EPIDEMIOLOGY OF SOCCER INJURIES IN RWANDA: A NEED FOR PHYSIOTHERAPY INTERVENTION

By

Janvier TWIZERE

A minithesis submitted in partial fulfilment of the requirements for the degree of Masters of Science in the Department of Physiotherapy, University of the Western Cape.

November 2004

Supervisor: Dr. José M. FRANTZ

KEYWORDS

PHYSIOTHERAPY
INJURY
COUNTERMEASURES
SOCCER
PREVENTION
REHABILITATION
SPRAIN
STRAIN
CONTUSION
RWANDA.

ABSTRACT

Being involved in soccer in Rwanda at both national and international level exposes soccer players to the risk of injury. The aim of this study was to identify common soccer injuries among the 1st and 2nd division soccer teams in Rwanda and to establish the need for physiotherapy intervention. This deals with the first two stages of injury prevention, which included identification and description of the extent of the problem and the identification of factors and mechanisms that play a part in the occurrence of injuries. A cross sectional retrospective quantitative study design was used. Simple random sampling clustered within teams was used to get a sample of this study. The random order was determined by using the random number generator in Microsoft Excel® to select a sample of 300 soccer players from all 30 teams of 1st and 2nd divisions. A response rate of 91% (273) was obtained. The soccer players gathered the data through a close-ended questionnaire, which was adapted from those questionnaires used in England and at The Sixth All Africa Games held in Zimbabwe. Team medical practitioners provided supplementary information through an open-ended questionnaire, which has been reported rather than displayed statistically. The collected data from soccer players were captured by means of the Microsoft Excel package. Both descriptive and inferential statistics were determined in Microsoft Excel. Non-parametric statistics such as the McNemar test was used to determine whether differences exist between groups. Associations between ordinal variables were evaluated by means of the Spearman Rank Correlation. Two levels of significance namely 5% and 10% were used. The results were displayed by means of tables, histograms, pie chart and graphs. The study revealed 68.1% injury prevalence with a

higher significance ($p < 0.005$) that more injuries occurred during training than during competition. The ankle was the most affected part (38.5%) followed by the knee (26.7%). Being tackled, collision, landing and overuse were the most common injury mechanisms in both training and competitive sessions. The soccer players preferred using protective equipment during competitions and not during training. The countermeasure sporting activities such as warm-up, cooling down, stretching, flexibility and strengthening exercises were poorly performed. More emphasis was put during competition than training concerning carbohydrate and water intake. Ice/cold, massages, exercises therapy, compression, deep friction and joint mobilization were the most frequently used physiotherapy techniques to the sustained injuries. The relationship between injuries occurring in training and injuries occurring during competition was highly significant ($p<0.005$). Although accessibility of physiotherapy services to soccer players is still low, physiotherapy seemed to be used in most major and severe injuries after medical treatment. Both players and team medical practitioners positively evaluated the need for physiotherapy intervention in management of soccer injuries.

DECLARATION

I hereby declare that: *"**Epidemiology of Soccer Injuries in Rwanda: A need for Physiotherapy Intervention**"*, is my own work, that it has not been submitted, or part of it, for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Signature: ……

Janvier TWIZERE

November 2004

Witness: …….

Dr. José FRANTZ

DEDICATION

To my mother KAZAYIRWA Marie and my farther late NTAWUMENYA Innocent.

To my beloved wife TWIZERE HITIMANA Janvière and daughter TWIZERE IRANKUNDA Danilla Joelle.

To my sister AKIZANYE Marthe.

ACKNOWLEDGEMENTS

I highly recognize and appreciate the contribution extended to me by:

- The Government of Rwanda, through the Ministry of Education for granting me a scholarship for further studies.
- To the Rwandan governing bodies of sports namely MIJESPOC in general and FERWAFA for soccer specifically, for their facilitations during the process of data collection.
- My sincere gratitude to my supervisor, Dr. José Frantz for her guidance and pertinent research advices.
- Greatful thanks to Mrs Therese Bishagara the former Director of K.H.I and to Mrs Jeanne Kagwiza for their support, advices and encouragement.
- Dr. TW Kotze for his guidance and inputs on statistical analysis.
- To Mrs Peterson Cristal and Mr Lyantagaye Sylvester for proofreading my work.
- To all persons who facilitated me during the process of data collection especially Kanamugire A, Rekeraho J, Gatsinzi C, Nuhu A, Harelimana H, Buhendwa M. and Sentama E.
- To my beloved wife Twizere Hitimana Janvière and my daughter Twizere Irankunda Danilla Joelle. I highly recognize your encouragement and patience during my absence.

- To my family members especially my mother Kazayirwa M, my sister Akizanye M. and brothers Habamenshi E. and Habimana E.
- To my colleagues Tumusiime K.D, Remera J, Kumuntu G, and Hakizimana M. for your support, advice and mostly in all academic angles while sharing everything.
- To my friends Sibomana A, Bizagwira L, Uzabumwana I. and Muramutsa M.E, for their moral and friendship support.
- Lastly but not leastly to all coaches and all soccer players for their appreciated contribution to this study.

TABLE OF CONTENTS

CHAPTER 2: LITERATURE REVIEW

CHAPTER 3: METHODOLOGY

CHAPTER 4: RESULTS

CHAPTER 5: DISCUSSION

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

AAP	American Academy of Pediatrics
ACL	Anterior cruciate ligament
AFL	Australian Football League
APTA	American Physical Therapists Association
CAF	Confédération Africaine de Football
CECAFA	Cup of East and Central African Championship
COMESA	Cup of Common Market for Eastern Southern Africa
FERWAFA	Fédération Rwandaise de Football Amateur
FIFA	Fédération Interantionale de Football Associé
IOC	International Olympic Committee
KHI	Kigali Health Institute
MIJESPOC	Ministère de la Jeunesse, Sport et Culture
PRICER	Prevention-Rest-Ice-Elevation-Referral
SD	Standard Deviation
UNICEF	United Nations International Children's Emergency Fund.
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION TO THE CHAPTER

This chapter describes the background of the study by giving the general, continental and national aspects of soccer injury studies specifically. In the general aspect, the definition of soccer, its characteristics and popularity and incidence of injury are overviewed. The continental level is presented under considerable popularity associated with few studies in terms of injury prevention. The overview at national level shows the level of competition within Rwandan soccer players. The role of physiotherapy is also outlined. The boundaries of the study are also highlighted in terms of injury prevention. The chapter also includes the statement, aim and objectives and the significance of the study. The chapter ends with definitions of term used as well as a summary of the chapters that will follow in this study.

1.2 BACKGROUND OF THE STUDY

Soccer, commonly known as football, is one of the most popular team sports in the world and continues to provide many young people with an opportunity for healthy exercise (Levy and Lohnes, 1996; McGrath and Ozanne-Smith, 1997; American Academy of Pediatrics [AAP], 2000; Dvorak, 2000; and Mithoefer, Gill, Giza, Mandelbaum, Peterson and Minas, 2002). It is characterized as a vigorous, high intensity, intermittent ball and contact sport (McGrath and Ozanne-Smith, 1997). The characteristics of soccer, along with the required functional activities, obviously place great demands on technical and physical skills of the individual player. According to

Hawkins and Fuller (1999), soccer is known to be associated with a relatively high injury rate compared to other contact team sports, and the injury rate is around 1000 times higher than for industrial occupations generally regarded as high risk. The overall level of injury to the professional football player has increased tremendously and thus calls for preventative action based on the results of epidemiological research (Hawkins, Hulse, Wilkinson, Hodson and Gibson, 2001).

Africans are as football-crazy as the rest of the world. However, Africa has yet to turn this passion into success (The Economist, 2000). Although Africa has produced many great soccer players, there are few great teams at national level. This is due to the fact that almost all the best players play for European clubs, because the salaries exceed by far, those on offer in, for example, Malawi or Kenya (The Economist, 2000). Many people now know that professional soccer is a great employer and now there is an increased level of participation in sporting activities suggesting the possible increase in sports-related injuries. Although the level of league and tournament competitions in Rwanda soccer is not higher than that of developed countries, the researcher believes that the injury prevalence, causes and other related causal factors could be the same or even more than those observed in developed countries due to the fact that the financial resources of Rwandan soccer teams are still very low.

The Rwandan soccer is amateur and not professional. Male soccer teams in Rwanda are grouped into two divisions: the first and the second divisions. The first division is more competitive than the second one because it is the one from which Champion Clubs are

drawn and regional as well as international competitions deal with. In addition to that, the national team soccer players are selected from teams of the first division. Therefore, there could probably be an expectation of more injuries in the first division than in the second division. However, we have also to consider that the second division teams are fighting in order to get a place in the first division. After each league season, the last team in first division moves to the second division whereas the first in second division joins the first division. As both divisions are in incessant competitive events, the researcher believes that there might be a high risk of both acute and overuse soccer injury occurrence. Some soccer players in Rwanda participate in competition at both national and international level, which expose soccer players to more risk of injury and thus ensures the health and safety of the soccer players. Thus there is a need to conduct an epidemiology study towards the common soccer injuries for both divisions in Rwanda.

According to Fevre (1998), soccer has been described as a "collision sport" due to its physical nature, but some epidemiological studies suggest that injuries do not occur due to direct contact, but due to other causes such as overuse or overstrain (Ekstrand and Gillquist, 1983). The fact that expert clinicians have diverse opinions on the nature and etiology of injury within soccer highlights the need for more epidemiological evidence. In Rwanda, the causes of soccer injuries may be worsened by financial problems. The fact that Rwandan soccer is amateur rather than professional justifies the reasons for the teams being self-sponsored. By self-sponsored, the researcher refers to individuals or associations being responsible for their teams expenses because, to the

researcher's knowledge, there is no business companies in Rwanda sponsoring soccer teams and consequently the state of playing surfaces and appropriate equipment may not be of good quality despite their role in injury prevention. A set of sporting programmes such as warm-up, stretching, protective and suitable equipment, appropriate surface as well as appropriate training, adequate recovery, psychology and nutrition have been designed as main components of injury prevention and rehabilitation (Brukner and Khan, 2003). However, the researcher's experience has shown the misuse of those sporting components by Rwandan soccer players. The misuse may play a big role in injury occurrence, and unfortunately, there is no study that has exhaustively researched this factor.

Although sport medicine seminars have been conducted in Rwanda by different institutions such as the International Federation of Football Association (FIFA) in 1998, the International Olympic Committee (IOC) in 1999 and African Football Confederation (CAF) in 2000, there are still a low number of medical practitioners for teams. This is probably due to the fact that some team leaders still do not know the importance of having a medical practitioner in a team, or the extent of soccer injuries in Rwanda has not yet been investigated. This could also be due to the fact that the genocide in 1994 had reduced the number of medical personnel and consequently the available medical personnel are more employed in public areas than in sport teams. For instance, in 1997, three years after the genocide the demand for doctors and nurses were respectively high because the shortage was as bad as 55,705 persons per doctor

and 6,365 persons per nurse. The need for both doctors and nurses were equivalent to about 40% (Kigali Health Institute, 2004).

Apart from the low number of medical personnel for teams, the attendance of Rwandan soccer players to some health clinics is still critical. Efforts must be made to prevent and control injuries. According to Hakizimana (2002), Rwandan soccer players do not benefit from physiotherapy management that contributes to the prevention and healing of their sports injuries, because the number of soccer players who visit physiotherapy services is still low. However, physiotherapists and physiotherapy services are in place to be accessed should the need arise. The Ministry of Health in collaboration with the Ministry of Education created an institute of higher Education namely Kigali Health Institute (K.H.I, 2004) that has been offering a physiotherapy course since June 1996, to solve the problem of inadequate health personnel both in quality and quantity. According to the recent survey done by "Office Nationale de la Population" in Rwanda (ONAPO, 2002), the Rwandan population was 8.2 million. Today, with about 100 qualified physiotherapists in Rwanda, it can be estimated that a shortage is more critical as 82,000 persons per physiotherapist when compared to the 1997 situation of 55,705 persons per doctor and 6,365 persons per nurse. However, in sport fields, the researcher believes that something can be done. According to Rwandan Ministry of Health (2000), there are three referral hospitals and 39 health district centers with a high level of functionality. Most of the health infrastructure has been rehabilitated and re-equipped. Sixty three percent (63%) of the peripheral health facilities provide the minimum package of activities as compiled from the components of primary health

care. Apart from those three referral hospitals, three to four other district hospitals have well equipped physiotherapy services with qualified physiotherapists who can care for and control the soccer injuries. Furthermore, there are currently two available rehabilitation centers, with qualified physiotherapists. Due to the fact that Rwandan soccer is amateur rather than professional, the Rwandan soccer teams mostly train after working hours and physiotherapists could be available at training time as well as during competitive matches.

As essential participants in the health care delivery system, physiotherapists assume leadership roles, specifically in the rehabilitation and prevention of sports injuries, their treatment, maintenance and health promotion (American Physical Therapists Association [APTA], 2001). Prior to 1968, a physician's referral was necessary for a client to be treated by a physical therapist (Goodman and Snyder, 1995). Today the Physical Therapy Practice Act is being changed in many more states to provide for independent practice of physical practice of physical therapists (Goodman and Snyder, 1995). Although physiotherapy is new in Rwanda, clients / patients have direct access to physiotherapy services. Soccer players therefore will be able to have quick and easy access to physiotherapy services without having to wait for a physician's referral.

Few systematic epidemiological studies have been conducted on sport injuries in Africa in general, specifically in South Africa and Rwanda. According to Frantz, Amosun, and Weitz (1999), the South African interprovincial under 20-soccer tournament held in Cape Town in 1997 had a high injury rate. In Rwanda, only two

football-related injury reports have been established. The first report by Hakizimana (2002) was aimed at investigating football sports injuries and their management in Rwanda and has been conducted on all first division teams. The second report was on the profile of football-related injuries among players in the first division four male Rwandan teams of 2003 (Nuhu, 2004). However, these reports did not exhaustively illustrate the causes, severity and treatments to the commonly sustained soccer injuries. The present study attempted to widely investigate those gaps since all teams from both divisions are matters of concern.

According to Van Mechelen, Hlobil and Kemper (1992), Van Mechelen (1997), and Hawkins *et al*. (2001) the process of injury prevention can be considered in 4 stages: Firstly, the extent of injury must be identified and described. Secondly, the factors and mechanisms that play a part in the occurrence of injuries have to be identified. Thirdly, preventive strategies are implemented based on stage 1 and 2 and finally strategies are evaluated to see effectiveness. The present study focused on the first two stages. The extent of the sports injury problem is often described by injury incidence and by indicators of the severity of sports injuries (Van Mechelen *et al.,* 1992). However, in this study the injury incidence was replaced by injury prevalence since the study was carried out retrospectively: injury incidence could not be expressed as the number of sports injuries per exposure time (e.g. per 1000 hours of sports participation). Nevertheless, one should realize that the outcome of research applying this definition of sports injury prevalence is highly dependent on the definitions of 'sports injury' and 'sports participation'. The injury prevalence adopted in this study was calculated or

defined as “sustaining at least one injury either in training or in competitive sessions”. According to various literature (Hawkins and Fuller, 1999; Hawkins *et al.,* 2001 and Woods, Hawkins, Hulse and Hodson, 2002), severity of sports injuries was described as minor, moderate, major and severe, depending on the time taken by the player to return to sport activity. Uniform definitions were important and necessary in order to enhance the comparability of research data. In the second step of injury prevention the etiological factors that play a role in the occurrence of a sports injury have to be identified by epidemiological studies. Depending on the nature of the research design, possible causes and injury mechanisms to injury occurrence are reported in the present study.

