOS) describes a Strain as a twist, pull, or tear of a muscle or tendon, a cord of tissue connecting muscle to bone. An acute, noncontact injury results from overstretching or over contraction. Symptoms of a strain include pain, muscle spasm, and loss of strength. Although it is hard to tell the difference between mild and moderate strains, severe strains not treated professionally can cause damage and loss of function.

Knee injuries

2.3 Knee Injuries

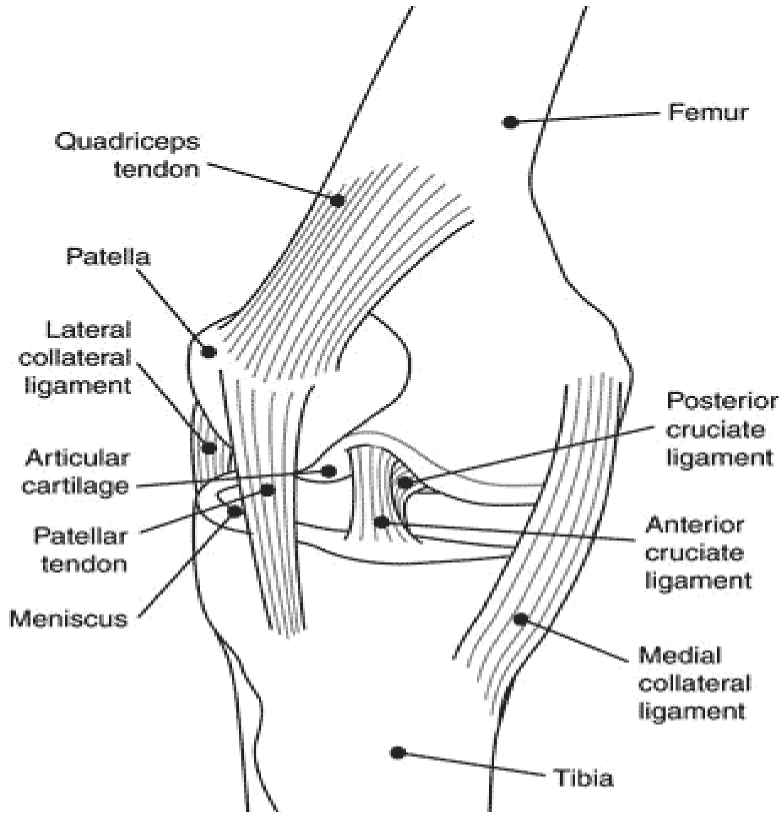
The knee is the most frequently injured joint of players at FIFA competitions next to the ankle. According to the literature from FIFA records, Knee injuries are 9 to 23% in males while in female it is about 0 to 10 %. The annual incidence is said to be 18% in males and 17% are only complaints without injuries. Knee injuries can occur at the femur, medial and lateral meniscus, anterior and posterior cruciate ligaments, medial and lateral collateral ligaments, proximal tibia and fibula, and at any joint articulating surfaces.

ACL injuries have the highest morbidity of knee injuries for football players and result in the most time lost. The incidence of ACL injury ranges from 0.06 to 3.7 per 1 000 hours of active soccer play, with females being 2 - 8 times more likely to sustain non-contact ACL injury than males.16 ACL injuries occur as a result of a combination of a deceleration and twisting on a planted foot with an extended or near fully extended knee. The result is a varus or valgus strain combined with internal or external rotation of the tibia on a fixed foot, combined with an anterior translation force. The player usually describes a 'popping' feeling with a sensation of giving way. The presence of a knee haemarthrosis (Table II) is positive for an ACL injury in 70% of cases (Silvers and Mandelbaum, 2007).

However, the true incidence of posterior cruciate ligament (PCL) injury is not known but is thought to be very low. The mechanism of injury is often a direct blow to the front of the lower leg in contact or a fall onto the knee. This in essence causes hyperflexion of the knee. Most injuries are isolated PCL tears, which can be treated conservatively with bracing and rehabilitation. Combined PCL injuries involving either the medial collateral ligament (MCL), ACL lateral collateral ligament (LCL) or posterolateral corner will require surgical reconstruction. The posterolateral corner (PLC) is made up of the fibular collateral ligament, popliteus tendon, and popliteofibular ligament. The PLC ligaments act to stabilise the posterolateral corner of the knee with the opposing convex surfaces of the lateral femoral condyle and lateral tibial plateau. PLC injury is one of the most debilitating ligament injuries of the knee, as patients may have instability even with normal gait and should always be assessed for when cruciate ligament injury is suspected (Ferguson and Collins, 2005:204).

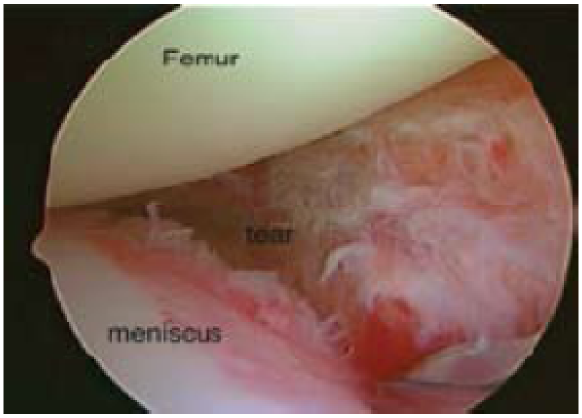
Because of its complex structure and weight-bearing capacity, as shown in figure 2.3.1, below, the knee is the most commonly injured joint. Each year, more than 5.5 million people visit doctors for knee problems (NIAMS, 2009).

Figure 2.3.1 Lateral View of The Knee



(Complex structures at the knee as adopted by NIAMS 2009)

Injuries of the knee can range from mild to severe. Some of the less severe, yet still painful and functionally limiting, knee problems are runner's knee (pain or tenderness close to or under the knee cap at the front or side of the knee), iliotibial band syndrome (pain on the outer side of the knee), and tendinitis, also called tendinosis (marked by degeneration within a tendon, usually where it joins the bone). More severe injuries include bone bruises or damage to the cartilage or ligaments. Figures 2.3.2 and 2.3.3 show how complex a knee injury could be.



There are two types of cartilage in the knee. One is the meniscus, a crescent-shaped disc that absorbs shock between the thigh (femur) and lower leg bones (tibia and fibula). The other is a surface-coating (or articular) cartilage.

Figure. 2.3.2 Acute vertical tear of the medial meniscus. (CME May 2010 vol.28 No.5)

It covers the ends of the bones where they meet, allowing them to glide against one another. The four major ligaments that support the knee are the anterior cruciate ligament (ACL), the posterior cruciate ligament (PCL), the medial collateral ligament (MCL), and the lateral collateral ligament (LCL) as shown in the diagram above.

Knee injuries can result from a blow to or twist of the knee from improper landing after a jump or from running too hard, too much, or without proper warm up.

Figure. 2.3.3 Arthroscopic view of a torn ACL. (CME May 2010 vol.28 No.5).

The three main factors that contribute to an increased risk of knee injury in football are the age of the player, a previous injury and the ligamentous status of the knee. Females sustain more injuries during training than males, whereas males sustain more injuries during competition and particularly during competition in contact situations, with the tackled player being the more susceptible to injury.

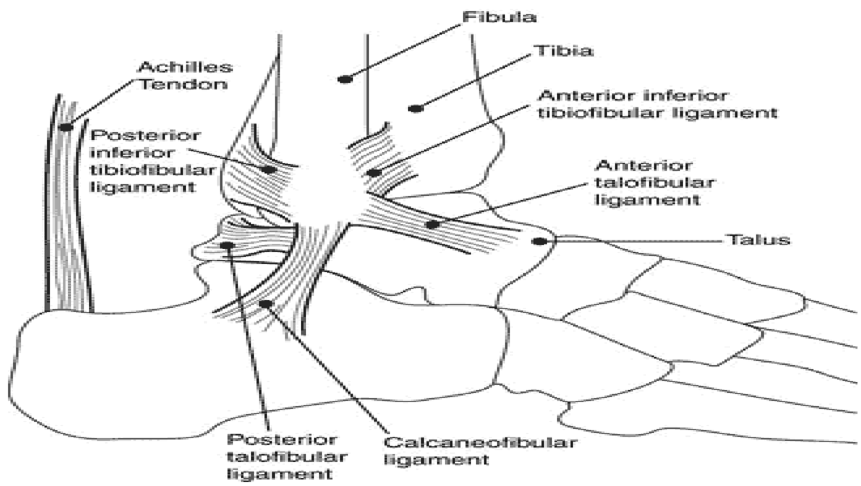
The playing environment has a role, with a higher number of injuries in indoor football, of which the majority are non-contact. It is not surprising that foul play was identified as a risk for a major knee injury, with 20% of illegal activity-related knee injuries requiring surgery. The high incidence of major knee injuries in female players is of great concern, with the incidence of anterior cruciate ligament (ACL) injuries being nearly seven times higher than previously reported. The majority are non-contact injuries that occur with a change in direction. Many aetiological factors for football injuries have been considered and some include anatomy, muscle strength and neuromuscular activation patterns (Faude et al., 2005).

2.4 Ankle joint injuries

According to National Athletic Trainers Association (NATA, 2009), an Achilles tendon injury results from a stretch, tear, or irritation to the tendon connecting the calf muscle to the back of the heel as shown in figure 2.2.4. These injuries can be so sudden and agonizing that they have been known to bring down charging professional football players in shocking fashion.

The most common cause of Achilles tendon tears is a problem called tendinitis, a degenerative condition caused by aging or overuse. When a tendon is weakened, trauma can cause it to rupture. Achilles tendon injuries are common in middle-aged "weekend warriors" who may not exercise regularly or take time to stretch properly before an activity. Among professional athletes, most Achilles injuries seem to occur in quick-acceleration, jumping sports like football and basketball, and almost always end the season's competition for the athlete (ACSM, 2009).

Figure 2.3.4 Lateral View of the Ankle (NIAMS 2009)



2.5 Specific Morphological Injuries

Researchers do not just look at sites of injuries but they also tend to classify injuries morphologically. Below is a profile of these injuries.

Compartment Syndrome

In many parts of the body, muscles (along with the nerves and blood vessels that run alongside and through them) are enclosed in a "compartment" formed of a tough membrane called fascia. When muscles become swollen, they can fill the compartment to capacity, causing interference with nerves and blood vessels as well as damage to the muscles themselves. The resulting painful condition is referred to as compartment syndrome. Compartment syndrome may be caused by a one-time traumatic injury (acute compartment syndrome), such as a fractured bone or a hard blow to the thigh, by repeated hard blows (depending upon the sport), or by ongoing overuse (chronic exertional compartment syndrome), which may occur, for example, in long-distance running (Moller-Nielsen and Hammar, 1991; Brynhildsen et al., 1990, 1997a, b).

Shin splints

Although the term "shin splints" has been widely used to describe any sort of leg pain associated with exercise, the term actually refers to pain along the tibia. This pain can occur at the front outside part of the lower leg, including the foot and ankle (anterior shin splints) or at the inner edge of the bone where it meets the calf muscles (medial shin splints). Shin splints are primarily seen in runners, particularly those just starting a running program. Risk factors for shin splints include overuse or incorrect use of the lower leg i.e. improper stretching, warm up, or exercise technique. Overtraining, running or jumping on hard surfaces; and running in shoes that do not have enough support. These injuries are often associated with flat (over pronated) feet (Moller-Nielsen and Hammar, 1989, 1991; Brynhildsen et al., 1997a, b).

Fractures

A fracture is a break in the bone that can occur from a quick, one-time injury either to the bone (acute fracture) or from repeated stress to the bone over time (stress fracture).

Acute Fractures

Acute fractures can be simple (a clean break with little damage to the surrounding tissue) or compound (a break in which the bone pierces the skin with little damage to the surrounding tissue). Most acute fractures are emergencies. One that breaks the skin is especially dangerous because there is a high risk of infection (NATA, 2009).

Stress fractures

Stress fractures occur largely in the feet and legs and are common in sports that require repetitive impact, primarily running/jumping sports such as gymnastics, football or track and field. Running creates forces two to three times a person's body weight on the lower limbs. The most common symptom of a stress fracture is pain at the site that worsens with weight-bearing activity. Tenderness and swelling often accompany the pain (ACSM, 2009).

Dislocations

When the two bones that come together to form a joint become separated, the joint is described as being dislocated. Contact sports such as football and basketball, as well as high-impact sports and sports that can result in excessive stretching or falling cause the majority of dislocations. A dislocated joint is an emergency situation that requires medical treatment (ACSM, 2009).

The joints most likely to be dislocated are some of the hand joints. Aside from these joints, the joint most frequently dislocated is the shoulder. Dislocations of the knees, hips, and elbows are uncommon(ACSM, 2009).

Location of Injuries

Most injuries are diagnosed as contusions, sprains or ligament ruptures and strains or muscle fiber ruptures (Fuller, 2007). The author of an article on comparison of the incidence, nature and cause of injuries sustained on grass and new generation artificial turf states that the ankle sprain is the single most often diagnosed injury (Tscholl et al, 2007). Almost all studies on injuries stress the high rate of knee and especially of anterior cruciate ligament (ACL) injuries. Location of injuries in football players is summarized as occurring in the following areas; 16% head injuries, upper extremities 8%, Trunk 9%, Thigh 12%, Knee 11%, Lower leg 11% and ankle 24% (FIFA tournament records).

2.6 Injury and Demographics

Several studies concerning football injuries in varying age groups, show that differences in injury incidence in different age groups are apparent (Hoff and Martin, 1986; Backous et al., 1988; Schmidt-Olsen et al., 1991; Andreasen et al., 1992; Junge et al., 2000; Junge et al., 2002).