1.3 PROBLEM STATEMENT

Very little research has been conducted to determine the need for physiotherapy intervention in soccer injury countermeasures in Rwanda.

1.4 THE AIM OF THE STUDY

The aim of this study was to identify common soccer injuries among the first and the second division soccer teams in Rwanda and to establish the need for physiotherapy intervention.

1.5 SPECIFIC OBJECTIVES

1.5.1 To identify the anatomic sites, nature, etiology and severity of common soccer injuries in Rwandan soccer players of the first and the second division teams.

1.5.2 To determine physiotherapy management received following injuries.

1.5.3 To determine the accessibility of physiotherapy services to soccer players in Rwanda.

1.5.4 To establish the need for physiotherapy intervention in soccer injury countermeasures in Rwanda.

1.6 SIGNIFICANCE OF THE STUDY

The results of this study in Rwanda will focus on the first two stages in the process of soccer injury prevention. These are: identifying and describing the extent of injury and identifying factors and mechanisms that play a part in the occurrence of injuries (Van Mechelen *et al.,* 1992; Van Mechelen, 1997; and Hawkins *et al.,* 2001). The data from this study will contribute to the already existing information on most affected anatomical sites, prevalence, causes and severities of soccer injuries in both first and second division Rwandan teams and their need for physiotherapy injury countermeasures. The results will consequently create awareness in Rwandan soccer players about the severity of their injuries and raise some precautions to take towards the causal factors of the commonly sustained injuries. Furthermore, this study will complete and fill the gap in the previous studies about soccer-related injuries and their management in Rwanda. The players will be informed about the need for physiotherapy treatment for better and faster recovery, and possibly increase the number of players who visit physiotherapy services. After completing the first two stages of injury prevention as described by Van Mechelen *et al.* (1992), Van Mechelen (1997), and Hawkins *et al.* (2001), the results of this study will also serve as the basic

data for further studies for the implementation of preventive strategies and their evaluation for effectiveness which are the third and fourth stages in injury prevention. As injury affects the performance of athletes, the results of this study will be credited to play an important role in performance of Rwandan soccer players. The role of physiotherapists in the prevention of injuries will be challenged by the results of this study, which is that there is a need for physiotherapy intervention in soccer injury countermeasures in Rwanda. To the team managers, as well as other sports authorities, the results of this study will shed light on the extent of common soccer injuries and their causal factors when faced with soccer injury prevention at a later stage. The present study will also serve as a contribution to the Rwandan epidemiology of soccer injuries literature.

1.7 DEFINITION OF THE KEY TERMS USED

Soccer: also called football, is a game in which two teams of 11 players try to kick or use their heads to send a round ball into the goal of the opposing side (Cambridge, 1996). In this study the words soccer and football are used interchangeably.

Physiotherapy: also called physical therapy, is a dynamic profession with an established theoretical and scientific base and widespread clinical application in the restoration, maintenance, and promotion of optimal physical function (APTA, 2001).

Injury: an incident occurring during a training session or a match and causing a soccer player to miss the following session(s) (Frantz *et al.,* 1999; Orchard, 2001).

Countermeasures: measures that could"counter", which means prevent or reduce, the risk of injury (McGrath and Ozanne-Smith, 1997).

1.8 SUMMARY OF CHAPTERS

Chapter one provides an overview of the epidemiology of soccer injuries worldwide, at African level and in Rwanda, specifically. The possible causal factors to soccer injury occurrence in Rwanda are highlighted. The chapter also shows the current situation of medical infrastructures with emphasis on physiotherapy services, its essential role in sports injuries and the level of accessibility in Rwanda. The gaps in previous soccer-related studies in Rwanda are reported. The stages of injury prevention to focus on in this study are described: identifying and describing the extent of injury and identifying factors and mechanisms that play a part in the occurrence of injuries.

In chapter two, the literature illustrates the components of epidemiology study. Thereafter, the literature reviews the main issues to be addressed in connection with the current study. These include, soccer injury prevalence, type of common soccer injuries, the anatomical sites prone to soccer injury, severity of soccer injuries, mechanisms and factors influencing soccer injury occurrence and injury prevention programmes. The chapter ends by addressing the relationship of physiotherapy and sport injuries.

In chapter three the research setting is described. It shows the geographical view of Rwanda as well as the location of Rwandan soccer teams. In research setting, Rwanda soccer status is also given. The chapter presents the design of this study, which is a cross-sectional retrospective study design. It thereafter gives the details concerning the study population and sampling techniques. The need and procedures of pilot studies as well as problems encountered are highlighted. An in-depth description of data

collection methods is concisely presented. This includes, tools used in data collection, data collection procedures and issues of reliability and validity of questionnaires for soccer players. The chapter ends by giving the data analysis and by showing how the issues of ethical considerations were addressed.

In chapter four, the demographic characteristics of the Rwandan soccer players are reported. The presentation and brief description of the main findings in this study are displayed. These include the prevalence of soccer injuries in Rwanda, most common anatomical sites prone to injury, mechanisms of sustained injuries, severity and impact of sustained injuries to the sporting sessions. The chapter further shows the results from investigation on the use of protective equipments and performance of some sporting programmes as possible factors, which could influence injury occurrence. The chapter also displays the results on treatments following injury and their relationships with injury severity. Physiotherapy as a core part of this study is also highlighted. This section illustrates the physiotherapy techniques utilized in treating injured players, the accessibility as well as the factors leading to inaccessibility to physiotherapy services. Finally, the impact of physiotherapy treatment to soccer injury is reported.

In chapter five, the entire discussion focuses on the interpretation of the main findings in this study. The identification and description of injury prevalence in this study is discussed on the basis of comparing, where possible, the findings of this study with the ones of the previous similar studies. The use of protective equipment as well as investigated sporting programmes are discussed in consideration with their evidence in

influencing injury occurrence as revealed in previous studies. Final discussion focuses on demonstrating the relationship between sustained soccer injury and need for physiotherapy intervention. The limitations of this study are also reported.

The last chapter provides a summary, conclusions and suggested recommendations. These are based on the main findings of this study.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents a review of literature regarding soccer injury studies. Prior to that review, the components and definition of epidemiology studies are outlined. The literature is discussed under five themes. The first theme encapsulates the prevalence and incidence of soccer injuries. Secondly the area, nature, mechanisms and severity of common soccer injuries are explored. The third section shows the factors influencing the occurrence of soccer injuries. The injury countermeasures programme is presented in the fourth section, and the chapter ends with an overview of physiotherapy and sports injuries.

2.2 DEFINITION AND COMPONENTS OF EPIDEMIOLOGY OF SPORTS INJURIES

Epidemiology is the study of the distribution and determinants of varying rates of diseases, injuries, or other health states in human populations for the purpose of identifying and implementing measures to prevent their development and spread (Caine, Caine and Lindner, 1996). The epidemiology in sports medicine is concerned with quantifying injury occurrence (*how much*) with respect to *who* is affected by injury, *where* and *when* injuries occur, and *what* their outcome is, for the purpose of explaining *why* and *how* injuries occur and identifying strategies to control and prevent them. The study of the distribution of varying rates of injuries (i.e., who, where, when, what) is referred to as descriptive epidemiology, and the study of the determinants of

an exhibited distribution of varying rates of injuries (i.e., why and how) is referred to as analytical epidemiology (Caine *et al.,* 1996). The figure 2.1 illustrates the components of the two interrelated types of epidemiologic research (descriptive and analytical).

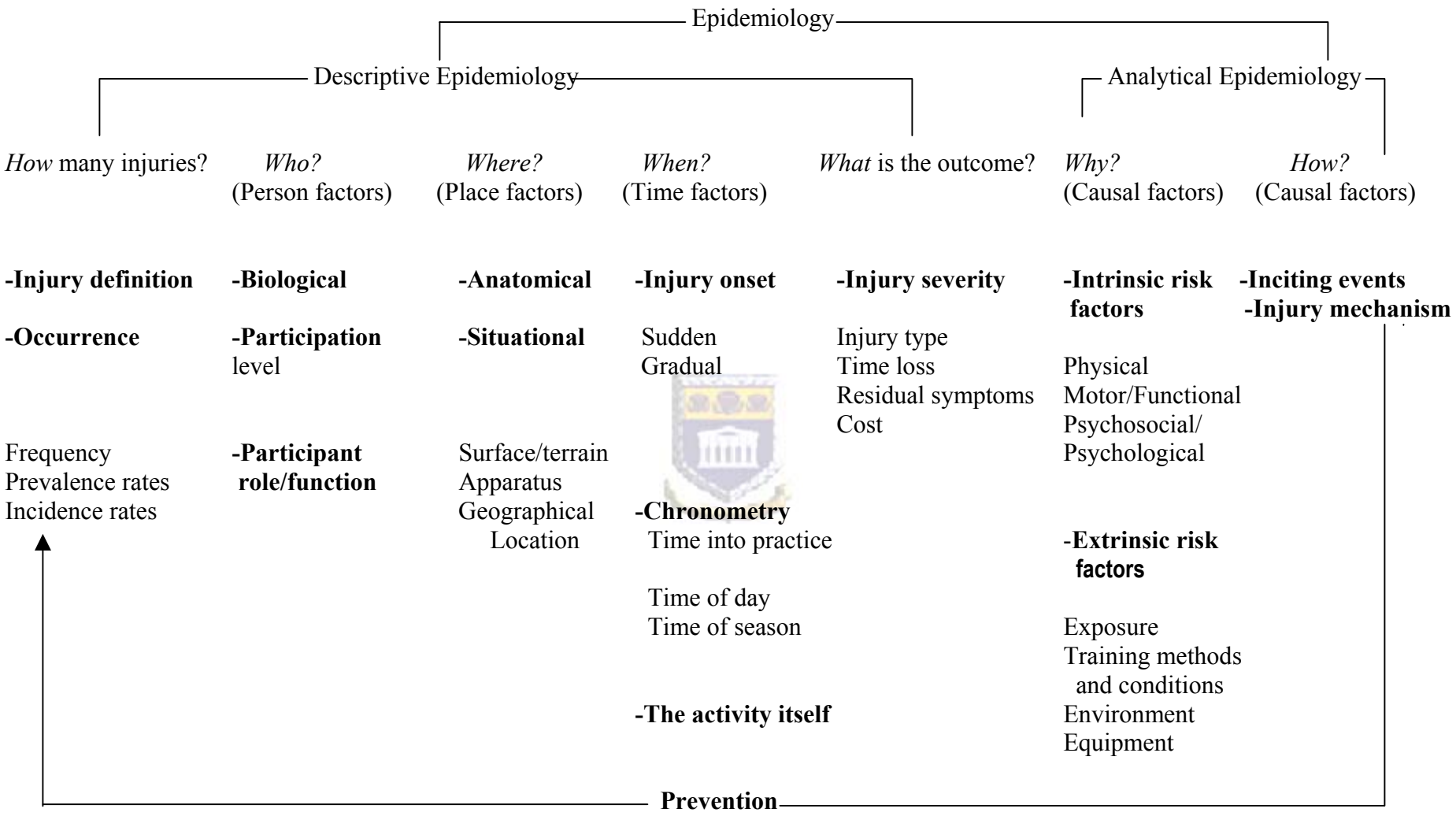

Figure 2.1: Components of Epidemiology of sports injuries

Source: Caine *et al.* (1996).

2.3 PREVALENCE AND INCIDENCE OF SOCCER INJURIES

A number of studies concerning the prevalence and incidence of soccer injuries have been reviewed. Literature defines prevalence and incidence of soccer injuries in different ways. Incidence may be referred to as the number of injuries per number of training hours or the number of injuries per player per season / tournament. When assessing injury incidence and prevalence, it also becomes important to define an injury. A study conducted by Dvorak (2000) on 588 players from Germany, France, and the Czech Republic followed weekly over the course of one year by unbiased physicians, revealed an incidence of 4.3 injuries per 1000 training hours, 20.3 injuries per 1000 competitive match hours, and 7.3 injuries per 1000 hours of total exposure. The author defined injury as one causing the injured player to seek medical attention and related rehabilitation and miss training and competitive matches.

According to Hawkins and Fuller (1998b), in their study on the examination of the frequency and severity of injuries and incidents at three levels of professional football, 808 players per season from the estimated 2600 players in the four English professional football leagues, sustained a match injury that caused them to miss at least one competitive match. In this case injury was considered as an incident occurring during a competitive match and causing a soccer player to miss at least one competitive match. Assessments were made from videotaped recordings of 171 televised matches over a period of three years.

In a prospective epidemiological study of the injuries sustained in English professional football over two competitive seasons, Hawkins *et al.* (2001) reported a total of 6030

injuries with an average of 1.3 injuries per player per season. A specific injury audit questionnaire was used together with a weekly form that documented each club's current injury status. The findings of their study were that football players are exposed to high risk of injury and therefore there was a need to investigate ways to reduce that risk. They further reported that areas that warrant attention included the training programme implemented by clubs during various stages of the season, the factors contributing to the pattern of injuries during matches with respect to time, and the rehabilitation protocols employed by clubs. The definition of a recordable injury was an injury received during training or competition and which prevented the injured person from participating in normal training or competition for more than 48 hours, excluding the day of injury.

A study conducted to assess the exposure of players to injury risk during English Premier League soccer matches in relation to selected factors such as type of action, period of match, zone of the pitch, and playing either at home or away, showed an overall injury incidence of 53 per 1000 playing hours (Rahnama, Reilly, and Lees, 2002). A television monitor and a video recorder (Panasonic NV-HD 685) were used to view the matches and enable notation of events taking place. The video was paused after every event occurred (for both home and away teams) and the action, location, and time were notated on paper.

In the analysis of the injury data collected from the 10 teams (237 players) that constituted Major League Soccer during its inaugural season in California, Morgan and Oberlander (2001) reported that the overall injury rate was 6.2 per 1000 hours of

participation. An injury rate of 2.9 per 1000 hours was noted for training and 35.3 per 1000 hours was found for competitive matches. They further mentioned that the difference was statistically significant. Data were recorded by each team's head athletic trainer on forms provided by the league (first report of injury). The instrument constructed for the purpose of gathering the data for this investigation included the following fields: date of injury, injury diagnosis, mechanism of injury, whether the injury occurred during a practice or game, total time (in days) lost from participation, player's position, and player's age. An injury was defined as one reported to and evaluated by the team athletic trainer or team physician. Morgan and Oberlander (2001) made the following assumptions: 1) a 4-4-2 formation (a popular formation that employs four defenders, four midfielders, two forwards, and a goalkeeper) was used by each team and 2) all players participated in each practice session and determined who, by position, was most often injured.