In football, as in other sports, muscle injuries can be either strain injuries or contusions from a direct external force. Muscle strain injuries are particularly common in female and male football players and account for: (i) approximately 10-30% of all football injuries; and (ii) 15% of more severe injuries. (4) In elite football players muscle strain injuries account for an even larger proportion of injuries (31-43%).

Such injuries occur most commonly in the thigh (8-22% of football injuries, mostly hamstring injuries), groin (hip adductors), and calf muscles (Peterson et al., 2000; Arnason et al., 2004: Junge et al., 2004). Within muscle injuries, the most common type of traumatic injury was strain. This agrees with studies by Engstrom et al. (1991), Ostenberg and Roos (2000) and Soderman et al. (2001).

Thigh muscle injuries occur frequently as contusion injuries in contact sports and as strains in sports involving maximal sprints and acceleration. Because football combines maximal sprints with frequent player-to-player contact, it is not surprising that up to 30% of all football injuries are thigh muscle injuries. Some research studies in England show that hamstring strains are the most common type of injury in male football, accounting for between 13% and 17% of all acute injuries. Other studies have shown that muscle contusion injuries to the thigh account for up to 16% of all acute football injuries at an elite level. The F-MARC studies have also revealed similar results. At FIFA competition, thigh muscle injuries in male is said to be 8 to 23%. In female incidence is about 8 to 22% while annual prevalence in male is about 15% and 19% complaints without injury (Woods et al, 2004).

A large number of studies have been conducted to identify possible risk factors for muscle strain injuries. The results show that the most important risk factors for such injuries are previous injuries (hamstring and groin), (Maffey and Emery, 2007) reduced muscle strength and muscle strength imbalances (reduced hamstring to quadriceps strength ratio), (Soderman et al., 2001; Miffed and Emery, 2007; Croisier et al., 2008) reduced pre-season range of motion (ROM), reduced core muscle strength, and delayed activation of the transversus abdominis muscle. (Maffey and Emery, 2007) age, body size, limb dominance and playing position The were not identified as significant risk factors for hamstring strains (Bradley and Portas , 2007).

Guidelines with regard to the return to play after a muscle injury are important for the attending sports physician, but there is no clear consensus on these guidelines. (Orchard et al., 2005) Research has established that there is a high risk of recurrent injury during the first 12 weeks after injury (Kraemer and Knobloch, 2009). The following are clinical guidelines for return to play after a muscle injury:

1. There must be no pain, weakness, stiffness, tenderness or pain with muscle contraction.
2. A full range of motion must be restored and the football player must perform normally during full functional sports-specific testing. It has been suggested that isokinetic muscle strength testing should show normal concentric and eccentric muscle strength (within 10% of the non-injured side) and normal muscle strength ratios must be present (concentric agonist/eccentric antagonist).
3. Normal muscle activity patterns must be restored before the player can return to full play.

Studies have shown that muscle strain injuries in football can be prevented by football-specific balance training in a dose-response fashion (Kraemer and Knobloch, 2009). Therefore, in addition to strengthening muscles, in particular eccentric trainingneuromuscular and proprioceptive training are important components of a muscle injury prevention programme in football (Askling et al., 2003; Biedert and Bachmann, 2005).

Groin and hip injuries in football are common. However, they are often difficult to diagnose and treat. Groin injuries are among the four most common types of injury in football. They account for 7 to 11% of all injuries (van Mechelen et al, 1992).

Overuse injuries are the result of constant overloading by repetitive forces and wearing down of a tendon, muscle, bone or joint. In football, overuse injuries account for 9 to 34% of all injuries and range from mild tendinopathy to stress fractures (Silvers et al, 2007).

Literature on head and brain injuries show that there have been concerns raised about potential brain damage due to repeated ball heading as well as head injuries that occur in football. Fortunately, brain injuries that result in structural damage are extremely rare and usually occur only after severe ground to head, head to head or elbow to head collisions in the facial or parietal region. Most head injuries are minor e.g., brain concussion, but more severe injuries could occasionally occur e.g. subdural haematoma or intracerebral haemorrhage. There is little prospective scientific literature available concerning head injuries in football and F-MARC has relied mainly on descriptive surveys conducted at FIFA competitions, starting with 1998 FIFA World Cup and including events for both male and female players as well as different age groups. Literature states that a total of 13,992 playing hours in 424 matches from 14 competitions were taken into account. Head and neck injuries (165 in total) during matches accounted for approximately 14% of all injuries seen, but only as few as 23 concussions (2% of all injuries, 13.9% of all head and neck injuries i.e. 1.6 per 1,000 playing hours) were noted. Concussions were due to contact with another player and not because of heading the ball. Comparing the head injury incidence from FIFA competitions with other literature from F-MARC studies on amateur football players, the frequency of head injuries increases as the level of competition increases and head injuries occur up to four times more in high-profile competitions.

Although there is no data available that would allow a precise comparison, it may well be true that real spinal injuries occur considerably less frequently among footballers than among other sportsmen. Spinal problems generally are more common among footballers than among other sportsmen. According to Ackerman et al (2009), the reason behind the greater incidence of spinal problem among footballers might be that football training often concentrates on building up or exercising the lower body musculature, while the stomach, back, shoulder and neck muscles tend to be neglected. The F-MARC study (2007) investigated back injuries and other complaints among footballers. All the injuries and complaints sustained by 264 footballers from different age and stability groups were recorded on a weekly basis over a one-year period. The weekly examinations of the players conducted by specially designated doctors ensured that complete documentation and records were kept. These included minor complaints and injuries. Over the course of the year, some 37% of the players in the study reported suffering from lumbar spine complaints, while 33% complained of problems in the neck and head region.

2.7 Other General Risk Factors to Football Injuries

Nutrition

The available literature generally shows that proper nutrition plays a role in the good health and performance of the footballers. The result of which is prevention of avoidable injuries among the athletes (Maughan et al, 2005). From the literature, it is the researcher's opinion that the opposite of good nutrition on part of the athletes usually yield a different effect as football injuries could be prevented by good muscular built and good body mass index according to a playing position of a footballer.

Doping

Another area of concern in football as far as injuries are concerned is the aspect of doping. The FIFA's strategy in the fight against Doping in Football defines doping as 'any attempt either by the player, or at the instigation of another person such as manager, coach, trainer, doctor, physiotherapist or masseur, to enhance mental and physical performance un physiologically or to treat ailments or injuries when this is medically unjustified for the purpose of taking part in a competition'. This includes using, taking or injecting, administering or prescribing prohibited substances prior to or during a competition. According to FIFA Doping Control Regulations (January 2006), doping contravenes the ethics of sport, constitutes an acute or chronic health hazards for players and may have fatal consequences. If a player has taken some performance enhancing substance, he/she plays under such drugs influence.

The judgement gets impaired temporarily and may fail to reason as to when and with what amount of energy to make a contact with either the ball, the opponent and or with the ground. This leads to high chances of sustaining injuries.

F-MARC 2009 states that the approach to reducing the incidence and minimizing the short and long term consequences of acute and overuse or gradual onset injuries in football is based on the principle of risk management. For example, prior to the FIFA 2006 World Cup German, F-MARC developed a standardized pre-competition medical assessment (PCMA) for the world's elite football players. The objective of this (PCMA) was to maximize the probability of detecting the risk factors that challenge players' health, with regard to not only sudden cardiac death (SCD) but also other serious health risks and severe injuries (Dvorak 2006).

Before a player starts participating in any sport, he or she should be medically examined to ensure that he is physically fit to cope with the demands of training and playing (Ackerman 2009).

Players should be asked about musculoskeletal injuries and current complaints, and an experienced physician should perform an orthopedic examination. Before the medical history, a player should be briefly asked for his position, the dominant leg and the number of matches he/she has played in the last 12 months. These initial questions help to indicate the physical and mental demands on a player as exerted by his or her individual responsibilities within the team, the level of play and his training and match schedules. Ackerman et al. further explains that knowledge of the medical history of the musculoskeletal system may help to identify risk factors for injury. The player should be asked about previous injuries, especially those leading to a time loss of more than four weeks, and about any operations on the musculoskeletal system. It should be determined whether the player suffers from any current complaints, aches or pains. Whether there are known diagnoses and what treatment is applied for those.

Van Mechelen et.al (1992) in the article "incidence, Severity, Aetiology and Prevention of sports injuries" gives a similar approach in prevention of injuries to that of Petersen et.al (2000). He states that many sports injuries are accidents that simply happen and others follow a predictable pattern. When the circumstances of an injury are predictable, there might be a way of avoiding them. If an injury can be prevented, a player will be a healthier player who can stay on the pitch and in doing so becomes a better player.

That is to say, prevention of injuries improves players' chances of developing as a player. He further explains in agreement with other studies that there are many ideas with regard to preventing injuries. Many of which make good sense but the medical profession prefers to test the effects of any prevention programme in order to prove that it actually works. Prevention programmes can be designed to have some impact on a multitude of injuries or can be specific to a certain injury. The process of proving if a programme works is said to be much the same in all cases. Firstly, experts must establish how frequently the injury in question occurs. Next, they determine what causes the injury. Thirdly, they should develop prevention programmes and put them into practice. Finally, they should be able to determine the injury rate after introducing the programme. This goes therefore with the evidence that if the programme works, then the new injury rate will be lower than the initial injury rate.

2.8 Mitigating Football Injuries

In the past few years, football-governing bodies have scaled up the promotion of medical assessment of players before they engage in active football and training. It is an approach to reducing the incidence of injuries and minimizing the short and long-term consequences of acute and overuse or gradual onset injuries in football. This approach is based on the principle of risk management. FIFA has mandated its affiliates, the local national football governing bodies to carryout research studies on injuries in order to facilitate for preventive and therapeutic interventions (F-MARC, 2009). It is through such studies that the risk factors could be identified estimated and evaluated (risk assessment). In Zambia, this fight has been extended to the Football Association of Zambia to improve the health of players through its Medical Committee in collaboration with the football team's physicians and team physiotherapists.

Their goal has been to raise physically, psychologically and medically fit football players who are self disciplined in following the football injuries prevention and management procedures while enhancing both individual as well as team performance (FAZ, 2009). This is true in the sense that there is need to prevent the increasing number of injuries in football. In order to manage and prevent the increasing number of injuries in football, quality health care service needs to be extended to the athletes. This is because well-informed athletes with qualified medical staff attached to their teams may be psychologically ready for either training or competitive game, which may put them at a less risk of sustaining an injury. This raises the need to attach health personnel to every football team in Zambia. However, very few qualified medical doctors and physiotherapists are actively providing health care to the footballers, a situation that contributes to incidence of football injuries.

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2.9 Consequences of Injuries

Usually the severity of injuries is estimated based on the duration of absence from matches and training sessions. As shown above, injuries are common in football and studies have shown that 11%-35% of injures are severe (lasted more than three or four weeks), and recurrent injuries are also common (Ekstrand and Gillquist 1983a; Nielsen and Yde 1989; Yde and Nielsen 1990; Poulsen et al. 1991; Luthje et al. 1996; Hawkins and Fuller 1999; Ostenberg and Roos 2000; Peterson et al. 2000; Hawkins et al. 2001; Woods et al. 2002). Therefore it could be expected that moderate, severe or recurrent injuries could affect players’ physical fitness and even the team performance. Some injuries could not only affect performance, but also have health consequences, either immediately or later in life. Studies have shown that knee injuries (especially ACL injuries) usually cause the longest absence from match and training (Ekstrand and Gillquist 1983a; Nielsen and Yde 1989; Luthje et al. 1996; Ostenberg and Roos 2000; Chomiak et al. 2000). Nielsen & Yde (Nielsen and Yde 1989) also found that 28% of players that incurred injuries during the study period, still had complaints one year after the injury occurred.

Drawer and Fuller (Drawer and Fuller 2002b) found from questionnaires from 185 former professional football players, that the players felt that injuries could limit the duration of their playing carrier or result in medical problems, as well as reduce future earning potential. From the same questionnaire they also found that 47% (n=79) of the former professional players retired because of injuries (Drawer and Fuller 2001). Of these, 42% (n=33) were acute injuries (mostly located in the knee, followed by the ankle and low back), but 58% (n=46) were chronic injuries (mainly located in the knee followed by the low back and the hip). They also refer to Windsor Insurance Brokers Limited (1997), which found that 2% of English professional football players retire each year because of an acute injury. Nielsen and Yde (Nielsen and Yde 1989) reported that 4% of players that incurred injuries during one season retired because of their injuries. (Ekstrand et al. 1990) reported that after eight years follow-up of 179 football players, 22% had given up because of injuries. Söderman et al. (Söderman et al. 2002) found that 78% of female football players had stopped playing football 2-7 years after ACL injuries, mostly (80%) because of symptoms from their injured knee. Roos (Roos 1998) reported that osteoarthrosis was the main chronic injury suffered by former professional football players and this is supported by others (Drawer and Fuller 2001). Studies have shown an increased risk of osteoarthrosis in knees and hips of former elite-level football players, with an odds ratio for the knee of 4.4-5.2 (Roos et al. 1994; Kujala et al. 1995), and 3.7 in the hip compared with an age-matched control group (Lindberg et al. 1993). Furthermore, it has been found that the prevalence of hip and knee osteoarthrosis among former elite football players at an average age of 63 years was 14-15% compared to 3-4% in a control group (Lindberg et al. 1993; Roos et al. 1994). Even when players with a history of previous knee injuries were excluded, 11% of the former elite players still had knee osteoarthrosis compared with 4% in the control group. Compared to the control group, no increase of osteoarthrosis was seen in knees and hips among former players that had played at lower level (Lindberg et al. 1993; Roos et al. 1994). Therefore, football at elite level seems to increase the risk of osteoarthrosis.