According to Orchard and Seward (2002), epidemiology of injuries in the Australian Football League (AFL), seasons 1997-2000, showed an incidence of new injuries of 39 per club (of 40 players) per season (of 22 matches). The match injury incidence was 25.7 injuries per 1000 player hours. The injury prevalence (percentage of players missing through injury on average week) was 16%. The recurrence rate of injuries was 17%. The AFL injury surveillance system used consistent methods to determine injury rates. The most fundamental element was the definition of an injury as "any physical or medical condition that caused a player to miss a match in the regular season". Prior to this definition, the original definition of injury for the AFL injury surveillance in 1992 was (a) any injury that caused a player to be unavailable for selection in a match, or

participation in a training session; or (b) any other injury that required specific medical treatment, other than routine conservative measures. This definition was complex and took into account two common elements of definitions used in football injury survey: time loss and medical treatment. The authors reported that the injury definition in their study did not produce rates that are complete for all minor injuries.

The study conducted on adolescent soccer players during an interprovincial under-20 soccer tournament in South Africa, reported 19% of injured players (Frantz *et al.,* 1999). A total of 405 players (aged 17-19 years) participated in the tournament. Injury was defined as an incidence occurring during a match and causing a player to seek medical attention. The information gathered included age, type of injury, and location of injury, previous injuries and treatment intervention at the time. The authors reported that, in that tournament, the incidence of injury was high enough to justify the need for physiotherapy services at major tournaments. During the tournament approximately 20% of the injured players had sustained similar injuries before the tournament.

Literature has shown that different studies have been carried out worldwide concerning the prevalence and incidence of soccer injuries. However, even though data collection procedures were similar in the studies, there are still gaps, which will play an important role in the prevention of injuries.

2.4 AREAS, NATURE, MECHANISMS AND SEVERITY OF INJURIES

2.4.1 Area of injuries

Most studies reviewed under prevalence and incidence took into consideration causes, types and nature of soccer injuries. Rahnama *et al.* (2002) reported that a great deal of research on soccer injuries has been carried out in England and Iceland. A number of facts about their nature, causative mechanisms, and characteristics have been established. Lower extremity injuries represent 60-87% of the total injuries incurred by soccer players of both sexes (AAP, 2000; Hawkins *et al.,* 2001; Lyon, 2001; Morgan and Oberlander, 2001; and Rahnama *et al.,* 2002). In the studies conducted by Lyon (2001), Morgan and Oberlander (2001), and Rahnama *et al.* (2002), the knee was the most affected joint followed by the ankle joint. However, according to Frantz *et al.* (1999) and Hawkins and Fuller (1999), the most affected joint was the ankle (26.6 and 17% respectively) followed by the knee (21.7 and 14% respectively).

2.4.2 Nature of injuries

Regarding the type of injuries Hawkins *et al.* (2001) found that most of the thigh injuries were muscular strains (81%). Of the knee injuries, 39% were ligament sprains, 75% of which were to the medial collateral ligament. Injuries to the ankle were predominantly ligament sprains (67%), over 80% being to the lateral ligament complex. The injuries classified as strains, sprains, or contusions represented 69-81% of all injuries (Hawkins and Fuller, 1999; Hawkins *et al.,* 2001; and Rahnama *et al.,* 2002). Others injuries, such as, fractures (relatively uncommon), dislocations, tendonitis, overuse injuries, and heat-related injuries, also occur in soccer but are not

unique to soccer or is not seen in disproportionate numbers among soccer players (AAP, 2000). In the study conducted by Frantz *et al.* (1999), bruises and joint swelling or inflammation were recorded among the commonest types of soccer injuries.

2.4.3 Mechanisms of injuries

For injury mechanisms, Hawkins *et al.* (2001) found that 38% were classified as resulting from contact with another player or the ball, and 58% from a non-contact mechanism. The authors further specified that about half of the injuries arise from player to player contact, including tackling, being tackled, and collisions, and the remainder (non-contact) arise from actions such as running, shooting, turning and heading. In addition to that, the role of muscle fatigue has been identified as a factor in injury causation, and it is believed that this can partly explain the greater injury incidence observed in the second half of competitive matches, especially during the final 15 minutes (Hawkins *et al.,* 2001).

In a study conducted by Rahnama *et al.* (2002), 16 soccer-specific playing actions notated were dribbling the ball, goal catch, goal punch, goal throw, heading the ball, jumping to head, kicking the ball, making a tackle, making a charge, passing the ball, receiving a ball, receiving a tackle, receiving a charge, shot on goal, set kick, and throw in the ball. Each action mentioned above had its own definition in their study. Data available from their study suggested that some playing actions were associated with higher injury risk than others. In particular, receiving a tackle, making a tackle, and receiving a charge were actions with a substantial risk of injury.

2.4.4 Severity of injury

Literature defines severity of injury in various ways. The injury severity was defined as slight, minor, moderate or major, depending on the length of time needed for recovery, with over 65% being minor, 25% moderate and 10% serious (Rahnama. *et al.,* 2002, and Hawkins *et al.,* 2001). The time for recovery being two to three days for slight, four to seven days for minor, one to four weeks for moderate, and more than four weeks for major or serious injuries (Hawkins and Fuller, 1999; Hawkins *et al.,* 2001 and Woods *et al.,* 2002). This cut-off is slightly different to some other studies. According to Arnason, Gudmundsson and Dahl (1996) and Nielsen and Yde (1989), a minor injury is corresponding to a recovery period less than one week; moderate injury corresponds to one to four weeks recovery period whereas the severe injury is considered with a more than four weeks recovery period. According to Orchard and Seward (2002) another definition appears. In their study about epidemiology of injuries in the AFL, seasons 1997-2000, injury severity was defined as the average number of games missed per injury. They further stated that, because the season was 22 weeks long, average injury severity could underestimate the average recovery time for serious injuries, for example, an anterior cruciate ligament (ACL) injury, which usually requires reconstruction and prevents a player from playing for 6 - 10 months. However Van Mechelen *et al.* (1992) and Van Mechelen (1997) recommended that the severity of sports injuries be described on the basis of six criteria: nature of injury, duration and nature of the treatment, sporting time lost, work time lost, permanent damage, and cost.

The fact that various literatures present controversial information about anatomical sites, nature, mechanisms and severity of common soccer injuries, data collections of

soccer injury in a country like Rwanda, will enhance the provision of a guide in injury prevention activities, in setting and monitoring sports safety policies and interventions, and serve as the basis for sports injury prevention research (Finch, 1997).

2.5 FACTORS INFLUENCING SOCCER INJURIES.

Understanding the individual risk factors for injury in soccer is an important basis for the development of preventive measures (Arnason, Sigurdsson, Gudmundsson, Holme, Engebretsen, and Bahr, 2004). According to Hackney (1994), sports injuries are the result of both intrinsic and extrinsic factors, and doctors should be able to recognize the types of injuries associated with various sports. Intrinsic factors, also called internal athlete-related risk factors, (Bahr and Holme, 2003) include the age, sex, weight, strength, and flexibility of the athlete. Extrinsic factors, also called external environmental risk factors, (Bahr and Holme, 2003) include training methods, the surface upon which the sport is played, equipment such as footwear and padding, and environmental factors such as the weather. In addition to these, McGrath and Ozanne-Smith (1997) added pre-season conditioning whereas Rahnama *et al.* (2002), in their study, found that playing actions, zone of pitch, periods of game were also among extrinsic factors influencing injuries.

2.5.1 Age

Aiming at the analysis of potential risk factors for muscle strain injury by means of data obtained prospectively from an injury surveillance system, Orchard (2001) conducted a cohort study involving players and matches in the AFL between 1992 and 1999. In this study, age (when considered independently of past history) was found to

be a risk factor for hamstring and calf muscle strains but not for quadriceps muscle strains. Orchard (2001) stated that these findings was consistent with the theory that abnormalities of the lumbar spine are implicated in the development of muscle strains, since the lumbar nerve roots of L5 and S1, which supply the hamstring and calf muscles, are more likely to be affected by age-related spinal degeneration than the nerve supply of the quadriceps muscles (L2, 3 and L4). Orchard (2001) concluded his study by mentioning that calf and hamstring muscle injuries are common in older players while quadriceps muscle injuries are common in the dominant leg and are related to kicking in Australian football. In their study, Morgan and Oberlander (2001) reported on the role that age may have played in injury rates and severity, players have been divided into three age groups: those under 25 years, those 25 to 30 years, and those over 30 years. The results of this study revealed that player age did not play a role in the occurrence or severity of injury.

2.5.2 Gender and weight

According to Murphy, Connolly and Beynnon (2003), Childs (2002), and Morgan (2003), female athletes incur substantially more knee injuries than male athletes, specifically ACL sprains. Many explanations have been suggested for the reason why female athletes suffer more serious knee injuries than male athletes, which include explanations of anatomical, hormonal and neuromuscular factors. According to Harner and Rhin (2003), factors that were identified in female subjects included signs of hyperlaxity, a body mass (weight in kg) >68 kg, and a body-mass index (weight in kg divided by the squared height in meters) of 24.7. Other risk factors that have been associated with the increased prevalence of anterior cruciate ligament injuries in female

athletes include the gender-related differences in lower extremity positioning during landing. In their review, Harner and Rhin (2003) reported that one study demonstrated that female subjects landed with the lower extremity more extended than did male subjects. Although it is clear that female athletes are at increased risk of suffering from ACL injuries, the relation between sex and other types of lower extremity injury is still unclear (Murphy *et al.,* 2003).

2.5.3 Muscle flexibility

Muscular tightness is frequently postulated as an intrinsic risk factor for the development of muscle injury. In a prospective cohort study conducted by Witvrouw, Danneels, Asselman, D'Have and Cambier (2003), 146 male professional soccer players were examined before the 1999-2000 Belgian soccer competition. Players with a hamstring (N=31) or quadriceps (N=13) muscle injury were found to have significantly lower flexibility in these muscles before their injury compared to the uninjured group. No significant differences in muscle flexibility were found between players who sustained an adductor muscle injury (N=13) or calf muscle injury (N=10) and the injured group. The authors concluded that soccer players with an increased tightness of hamstring or quadriceps muscles have a statistically higher risk for subsequent musculoskeletal lesions. Their findings suggested that pre-season testing of flexibility of these muscles could identify soccer players at risk of developing muscle injuries.

2.5.4 Foot structure

Kaufman, Brodine, Shaffer, Johnson and Cullison (1999) conducted a well-defined prospective cohort study of 449 trainees at the Naval Special Warfare Training Center

in Coronado. The purpose of the study was to determine whether there was an association between foot structure and the development of an overuse injury in a well-defined cohort undergoing high-intensity physical training session. The results showed an association between foot structure and the risk of overuse injury. Subjects with either pes planus or pes cavus, as measured both statistically and dynamically, consistently had nearly twice the incidence of stress fractures compared to subjects with average arch height. Using anatomic measurements and the more precise biomechanical methods, Kaufman *et al.* (1999) found that the application of these two methods could make it possible to better define arch characteristics as well as the interaction with modifying factors such as footwear that contribute to injury.

2.5.5 Training methods

In literature the review conducted by Baker, Horton, Robertson-Wilson and Wall (2002), evidence was found that research on the quality and quantity of training indicated that these two elements were crucial predictors of attainment. According to Brukner and Khan (2003), training errors are among the most common predisposing factors in the development of sport injuries. They further stated that it is essential for all sports medicine practitioners to understand the different elements of training and their possible relationship.

2.5.6 Playing surface

Traditionally soccer is played on a rectangular field, not more than 68m wide and 105 m long with a predominantly grass surface, and less common a surface of sand, gravel or artificial turf. A player covers approximately 10 km of ground per game, of which 8-18% is at the highest individual speed and therefore suffers significant impact forces of

two to three times his own body weight (McGrath and Ozanne-Smith, 1997). Therefore, the surface and the environmental surrounds are important factors to consider when reviewing the nature and incidence of soccer injuries (McGrath and Ozanne-Smith, 1997).

In a study of National Football League athletes between 1980 and 1985, Murphy *et al.* (2003) mentioned that playing on artificial turf increased the incidence of knee and foot / ankle injuries. Tartan Turf had the highest injury incidence rate (IR=2.36) followed by Super Turf (IR=2.34) and Astro Turf (IR=1.78). Likewise, Arnason *et al.* in Murphy et *al.* (2003) also found a more than twofold-increased incidence of injuries on artificial turf compared to grass or gravel in 84 elite male soccer athletes. More injuries may be incurred on artificial turf than on other surfaces because of its stiffness and the increased friction force at the shoe / surface interface. Stiffness of a surface affects impact forces and can result in overload to tissues such as bone, cartilage, muscle, tendon, and ligament. Normally, friction is necessary for rapid starting, stopping, cutting, and pivoting inherent in sports such as football and soccer; however increased friction force may contribute to the increased incidence of injury among athletes who play on artificial turf (Murphy *et al.,* 2003).

2.5.7 Footwear and padding

According to McGrath and Ozanne-Smith (1997), protective equipment such as shin pads and appropriate footwear were introduced in FIFA regulations as compulsory for both competition and training in 1990. Prior to FIFA regulations, the voluntary use of shin guards was limited. In the study concerning the evaluation of the effectiveness of

shin guards in protecting against tibia fracture in soccer players (Fransisco, Nightingale, Guilak, Glisson and Garret, 2000), the results have shown that shin guards provide significant protection from tibia fracture. The authors further stated that the average guard reduced force by 11% to 17% and strain by 45% to 51% compared to an unguarded leg. In football, wearing edge style cleats increased the risk of sustaining ACL injury compared to other cleat designs. One prospective study investigated the relationship between cleat design and the incidence of ACL tears in 3119 high school American football athletes participating on natural turf (Murphy *et al.,* 2003). This study has shown significantly more ACL tears occur in athletes wearing edge cleat designs with longer irregular cleats positioned at the periphery of the shoe and smaller pointed cleats positioned interiorly (n=38, IR=0.017) than in athletes wearing other cleat types, including fiat, screw in, and pivot disk designs (n=4, IR=0.005).

2.5.8 Adequate warm-up & pre-season conditioning

According to McGrath and Ozanne-Smith (1997) and Prentice (1999), programme such as physical fitness, a warm-up period of 15-20 minutes, stretching during cool-down, strengthening, endurance and power are imperative in pre-season conditioning for soccer players in order to cope with the requirements of competitions. Fatigued athletes have decreased skill performances, which can lead to injury (McGrath and Ozanne-Smith, 1997).

In the study conducted on adolescent soccer players during an interprovincial under-20 soccer tournament in South Africa, Frantz *et al.* (1999) suggested that soccer coaches should be made aware of their responsibility in terms of preventing some of these

injuries. They should encourage proper warm-up exercises and stretches prior to matches or training sessions. The coaches should prevent previously injured players from playing until their injuries are adequately healed. In this study, factors such as protective equipment and the condition of the playing ground should also be included as ways to prevent or reduce the risk of injury. According to Drawer and Fuller (2002), playing when not fully fit exposes soccer players to high risk of reinjury. Unfortunately, players are often under pressure to play for personal reasons or as a result of pressure from their club's management and / or medical team.

2.5.9 Carbohydrate and water intake

The athlete is often encouraged to eat dietary carbohydrates at special times, or in quantities greater than that, which would be provided in an everyday diet or dictated, by their appetite and hunger. The carbohydrate is used as fuel at onset of exercise at all intensities and is obligatory for the continuation of exercise at intensities above 50-60% of the subject's maximal oxygen uptake. Depletion of the muscle carbohydrate stores will impair exercise performance (Maughan, 2000). The main deficiencies in awareness of injury strategies for players were identified as: use of shin pads during training, carbohydrate intake before and after matches, cool downs after training and matches, and flexibility work. According to Hawkins and Fuller (1998a), these deficiencies were the indicators of a need for wider education of players in current injury prevention strategies.

2.6 INJURY PREVENTION PROGRAMMES

According to McGrath and Ozanne-Smith (1997), injuries are considered to result from a culmination of sets of circumstances and pre-existing conditions that may best be understood as a chain of events: pre-event, event and post-event. Injury countermeasures can be equated with primary (pre-event), secondary (event) and tertiary (post-event) prevention in the chain of events leading to injury.

2.6.1 Primary injury countermeasures

According to McGrath and Ozanne-Smith (1997), primary injury countermeasures are viewed as measures acting before an event or incident that could potentially lead to injury, to prevent the event from occurring in the first place. The primary injury countermeasures consist of conditioning, protective equipment and environmental conditions. Adequate warm-up and strengthening exercises, good nutrition, correct use and maintenance of equipment and awareness of environmental factors and personal limits all help to prevent sports injuries. In environmental conditions, the surface that is being played on as well as weather conditions are matters of concern in occurrence of injury.

2.6.2 Secondary injury countermeasures

According to McGrath and Ozanne-Smith (1997), secondary injury countermeasures are viewed as measures acting during the event to prevent the injury from occurring or to reduce the severity of injury. There are different ways in which authors define the first aid management of soft tissue injuries, namely RICE, PRICE, RICER or PRICER. The common first aid is called RICE, which means Rest, Ice, Compression, and Elevation. If a part of the body is injured, the body's reaction will cause damage to the

tissue surrounding that part. Brukner and Khan (2003) state that whenever possible, the injured athlete should cease activity immediately following injury. Continued active movement of the injured part will result in increased bleeding and swelling. For example, with a thigh contusion, bleeding will be increased by contraction of the quadriceps muscle during running. The application of ice immediately after injury results in reduction of pain and causes local vasoconstriction (contraction of blood vessels), thus reducing bleeding and swelling. Ice reduces the metabolic rate of the tissue, thus lowering demands on oxygen and nutrients. Ice may also decrease inflammation and muscle spasm (Brukner and Khan, 2003). Compression of the injured area with a firm bandage reduces bleeding and, therefore, minimizes swelling too. Elevation of the injured part reduces blood flow to the injured area and encourages return of venous blood and lymph (Brukner and Khan, 2003). Flegel (1997) suggested another additional measure, which is Protection (PRICE). In the study about prevalence and incidence of athletic related sports injuries in primary and high school children in the Cape Metropolitan area, Frantz (2000) highlighted another argument as additional to RICE, which is Referral (RICER). By taking into consideration the effects those measures could bring to the wellness of a soccer player, the author supports these arguments and summarizes first aid as PRICER.

2.6.3 Tertiary injury countermeasures

According to McGrath and Ozanne-Smith (1997), tertiary injury countermeasures are viewed as measures acting after the chain of events or incidents leading to injury and help to minimize the consequences of injury. This stage is considered as the rehabilitation stage. Rehabilitation is both for injuries and the prevention of re-

occurrence. Many techniques such as mobilization, traction technique, proprioceptive neuromuscular facilitation, therapeutic exercise, regaining muscular strength, endurance and power, were discussed by Prentice (1999). The principal aim of the rehabilitation is to restore full muscle power, extendibility, range of motion and skill patterns.

Apart from those injury countermeasures as defined by McGrath and Ozanne-Smith (1997) and Brukner and Khan (2003) suggested a set of principles to injury prevention. According to those principles, injury prevention can be divided into:

-Primary prevention: dealing with health promotion and disease prevention

-Secondary prevention: dealing with early diagnosis and treatment to limit disability

-Tertiary prevention: which focuses on rehabilitation to reduce and correct existing disability.

In addition Brukner and Khan (2003) reported components that could be regarded in terms of injury prevention. Those are correcting biomechanics, warm-up, stretching, taping and bracing, protective equipment, suitable equipment, appropriate surfaces, adequate recovery, psychology and nutrition.

2.7 PHYSIOTHERAPY AND SPORTS INJURIES

According to Zuluaga, Briggs, Carlisle, McDonald, McMeeken, Nickson, Oddy and Wilson (1995), one of the skills of physiotherapists dealing with team sport, is to utilize experience and / or information from the sport and relevant literature, in order to formulate and implement injury preventive conditioning programme for that sport. Since physiotherapy is the health care profession that is recognized for its role in the

management of musculoskeletal dysfunction, physiotherapists have an important role to play in the prevention of soccer injuries.

Physiotherapy encapsulates many therapeutic techniques used in the treatment of sports injuries. These techniques include manual therapy, electrotherapy and exercise physiology such as specific soft tissue mobilizations, re-education of proprioception, stretching, rehabilitative specific exercises for flexibility, strength, endurance and power, and taping and bracing. Other techniques include massage, cryotherapy and other electrotherapy modalities such as heat, TENS, ultrasound and inferential therapy. All these techniques contribute extremely to sports injury treatment and enable the athlete to regain his pre-injury level of sport through a well-scheduled rehabilitation programme.

2.7.1 Pathophysiology of soft tissue injuries

The most common soccer injuries reported in literature are soft tissue injuries. According to Markku and Matti (1993) muscles injuries occur in two ways: either through a direct mechanism such as contusion or through an indirect mechanism involving excessive stress or strain. Despite the different injury mechanisms, the pathological events in the muscle repair are similar. Muscle fibres and their connective tissue sheets are totally or partially disrupted, and a gap appears between the ruptured fibres, which are retracted. The rupture gap is soon filled by a haematoma and later by proliferating granulation tissue.

The biological process following muscle injury includes two competitive events: regeneration of muscle fibres and the simultaneous production of granulation tissue. Muscle fibre regeneration is inhibited by the formation of dense connective tissue scar. Immobilization following injury limits the size of the connective tissue area formed within the site of injury: the penetration of muscle fibres through the connective tissue is prominent but their orientation is complex and not parallel with the injured muscle fibres (Markku and Matti, 1993).

2.7.2 Physiotherapeutic management principles

2.7.2.1 Referral

Although physiotherapeutic treatment has been advocated as crucial treatment in most sport injuries, a need for a multidisciplinary team is also required depending on the conditions and extent of the injury. Therefore, for any condition that does not show any improvement after the third or fourth treatment session the athlete is generally referred to the specialist. It is also important to acknowledge that physiotherapists do not handle rare conditions in field sports such as fractures even if this becomes a matter of concern during rehabilitation.

2.7.2.2 Treatment

Most of soccer injuries occur in the soft tissue. The aim of soft tissue treatment is:

- To minimize the extent of damaged tissue,
- To reduce associated pain and inflammation,
- To promote healing of damaged tissue,

- To maintain or restore flexibility, strength, proprioception and overall fitness during the healing process of the athlete,
- To functionally rehabilitate the athlete to enable his return to sport activity, and
- Finally to assess or correct any predisposing factor in order to prevent recurrence.

To achieve these aims, physiotherapy provides treatment in three phases of the healing process: inflammatory phase, fibroblastic phase and remodeling phase. These phases sometimes overlap. According to McGonigle and Matley (1994), those phases are also seen clinically as the acute phase, usually lasting from 24-48 hours to two weeks or more; subacute phase, which can last for approximately two weeks; and the chronic phase, which lasts until the collagen scar is mature.

Inflammatory phase

In this phase, most of the treatment is embodied in the acronym RICE, which stands for rest, ice, compression, and elevation to restore swelling/oedema and to reduce pain. Towards the end of this phase (48 to 72 hours), it is recommended to start gentle mobilization in order to prevent cross-linkage / adhesions and to restore the orientation of newly formed fibres. In so doing, the treatment in this phase achieves the aims of minimizing the extent of damaged tissue, of reducing associated pain and inflammation as well as the promotion of healing of damaged tissue.

Fibroblastic phase

The main aim in this stage will be to increase tensile strength. The physiotherapist performs the graded specific soft tissue mobilization. Association of RICE and beginning of slight exercises is also recommended in this phase to bring about healing of damaged tissue, maintaining or restoring flexibility, strength, proprioception and overall fitness during the healing process of the athlete.

Remodelling phase

In this phase, the main objective is to get a functional scar. According to McGonigle and Matley (1994), the functional quality of the scar is determined by the collagen tissue's ability to (1) form along the same line of stress as the tissue it is replacing, (2) be as long as the tissue it is replacing to allow full range of movement, (3) allow independent movement between itself and the layers of tissue adjacent to it, and, (4) be of sufficient quantity and quality to accept the compressive, distracting and sharing stresses to which it will be subjected. The graded specific soft tissue mobilization must be performed in association with stretching and therapeutic exercises. The stretching will bring about the elasticity of the newly formed scar. To return to sports activity, the athlete must be given the exercises related to the performed sport. As good rehabilitation must have a preventive aspect, in this phase, any assessed predisposing factor to the injury sustained must be advocated.

2.7.2.3 Rehabilitation

While treatment may lead to an athlete becoming pain-free and return to activities of daily living, rehabilitation is required to return the athlete to previous level of

functioning. According to Brukner and Khan (2003), all musculoskeletal injuries require active rehabilitation. The primary aim of injury rehabilitation is to enable the athlete to return to sport with full function in the shortest possible time. If rehabilitation is inadequate the athlete is:

- prone to reinjury of the affected area,
- incapable of performing at pre-injury standard, and
- predisposed to injuring another part of the body.

According to Brukner and Khan (2003), the important components of rehabilitation include: muscle conditioning, flexibility, proprioception, functional exercises, sport skills, correction of abnormal biomechanics, maintenance of cardiovascular fitness and psychology. Within the muscle conditioning, four components are necessary to varying degrees in both activities of daily living and sport. Those are: muscle strength, muscle power, muscle endurance and motor re-education (Brukner and Khan, 2003). Regaining full flexibility of joints and soft tissues is an essential component of rehabilitation.

Brukner and Khan (2003) also reported that impaired proprioception is a common sequel to lower limb injuries. Therefore when early and comprehensive propriocetive training is undertaken, objective improvement in propriocetion can be demonstrated and there is a reduced rate of recurrence of injuries. Once a reasonable level of strength, power, endurance, flexibility and proprioception has been achieved, the athlete should be gradually reintroduced to the functional activities that form the basis of his or her sport. These activities prepare the athlete physically and mentally for the demands of the sport (Brukner and Khan, 2003).

As athletes often harbour the fear that they will not regain their pre-injury skill level, even if the physical deficits are corrected, Brukner and Khan (2003) recommend that an important part of the initial discussion with the athlete should include the reassurance that talent was not lost overnight and that the rehabilitation process will permit sport-specific skill training as soon as possible. The athlete begins with the most basic level in the programme and works until the required level is reached. The athlete should incorporate skills into the programme as soon as he is able. For soccer players, jogging and stretching with the rest of the team while recovering from injury makes him feeling more motivated and skill levels are maintained as much as possible.

Biomechanical abnormalities are important predisposing factors to injury especially overuse injuries. If abnormal biomechanics is contributing to an injury, its correction is a vital part of treatment and rehabilitation. An athlete should not be allowed to return to the same activity that produced the overuse injury without the cause of the injury having been removed (Brukner and Khan, 2003). The maintenance of cardiovascular fitness is another essential component of the rehabilitation process. No matter what type of injury the athlete has sustained, it should always be possible to design an exercise programme such as swimming, cycling to enable cardiovascular fitness to be maintained.

However, a good rehabilitation programme must be progressive. Brukner and Khan (2003) mentioned that the type of activity, duration of the activity, frequency of the activity / rest, intensity as well as complexity of the activity are parameters to be

manipulated by the therapist to progress the athlete's programme to a level where it is possible for the athlete to return to sport.

2.7.2.4 Health promotion

The World Health Organisation (WHO, 1986) defines health promotion as the process of enabling people to increase control over, and to improve health. To reach a state of complete physical mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs and to change or cope with the environment. Health is therefore seen as a resource for life, not the objective of living. Health is a positive concept, emphasizing social and personal resources, as well as physical capacities.

Therefore, within sport clubs, physiotherapy could promote the health of soccer players by enabling them to increase control over their injuries in terms of prevention, treatment once occurred, and promoting some other countermeasures related to those injuries. This will then lead to the improvement of soccer players' health.

The reviewed literature justifies that a great deal of research has been done concerning soccer injury prevalence, type of common soccer injuries, the anatomical sites prone to injury, severity of soccer injuries, mechanisms and factors influencing soccer injury occurrence and injury prevention programmes. The benefits of physiotherapy management in soccer injuries is highlighted and identified as being essential. In short, physiotherapy plays a great role in reducing pain and inflammation, promoting the healing of damaged tissue, maintaining or restoring joint flexibility, muscle strength as

well as joint proprioception and functionally rehabilitating the injured athlete to enable his return to sporting activity. To prevent recurrence and overuse injuries, physiotherapy management also utilises methods to assess and correct any biomechanical abnormality that makes the athlete prone to injury. Thus the absolute value of physiotherapy is highlighted and also the importance of including physiotherapy as part of injury prevention and injury management.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research setting, the study design and the rationale of the study as well as the implementation of sampling techniques to the targeted group. The methods of data collection and data analysis are explained as well as the description of the pilot study. This chapter ends with the ethical considerations for the study.

3.2 RESEARCH SETTING

The study was carried out in Rwanda. Rwanda is a small country, situated in the great lakes region in central Africa with a surface area of 26,338 km^2 (UNICEF, 1998). Rwanda is bordered to the North and East by Uganda and Tanzania, to the West by the Democratic Republic of Congo and to the South by Burundi. It is often called the 'heart of Africa' by virtue of its location. To Cairo due north, it is approximately 3650 km; and to Cape Town due South it is approximately 3750 km. On the other hand, it is about 2200 km to Cabinda and 1500 km to Dar es Salaam (UNICEF, 1998).

Currently, Rwanda is a member of the African Football Confederation (CAF, 2003) and has been affiliated to the International Federation of Football Association since January 1976 (FIFA, 2003). As an active member of CAF as well as FIFA, Rwanda is called upon to participate in several competitions organized by the above-mentioned organizations. This participation was widely demonstrated in the last five years where the Rwandan national soccer team (AMAVUBI) won the Cup of East and Central

African Championship (CECAFA, 1999), and the Cup of Common Market for Eastern Southern Africa (COMESA, 2000). Recently the Rwandan national soccer team qualified and participated in The African Nations Cup for the first time after eliminating Uganda and Ghana's national soccer teams (CAF, 2003). This shows the performance and the effort made by the Rwandan soccer players.

Table 3.1 demonstrates the provinces, their geographical localization, the teams and their respective divisions considered in this study. All male soccer teams in Rwanda of the first and the second division are not equally placed in the twelve provinces composing the country. Out of twelve provinces, only Gikongoro and Kigali rural provinces do not have a first or a second division male soccer team. The highest number of teams however was found in Kigali province, the capital city of Rwanda. Out of 30 teams registered in the first and the second divisions in 2003, 15 teams were found there. Among those 15 teams, five teams were registered in the first division and 10 teams in the second division.