Injuries in football are also expensive for the players, teams and insurance providers. Dvorak and Junge (Dvorak and Junge 2000) estimated that the medical costs of football-associated injuries among around 200 million football players registered with FIFA were around $30 billion per year. This estimate does not include the costs associated with loss of competition or working days. Increased knowledge about risk factors and mechanisms of injuries in football is therefore important, so effective preventive measures can be developed.

2.10 Causes of injuries

Risk factors for injuries in sport are commonly divided in intrinsic and extrinsic risk factors. Intrinsic or person-related risk factors can further been classified in physical and psychological risk factors. The physical risk factors consists for example of age, gender, previous injuries, level of play, flexibility, joint instability, generalized joint laxity, muscle strength, aerobic fitness, functional performance, prolonged reaction time, players height, weight and BMI, and anatomical alignment (Taimela et al. 1990a; Inklaar 1994b; Engstrom and Renstrom 1998; Ostenberg and Roos 2000; Dvorak et al. 2000; Gissane et al. 2001). The psychological risk factors reported are for example live-event stress, fighting mentality and risk-taking behaviour (Taimela et al. 1990a; Dvorak et al. 2000).

Extrinsic or environmental related risk factors may be the playing surface, player exposure, playing position, time in match, equipment (shin guards, shoes, orthosis, tape), coaching-related factors (quality, training load), rules and foul play (Taimela et al. 1990a; Inklaar 1994b; Engstrom and Renstrom 1998; Gissane et al. 2001).

Football is a complicated sport characterized by short sprints, rapid acceleration or deceleration, turning, jumping, kicking and tackling (Wisloff et al. 1998; Bangsbo and Michalsik 2002). Understanding the aetiology of risk factors and mechanisms of injuries in football is an important base of preventive measures. Meeuwisse (Meeuwisse 1994) developed a multifactorial model of athletic injury aetiology to examine the contribution of various factors in injury aetiology and to explore their interrelationship (Figure. 2.13.1). In this model, intrinsic risk factors may predispose an individual to injury, but are seldom sufficient to cause the injury. Then extrinsic risk factors may interact with the intrinsic risk factors, and when both intrinsic and extrinsic risk factors are present the athlete is defined as “susceptible” for injury. However, this is usually not sufficient for injury to occur. The final link in the chain of causation is the inciting event, which is described as all of the events leading to injury. This includes e.g. joint kinematics, the playing situation where the injury took place, the position on the field, the interaction with other players and the skill performed by the injured player (Bahr and Holme 2003).

When studying risk factors for injuries, all of these factors must be taken into account, because it is the sum of these factors that causes the injury (Meeuwisse 1994).

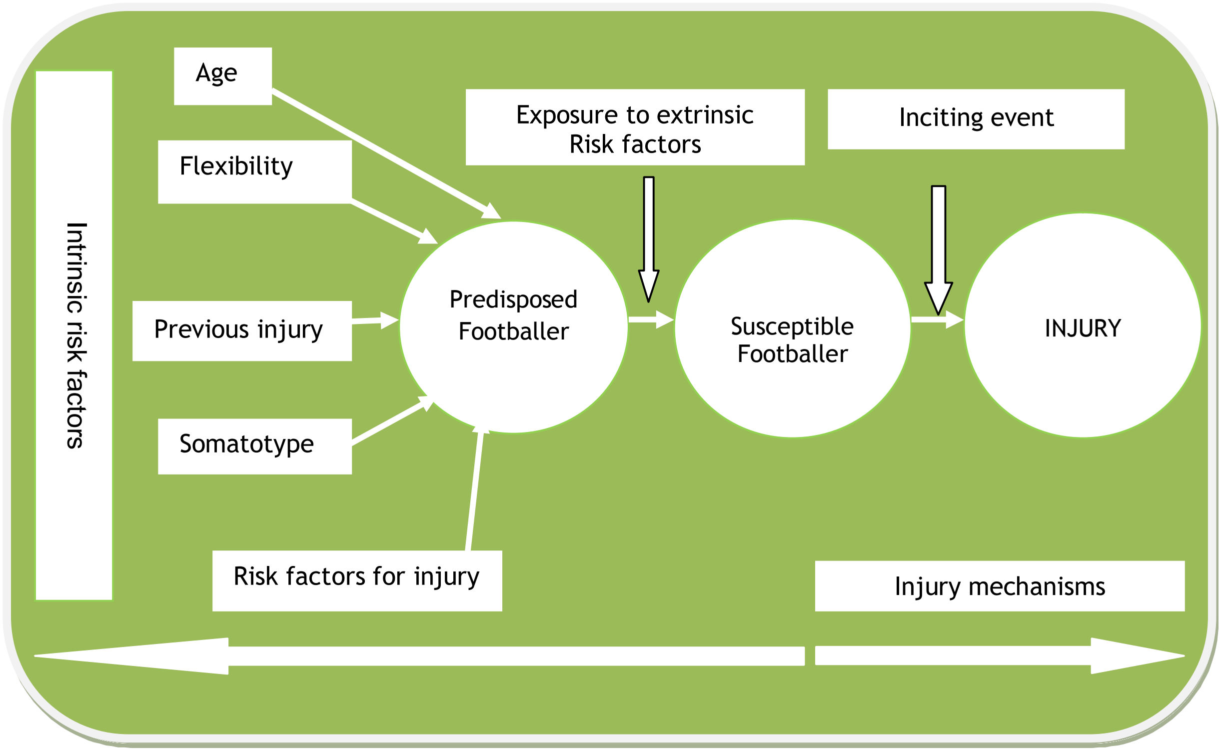

Figure. 2.10.1 Multifactorial model of athletic injury aetiology (Meeuwisse 1994).

Unfortunately, some of these studies have an insufficient number of participants, making the study power too low to obtain significant results. Most of these studies examine the injury frequency in relation to the presence or absence of a single risk factor (univariate analysis). Because of the complexity of risk factor analysis and possible interaction between different risk factors, a multivariate model has been recommended (Meeuwisse 1994; Ostenberg and Roos 2000). However, only two prospective cohort studies were found that have used a multivariate approach to analyze risk factors for injuries in football. They are both published but include only relatively few athletes and risk factors (Ostenberg and Roos 2000; Soderman et al. 2001b) (Table 2.13.1). In addition, one study used a multivariate model both on retrospective and prospective data (Taimela et al. 1990b), and two retrospective studies used a multivariate approach (Delaney et al. 2001; Delaney et al. 2002). Thus, it should be kept in mind that the research on risk factors for football injuries is limited, both in terms of methodological quality and the number of studies available.

Table 2.10.1 Profile of Risk Factors within the Ecological Paradigm

Citation Country	Study population (age)	Duration	Injuries Studied	Factors evaluated as possible risk factors
Delaney et al. (2002) Canada	82 male and 110 female football players at university level	1 season (1985)	Concussion	Previous concussion during or not during football, previous loss of consciousness during or not during football, years played football, age, age started organized football, participation in other sport, increased alcohol intake, gender, average number of headings per match, amount of season played (summer, fall, winter).
Delaney et al. (2001)	70 male and female football players, university level (20.6 ± 2.7)	1 season (1997)	Concussion	Age, number of years plying football, number of matches played during the season, past concussion, past losses of consciousness, alcohol intake.
Hawkins et al. (2001)	2376 male professional football players	2 seasons (1997-1999)	All time loss Injuries	Time in match.
Söderman et al. (2001b)	199 female football players, 2nd and 3rd Division (20.6 ± 4.7)	1 season (1998)	Traumatic leg injuries	Age, previous injuries, foot alignment, knee alignment, Qangle, generalized joint laxity, anterior drawer test for ankle, knee laxity (Lachman, varus, valgus), balance (stabilemetric value), ankle dorsal flexion, hamstring flexibility, H/Q ratio, exposure.
Dvorak et al. (2000) Czech Republic	264 football players at different age and skill level	1 year	All time loss Injuries	Age, BMI, body fat (%), previous injuries, pain in low back, muscle/tendons or joints, age when beginning football play, started to play football not in a club, technique (self rating), exposure, aching/stiff muscles before match, warm-up, 12 min run, reaction time, drinking alcohol, more a "fighter" when getting near an opponent, life event stress, change of coach, and transfer to another club.
Östenberg and Roos. (2000)	123 female football players at different age and skill levels (14-39 y)	1 season (1996)	All time loss Injuries	Age, weight, height, BMI, years of playing football, Generalized joint laxity, Isokinetic hamstring and quadriceps muscle strength, estimated VO_{2max} (continuous multistage fitness test), one leg hop, vertical jump, square-hop.

Citation Country	Study population (age)	Duration	Injuries Studied	Factors evaluated as possible risk factors
Hawkins and Fuller. (1999)	108 professional and 30 youth football players	3 seasons (1994-1997)	All time loss Injuries	Time in match.
Bjordal et al. (1997)	176 male and female football players at various level (15-55 y)	(1982-1991)	ACL	Gender, age, level of play.
Inklaar et al. (1996)	245 senior and 232 junior male non professional football players (21.6 ± 8.4, range 13-60 y)	2nd half of the 1996/1997 season (Feb.- June)	All (not only time loss)	Age, level of play, previous injuries.
Arendt and Dick. (1995)	On the average 92 collage male teams and 56 college female teams per year	5 years (1989-1993)	Knee injuries	Gender.
Roos et al. (1995)	778 male and female football players at various level	One year (1986)	Knee injuries	Age, gender, level of play, playing position.
Lindenfeld et al. (1994)	Male and female football players at various age and level of play (7-50 y)	7 weeks (300 indoor games at local indoor football arena)	All, if player left match, or requested Medical attention, or match stopped because of injury	Age, gender.
Poulsen et al. (1991)	19 elite football players (21-28y) and 36 players at lower level (24-30 y)	1 year	All time loss injuries	Level of play.

Citation Country	Study population (age)	Duration	Injuries studied	Factors evaluated as possible risk factors
Taimela et al. (1990b)	37 male football players at various level of play	3 years before test, 1 year after test	All time loss injuries	Previous injuries, reaction time, arm-hand-steadiness, balance, speed of arm and leg movements, multi-limb coordination, vertical jump, figure-8-running, personality factors.
Backous et al. (1988)	681 boys and 458 girls at summer soccer camp (6-17 y)	4½ days of activity	All time loss injuries	Girls: Age. Boys: Age, weight, height and, grip strength.
Eriksson et al. (1986)	40 male football players form 4th division (23.6 ± 4.0)	1 year (1980)	Time loss injuries classified as: overuse, sprains and other	Estimated maximal O_2 uptake on ergometer bicycle.
Tropp et al. (1984)	127 male football players (17-38 y)	1 season (1980)	All time loss injuries especially ankle injuries	Previous ankle injuries, stabilometry.
Ekstrand and Gillquist. (1983b)	180 male football players in 4th division (24.6 ± 4.6, range 17-38 y)	1 year (1980)	All time loss injuries	Previous injuries, joint instability, muscle tightness in hip adductors, hip flexors, hamstring, quadriceps and gastrocnemius, hamstring and quadriceps isokinetic strength, H/Q ratio, lack of training, inadequate rehabilitation, inadequate use of shin guards, quality of playing surface.
Ekstrand et al. (1983b)	180 male football players from 4th division (24.6 ± 4.6, range 17-38 y)	1 year (1980)	All time loss injuries	Player exposure in match and training.
Ekstrand and Gillquist. (1983a)	180 male football players from 4th division (24.6 ± 4.6, range 17-38 y)	1 year (1980)	All time loss injuries	Previous injuries, time of injuries during in matches and training.

2.11 Research Designs in Sports Medicine

Research in football takes a prospective or cross sectional non-experimental design. Very few studies look at prevalence but a great deal of them looks at incidence. Sample sizes are usually large and range from half a thousand to over a thousand and studies last at least one season. Various data collection methods are used depending on the design. Pure quantitative research uses injury cards, epidemiological data and survey questionnaires whereas researchers tend to conduct documentary reviews, interviews and observations. Studies tend to be explorative and descriptive although there are some that are intervention based.

Researchers may collect data from training camps and training sessions associated qualitative with official and friendly matches. Complex data analyses are performed depending on the research design used. Where comparative tests were needed, quantitative variables were compared between groups using Student's t-test or the Mann–Whitney U-test in case of heterogeneity of variance (F-ratio test) or a non-normal distribution (Kolmogorov– Smirnov test). The significance level in most instances was set at $\rho < 0.05$. Results were expressed as means with standard deviations (SDs) for continuous variables and counts and percentages for categorical variables. X^2Test was used to compare the rates of injuries in matches and training sessions in some instances and Fisher's exact test was used when the expected count was <5. Mann–Whitney U-test was used when comparing two groups and Kruskal–Wallis test when comparing more than two groups (see Table 2.11.1).

Table 2.11.1 Samples of Most cited Articles and their Research Designs

Author	Title	Design
C. Eirale, B. Hamilton, G. Bisciotti, J. Grantham, H. Chalabi (2010)	Injury epidemiology in a national football team of the Middle East.	The Qatar senior male national football team was followed prospectively for a period of 17 months (June 2007–October 2008). During this period, 14 official and 19 friendly matches were played. All training camps and training sessions associated with official and friendly matches are included in this study, accounting for 171 training sessions. A total of 36 different players were included in the analysis, with the players mean age, weight and height upon entry to the study being 23.8 years, 72.9 kg and 176.3 cm, respectively.
J. Ekstrand, M. Hagglund, C. W. Fuller (2010)	Comparison of injuries sustained on artificial turf and grass by male and female elite football players. Scand J Med Sci Sports	The objective of this study was to compare incidences and patterns of injury for female and male elite teams when playing football on artificial turf and grass. Twenty teams (15 male, 5 female) playing home matches on third-generation artificial turf were followed prospectively; their injury risk when playing on artificial turf pitches was compared with the risk when playing on grass.
J. Petersen K. Thorborg, M. B. Nielsen, P. Ho¨ lmich (2000)	Acute hamstring injuries in Danish elite football: A 12-month prospective registration study among 374 players.	Hamstring injuries among 374 elite football players were registered prospectively during a 12-month period. A total of 46 first time and eight recurrent hamstring injuries were registered.
K. Steffen, G. Myklebust, O. E. Olsen, I. Holme, R. Bahr (2008)	Preventing injuries in female youth football – a cluster-randomized controlled trial	A set of exercises – the ‘‘11’’ – have been selected to prevent football injuries. The purpose of this cluster-randomized controlled trial was to investigate the effect of the ‘‘11’’ on injury risk in female youth football. Teams were randomized to an intervention (n559 teams, 1091 players) or a control group (n554 teams, 1001 players). The intervention group was taught the ‘‘11,’’ exercises for core stability, lower extremity strength, neuromuscular control and agility, to be used as a 15-min warm-up program for football training over an 8-month season.

Author	Title	Design
Martin Hagglund, Markus Walde´n, Jan Ekstrand	Injury incidence and distribution in elite football prospective study of the Danish and the Swedish top divisions	Using a cohort study design, the Danish male Super league (highest domestic level of competition) was followed prospectively during the Spring season (January–June) of 2001. From March to June. All 12 teams in the Danish Super league were invited to participate in the study.
J. Ekstrand1, M. K. Torstveit	Stress fractures in elite male football players.	The objective was to investigate the incidence, type and distribution of stress fractures in professional male football players. Fifty-four football teams, comprising 2379 players, were followed prospectively for 189 team seasons during the years 2001–2009. Team medical staff recorded individual player exposure and time-loss injuries. The first team squads of 24 clubs selected by UEFA as belonging to the 50 best European teams, 15 teams of the Swedish Super League and 15 teams playing their home matches on artificial turf pitches were included.
Michael J. Mello, MD, MPH, Richard Myers, Jennifer B. Christian, PharmD, PhD, Lynne Palmisciano, MD, and James G. Linakis, MD, PhD	Injuries in Youth Football: National Emergency Department Visits during 2001–2005 for Young and Adolescent Players	A retrospective analysis of ED data on football injuries was performed using the National Electronic Injury Surveillance System–All Injury Program. Injury risk estimates were calculated over a 5-year period (2001–2005) using participation data from the National Sporting Goods Association. Injury types are described for young (7–11 years) and adolescent (12–17 years) male football participants.
Martin Hagglund, Markus Walde´n, Jan Ekstrand	Exposure and injury risk in Swedish elite football: a comparison between seasons 1982 and 2001	Using a cohort study design, all teams (N512) in the Swedish top division (highest domestic level of competition) were followed throughout the football season (January to October) in 1982. The design was the same as that used previously by Ekstrand (1982) on male amateurs. Before the start of the study, each team coach selected 15 players (first team) to participate in the study, giving a total of 180 players.

Author	Title	Design
B. J. Gabbe[1], K. L. Bennell, C. F. Finch, H. Wajswelner[4], J. W. Orchard[2]	Predictors of hamstring injury at the elite level of Australian football	A cohort of 222 elite players was recruited from six Melbourne-based AFL clubs during the 2002 pre-season period.
I. Jacobson, Y. Tegner	Injuries among Swedish female elite football players: a prospective population study.	All 12 female senior football teams from the premiere league in Sweden were invited to participate in this prospective cohort population study, and they all accepted the invitation. All active players in the teams at the beginning of the football season (n5269) were included in the study and followed until their individual time of dropout. Players recruited to the teams during the study period were not included in the study. In order to study total football exposure for these elite players, the women's national team and U-21 (under 21 years) the national team, were also studied.

2.12 Research Questions

Based on the statement of the problem, this study sought to answer the following research questions:

1. What is the prevalence of injuries in football teams affiliated to FAZ?
2. What types of injuries are sustained by football players?
3. What factors contribute to football injuries?

2.13 General Objective

To investigate the prevalence of football injuries as a way to evaluate injury patterns with the ultimate purpose of developing specific injury prevention programs for football teams affiliated to FAZ.

2.14 Specific Objectives

a) To determine the prevalence of injuries in Lusaka based Super and Division one football teams.
b) To describe the types of injuries sustained by football players.
c) To determine factors that may be associated with football injuries.
d) To compare in retrospect the prevalence of injuries between teams with qualified medical personnel and those without.

2.15 Hypothesis

There is no link between ecologic factors and injury.

2.16 Scope of the Study

This was an exploratory and descriptive study restricted to Lusaka based super division and division one-football teams registered with the Football Association of Zambia.

CHAPTER THREE- METHODOLOGY

3.0 Study Type

A cross sectional exploratory and descriptive study was proposed. This was determined by the fact that there was very little known about the subject.

3.1 The Research Setting and Study Population

In Zambia, football is mainly a post summer sport. The training period begins in February and practice games and tournaments start in March. The competitive season commences in April and ends in October or November. The investigated period in this study, include the footballing period.

The study population were only football teams belonging to two levels super league league and division I league based in Lusaka province. There are 207 teams in Zambia of which 46 are based in Lusaka belonging to four levels. Each team is allowed to register about 30 players. Within these 46 teams in Lusaka, 7 teams or clubs are in super League and 6 are in division and the rest are either in division two or three (FAZ records, 2010). This gave the researcher 13 teams from which to sample players. At the outset, all teams were eligible for study however, over time, six teams were unwilling to be part of the study and this left a total number of seven. Therefore, the study population included only football players. The population size from these teams was 390.

Using Epi-Info version 3.5.1, from a population size of 390, with the expected frequency (incidence) of 50% and using a precision of 5% which brings worst acceptable results at 55%, the researcher adjusted for a response rate of 90% which is 194/0.9 resulting into a final sample of (215.5) or 216 required sample size. The formula below informed this study. Sample size n = 216 will be calculated using the following formula;

$$n = Z^2 PQ / d^2$$

Where; $Z=1.96$ at $\alpha = 0.05$ and $Q = 100 - P$.

3.2 Inclusion and Exclusion criteria

Inclusion criteria

The present study covered all injuries sustained only by male players during the matches and associated training sessions in the last half of 2010 season and the 2011 full soccer season.

Exclusion criteria

The researcher did not include injuries sustained by players who were on trial and who were not registered with the team in the last half of the season

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3.3 Sampling, Data Collection Techniques and Procedure

In order to elucidate the demands of the research questions, a sampling frame of all registered players was used. Injuries that were on the register were first examined to determine the rates of injuries at that particular time and those that were registered during last half of the 2010 football season in the super and division one leagues.

The collection of data followed the international consensus agreements on procedures for epidemiological studies of football injuries recommended by FIFA and UEFA (Hagglund et al., 2005; Fuller et al., 2006). Whereby, in order to reduce bias and inconsistencies in data collection, all clubs were provided with a manual containing information about the study design and definitions together with explanatory examples and scenarios.

Eligible football players who were found on the pitch on the day of the study were invited to participate in the study. Proportionate sampling was be used to draw players as study units from each team. All respondents were asked to fill in a standardized injury card (called in research as a survey questionnaire). The standardised injury card was filled in for all injuries that may have occurred in a team in the previous six months and o that day.

3.4 Operational Definitions

The definitions used follow the recommendations of the consensus statement for football injury studies (Fuller et al., 2006). The operational definitions that apply in this study are as follows:

Dependent variables

1) An injury will be defined as any harm occurring during a match or training session causing the player to miss the next match or training session.The injury will be operationalised using FIFA football for health research guidelines to determine the severity of an injury using time as an indicator. A definition of injury based on time lost from the sport, as used in this study, has been recommended for studies on football injury since it directs attention to those injuries that are most likely to have an important effect on the player's health and performance (Keller et al., 1988). Therefore a classification into three based on severity according to the length of absence from training sessions and matches including the day of injury is used and this includes (i) minor (1–7 days); (ii) moderate (8–28 days) and (iii) and major (over 28 to 428 days) (Hagglund et al., 2003 ; Ekstrand et al., 2004).
2) A player is defined as injured until he considered himself able to participate fully in the practice and/or game time.

3) A player who could not fully participate in team training or matches, or trained with a modified exercise programme, is considered as injured (Ekstrand et al., 2004:37).
4) Re-injury is injury of the same type and at the same site as an index injury occurring within 2 months after a player's return to full participation from the index injury.
5) An overuse injury is that harm without any known trauma being a pain syndrome of the musculoskeletal system appearing during physical exercise, disease, deformity or anomaly that might have given previous symptoms (Orava, 1980).
6) Sprain is defined as a ligament injury.
7) Strain as a distension injury to the muscle-tendon unit.
8) A training session is defined as any coach-directed scheduled physical activity carried out with the team.
9) A match means a football game that was a competitive one or a practice one and coach-directed.

Independent variables

Ecologic factors will be operationalised as causes or associated factors with football injuries and these include:

1. Intrinsic or person-related risk factors will be classified as physical and psychological risk factors. The physical risk factors consists for example of age, gender, previous injuries, level of play, aerobic fitness, prolonged reaction time, players height, weight (Taimela et al. 1990a; Inklaar 1994b; Engstrom and Renstrom 1998; Ostenberg and Roos 2000; Dvorak et al. 2000; Gissane et al. 2001). The psychological risk factors reported are for example live-event stress, fighting mentality and risk-taking behaviour (Taimela et al. 1990a; Dvorak et al. 2000).

2. Extrinsic or environmental related risk factors will be classified as ; playing surface, player exposure, playing position, time in match, equipment (shin guards, shoes), coaching-related factors (quality, training load), rules and foul play (Taimela et al. 1990a; Inklaar 1994b; Engstrom and Renstrom 1998; Gissane et al. 2001).

3.6 Data Processing and Analysis

Univariate ,bivariate analysis and multivariate analyses were done after recoding the data. Statistical analyses were performed with use of the Statistical Analysis System 6.03 edition (SAS Institute, Inc., Cary, North Carolina). The Wilcoxon test was used for comparison of median values when the distributions were not normal, as was the case for many of the variables examined (age, levels of education, level of playing football, experience, intrinsic and extrinsic factors). The chi-square and Fisher's exact test were used for comparisons of categorical data. Stepwise logistic regression analysis was used as an exploratory technique to determine whether baseline variables were associated with the occurrence of subsequent injury.

Only one injury per player was counted in the analysis even though a player may have sustained more than one injury during the season. Analyses based on the entire team would include some players who played very little and some who had a lot of exposure time. On the other hand, first-string players would, on average, have similar amounts of playing time ("time at risk"). Because actual amount of playing time was not available for each individual player, analyses of first-string players were performed separately in an effort to indirectly control for playing time (exposure potential). A *p* value 0.05 was used to define statistical significance.

3.7 Ethical Consideration

Ethical approval was sought from the Biomedical Ethics Committee of the University of Zambia. Permission to carry out the study was obtained from the National Football Governing body, Football Association of Zambia FAZ and from the relevant local teams' authorities. Informed consent from the legible respondents was obtained and confidentiality was highly assured. Players with undisclosed injuries were assured of confidentiality that there will be no victimization and their names will not be known or disclosed to their club officials. In case of the media breaking confidentiality, no actual names were entertained in the research and there was no disclosure of individual identity in the report.

3.8 Pilot Study

Pre-testing of the study instruments will be done before the main study in order to make sure the questions are clear and user friendly, concise and consistent. One super league team and one division one team on the Copper belt were randomly selected for this purpose. The pilot study was conducted on a sample of thirty (30) respondents and these have not been included in the sample of the main study.

CHAPTER FOUR- RESEARCH FINDINGS

4.0 Introduction

This chapter presents the research findings as presented in the three research questions. Three themes underpin the presentation. However, before examine the key findings; this section presents the demographic profile and the football setting. This is done to allow readers appreciate the background information and understand the findings in a definite context.

4.1 Demographic Profile of Respondents

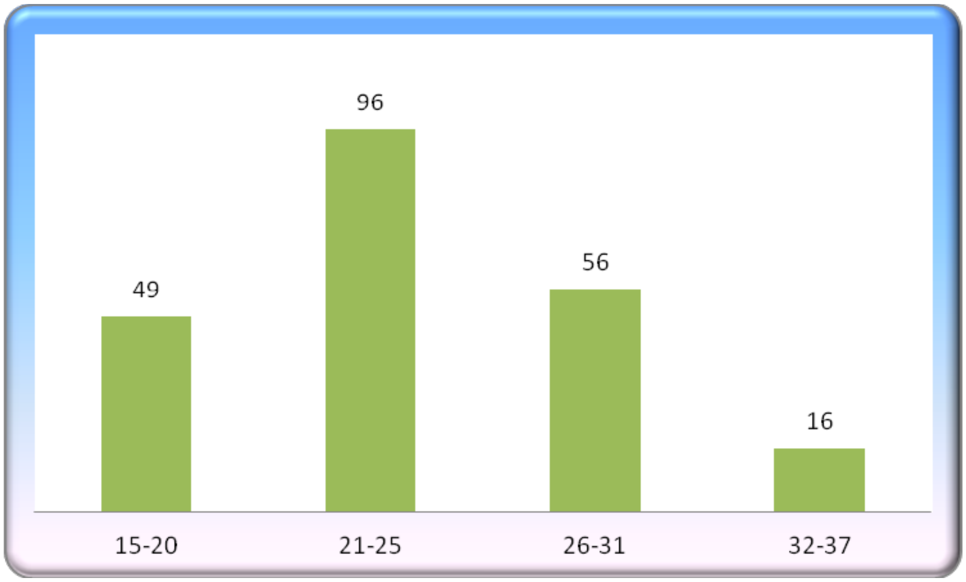
The sample for this study comprised 217 football players enlisted by two divisions, which are super, and division I. The sample was relatively composed of youthful players. The youngest who was 15 was playing for the first division and this was expected. The mean age was 23 (SD ±4.4). There was no difference in the median and modal ages in the sample (table 4.1.1).