Table 3.1 Distribution of teams per province and their corresponding divisions

PROVINCE	GEOGRAPHICAL LOCALIZATION	MALE SOCCER TEAM	DIVISION
KIGALI CITY	CENTRAL	APR *F.C*[*] (Armée Patriotique Rwanda)	1st
		ASPOR F.C	2nd
		GATSATA F.C	2nd
		JAGUAR F.C	2nd
		KIE F.C (Kigali Institute of Education)	2nd
		KIST F.C (Kigali Institute of Science and Technology)	2nd
		KIYOVU Association Sportive	1st
		LA JEUNESSE F.C	2nd
		LEOPALD F.C	1st
		LES CITADINS / Kigali F.C	1st
		RAYON SPORT F.C	1st
		RENAISSANCE F.C	2nd
		RWANDA F.C	2nd
		TOUT PUISSANT VICTORY F.C	2nd
		UNION SPORTIVE DE KIGALI	2nd
BUTARE	SOUTH	INTARE F.C	1st
		MUKURA VICTORY. SPORT	1st
		NYANZA F.C	1st
		TONNERRE F.C	2nd
GISENYI	NORTH	ETINCELLES F.C	1st
		MARINES F.C	1st
		STELLA MARIS F.C	2nd
BYUMBA	NORTH	MURAMBI F.C	2nd
		ZEBRES F.C	1st
KIBUYE	WEST	ETOILE DE LA CRETE F.C	2nd
MUTARA	NORTH EST	MUTARA F.C	1st
RUHENGERI	NORTH	NTARUKA F.C	2nd
KIBUNGO	EAST	POLICE F.C	1st
CYANGUGU	SOUTH-WEST	SIMBA F.C	2nd
GITARAMA	CENTRAL	FLASH F.C	1st

[*]F.C: Football Club

3.3 STUDY DESIGN

The study design used in this study was a cross-sectional retrospective quantitative study design. By using cross-sectional, the study was conducted in a short period of time. The data were retrospectively collected over a period of less than one-year (the previous season, 2003). The questionnaires for soccer players instructed them to only report the injuries sustained in the previous season. All players were given time to think about or remember injuries sustained during the previous season in order to produce a realistic result. An epidemiology study must reflect a big number of targeted people, hence the possibility to generalize the results.

3.4 STUDY POPULATION

The study was conducted on 30 male soccer teams from both the first and the second divisions, registered in the Rwandese Federation of Football Amateur (FERWAFA) for the 2003 season. Out of 30 teams, 14 teams composed the first division and 16 teams composed the second division. FERWAFA requires each team to register 30 players at the beginning of each champion season. That led to a total of 900 soccer players from both divisions.

3.5 SAMPLING TECHNIQUE

Simple random sampling clustered within the teams was used to get a sample of this study. Each of the 30 teams made a cluster, and so a total of 30 clusters were used for this study. According to De Vos (2002), the selected clusters can either be included fully in the sample, or further sampling within the selected clusters can be performed.

Selection within the selected clusters must, of course, still occur randomly. Therefore, random order determined by using the random number generator in Microsoft Excel® was used to select 10 soccer players per team to be included in the study. A total number of 300 players were expected to participate in this study. However, a total number of 273 players from both the first and the second divisions' male soccer teams responded in the present study. For this sampling technique, a list of players registered for the last season (2003) per team was given to the researcher by FERWAFA teams' registrar. The number generated by Microsoft Excel® for each team (with n=30) corresponded with the number of the player to be included into this study from the list of each team. If a selected player decided not to participate in the study or was reported unavailable, we passed on to the next candidate until we had 10 players in each team. This enabled us to get a sample of approximately 273 players. This technique ensured an optimal chance of drawing a sample that is representative of the population from which it was drawn (De Vos, 2001). Team medical practitioners were also respondents to this study. The purpose of their inclusion into the study was to supplement the information gathered by the players because some relevant points regarding the types of injuries as well as the causes could be expressed directly in appropriate medical terms. Out of the 30 male soccer teams investigated in the present study, only eight team medical practitioners responded to the present study.

3.6 PILOT STUDIES

Two pilot studies were carried out to assess whether the participants easily understood questions asked and also how long it would take to complete the questionnaires. The first pilot study was conducted on five players conveniently selected from different

teams, and the second one was conducted on one team medical practitioner. The researcher took a few participants for pilot studies from soccer players due to time constraints and one team medical practitioner due to the low number of team medical practitioners available. The subjects of the pilot study were automatically excluded from the main study in order to avoid biased responses.

The first problem encountered in conducting the pilot study was the way questions were arranged. In part B of soccer players' questionnaire (Appendix E), the re-arrangement has been made from the first to the seventh questions to allow a good flow and a better understanding of injuries they were referring to.

The warm-up was among countermeasures programme designed in the questionnaire of soccer players. The question related to warm-up as it was stated in part D of the questionnaire, question 2, as previously constructed, did not indicate whether the question referred prior to training or prior to competitive matches. As the issue of warm-up could be referring to both periods, training and competitive sessions, the question was subdivided into 2 questions: one referring to prior to training another to prior to competitive matches.

The last problematic issue found during the pilot study was to find out whether soccer players consciously consume carbohydrate (question 1 in part E of the soccer players' questionnaire). The problem raised by that question was that the players did not know whether the question was referring to their carbohydrate intake while they are with the team, provided by their respective teams or whether it was referring to their intake at

home, with their families. The researcher decided to refer this question to the carbohydrate provided by teams because the results expected from that question were to reflect the players' issues in term of nutrition in their teams and not in their families.

The time it took for respondent to complete the questionnaire was between 12 to 20 minutes. The time varied because of two reasons. The first one was that the players who did not sustain injury either in training or during competitive matches (part B, question1), automatically had to continue with the eighth, ninth and tenth questions, and consequently had to respond to few questions. Another natural factor, difficult to manage, was that some players developed a quicker understanding than others hence quicker responses.

The pre-test of team medical practitioner questionnaire raised no problems in terms of clarity, understanding or time consumption.

3.7 DATA COLLECTION METHOD

The researcher and trained research assistants collected the data for this study. The data collection was conducted during the vacation period for players and up to the period of preparation for the 2004 Rwandan champions' league where the researcher observed a number of players changing teams. The delimitation to this was to remind the players to give information accordingly where they played last season only (2003).

3.7.1 Tools

Two types of self-administered questionnaires were used to collect the data for this study. The close-ended questionnaires were used to collect data from soccer players

and the open-ended questionnaires were used to collect data from team medical practitioners. The collected data was captured by means of the Microsoft Excel package.

3.7.1.1 Close-ended questionnaires for soccer players

The researcher had pre-established questions and pre-set response categories in the form of spreadsheets on which quantitative data had to be recorded. The pre-established questionnaire was adapted from validated ones in those used in various literature (Jelsma, Dawson, Smith, Masaya and Madzivire, 1997 and Hawkins and Fuller, 1998a). The content of those validated questionnaires included demographic data, injuries sustained, injury dates, injury status, management received, availability of and need for physiotherapy services, preventive programmes and nutritional advice. The questionnaire constructed by the researcher highlighted almost the same information as that reported in the validated ones.

The soccer players' questionnaire comprised five parts. PART A was constructed purposely to provide information about the soccer player such as division, team name, age, experience as well as the played position (Appendix E). PART B required information on the history of injury, which included the number of injuries sustained and the severity (time loss), body parts affected, injury mechanism, types and kind of physiotherapy treatment received, access to physiotherapy services and evaluation of the need for physiotherapy treatment towards the injuries sustained. As lack of protective equipment usage could lead to the occurrence of injury, the third portion of the soccer players' questionnaire (PART C) included the information regarding the use

of different equipment such as shin guards, ankle protection and the appropriate shoes. The fourth section (PART D) was about the injury countermeasure programmes such as warm-up, cool-down, stretching, flexibility and strengthening exercises. The last section (PART E) reflected the nutrition advice. In this part, questions about carbohydrate consumption, quantity of water intake and general nutrition (food & water) advice to the soccer players in their respective teams were asked (Appendix E).

3.7.1.2 Open -ended questionnaires

This questionnaire was designed to firstly supplement the information obtained from the questionnaire of soccer players, and also to measure partly some points of the objectives of this study. The first objective of this study was to identify the body area, nature, aetiology and severity of common soccer injuries in Rwanda. In terms of aetiology and severity, both groups, players and team medical practitioners, might have certain points in common. However, the nature of injury was a sensitive issue to be evaluated by team medical practitioners. By nature, the respondents had to reveal the types of injury they sustained during the previous season. A great deal of research on soccer injuries carried out classified their nature into strains, sprains, and contusions (Hawkins and Fuller, 1999; Hawkins *et al.,* 2001; and Rahnama *et al.,* 2002). It was therefore designed by the researcher to leave this question open to the team medical practitioners whose knowledge acquired, allowed / enabled them to express that nature in its proper medical term.

To ensure enough support or supplement of information expected, the researcher designed a set of 20 open-ended questions in the team medical practitioner

questionnaire (Appendix H). The content included details on team name, academic qualifications, and experience in sport medicine. Questions 4, 5, and 6 were constructed purposely to supplement information on body area, nature, aetiology and severity of common soccer injuries in Rwanda. Questions 9 and 10 aimed to supplement on physiotherapy treatments received following injuries. Question 14 and 15 were designed to supplement on the accessibility of soccer players to physiotherapy services as a third objective of this study. To find out whether there is a real need for physiotherapy intervention in treatment of common soccer injuries as last objective, the researcher designed questions 16 and 17 for this purpose. Other questions had do clarify certain points in connection with the occurrence of the reported soccer injuries.

The questionnaires were distributed to the team medical practitioners and an appointment was made between the researcher or the research assistants and the respondents on the date of collecting the answered questionnaires.

3.7.2 Translation

Prior to the fieldwork the instrument for this study had to be translated. The questionnaires for soccer players constructed in English by the researcher were translated into French (Appendix F) and Kinyarwanda (Appendix G) to enhance the comfort of every respondent. To ensure the validity of the tools, two linguistic professionals did translations from English to the above-mentioned languages and two other translators translated them back into English. There was one translator from English to French, and another from French to English, and the same for the translation from English to Kinyarwanda and from Kinyarwanda to English. The same translators

that translated the soccer players' questionnaire translated the second questionnaire, the one of the team medical practitioner. This only had to be translated from English to French (Appendix I) and back to the English. The rationale was that all medical practitioners were supposed to have an understanding of either English or French as the main medical academic languages in Rwanda.

3.7.3 Procedure

The data collection of the presented study needed intervention of research assistants due to the fact that the time allocated to that activity was short due to some external factors such as vacation of soccer players, and the Africa Nations Cup in which the Rwanda national team went to participate during the period of data collection.

Two final-year physiotherapy students at K.H.I were trained as research assistants for this study. The researcher did the training over two days. The purpose of that training was to promote a good understanding of the study in general, the aim of the study, their role as well as their understanding of questions addressed to the participants. The ethics of the study was also explained to the participants. Their role was mainly to distribute and collect the questionnaires of both groups, soccer players and team medical practitioners, and also to assist soccer players with difficulties to complete the questionnaire. After the pilot studies, the researcher held a two-hour session with the research assistants to discuss the difficulties encountered. The changes made within the questionnaire were made known to the research assistants.

The list of team managers' telephone numbers was obtained from FERWAFA. The appointment was made by telephone to the team manager to find a suitable time and

date for data collection. A brief introduction of the research was given to give the managers an idea of what the study was about. The purpose of making appointments with managers was to ensure that the research does not interfere with their training programmes. Apart from the letterhead of each questionnaire requesting the respondents to participate in this study, the researcher and research assistants ensured a verbal consent prior the data collection. The researcher introduced the research assistants to the participants before data collection. The participants in the study were informed about the research, their participation and its importance. All the instructions were provided before any data collection, to allow clarification. The data collection started mid December 2003 and ended on 19th February 2004.

3.7.4 Reliability and Validity

The questionnaires for soccer players were adapted from two validated questionnaires: The first one was the one used in The Sixth All Africa Games developed to record physiotherapy data based on those used during the 1994 Commonwealth Games in Victoria, Canada and the World Police and Fire Games held in Melbourne in 1995 (Jelsma *et al.,* 1997). The second one was the one used in the preliminary assessment of professional footballers' awareness of injury prevention strategies (Hawkins and Fuller, 1998a). For validity purposes, all questionnaires for this study were pre-tested during the pilot stage.

3.8 DATA ANALYSIS

The data from players and those from team medical practitioners were analyzed separately. Since the questionnaires of the team medical practitioners were very few

(only seven), and their expected information was purposively gathered to supplement the information from soccer players in general and types of injury specifically, their results were reported rather than displayed statistically. Statistical analysis was used only for the questionnaires of the soccer players.

The data-capturing sample was processed in Microsoft Excel. Both descriptive and inferential statistics were determined in Microsoft Excel. Descriptive statistics, frequencies, means, standard deviation, maximum and minimum of the variables measured in the questionnaire of soccer players were separately displayed for both the first and the second divisions. While the questionnaire contained a high number of ordinal variables, non-parametric statistics (e.g. McNemar test), were used to determine whether differences exist between the groups. Associations between ordinal variables were evaluated by means of the Spearman Rank Correlation. Two levels of significance namely 5% and 10% were used. The results were displayed by means of tables, histograms, pie chart and graphs.

3.9 ETHICAL CONSIDERATIONS

On approval of the research study by the University senate, the researcher requested permission to conduct the study from the Rwandan Ministry of Youth Sports and Culture, MIJESPOC (Appendix A), and also from FERWAFA (Appendix C). The written feedbacks have been obtained from both Ministry and FERWAFA (Appendices B and D, respectively). In addition, written and/or verbal consent was sought from all participants (Appendices E, F, G, H and I). The aim of the study was well explained to all relevant parties and participants were assured of anonymity as well as their right to

withdraw from the study at any time. Information obtained was handled in the strictest confidentiality and the researcher promised to make results of this study available to participants, Rwandan Federation of Football Amateurs and the Rwandese Ministry of Youth Sports and Culture.

CHAPTER 4: RESULTS

4.1 INTRODUCTION

In this chapter the results of the study are presented in two sections. Section A presents the results from soccer players whereas section B presents the supplementary information collected from the team medical practitioners. In section A the results are presented under various headings, which reflect the objectives of the present study. Prior to those related objective results, the response rate, age, experience and playing position are presented as sample demographic characteristics. In those characteristics, a general description of both divisions is given. The headings reflect a general picture of the epidemiology of soccer injuries in Rwanda by giving injury prevalence, most affected body parts, mechanisms and causal factors to injury occurrence, severity of injuries sustained as well as their respective treatments. The physiotherapy treatment and the information about the accessibility of physiotherapy services to soccer players are also highlighted. Finally the section ends by illustrating the impact of physiotherapy treatment to the sustained injuries according to the players. Section B presents the injury perspective for team medical practitioners; the most body parts affected as well as the types of injury and their related causal factors as well as the respective treatment. The physiotherapy perspective is also incorporated.

4.2 SECTION A: DEMOGRAPHIC CHARACTERISTICS OF SOCCER PLAYERS

4.2.1 Response rate

In general, out of the 300 questionnaires provided for both the first and the second divisions' soccer players, 273 questionnaires were answered. This gives an overall response rate of 91% (273 players). Of the 140 pre-determined sample from 14 teams of the first division, the response rate was 98% (137 players) and of the 160 pre-determined sample from 16 teams of the second division, the response rate was 85% (136 players). The observed difference was due to the fact that the second division teams had more student players than the first division teams and consequently, a considerable number of the second division players were on vacation during the data collection period.

4.2.2 Biodemographic data

The respondents were aged between 15 and 35 years old (mean=22.9 years; standard deviation, SD= 3.38 years). In the first division the age varied between 17 and 32 years (mean=23.6 years; SD= 3.07 years) whereas in the second division the age varied between 15 and 35 years (mean=22.2 years; SD= 3.54 years). Table 4.1 illustrates that the modal group was 20 to 24 years old with 74 (54%) and 63 (46%) players from the first and the second divisions, respectively. However, the second division team players seemed to be younger than the first division (35 versus 13 players under 20 years of age).

The experience of the Rwandan soccer players ranged from 1 year to 16 years (mean= 2.75 years; and SD= 2.18 years). The first division players had experience ranging from 1 year to 16 years with an average of 3.77 years and a standard deviation of 2.58 years. The second division players had experience ranging from 1 to 5 years with an average of 1.73 years and a standard deviation of 0.85 years. Table 4.1 below illustrates that more players from both divisions had 1 to 3 years of experience with 72 (53%) and 132 (97%) players of the first and the second division respectively. Almost all second division players 132 (97%) had one to three years of experience. Hereafter, the number drops off considerably to 4 (3%) players with 4 to 6 years of experience.

Of the 273 respondents in this study, 137 (50.18%) were players in the first division and 136 (49.82%) were players in the second division. Regarding playing position, a large number of respondents in both divisions were defenders, 53 (38.70%) players of the first and 51 (37.50%) players of the second division, followed by forwards, 39 (28.50%) players of the first and 40 (29.40%) players of the second division. The low frequencies were evident in the number of goalkeepers; 11 (8.00%) and 12 (8.80%) players of the first and second divisions, respectively. The samples from both divisions represented a symmetrical look in terms of playing positions: 11 versus 12 goalkeepers, 53 versus 51 defenders, 34 versus 33 midfielders and 39 versus 40 forwards respectively to the first and the second division (Table 4.1).

Table 4.1: Sample distribution of players regarding their age, experience and playing position (n=273)

Variable measured	*Characteristics*	*Frequency 1st division*	*Column %*	*Frequency 2nd division*	*Column %*
Age	15 - 19 years	13	9%	35	26%
	20 - 24 years	74	54%	63	46%
	25 - 29 years	45	33%	34	25%
	30 - 34 years	5	4%	3	2%
	> 34 years	0	0%	1	1%
Experience	1 - 3 years	72	53%	132	97%
	4 - 6 years	49	36%	4	3%
	7 - 9 years	11	8%	0	0%
	10 - 12 years	3	2%	0	0%
	13 - 15 years	1	1%	0	0%
	> 15 years	1	1%	0	0%
Position	Goalkeeper	11	8.00%	12	8.80%
	Defender	53	38.70%	51	37.50%
	Midfielder	34	24.80%	33	24.30%
	Forward	39	28.50%	40	29.40%

4.2.3 Injury prevalence

The prevalence was calculated from the total players in both the first and the second division teams who at least, sustained one or more injury at any time (of training or competition) from soccer sporting activity. The overall injury prevalence revealed within the sample of this study was 68.1% (186 players). Injury prevalence during training and competitive sessions, were 52.7% (144 players), and 42.5% (116 players) respectively. The first division sample showed an injury prevalence of 70.8% (97

players). A higher incidence of injuries was sustained during training, which accounted for 58% in comparison with 44% of players who sustained injuries during competition. The second division sample showed an injury prevalence of 65.4% (89 players). A higher incidence of injuries was sustained during training, which accounted for 47.2% in comparison with 41.2% of players who sustained injuries during competition.

The Test Statistic CHI-Squared ($\chi 2$=9.874) calculated within the injuries reported in this study showed that the number of injuries sustained during training and the number of injuries sustained during competition were related (p=0.0017). However, there was a higher significance ($p< 0.005$) that more injuries occurred during training (144 players) than during competition (116 players).

4.2.4 Body part injured

Figure 4.1 below summarizes the most affected body parts of 186 injured players. The most affected part in the lower extremities and in the whole body in general was the ankle (38.5%) followed by the knee (26.7%). The upper limbs were also affected (11.4%), followed by the trunk (9.1%) and head and neck (5.9%). The upper limbs injuries comprised upper arm, elbow, fore arm, wrist, hand and finger injuries. The trunk injuries included both chest, abdomen, back and shoulder injuries. The face injuries included head and neck injuries. The rest of the body parts such as pelvis, buttock, groin, hip, anterior and posterior thigh, shin, calf, foot and toe were less affected. The injuries reported in this study showed that the lower extremities were more commonly affected than the upper extremities.

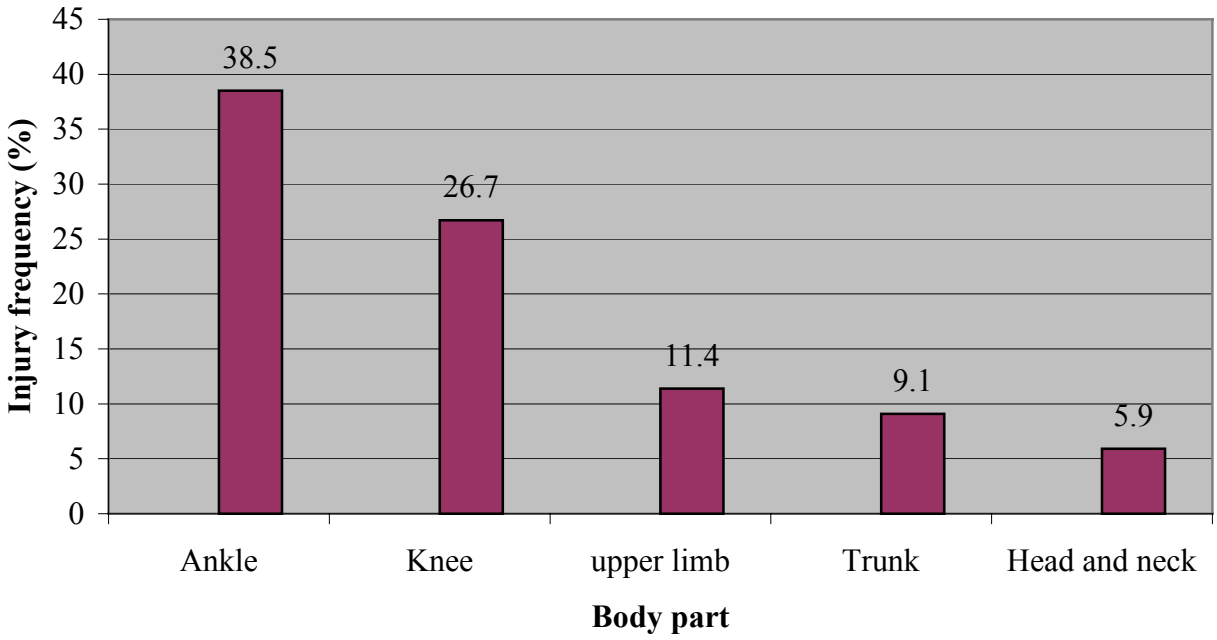

Figure 4.1 Distribution of most common injuries over the body parts (n=186)

The ankle and knee were the most affected body parts and their injuries were distributed differently in both the first and the second divisions. Figure 4.2 below illustrates the extent of the injuries to those body parts regarding the respective divisions. In both divisions, the ankle remained the most commonly affected body part, but a higher prevalence was found in the first division (41.6%) than in the second division (35.3%). Furthermore, the first division players suffered more knee injuries (29.9%) than the second division players (23.5%).

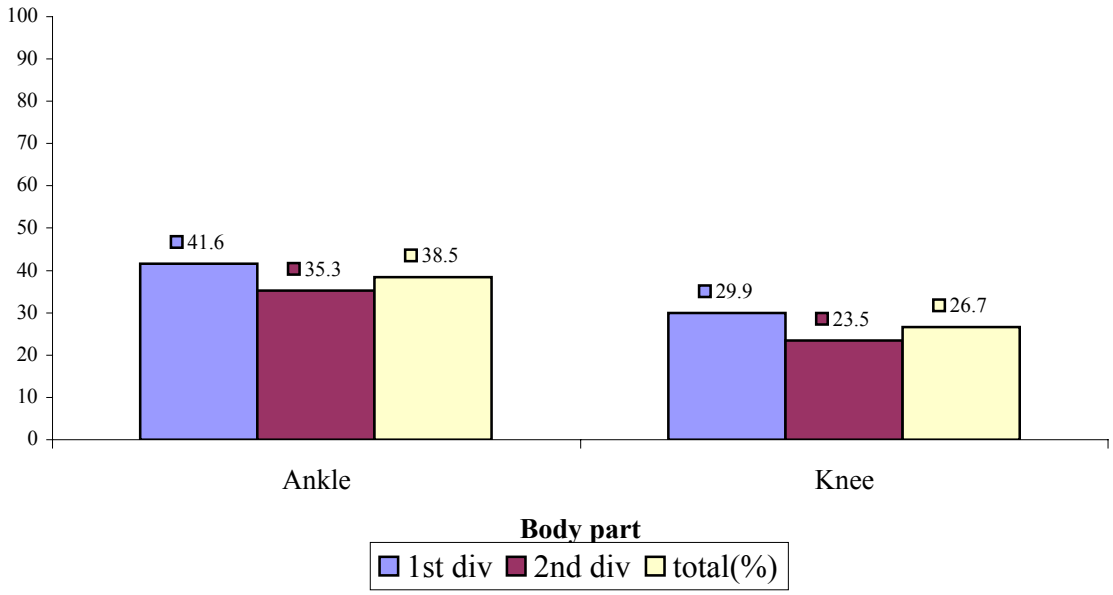

Figure 4.2: Distribution of Ankle and Knee injuries in 1st and 2nd Division

4.2.5 Mechanisms of sustained injuries

Table 4.4 lists the mechanisms by which players were commonly injured during soccer training and match competitions. During training, being tackling caused the most injuries (16.8%) followed by collision (13.6%), with landing and overuse both causing 10.3% each. Collision accounted for 15.4% and was the most frequently reported mechanism in competitive injuries followed by landing 9.9%, overuse 8.8% and being tackled 8.1%. However, shooting (7.7%), tackling (7.3%) and running (7.2%) were also reported as mechanisms of injury occurrence during training sessions as well as during competitive sessions (4.4%, 4.4% and 5.1%), respectively.

Table 4.2: Training and Competitive mechanisms of soccer injuries

Mechanism	Training injury (%)	Competitive injury (%)
Tackled	16.8	8.1
Collision	13.6	15.4
Landing	10.3	9.9
Overuse	10.3	8.8
Shooting	7.7	4.4
Tackling	7.3	4.4
Running	7.2	5.1
Heading	2.9	2.2
Turning	2.6	3.3
Jumping	2.6	1.5

4.2.6 Factors leading to injury prevention

4.2.6.1 Protective equipment

Figure 4.3 below describes the frequency of the use of sport equipment by the first and the second division Rwandan soccer players. Shin guards, ankle protections and appropriate shoes composed the investigated equipment in this study. The respondents had to indicate how often they used the equipment in both training and competitive sessions. Prevalent users always or very often use the described equipment in both training and competitive sessions while infrequent users never or only sometimes used the equipment in either training or competitive session. Fifteen players out of 273 (5.49%) were prevalent users of shin guards, 33 of 273 (12.09%) players were infrequent users of the shin guards and 205 of 273 (75.09%) players use shin guards only in competitive matches and not in training. Sixty-five players out of 273 (23.81%) were prevalent users of ankle protections, 151 of 273 (55.31%) players were infrequent users of ankle protections and 22 of 273 (8.06%) players use ankle protections only in

competitive matches and not in training. Fifty-six players out of 273 (20.51%) were prevalent users of appropriate shoes, 25 of 273 (9.16%) players were infrequent users of appropriate shoes and 36 of 273 (13.19%) players only use appropriate shoes in competitive matches and not in training.

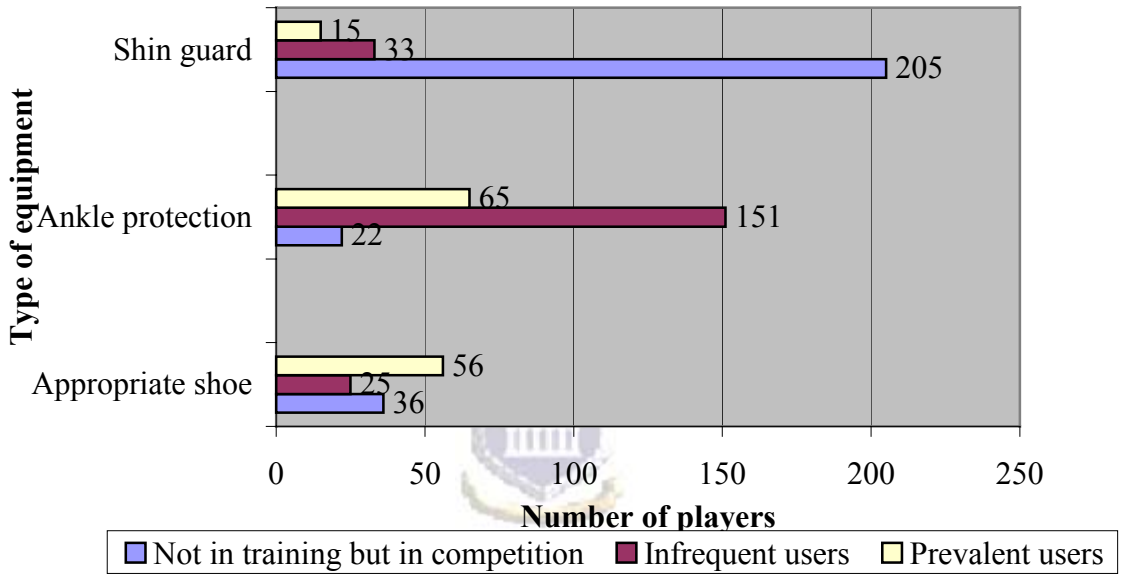

Figure 4.3 The use of sport equipments in both training and competitive sessions (273 players)

4.2.6.2 Countermeasure programmes

Table 4.6 summarizes the participation of soccer players in different sporting programmes. Prior to any sporting activity, it is recommended to warm up for at least 15 to 30 minutes. Although many players performed more warming up prior to competition than to training (78 players versus17 players), a huge number spent more time of at least 15 minutes prior to training (245 players) compared to the number of

players spending the same time prior to competition (28 players). More cooling down was done at the completion of training sessions (94 players) than at the completion of competitive sessions (68 players). A stretching programme is also recommended to be performed prior to and after any sporting activity. However, few players (19 players) performed more stretch programme prior to training compared to the players who performed more stretches prior to competition (95 players). It was highly significant ($p< 0.001$) that more players did stretching prior to competition than prior to training. A big difference was also observed in the performance of stretching during the cooling down after the training and competition. Only two players did more stretches during the cooling down after the competition whereas 217 players did more stretches during the cooling down after the training. The results of this study also revealed that 39 players never stretched during the cooling down after training whereas the vast majority (241 out of 273 players) did not stretch during the cooling down after competition. The flexibility and strengthening exercises were also investigated on how often they were performed either individually or in team sessions. However, no big difference was observed in performing those types of exercises at least twice per week individually or as a team. Individually, 137 players performed the flexibility exercises at least twice per week whereas 140 players performed it at least twice in team training. Individually, 125 players performed the strengthening exercises at least twice per week whereas 111 players performed it at least twice in team training. Despite their importance, the results showed that there were some players who never did those exercises neither individually nor in team training. Individually, 86 players never did any flexibility exercise whereas 69 reported to not do it in team training. Individually,

87 players never did any strengthening exercise whereas 81 reported to not do it in team training.