Table 4.1.1 Age profile of football players

Mean	23.67
Median	23.00
Mode	24.00
Std. Deviation	4.41
Minimum	15.00
Maximum	36.00

Looking at the age range profile, it was evident that most of the players n = 150 would have longer playing careers (aged 15 to 25) as compared to those n = 82 aged 26 to 37. This is considered out of prime playing time in Zambia.

Figure 4.1.1 Age range profile of football players N = 217



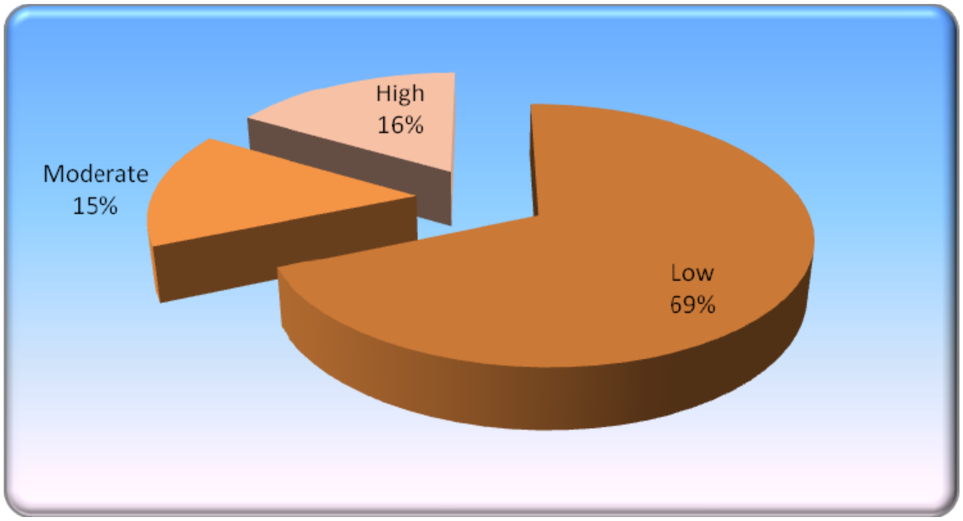
Generally, the players could be said to have been schooled and there was no significant difference in level of schooling across the two divisions (Values 4.498' *df* 3 and *p* = 0.212). There were very few graduates n = 23 playing completive football as compared to non-graduates n = 194.

Table 4.1.2 Highest level of education attained and Level of playing N = 217

		Level of playing		***Total***
		Super division	***Division I***	
Highest level of education attained	Primary level	1	8	9
	Grade Nine level	14	32	46
	Grade Twelve	28	111	139
	College/University level	8	15	23
Total		51	166	217

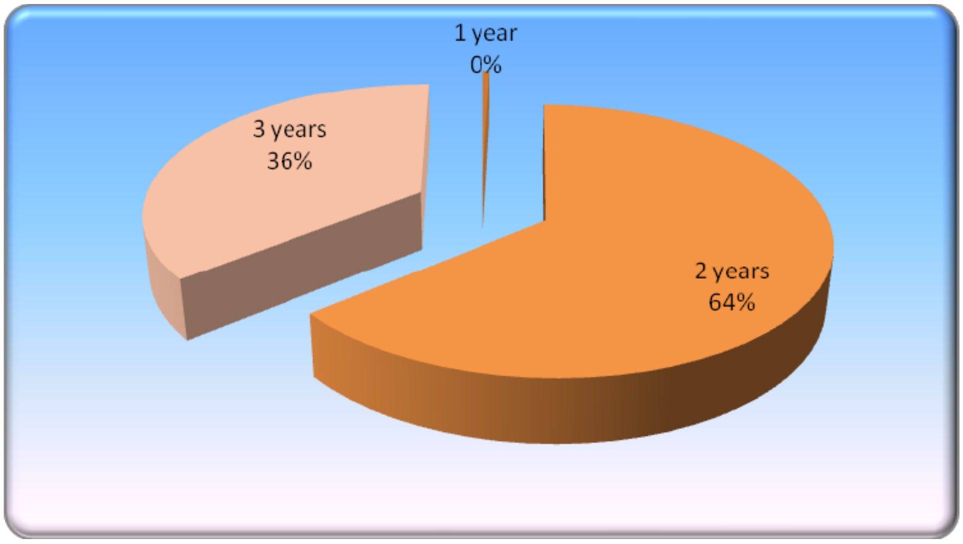
Though football is the most popular sport, in the study sample, the footballers perceived themselves as low, moderate, or highly paid. N = 149 (68.7%) stated that they were lowly paid, n = 36 (16.6%) were highly paid and n= 32 (14.7%) were moderately paid.

Figure 4.1.2 Income levels of football players N = 217



The football players had not been with their teams longer than expected. The mean, median and modal playing duration was 2 years. A large number n = 138 (63.6%) had been with their teams for at least two years, n = 78 (35.9%) for one year and one (0.5%).

Figure 4.1.3 Duration with team N = 217



While type of medical personnel in the team is critical, the author assessed the distribution of these within the teams. It was noted in the seven football teams that when a doctor was present, the need for other helpers was reduced. The chances of seeing a doctor in the first division were slim. However, other types of personnel would be available only when combinations were needed by the team (table 4.1.3).

Table 4.1.3 Distribution of medical personnel N = 7

Team type	*Level*	*Medical Personnel*					
		Clinical officer	*First Aider*	*Physio therapist*	*nurse*	*Occupational Therapist*	*Team doctor*
Team 1	Super league	-	-	1	-	-	1
Team 2	Super league	-	-	1	-	-	1
Team 3	Super league	-	2	1	-	-	1
Team 4	Division I	1	-	-	-	-	-
Team 5	Division I	-	1	-	-	1	-
Team 6	Division I	1	1	-	-	-	-
Team 7	Division I	-	-	1	-	-	-

4.2 Rates of injuries

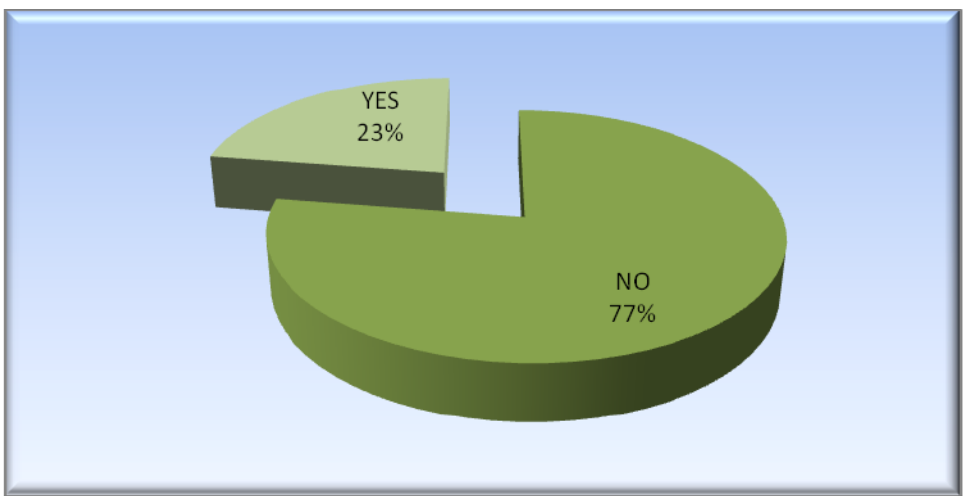
In this sample, most of the players were right footed n = 110 (50.7) than both n = 75 (34.6) or left footed n = 32 (14.7%). At the time, data was being collected, n = 71 (32.7%) football players were on the injury list. Of these 71, n = 15 were from the super division and n = 56 were from the first division (Table 4.2.1). There was however, no association between level of playing football be it in the super division or first division in being injured (value = 0. 331, df = 1 and the observed p value was = 0.565 and this was higher than the alpha value 0.05.

Table 4.2.1 Injury rate

	Response type	Super division	Division I	Total
At the moment, do you have an injury?	NO	36	110	146
	YES	15	56	71
Total		51	166	217

When the football players who had an injury sometime in the season arising either from training and competitive matches were asked if at all they had participated in some training, it was surprising to find that they were involved. Forty-nine (22.6%) of those who had been injured actually participated in some of training (figure 4.2.1).

Figure 4.2.1 Rate of football activity while injured



Additional analysis comparing rates of injury whether super division and division I by teams. There was no evidence to suggest that super division for instance had an increased rate of either head or neck (rate ratio (RR) = 0.76, 95 percent confidence interval (CI): 0.40, 1.43) or lower extremity (RR = 0.84, 95 percent CI: 0.51, 1.38) as compared with division I.

Table 4.2.2 suggested an increasing risk of head and neck and lower extremity injuries with each game played when over used were controlled for past injury. The Poisson regression equation predicted that the rate in any given division was 19 percent (95 percent CI: 9, 31) higher than the rate when there is no over use. Lower extremity injury rates were estimated to increase 15 percent (95 percent CI: 9, 23) per additional game played. Upper extremity injury rates were estimated to increase 10 percent (95 percent CI: 1, 21) per additional game played, although the confidence limits crossed the null value.

Table 4.2.2 demonstrates that there was evidence to suggest a greater rate of neck injuries, brachial plexus or "burner" injuries (i.e., a stretch injury to the nerves of the brachial plexus), and concussions when an individual had a history of injury, after results were controlled for economic status. There was no evidence to suggest a greater rate of subsequent head injury (excluding concussions) given a prior head injury, after data were controlled for level of playing. There was evidence to suggest that the rate of upper extremity, trunk, and lower extremity injuries increased given a history of injury, after control for level of playing. The rate of lumbar spine/pelvis injuries was estimated to be higher among footballers with a history of injury to this region (RR = 1.47), although the confidence interval for the rate ratio ranged from 0.88 to 2.47.

When these relations were evaluated according to body part, the point estimates of the incidence rate ratios were higher than those presented in the table for all upper extremity injuries combined. Specifically*,* Generalized Estimating Equation (GEE) Poisson regression rate ratio estimates, controlled for level of playing, ranged from 2.23 (95 percent CI: 0.82, 6.06) for the right hand to 4.11 for the left hand (95 percent CI: 1.96, 8.63), while the estimates for the left and right shoulder were 3.0 (95 percent CI: 1.62, 5.56) and 3.71 (95 percent CI: 2.28, 6.04), respectively.

Low numbers of cases for the arm, elbow, forearm, and wrist precluded sound estimates of the risk of injury given a history of injury as compared with no past injury. For the lower extremity, the GEE Poisson regression rate ratio estimates for specific body parts ranged from 1.47 for the left foot (95 percent CI: 0.28, 7.83) to 7.21 for the right hip (95 percent CI: 2.70, 19.27), after controlling for economic status.

The researcher conducted a sensitivity analysis to examine the effect of underreporting of neck injury among those with no past neck injury (unadjusted RR = 5.81 (table 4.2.2), assuming that no underreporting occurred among those with a past neck injury. With 90 percent of the neck injury cases captured in the no-past-neck-injury category, the unadjusted rate ratio would change to 5.23. At 70 percent case capture in the no past-neck-injury group, the unadjusted rate ratio would decrease to 4.1. Under the extreme condition of 50 percent case capture in the no-past-neck-injury group, the rate ratio would fall to 2.9. Neck injury capture would have to be 20 percent in the no-past-neck-injury group in order for the unadjusted rate ratio to fall to a practically and statistically insignificant value of 1.16.

Table 4.2.2 Rates of acute injury in game situations by level of playing

Location of injury and history of injury	Unadjusted rate of injury*	Unadjusted rate ratio	Adjusted† rate ratio	95% confidence interval
Head				
No past injury	0.24			
Past injury	0.47	2.00	1.20	0.15, 9.61
Neck				
No past injury	0.61			
Past injury	3.56	5.81	5.04	3.12, 8.16
Concussion				
No past injury	0.88			
Past injury	1.50	1.72	1.63	1.07,2.50
Brachial plexus				
No past injury	0.45			
Past injury	1.78	3.99	3.21	1.87, 5.52
Right upper extremity				
No past injury	1.10			
Past injury	2.07	1.88	1.61	1.07, 2.45
Left upper extremity				
No past injury	1.13			
Past injury	2.08	1.85	1.70	1.12, 2.57
Thoracic spine chest				
No past injury	0.34			
Past injury	1.63	4.73	4.26	2.19, 8.28
Lumbar spine/pelvis				
No past injury	0.60			
Past injury	0.87	1.46	1.47	0.88, 2.47
Right lower extremity				
No past injury	2.74			
Past injury	4.27	1.56	1.34	1.00, 1.81
Left lower extremity				
No past injury	2.13			
Past injury	4.24	1.99	1.53	1.10,2.12

4.3 Types of injuries

The design of this study regarding analysis of football injuries follows the descriptions by sports injury researchers (Moller-Nielsen and Hammar, 1989, 1991; Brynhildsen et al., 1990, 1997a, b; NATA, 2009; CME, 2010). The description looks injuries according to compliant as described by the injured footballer, site and mechanisms. The findings are presented below under these three headings. However, a preliminary finding worth reporting relates to the number of times footballers may have suffered a similar injury. It was observed that fewer footballers n = 170 (78.3%) had not suffered a similar injury before during training as compared to those who had suffered from any injury n = 47 (21.7%) (Table 4.3.1).