Table 4.3: Distribution of players in respect to the sporting programmes (frequency in cells out of 273 individuals).

Programme	Training	Competition	Team session	Individual session
More Warm-up prior to	17	78		
Duration of warm up (≥ 15 minutes) prior to	245	28		
More cool-down period at the completion of	94	68		
More Stretching in warm up prior to	19	95		
More Stretching in cooling down after	217	2		
Never do Stretching in cooling down after	39	241		
At least two weekly Flexibility exercise			140	137
Never Flexibility exercise			69	86
At least twice weekly Strengthening exercise			111	125
Never Strengthening exercises			81	87

4.2.6.3 Nutritional intake

Table 4.7 illustrates the carbohydrate and water consumption by soccer players prior to and after both training and competition sessions. The vast majority of players reported that they never or sometimes consumed the carbohydrate prior to training (252 players) and after training (231 players) being given that the remaining players consumed often or always the carbohydrate prior to training (21 players) and after training (42 players).

Although more players reported that they often or always consumed carbohydrate prior to competition (210 players) and after the competition (130 players), there were still a considerable number of players who also never or sometimes consumed carbohydrate prior to competition (63 players) and after competition (143 players). The importance of water intake was put more on competitive than training sessions. During the competitive sessions, the provided quantity of water intake was ranged from good to excellent for about 230 players versus 30 in training session whereas the provided quantity of water intake was ranged from poor to fair for about 70 players during competition versus 243 players in training session. Finally there was a slight difference in players regarding obtaining and not obtaining nutritional advice from their respective team medical practitioners. More players got no nutritional advice (163 players) whereas 111 players obtained a little or a lot of information about nutrition

Table 4.4: Distribution of players' consumption of carbohydrate and water (frequency in cells out of 273 individuals).

Nutritional item	Training	Competition	Any time
No to Sometimes carbohydrate intake prior to	252	63	
Often to Always Carbohydrate intake prior to	21	210	
No to Sometimes Carbohydrate intake after	231	143	
Often to Always Carbohydrate intake after	42	130	
Poor to Fair water intake during	243	70	
Good to Excellent water intake during	30	203	
No nutritional advice			162
Little to A Lot of nutritional advice			111

4.2.7 Severity of soccer injuries

Figure 4.4 shows the severity of the injuries occurring in both training and competitive sessions. The severity of injury was classified under four types of injury according to

the time taken to return to the sport activity: minor (2-3 days), moderate (4-7days), major (1-4weeks) and severe (more than 4 weeks). The severity of injury was observed in training rather than in competitive sessions. Of all the injuries reported, minor injuries accounted for 23.5% and 12.5% in training and competition respectively. Moderate injuries accounted for 31.6% and 21.7% in training and competition respectively. Major injuries accounted for 27.5% and 21.7% in training and competition respectively. In addition, severe injuries accounted for 15.4% and 12.5% in training and competition respectively. The results of this study revealed that the training injuries were more severe than the competitive injuries at the 10% level of significance (two-sided) when only considering first injuries.

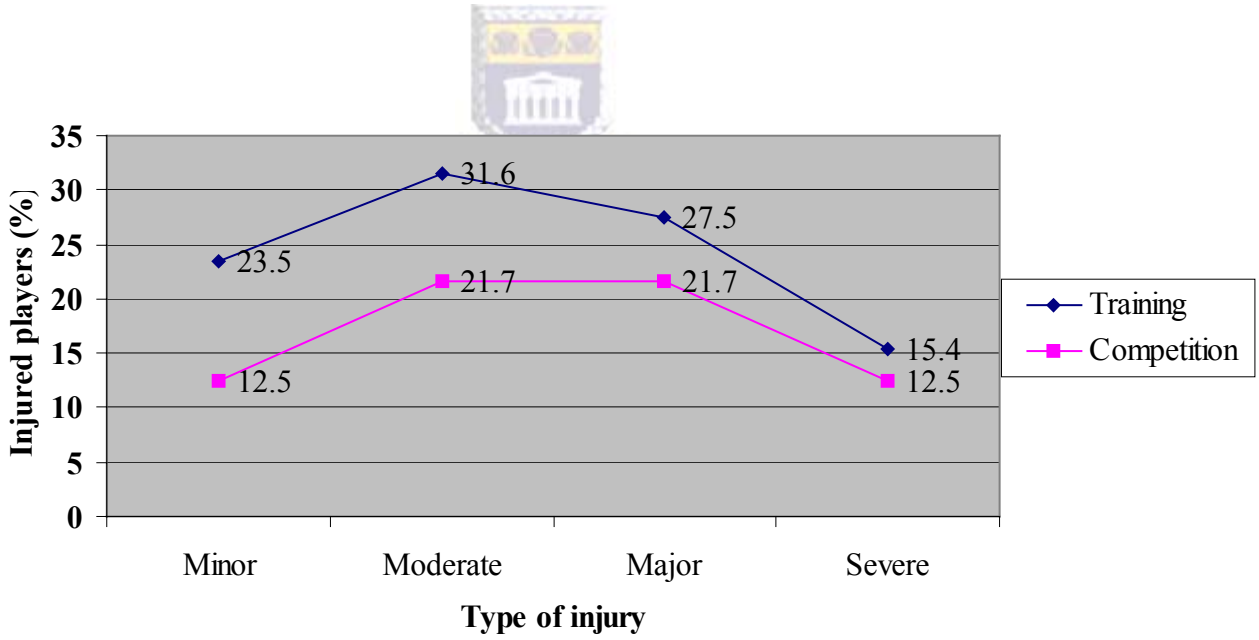

Figure 4.4: Severity of injury in both training and competition

4.2.7.1 Impact of injury to the sporting sessions

The impact of injury on the sporting session was measured by the number of missing sessions (time loss). The reported missed training sessions ranged from one to 180 days. The players who missed at least one training session were 66.3% (181 players). A high frequency was observed of players who missed seven days (11%, 30 players), whereas the players who missed up to 120 and 180 days had the smallest observed frequencies of 0.4% (one player) and 0.7% (two players) respectively. The missed competitive matches ranged from one to 50 matches. The players who missed at least one competitive match were 51.5% (138 players). From those players a high-observed frequency was 14.7% (40 players) who missed one competitive match followed by 14.3% (39 players) who missed two competitive matches. The lowest frequencies were 0.4% for two players of whom one missed 24 and another 50 competitive matches as a result of injury.

4.2.8 Treatment following injury

Figure 4.5 illustrates the given treatments following injuries. Five types of treatment were inclusive within the present study: medical, physiotherapy, traditional, self and none. The percentages were calculated in terms of number of players who sustained at least one sporting injury at any time (of training or competitive). Since one or more treatment could be reported, the total percentages did not equal 100%. Of the 186 injured players, 72.04% (134 players) got medical treatment, 40.32% (75 players) got self-treatment, 30.65% (57 players) got physiotherapy treatment, 19.35% (36 players) received traditional treatment and 1.61% (3 players) did not benefit at all from any

treatment. Each of the above treatments could be used in conjunction with other treatments.

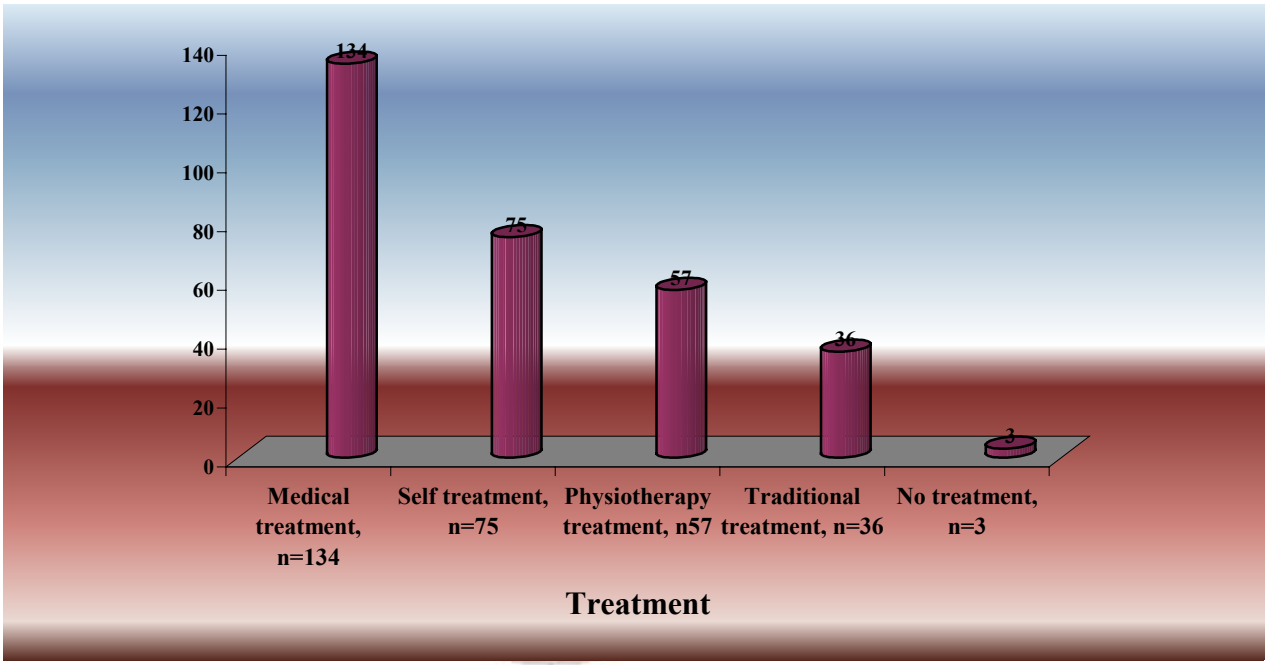

Figure 4.5: Types of treatment received by injured players (n=186)

4.2.8.1 Injury severity versus the mode of treatment

Figures 4.6 and 4.7 illustrate the severity of sustained injuries in both training and competition sessions versus different types of treatments approached. After medical treatment, physiotherapy treatment seemed to be the second mode of treatment used in many severe and major training and competitive injuries. However, the self-treatment was more commonly used after medical treatment for moderate and minor training and competitive injuries.

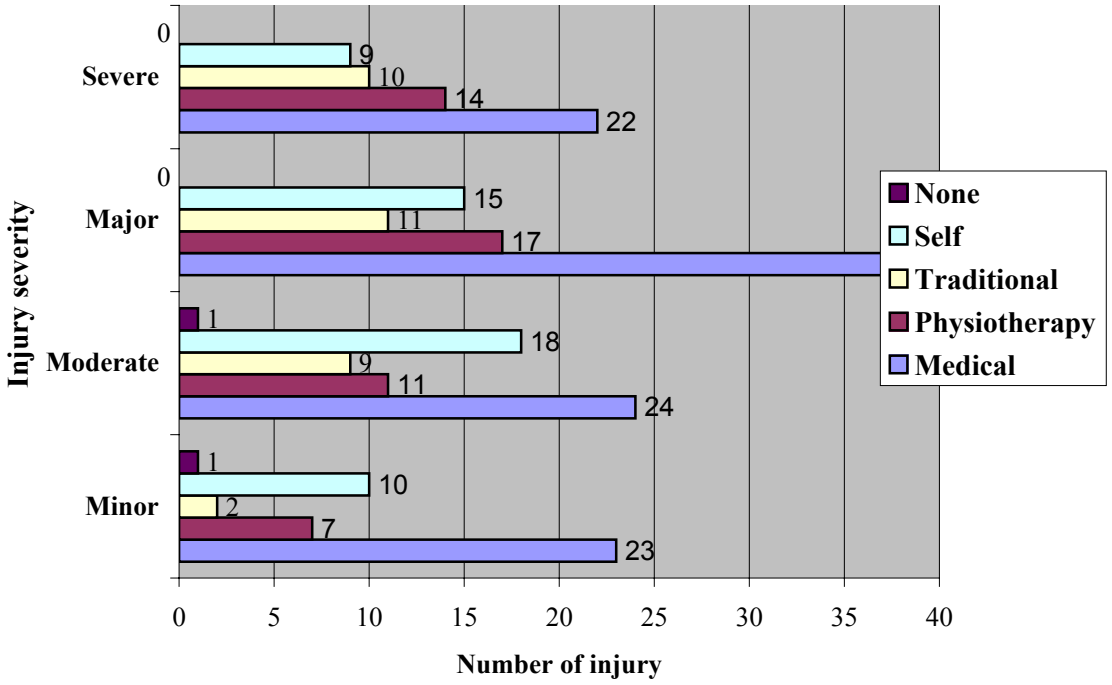

Figure 4.6 Training injury severity versus mode of treatment

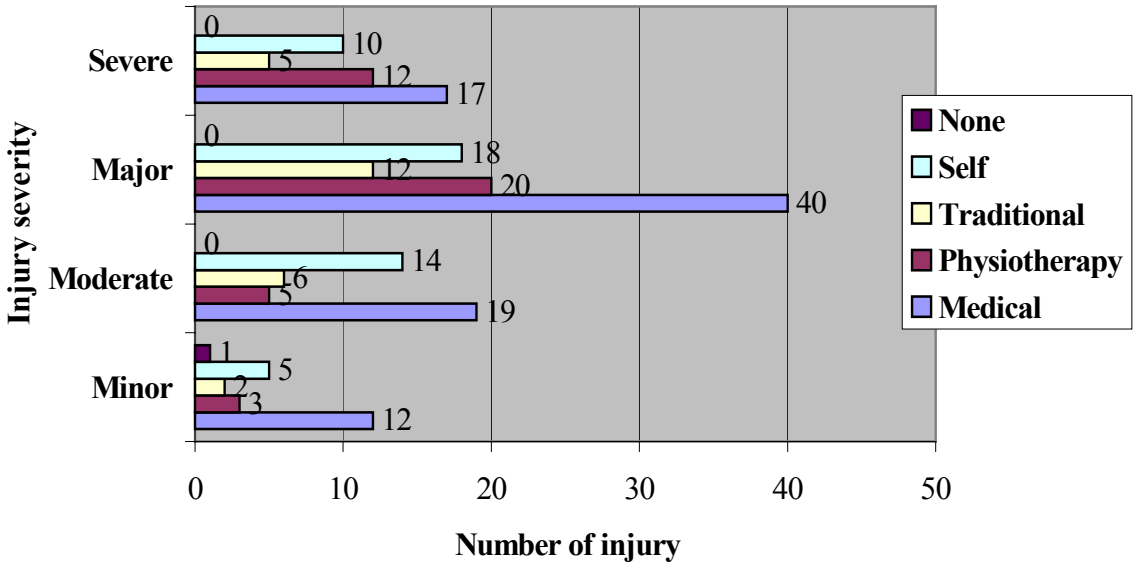

Figure 4.7 Competitive injury severity versus mode of treatment

4.2.8.2 Relationship between Treatment and "Nothing Missed Proportionality"

Table 4.5 below summarizes the relationship between three modes of treatment (physiotherapy, medical and traditional) given and missed proportion in either training or competitive sessions. The nothing-missed proportion was calculated by the number of players who did not miss any training or competitive session (M) while undergoing a specific treatment over the total number of players who were undergoing the same treatment (N). The medians, frequencies and proportions were calculated bases on the possibility that players might use other modes of treatment. The calculations were not based on "ONLY" one mode of treatment.