Table 4.3.1 Frequency of previous injuries

	Frequency	***Percent***
YES	47	21.7
NO	170	78.3
Total	217	100.0

4.3.1 Type of Injury by Complaint

In this study, footballers had several types of injures based on morphological presentation or appearance or subjective experiences. However, the types of injures were categorized as follows: Pain, sprain or a ligament, strain like a distention or injury to the muscle, a cut, a bruise, a broken bone and a fracture. These types of injuries occurred both during training and competitive matches (Table 4.3.1.1). Generally, footballers experienced more types of injuries during training than during competitive matches. A bruise, pain, sprain and a cut seemed to be the most frequent types of injury and a broken bone was unlikely.

Table 4.3.1.1 Frequency of previous injuries

Variable	***Training***				***Competitive match***			
	Yes		***No***		***Yes***		***No***	
	n	***%***	***N***	***%***	***n***	***%***	***n***	***%***
Pain	25	11.5	192	88.5	5	2.3	212	97.7
Sprain or a ligament distortion	20	9.2	197	90.8	14	6.5	203	93.5
Strain like a distention or injury to the muscle	12	5.5	205	94.5	11	5.1	206	94.9
A cut	19	8.8	198	91.2	17	7.8	200	92.2
A bruise	34	15.7	183	84.3	25	11.5	192	88.5
A broken bone	1	0.5	216	99.5	4	1.8	213	98.2
A fracture	9	4.1	208	95.9	8	3.7	209	96.3

4.3.2 Type of Injury by Site or Organ

Footballers sustained injuries afflicting nearly every organ or site. However, there were similar incidences of injuries during training and during competitive matches. There were actually more injuries involving the lower extremities than the upper extremities. Even if the sum of the injuries included the trunk, neck and head, the incidences of injuries of the lower extremities were predominant. There were more injuries involving the ankle than any other injury. There were very few injuries involving the trunk and back both during training and completive matches (table 4.3.2.1). There was no significant difference in terms of type of injury sustained if we examined the level of playing be it super division and division I (*p* was 0.00, t was 61.77 at df 216).

Table 4.3.2.1 Frequency of previous injuries by type of activity

Variable	***Training***				***Competitive match***			
	Yes		***No***		***Yes***		***No***	
	n	***%***	***N***	***%***	***n***	***%***	***n***	***%***
Got injured on the foot	25	11.5	192	88.5	20	9.2	197	90.8
Got injured on the ankle	40	18.4	177	81.6	34	15.7	183	84.3
Got injured on the lower leg	25	11.5	192	88.5	18	8.3	199	91.7
Got injured on the knee	31	14.3	186	85.7	28	12.9	189	87.1
Got injured on the thigh	12	5.5	205	94.5	14	6.5	203	93.5
Got injured on the hip/groin	26	12.0	191	88.0	24	11.1	193	88.9
Got injured on the trunk/back	2	.9	215	99.1	2	.9	215	99.1
Got injured on head/neck	5	2.3	212	97.7	9	4.1	208	95.9
Got injured on the upper extremity	16	7.4	201	92.6	9	4.1	208	95.9

4.3.3 Type of Injury by Mechanism

While footballers could be injured under various, contact mediated mechanisms n = 52 (24.0%) seemed to have a greater effect, than running n = 41 (18.9%) and collisions. Circumstances n = 36 (16.6%) Table 4.3.3.1.

Table 4.3.3.1 Frequency of mechanism behind Injury

Variable	*Football activity*			
	Yes		*No*	
	n	*%*	*n*	*%*
Got injured as I was running	41	18.9	176	81.1
Got injured through contact	52	24.0	165	76.0
Got injured through a collision	36	16.6	181	83.4

4.4 Factors Contributing To Football Injuries

Football injuries could be induced by both external and internal factors. In this study, the researcher examined the extent to which intrinsic and extrinsic factors were associated with injures. Table 4.4.1 shows the effect of intrinsic factors on football injures. Generally, a large number of injured football players claimed to have observed that football injuries could be linked with previous injuries, lack of aerobic fitness, prolonged reaction, unsuitable playing position, being under stress because of the type of game and fighting mentality.

Table 4.4.1 Intrinsic factors and football injuries

Intrinsic Variable	*Football activity*			
	Yes		*No*	
	n	*%*	*n*	*%*
Having previous injury as cause of further injuries sustained	174	80.6	42	19.4
Lack of aerobic fitness as a cause of	204	94	13	6.0
Prolonged reaction time as a cause of injuries	196	90.3	21	9.7
Being under stress because of the type of game as a cause of injuries	182	83.9	35	16.1
Fighting Mentality as a cause of injuries	168	77.4	49	22.6
Risks taking as a cause of injuries	176	81.1	41	18.9

In order to determine the effect of association of intrinsic factors on football injuries within teams, it was observed that no factors were significantly associated with football injuries within the teaams. This is shown by ***p*** values falling below the alpha value 0.05 (Table 4.4.2). We can say that intrinsic factors as a component of ecologic causes of injuries are insignificant.

Table 4.4.2 Intrinsic Factors association with football injuries within teams

Intrinsic Variable	Value	df	Asymp. Sig. (2-sided)	Decision
Having previous injury as cause of further injuries sustained not associated with current injury	0.212[a]	1	.645	Not statistically significant
Lack of aerobic fitness as a cause of not associated with current injury	1.134[a]	1	.287	Not statistically significant
Prolonged reaction time as a cause of injuries not associated with current injury	0.838[a]	1	.360	Not statistically significant
Being under stress because of the type of game as a cause of injuries not associated with current injury	0.032[a]	1	.859	Not statistically significant
Fighting Mentality as a cause of injuries not associated with current injury	0.112[a]	1	.738	Not statistically significant
Risks taking as a cause of injuries not associated with current injury	1.756[a]	1	.185	Not statistically significant

With reference to extrinsic factors, Table 4.4.3 shows the effect of extrinsic factors on football injures. Generally, a large number of football players in the teams agreed that extrinsic factors are not linked with football injuries.

Table 4.4.3 Extrinsic factors and football injuries within teams

Intrinsic Variable	*Football activity*			
	Yes		*No*	
	n	*%*	*n*	*%*
Unsuitable playing surface as a cause of injuries	75	34.6	142	65.4
Early exposure to playing football at a higher level as a cause of injuries	18	8.3	199	91.7
Unsuitable playing position as a cause of injuries	38	17.5	179	82.5
Fatigue as a cause of injuries	15	6.9	202	93.1
Lack of suitable playing equipment	13	6.0	204	94.0
Poor coaching as cause of injury	10	4.6	207	95.4
Little observance of football rules and foul play by opponents as a causes of injuries	52	24.0	165	76.0
Do you take alcohol?	71	32.7	146	67.3
Where you suffering from TB at the time you sustained an injury?	5	2.3	212	97.7

In order to determine the statistical effect of association of extrinsic factors on football injuries, it was observed that no factors were significantly associated with football injuries. This is shown by ***p*** values falling below the alpha value 0.05 (Table 4.4.4). We can say that extrinsic factors as a component of ecologic causes of injuries are insignificant within the teams.

Table 4.4.4 Extrinsic Factors association with football injuries within the teams

Extrinsic Variable	Value	df	Asymp. Sig. (2-sided)	Decision
Unsuitable playing surface as a cause of injuries are not associated with football injuries	1.907[a]	1	.167	Not statistically significant
Early exposure to playing football at a higher level as a cause of injuries are not associated with football injuries	0.339[a]	1	.560	Not statistically significant
Unsuitable playing position as a cause of injuries are not associated with football injuries	0.047[a]	1	.829	Not statistically significant
Fatigue as a cause of injuries are not associated with football injuries are not associated with football injuries	1.424[a]	1	.233	Not statistically significant
Lack of suitable playing equipment	1.134[a]	1	.287	Not statistically significant
Poor coaching as cause of injury are not associated with football injuries are not associated with football injuries	1.422[a]	1	.233	Not statistically significant
Little observance of football rules and foul play by opponents as a causes of injuries are not associated with football injuries	0.453[a]	1	.501	Not statistically significant
Alcohol intake is not associated with football injuries	0.298[a]	1	.585	Not statistically significant
Suffering from TB at the time is not associated with football injuries	1.032[a]	2	.597	Not statistically significant

In this study, the researcher wanted to establish whether two factors were responsible for injuries among football players according to level of playing football or Divisions. The author hypothesised that one way in which these injuries could in the super league or division I teams is by playing on an unsuitable surface or using unsuitable equipment. The question asked was : Did the injuries in the super league or division I teams depend on playing on an unsuitable surface or using unsuitable equipment?

The output from regression analysis is given below:

[In MINITAB Stat Regression. In Response Box “Unsuitable turf (UT)”; in Predictors Box “Unsuitable equip (UE) , *Regression Analysis*

The regression equation is:

Injury = Unsuitable turf (UT) 10.9 + 1.11 Unsuitable equip (UE)

Predictor	Coef	StDev	T	P
Unsuitable turf (UT)	10.854	5.708	1.90	0.066
Unsuitable equip (UE)	1.1140	0.1550	7.19	0.000

S = 15.35   R-Sq = 71.9%   R-Sq(adj) = 70.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	19866.0	9933.0	42.18	0.000
Residual Error	33	7770.6	235.5	-	-
Total	35	27636.5	-	-	-

Source	DF	Seq	SS
Unsuitable equip(UE)	1	1216	0.9

Conclusions from the output

The regression equation to describe the data is as follows:

Injury = 10.9 + 1.11 μM Unsuitable equip (UE)

This analysis reveals that an injury in the super league or division I teams depends on the unsuitable equipment. The t-ratio for is highly significant. The conclusion to be drawn is that unsuitable equipment increases the risk of football injuries. Since equipment may be shared and perhaps over used, the researcher concludes a causal relationship.

Fig. 4.4.1 Scatter plot of “Unsuitable Equipment” against ‘Injury’

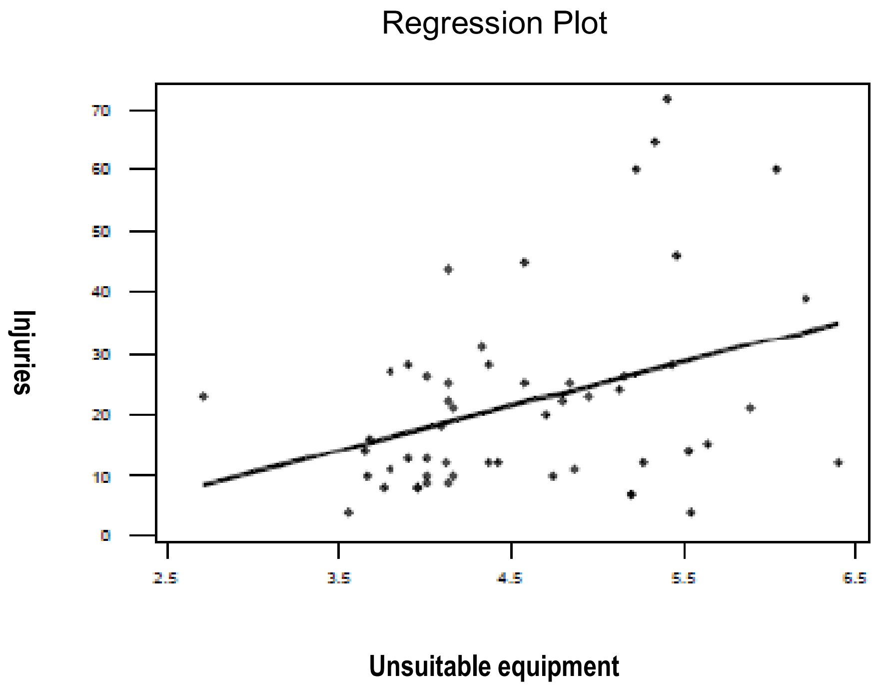
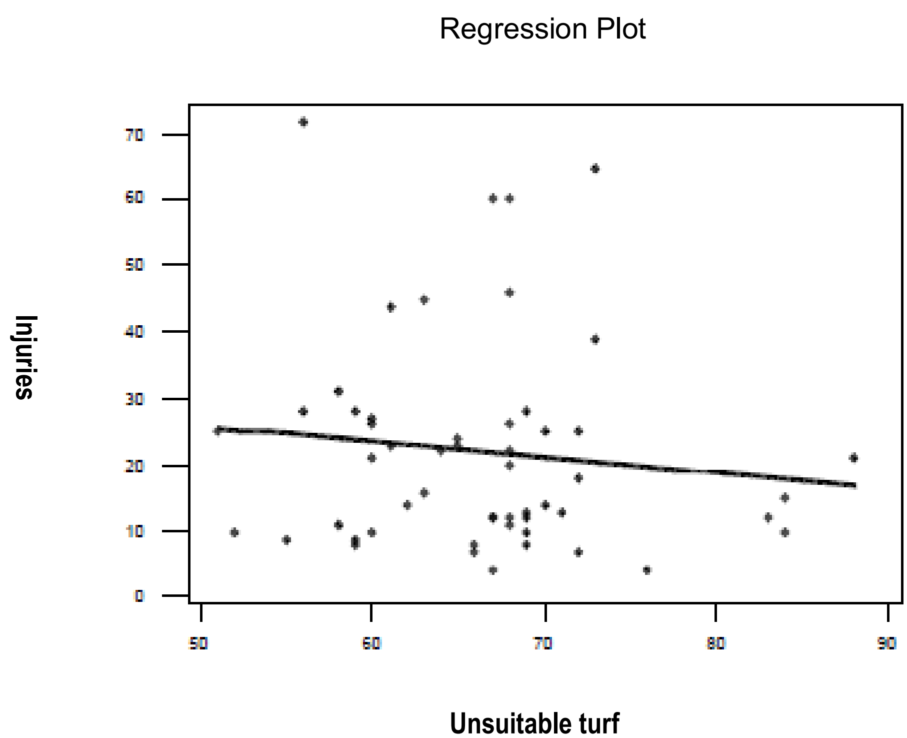


Fig. 4.4.2 Scatter plot of ‘Unsuitable Equipment’ against ‘Injury’



The two scatter plots with their regression lines inserted show linear relationships and it can be inferred that the two are responsible for injuries in the super league or division I teams. That is, it does not matter the division, the factors are at play.

An observation of the quality of turf in both divisions was not encouraging. The turfs were rather partially green and bumpy for teams in the super league and for those in Division one, the turfs were bumpy to almost bare. Most of the players were using worn-out shoes and a few had shin guards only during completive matches. Availability of shin guards was low when practicing than when in a competitive game.

CHAPTER FIVE – DISCUSSIONS AND CONCLUSIONS

5.0 Introduction

This chapter begins by presenting in short campus the research findings in order to meet the thesis tenets. These are followed by a contextual presentation of the findings in order to show what is similar and dissimilar between this study and previous studies.

5.1 Answers to the Research Question

This study sought to answer three research questions and these were as follows:

1. What is the prevalence of injuries in football teams affiliated to FAZ?
2. What types of injuries are sustained by football players?
3. What factors contribute to football injuries?

Research Question One: What is the rate of injuries in football teams affiliated to FAZ?

The critical finding related to this question is that n = 71 football players were on the injury list. Of these 71, n = 15 were from the super division and n = 56 were from the first division (Table 4.2.1). There was however, no association between level of playing football be it in the super division or first division in being injured (value = 0. 331, df = 1 and the observed p value was = 0.565 and this was higher than the alpha value 0.05. Forty-nine (22.6%) of those who had been injured actually participated in some of training.

Research Question Two: What types of injuries are sustained by football players?

A preliminary finding worth reporting relates to the number of times footballers may have suffered a similar injury. It was observed that fewer footballers n = 170 (78.3%) had not suffered a similar injury before during training as compared to those who had suffered from any injury n = 47 (21.7%).

Footballers had several types of injures based on morphological presentation or appearance or subjective experiences. However, the types of injures were categorized as follows: Pain, sprain or a ligament, strain like a distention or injury to the muscle, a cut, a bruise, a broken bone and a fracture. These types of injuries occurred both during training and competitive matches. Generally, footballers experienced more types of injuries during training than during competitive matches. A bruise, pain, sprain and a cut seemed to be the most frequent types of injury and a broken bone was unlikely.

Footballers sustained injuries afflicting nearly every organ or site. However, there were similar incidences of injuries during training and during competitive matches. There were actually more injuries involving the lower extremities than the upper extremities. Even if the sum of the injuries included the trunk, neck and head, the incidences of injuries of the lower extremities were predominant. There were more injuries involving the ankle than any other injury. There were very few injuries involving the trunk and back both during training and completive matches. There was no significant difference in terms of type of injury sustained if we examined the level of playing be it super division and division I (*p* was 0.00, *t* was 61.77 at *df* 216).

While footballers could be injured under various, contact mediated mechanisms n = 52 (24.0%) seemed to have a greater effect, than running n = 41 (18.9%) and collisions. Circumstances n = 36 (16.6%).

Research Question Three: What factors contribute to football injuries?

Football injuries could be induced by both external and internal factors. In this study, the researcher examined the extent to which intrinsic and extrinsic factors were associated with injures. Generally, a large number of injured football players claimed to have observed that football injuries could be linked with previous injuries, lack of aerobic fitness, prolonged reaction, unsuitable playing position, being under stress because of the type of game and fighting mentality. It was observed that all factors were not significantly associated with football injuries. This is shown by ***p*** values falling below the alpha value 0.05. We can say that intrinsic factors as a component of ecologic causes of injuries are insignificant.

With reference to extrinsic factors, generally a large number of football players agreed that extrinsic factors are not linked with football injuries. In order to determine the statistical effect of association of extrinsic factors on football injuries, it was observed that all factors were not significantly associated with football injuries. This is shown by ***p*** values falling below the alpha value 0.05. We can say that extrinsic factors as a component of ecologic causes of injuries are insignificant.

In addition, regression analyses show linear relationships between unsuitable equipment as well as unsuitable turf to be responsible for injuries in both the super league division and division leagues.

5.2 Contextualising and Analysing Findings

This study has shown that incidence rate of injuries in football in Lusaka is not alarming but the conditions under which football is played require concern (unsuitable equipment as well as unsuitable turf). Like all other studies, this study has shown that the most commonly injured body region is the lower limb and this reflects the nature of the game as a running sport requiring speed, power and agility. The predominance of lower limb injuries in football has also been well documented by club-based injury surveillance from all levels of competitive football in the West and Asia (Dicker et al., 1986; Seward and Patrick, 1992; McMahon et al., 1993; Seward et al., 1993; Shawdon and Brukner, 1994). In this study, joint/ligament sprains were the second most common types of injury and, when combined with muscle/tendon strains, accounted for more than half of all injury cases. Seward et al. (1993) reported a similar finding, although muscle/tendon injuries were slightly more common than joint/ligament injuries in the elite setting. Unlike this study, Finch et al. (1998) reported a lower proportion of sprains and strains but a much higher proportion of fractures. The high proportion of joint/ligament injuries is consistent with the predominance of body contact and traumatic injury causes.

It was surprising to find that footballers were involved in training when on the injured list and yet it is well established that there is a high risk of recurrent injury during the first 12 weeks after injury (Kraemer and Knobloch, 2009). Unlike this study that had low re injury studies, previous studies like Soderman et al. (2001), show that there are high levels of re-injuries. Over half of the injured players reported an injury to the same body part occurring within 2 months of the initial injury.

The empirical observation induced by this study showing that playing surface conditions and unsuitable equipment are factors are only unique to Lusaka when looking at the two football divisions. This can be explained as follows: Concerning surface conditions, football in Lusaka is played on natural green turf and on plain ground whereas studies in the West and Asia show that football is played on new generation artificial turf and grass. This makes a contextual comparison of our findings difficult. According to Dvorak et al., (2007), whether the incidence of injuries when playing or training on natural green turf is different compared with when playing or training on plain ground, research in the West has not shown any differences between the Divisions. For instance, studies in the West and Asia (Ekstrand et al., 1991; Amandusson et al.,1996; Andreasen et al., 1992 Ekstrand et al., 2006) found no major differences between the incidence, severity, nature or cause of training or playing injuries sustained on new generation artificial turf. This is reassuring for the West considering the design of new stadia and the playing surfaces that may be used but this is not assuring for the two football Divisions in Lusaka.

The quality of turf in Lusaka has not improved throughout all the years, with little attention being paid on optimal hardness (the ability to absorb impact energy) and shoe-surface friction (the footing or grip provided between surface and shoe). These are the two main surface-related risk factors documented (Ekstrand and Nigg, 1989; Inklaar

1994; Milburn and Barr, 1998; Orchard, 2002). To allow high intensity movements in football such as sprinting, rapid acceleration and deceleration, cutting, pivoting and gliding for example in tackling, the translational (sliding) and rotational friction between shoe and surface must be suitable. This is not the case in Lusaka in the two Divisions. If the translational or rotational friction is too high, the players can run a higher risk of injuries such as ligament sprains in ankle and knee or even fractures because the high friction does not allow sufficient movement between the surface and the shoe. Looking at the turfs in Lusaka, one would observe that friction is too low to mitigate speed and as such the turfs, especially in Division I, fail to decrease the players maximal speed and their ability to accelerate and decelerate or turn quickly, and the players often slip and even fall when it is not wanted. This is feature once observed by Ekstrand and Nigg (1989). Hard surfaces increase impact forces and can possibly result in overload of tissues because of a large single impact or repeated submaximal impact forces (Ekstrand and Nigg, 1989; Inklaar, 1994).

Concerning unsuitable equipment, the Lusaka study showed that nearly every team had inadequate shin guards but Division I teams had very few shin guards as compared to super league teams. These are assumed to be important in football. Like the Zambian study, Ekstrand and Gillquist (1983) found that all traumatic leg injuries that occurred in their study affected players using inadequate or no shin guards, and Backous et al. (1988) reported a lower number of lower leg injuries using shin guards. Studies have also reported that the protective effect of shin guards is different between types of shin guards and their material (Bir et al. 1995; Francisco et al. 2000). Football shoes are usually tight fitting and provide little protection, support and cushioning. In this study, shoes were not fitting and rather old. Some authors have suspected the shoes to increase the risk of some overuse injuries (Inklaar, 1994).

One other important finding in this study relates to return to competitive football after injury. It appears that in Lusaka, the FIFA clinical guidelines for return to play after injury are violated especially the following:

1. There must be no pain, weakness, stiffness, tenderness or pain with muscle contraction.
2. A full range of motion must be restored and the football player must perform normally during full functional sports-specific testing. It has been suggested that isokinetic muscle strength testing should show normal concentric and eccentric muscle strength (within 10% of the non-injured side) and normal muscle strength ratios must be present (concentric agonist/eccentric antagonist).
3. Normal muscle activity patterns must be restored before the player can return to full play.

While the causes of injury are believed to be multifactorial, such as intrinsic factors as well as extrinsic factors, it was not expected in this study that extrinsic factors would not show significant difference within the study population. However, a critical analysis from the regression tests in terms of level of playing showed extrinsic factors to be significant. This may have something to do with the differences in financing of football in the two divisions. The poor turfs and poor equipment in the two divisions seem to suggest the observed scenario. This study, has shown that level of play, position on the field, amount and standard of practice/game, equipment, pitch conditions, rules, and fair play have been known to be significant factors (Meeuwisse, 1994; Bahr and Holme, 2003; Ekstrand et al., 2009). While the risk for injury during matches has been reported to be higher amongst high-level players than low-level players (Nielsen and Yde, 1989; Ekstrand and Tropp, 1990; Inklaar et al., 1996) and even with training, in this study it has not been the case. This study showed no statistical differences with training injuries and level of playing. The findings are consistent with research done in the West, Australia and Middle (Nielsen and Yde, 1989; Ekstrand et al., 1990; Inklaar et al., 1996).

5.3 Limitations and Strengths of This Study

This study has significant limitations worth noting. The first one relates to the design. The reliance on retrospective self-reports has lowered the validity of these findings. However, the fact that more injuries are usually recorded by prospective injury registration and on spot registration compared with retrospective interviews is in accordance with previous studies (Twellaar et al., 1996; Junge and Dvorak, 2000; Fonseca et al., 2002). Prospective injury registration is not complete, but the reliability of retrospective injury registration is even poorer (Twellaar et al., 1996). This was the case in this study since most of the teams did not keep a reliable injury register or card.

The second limitation has to do with recall bias. The fact that players were also asked to report injuries they may have suffered in the previous season has an element of recall bias (Junge and Dvorak, 2000). There is significant recall bias associated with retrospective player interviews, especially regarding mild injuries sustained close to 1 year in the past (Junge and Dvorak, 2000).

The third one is associated with the failure to determine incidence adult male players per 1,000 hours of match play as most studies do. However, while this may be so, research has shown that data on injury incidence and risk factors in youth is inconsistent.

The third one has to do with data collection. The relatively short data collection period and the rotation of players in and out of the national squad are limitations of this paper. An additional limitation was not being able to collect data on injuries sustained during national team training and competitions. This was not taken on board during the visits.

The fourth one is associated with the large data set which was underestimated at the design stage and there were numerous analysis done. As a result, the researcher acknowledges the likelihood of type I error (i.e., the probability of false-positive statistical results). However, we chose to present confidence limits in order to provide a plausible range for each effect rather than rely on *p* values using an arbitrary cut point (i.e., α = 5 percent) to decide whether these effects were real. The consistency and plausibility of the findings make chance (i.e., spurious associations due to multiple testing) an unlikely explanation for the results.

Using only acute injuries may have changed the effects of many risk factors on the risk of injury. For example, in the comparison of level of playing, it has been suggested that limiting the analysis to acute injuries might cause one to underestimate any negative effect of level of playing in producing injuries that occur because of repeated football player participation.

The homogeneity of player ages, skill levels, and other physical characteristics makes confounding by these factors unlikely. Results for history of injury were controlled for division or level of playing and newness to the team. The objective nature of the exposures and the access to therapists and physicians for injury assessment and diagnosis (i.e., outcome), respectively, make information bias an unlikely explanation for the results because there were no differences in personnel type within each level of playing.

It is possible that those footballers who were more likely to report previous injuries would also be more likely to report subsequent injuries. This cannot be excluded as a possible explanation for the association between past injury and higher subsequent injury risk. However, the associations grew stronger when particular body regions were considered. The sensitivity analysis also indicated that the underreporting would need to be so extreme as to be untenable to effect a meaningful change in the largest point estimates. It is unlikely, then, that the past injury findings are a consequence of differential injury reporting. The footballers in this investigation represented “survivors” of all previous years of football in the sense that none had suffered a career-ending injury. This, coupled with the elite level of play and the homogeneous age range, may limit the generalisability of these findings to different age groups and levels of play.

While these limitations seem to affect validity of the findings, the present study is the first injury epidemiological study performed in Lusaka and Zambia to be broad enough.
However, this study highlights some issues for football injury epidemiology in Lusaka, such as a non-significant incidence difference of injuries during matches than during training and the high incidence of soft tissue injuries. Despite the unique environmental,

social and cultural settings, these findings are generally consistent with previous data from European, Australian an Asian football.

5.4 Conclusions

This study illustrates that the rate (32.7%) of self-reported and observed football injuries among super division and division I football teams is worrisome. Ecologic factors are not statistically associated with football injuries. This was the first study to evaluate the rate of football injuries and see how these are associated with ecological factors in this part of the world. Future studies may need to be extended to other towns and lower leagues to have a broader picture. There is need to address preventive and health promotional needs of football players.

5.5 Recommendations

Based on the results, the author is recommending the following:

1) Today, injury registration is not compulsory for the clubs and medical staff. Implementation of injury registration ought to be a requirement to be issued a club license by the football association of Zambia to ensure that this important risk management tool is in place.
2) Recognising that data at club level of injuries was rather not readily available , this study highlights the need for an injury database to be kept at club level to allow integration of the club and national team data.
3) The football Association of Zambia should scale up the promotion of medical assessment of players before they engage in active football and training. It is an approach to reducing the incidence of injuries and minimizing the short and long-term consequences of acute and overuse or gradual onset injuries in football. This approach is based on the principle of risk management.
4) The Football Association of Zambia should adhere to FIFA’s mandate to carryout research studies on injuries in order to facilitate for preventive and therapeutic

interventions. It is through such studies that the risk factors could be identified estimated and evaluated (risk assessment).

5) The Football Association of Zambia should ensure that each football team in Zambia has a qualified medical person.
6) Proprietors of teams and the Football Association of Zambia should ensure that playing surfaces have turf and are smooth. There is need to ensure that equipment is of good quality and readily available for players to use.

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APPENDIX I - INFORMATION SHEET

Dear Participant,

My name is Donald Mwandila.

I am a Master of Public Health student at the University of Zambia, School of Medicine. In partial fulfillment of the program study I am expected to undertake a research that will contribute to the provision of quality health care and contribute to the body of knowledge.

The aim of this survey is to determine the prevalence of football injuries and factors contributing to players sustaining sports injuries in Lusaka based super league and division one teams.

Information will be collected using a questionnaire that you will take to fill in. Additional information will be obtained through an interview and from me observing you go about your activities.

Information that will be obtained from this study shall be submitted to UNZA, Department of Public Health and will be made available to Football teams Authorities, Ministry of Sports Youth and Child Development FAZ and sports health policy makers. The findings will also be of great importance as it would help both players and team officials on how best to prevent the occurrence of such injuries and how best to manage football injuries while improving a healthy football performance. You will not be personally identified in the document that will be submitted.

Please note that:

Voluntary Participation: Your participation in this study is voluntary. You are free to withdraw from the study at any time if you wish to do so without any consequences on your rights as a professional footballer.

Risk and discomforts: There are no obvious risks or discomforts involved in taking part in this study. However, if you feel uncomfortable answering some of the questions, you are free not to answer.

Benefits: There are no monetary benefits that will be given in exchange for information obtained. However, taking part in this study will generate information that will contribute to the provision of quality health services among sports health care professions and will be of benefit to sports men and women.

Confidentiality: The information that you will give shall be handled with utmost confidentiality. You are not required to write your name or initials on the questionnaire to give identity.

Clarification: Should you need any clarifications do not hesitate to contact the researcher on the contacts that have been given below.

Mr. Donald Mwandila

University of Zambia, School of Medicine

Department of Community Medicine

P.O. Box 50110, Lusaka.

E-mail: donaldkmwandila@yahoo.com

Mobile: +260-978118842/966769790.

You can also get in touch with the Chairperson of the Biomedical Research Ethics Committee at UNZA on:

The UNZA Biomedical Research Ethics Committee

University of Zambia

Box 50110, Lusaka.

E-mail: unzarec@unza.zm

Telephone: +260-211-256067; Fax: +260-211-250753;

APPENDIX II - INFORMED CONSENT

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

The aim and benefit of this study have been explained to me. I am aware that my participation is entirely voluntary and that I can withdraw my participation at any time without losing my rights as a professional football player.

Signed or Thumb print……..…………………………date: ………/……/…….

(Participant)

Signed: ………………………………………………date: …..…/…..…/…..….

(Witness)

Signed: ………………………………………………date: ……./…..…/……..

(Researcher)

Date: ………./………/…………

APPENDIX III - PERMISSION LETTER- MINISTRY OF SPORTS

All Communications should be addressed to the Permanent Secretary of the Ministry of Sport, Youth and Child Development and not to any individual by name.

Telephone: 227158
Fax: 223996

In reply please quote:

No.............................

MSYCD/53/2/4

REPUBLIC OF ZAMBIA

MINISTRY OF SPORT, YOUTH AND CHILD DEVELOPMENT

GOVERNMENT COMPLEX, KAMWALA
P.O. BOX 50195
LUSAKA

18th February, 2011

The Course Coordinator
Master of Public Health
University of Zambia
P. BOX 50110
LUSAKA

RE: INTRODUCTORY LETTER DONALD MWANDILA

The Ministry is in receipt of your letter in respect to the above captioned matter.

I am happy to inform you that we have no objection in Mr. Donald Mwandila collecting information for his research project from us.

Benard N. Nakacinda
Director of Sport
For/Permanent Secretary
MINISTRY OF SPORT, YOUTH AND CHILD DEVELOPMENT

APPENDIX IV – PERMISSION LETTER- NATIONAL SPORTS COUNCIL

NATIONAL SPORTS COUNCIL OF ZAMBIA

*All Correspondences should be addressed to
The General Secretary
P.O. Box 33474
LUSAKA, ZAMBIA*

*Tel/Fax: 260 1 250 321
E-mail: sportscouncilzambia@gmail.com*

NSCZ

NSC/ZUCSA/29/4

8th February 2011

Mr. Donald Mwandila
C/O University of Zambia
School of Medicine
Department of Community Medicine
P.O Box 50110
Ridgeway
LUSAKA

Dear Mr. Mwandila

RE: PERMISSION TO CONDUCT A SURVEY TO DETERMNE PREVALENCE OF INJURIES AND FACTORS CONTRIBUTING TO SPORTS INJURIES AMONG PREMIER AND DIVISION COVER LEAGUE FOOTBALL PLAYERS IN LUSAKA BASED TEAMS IN THE 2011 FOOTBALL BASED SEASON

Reference is made to the above subject.

We are in receipt of your letter of 18th January 2011 and the letter from Dr. S.H Nzala of the Department of Committee Medicine.

Permission to carry out this research has been granted, but please remember to share your findings with all stakeholders in order for all to benefit from your research.

I would just like to wish you well in this assignment.

Yours faithfully,

RODGERS CHIPILI
CHIEF EXECUTIVE OFFICER/ GENERAL SECRETARY

Cc: Chairman - NSCZ
Cc: Vice Chairperson - NSCZ

APPENDIX V – APPROVAL LETTER- FOOTBALL ASSOCIATION OF ZAMBIA

FAZ/MED/07/05

FOOTBALL ASSOCIATION OF ZAMBIA

(Affiliated to FIFA, CAF, COSAFA, NSCZ & ZOCAGA)
P.O. Box 34751, Tel:+260 211 250940, Fax: +260 211 250946/254835, E-mail: faz@zamnet.zm, website: www.faz.co.zm
Patron: H.E. Rupiah B. Banda, President of the Republic of Zambia

15th February 2011

Dr S H Nzala
MPH Course Coordinator
Department of Commnity Medicine
School of Medicine
University of Zambia
P O Box 50110
LUSAKA

Dear Sir,

Re: MR DONALD MWANDILA'S PROJECT

We refer to your letter of 7th February 2011 on the above matter.

This Association is ready to assist Mr Mwandila in his research on "The Prevalance of Sports Injuries in Lusaka". Kindly advise him to get in touch with Dr. George Magwende, our U-20 National Team Doctor and Chairman of our Medical Committee, who will be our front person in this project.

Yours faithfully,
Football Association of Zambia

Julio Z B Chiluba
Head, Administration & Competitions
For/GENERAL SECRETARY

OFFICIAL SPONSORS

KONKOLA COPPER MINES PLC

APPENDIX VII - FOOTBALL INJURY RISK SURVEY QUESTIONNAIRE (FIRSQ) Dear participant, You are required to fill in spaces provided by ticking what is applicable to you.

1. Level where you are playing (tick what is applicable)				1) Super division	2) Division One
2.What Income level is applicable to your team please tick one.	1 Low	2 Moderate	3 High		
	(<K300,000)	(K300,000-K600,000)	(>K600,000)		
3. Age					

4. What is your highest qualification attained? 1) Never been to school 2) Primary level 3) Grade nine level 4) Grade twelve level 5) College or university level		
5. Duration with the team (Indicate in years)		
6. What members of the technical bench does your team have? tick what is applicable	1) Yes	2) No
a) Coach		
b) Clinical officer		
c) Team manager		
d) First Aider		
e) Team Physiotherapist		
f) Occupational therapist		
g) Team Doctor		
h) A Volunteer Nurse		
7. What leg do you use often? 1) Left footed 2) Right footed 3) Right as well as left footed		
8. Do you play in the first team		
9. **Where you a member of this team during the last half of the 2010 season?**		
10. Were you on trial then in the last half of the 2010 season?		
11. **Were you about the age between 13 and 19 years old during 2010 season?**		
12. Did you have a professional contract?		
13. Were you registered with FAZ?		
14. What position do you play in the team? 1.Goal Keeper. 2. Defender. 3. Mid fielder 4.Striker		
15. How many practice matches do you remember you played in the last half of the 2010 season? (Tick only one) 1) I was in all of them 2) I was almost in all of them because I was injured (For 1 to 7days i could not) 3) I was in half of them because I was injured (For 8 to 28 days i could not) 4) I was in less than half of them because I was injured (For over 28 days i could not)		
16. How many competitive matches do you remember you played in the last half of the 2010 season? (Tick only one) 1) I was in all of them 2) I was almost in all of them because I was injured (For 1 to days 7 I could not) 3) I was in half of them because I was injured (For 8 to 28 days I could not) 4) I was in less than half of them because I was injured (For over 28 days I could not)		
17. At the moment, do you have an injury?	1) Yes	2) No
18. At the time you had injury, would you consider yourself to be a player who was not fully able to participate in team training or competitive matches (Meaning you could not do light training?	1) Yes	2) No

19. I got injured during training and, (tick what is applicable)	1) Yes	2) No
a) I suffered an injury of the same type more than once and at the same site within 2 months of returning to full participation from the earlier injury.		
b) I suffered pain without any known injury to me in the bone or muscle which appeared during physical exercise.		
c) I suffered some sprain or a ligament injury.		
d) I suffered strain like a distension or injury to the muscle.		
e) I had a sprain		
f) I suffered a cut		
g) I suffered a bruise		
h) I suffered from a broken bone		
i) I suffered from a fracture		
j) I had a problem with a joint		
20. I got injured while training in the following area.	1) Yes	2) No
a) Foot		
b) Ankle		
c) Lower leg		
d) Knee		
e) Thigh		
f) Chest		
g) Hip and groin		
h) Trunk/back		
i) Head/neck		
j) Upper Extremity		
21. I got injured during a competitive game and,	(1) Yes	(2) No
a) I got injured as I was Running		
b) I got injured through Contact		
c) I got injured through a collision		
d) I suffered an injury of the same type more than once and at the same site within 2 months I had returned to full participation from the earlier injury.		
e) I suffered pain without any known injury to me in the bone or muscle which appeared during physical exercise.		
f) I suffered some sprain or a ligament injury.		
g) I suffered strain like a distension or injury to the muscle.		
h) I had a sprain		
i) I suffered a cut		
j) I suffered a bruise		
k) I suffered from a broken bone		
l) I suffered from a fracture		
22. I got injured in a competitive match in the following area.	1)Yes	2) No
a) Foot		
b) Ankle		
c) Lower leg		
d) Knee		
e) Thigh		
f) Hip and groin		
g) Trunk/back		
h) Head/neck		
i) Upper Extremity		

	1) Yes	2) No
23. Generally speaking, what do you think caused any of the injuries that you sustained? (Tick what applies in your case. You may have more than one answer)		
a) I had a previous injury.		
b) I did not have any aerobic fitness.		
c) I believe this may have to do with my prolonged reaction time.		
d) I believe this may have had to do with my height.		
e) I believe this may have had to do with my weight.		
f) I was under some stress because of the type of game.		
g) I have a fighting mentality.		
h) I do not mind what happens I take risks.		
i) I suspect the playing surface.		
j) I suspect my personal exposure to playing football at this level.		
k) I suspect this has to do with my playing position.		
l) I suspect this has to do with amount of time I had been playing football.		
m) I suspect this has to do with lack of equipment (shin guards, shoes).		
n) I suspect this has to do with coaching-related factors (quality, over training).		
o) There is little observance of football rules and foul play by other players.		
24. Do you take alcohol?		
25. Were you suffering from TB at the time you sustained an injury?		