The traditional treatment presented a higher training median (14 sessions) than the other two treatments. In competitive matches the high median was two matches for all three treatments. When all three treatments were not approached, the nothing-missed proportion was very high (79%), consequently indicating a low severity. Therefore, the rationale behind low severity indicated that the degree of severity plays an important role in the choice of the individual on who the player should approach for help.

Table 4.5 Relationship between treatment and nothing missed proportionality

Mode of treatment	Missed training Median	Missed matches Median	M[1]	N[2]	Nothing missed proportion
Medical	10	2	3	134	2%
Physiotherapy	12	2	0	57	0%
Traditional	14	2	0	36	0%
Any of above three treatments	5	1	89	273	33%
None of above treatments	14	0	86	109	79%

4.2.8.3 Physiotherapy treatment following injury

Table 4.6 shows the physiotherapy treatments received following training and competitive injuries. The physiotherapy treatments frequently used in both training and competitive sessions included massage with 14.7% (40 players) in training versus 13.2% (36 players) in competition, ice/cold treatment with 11% (30 players) in training versus 12.1% (33 players) in competition, exercises therapy with 5.9% (16 players) in training versus 7.7% (21 players) in competition, compression with 5.5% (15 players) in training versus 7.3% (20 players) in competition, deep friction with 3.7% (10 players) in training versus 5.1% (14 players) in competition and joint mobilization with 2.6% (7 players) in training versus 5.1% (14 players) in competition.

[1] : Number of injured players who never miss any training or competition session
[2] : Total number of injured players with the same treatment.

Table 4.6: Distribution of physiotherapy treatment to injured players

Type of treatment	Training (%)	Competition (%)
Massage	**14.7**	**13.2**
Ice / cold	**11**	**12.1**
Exercise Therapy	**5.9**	**7.7**
Compression	**5.5**	**7.3**
Deep Friction	**3.7**	**5.1**
Joint mobilization	**2.6**	**5.1**
Ultrasound	2.6	2.2
Inferential	2.2	2.6
Heat	2.2	2.6
Strapping	1.8	2.6
Tens	1.5	1.8
Elevation	0.4	0.7
Stretching	2.2	1.1
Crutch walking	0	0
Muscle stimulation	0	0
Splinting	0	0

4.2.8.4 Advice given to injured players

Rest influences the healing process as the injured player is less predisposed to re-occurrence of injury. Rest has been scheduled in three categories: rest/ no sport activity, limited sport activity and full sport activity. Of 186 injured players, 40 players had been advised to stop sport activity, 15 players had been advised to engage in limited sport activity whereas two players were allowed to participate in sport activity after sustaining injury.

4.2.9 Accessibility to physiotherapy services

Figure 4.8 illustrates the accessibility of physiotherapy services to soccer players. Of 273 players, 242 players reported that they never or sometimes had access to

physiotherapy services when required. Only 31 players reported that they often or always had access to physiotherapy services. However, the Statistical Test CHI- Square has been calculated to assess whether there is a difference in having access to physiotherapy services by players from both the first and the second divisions. The Test Statistic CHI-Square, $\chi 2 = 7.3148$ (p-value= 0.0068) indicated that there was a definite difference in the accessibility of physiotherapy services to both divisions.

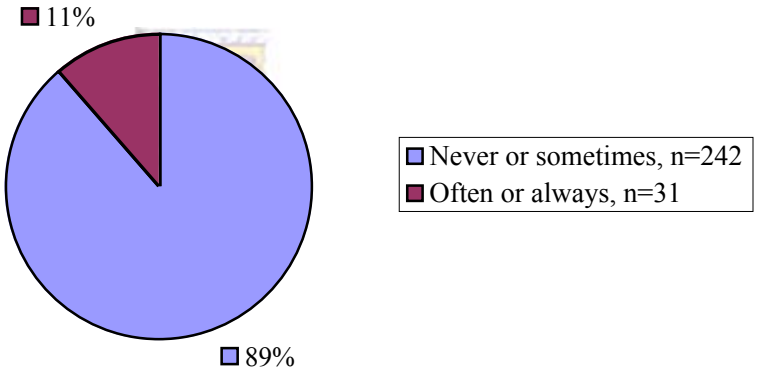

Figure 4.8 The level of accessibility of physiotherapy services to soccer players (n=273)

4.2.9.1 Factors leading to inaccessibility of physiotherapy services

Figure 4.9 outlines the investigated reasons leading to the inaccessibility of physiotherapy services. Ignorance, absence of physiotherapy services, lack of information about physiotherapy services and financial problems contributed unequally

to inaccessibility. Of the 186 injured players, 32 were ignorant to physiotherapy treatment, 110 players reported that the lack of financial means led to the inaccessibility of physiotherapy services, 19 players reported there were no physiotherapy services available in their respective places, and finally 25 players mentioned that the inaccessibility was due to the lack of information from their team medical practitioners.

The Statistical Test CHI-Square, $\chi 2=2.7968$ (p-value=0.5924), that was use to compare the first and the second divisions with respect to the reasons leading to inaccessibility of physiotherapy services showed that there is no difference in this regard between divisions. However another Statistical Test CHI-Square, $\chi 2=0.0003$ (p-value=0.9873) assessed the use of physiotherapy services if available, and found that both divisions utilized them in a similar fashion.

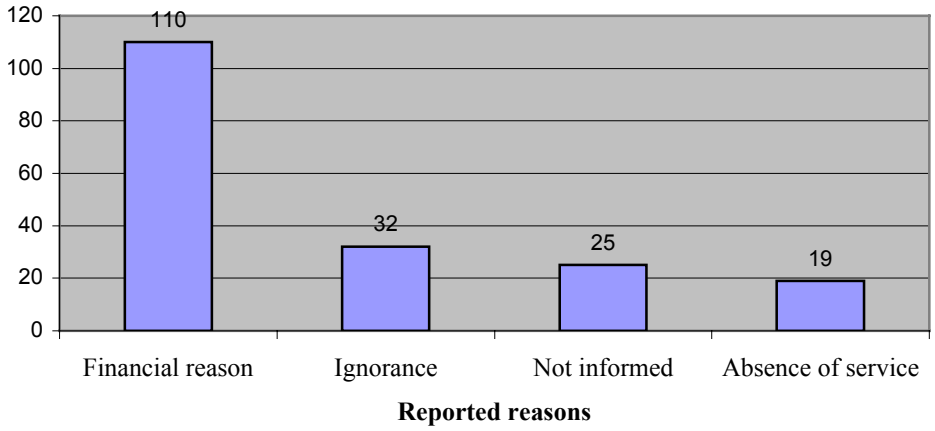

Figure 4.9: The reported reasons leading to inaccessibility of physiotherapy services to 186 injured players

4.2.10 Impact of physiotherapy treatment on soccer injury

Table 4.7 demonstrates the need of physiotherapy treatment according to soccer players. The players in the first and the second divisions also reported about their need for physiotherapy treatment regarding sustained injuries. In the first division, 94 players ranged from agree to strongly agree whereas 41 players ranged from strongly disagree to disagree regarding their need for physiotherapy services. In the second division, 76 players ranged from agree to strongly agree whereas 59 players ranged from strongly disagree to disagree. The Statistical Test CHI-Square, $\chi 2=5.1459$ with p-value=0.0233, calculated showed a significant difference between both divisions at 5% level. The players in the first division were more aware (70%) of the value of physiotherapy treatment to their injuries compared to the second division players (56%).

Table 4.7: Distribution of players in terms of physiotherapy treatment need (n=270)

Physiotherapy treatment	First division	Second division
Needed Agree – Strongly Agree	**94 (70%) players**	**76 (56%) players**
Not needed Strongly disagree – Disagree	**41 (30%) players**	**59 (44%) players**

4.3 SECTION B: INJURY PERSPECTIVE OF TEAM MEDICAL PRACTITIONERS

The team medical practitioners participated in this study for the purpose of supplementing the information given by the soccer players on the one hand, but on the other hand they also provided information that could not be delivered by the soccer players such the types of injury sustained. The participants were selected from 30 teams. Out of the 30 teams, only 8 teams had qualified medical personnel to care for

their respective players. Among those, three were nurses, two were physiotherapists, and two were medical assistants and one a medical doctor. Their experiences in caring for injured players in general and in sport medicine specifically ranged from one year to fifteen years (mean=8.14 years, and SD =5 years). The information reported by team medical practitioners included types of injury sustained, their related causes and mechanisms, the period of occurrence, most affected body parts, treatment of sustained injuries, access to physiotherapy services and their perceptions towards the need for physiotherapy in the rehabilitation of injured players. Seven team medical practitioners gathered the information of the present study because one team medical practitioner had been excluded from this study due to being part of the pilot study.

4.3.1 Types of soccer injuries in Rwanda

Figure 4.10 illustrates the types of injuries sustained by Rwandan soccer players. As reported by team medical practitioners, those injuries were classified as sprains, contusions, fractures, joint swellings / inflammation, tendonitis, bruises, wounds, strains and subluxations. Of the injured players, the team medical practitioners confirmed that the most common types of injuries sustained were ligament sprains (26%), followed by contusions (21%) and fractures (13%). The smallest percentages (4%) were reported for wounds and tendonitis. Out of seven respondents, five (71.43%) reported that those injuries were more prevalent during competition than training sessions.

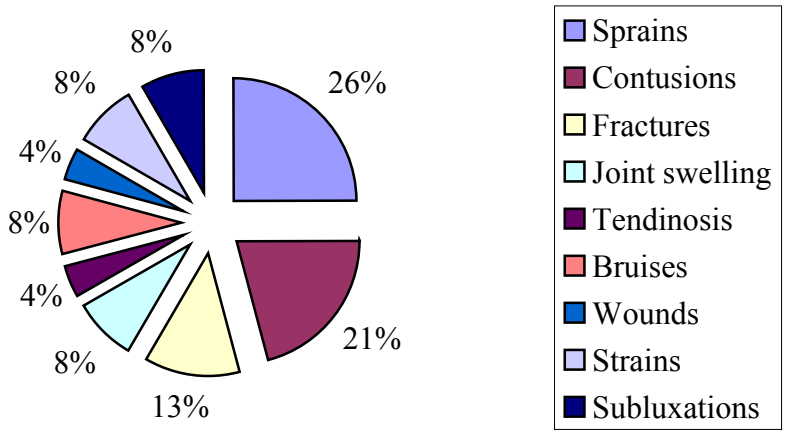

Figure 4.10: Types of Soccer Injury

4.3.2 Cause – related soccer injuries

According to the Rwandan team medical practitioners, the state of the pitch was the most frequent reported causal factor of the soccer injuries, followed by over training and violent game. Although those were the main causal factors, other causes have also been reported. Those are: sport level, congested league calendar (many games in a short period), inadequate warm-up, overuse, inappropriate footwear, lack of endurance, nutritional deficiency, lack of adequate rehabilitation, age which is not adapted to high competition, insufficient cooling down period and the lack of a good number of qualified team medical practitioners.

4.3.3 Injury distribution

The ankle and knee were the most affected body parts by soccer injuries in Rwanda. Those parts were reported by almost each team medical practitioner (six out of seven)

that came to a total of 85.7%. The remaining respondent also reported that the most affected parts are the lower limbs. The other reported parts included shoulder and hip with a frequency of 42.86% (from three respondents) respectively. The smallest percentages (14.3%, one respondent) reported injuries to head, back, elbow, wrist, hand, groin, and buttock.

4.3.4 Physiotherapy approach to injured players

According to team medical practitioners injured players received both medical and physiotherapy treatment. Most of them (five out of seven) reported massage, ice and rest as most treatment provided to injured players. Of the seven team medical practitioners, two physiotherapists found that it is easy to get access to physiotherapy services when needed, whereas the remaining five always had to refer players to the closest available physiotherapy services. However, 28.5 % (two respondents) reported that they associated treatment with good follow-up and health education even if the lack of equipment and financial deficiency interfered. All (100%, seven respondents) team medical practitioners reported that physiotherapy treatment plays a crucial role in management of soccer injuries in Rwanda and it is of utmost importance to have these services available.

CHAPTER 5: DISCUSSION

5.1 INTRODUCTION

The aim of this study was to identify common soccer injuries among the first and the second division soccer teams in Rwanda and to establish the need for physiotherapy injury countermeasures. This chapter discusses the epidemiology aspects of the Rwandan soccer injuries, by looking at the injury prevalence, the use of protective equipment, the performance of soccer sporting activities, sustained injuries versus physiotherapy services and the effectiveness of physiotherapy treatments. The discussion is based on comparison with other studies. The findings are the results of the information gathered from soccer players, supplemented by the information from team medical practitioners. The findings on demographic characteristics of the participants are also taken into consideration. The chapter ends by showing the limitations of this study.

5.2 FINDINGS ON DEMOGRAPHIC CHARACTERISTICS

The response rate of 91% in this study was very high compared to rates reported in previous studies (Hawkins and Fuller, 1998a; Guskiewicz, Weaver, Padua and Garrett, 2000; Junge and Dvorak, 2000; and Woods *et al.,* 2002). The first division teams showed a higher response rate (98%) compared to the second division teams (85%) due to the fact that the second division had more student players than the first division and consequently, a considerable number of second division players was on vacation during the data collection period. The high participation indicated how much soccer players were voluntarily interested when their injuries were matters of concern.

The mean age of the soccer players was 22.9 years with a standard deviation of 3.38 years. This small standard deviation signified a small deviation in the age of players, which meant the majority of them were aged between 20 to 24 years old. Therefore, the age range and low standard deviation compared to the mean indicate that the majority of Rwandan soccer players are in younger age groups (Woods *et al.,* 2002). Furthermore, the results indicated that, players from both divisions had similar age characteristics.

The Rwandese soccer players had adequate soccer experience as revealed by the study. The first division players were more experienced than the second division players. This is due to the fact that players in the second division continue with their soccer career in the first division and consequently their experience is more marked in the first division than in the second division.

Lastly, the findings on demographic characteristics in this study were that, samples from both divisions represented a symmetrical number of players in terms of playing positions. This illustrates the accuracy of the information gathered from both sides. However, the low participation number of goalkeepers in the sample study could only be explained by their low frequency in teams. A team of around 30 players can only have 3 goalkeepers whereas the remaining players are subjected to defenders, midfielders and forwards. Taken as a whole, however, the demographic findings revealed to some extent that the study was representative, hence the possibility of generalizing the results.

5.3 IDENTIFICATION AND DESCRIPTION OF INJURY PREVALENCE

The results of this study revealed a higher prevalence (68.1%) of soccer injuries than reported in similar studies (Hawkins and Fuller, 1998b; Orchard and Seward, 2002). Nevertheless, the definition of injury and injury prevalence adopted in this study was different from those used in some other studies. In this study, injury was defined as an incident occurring during a training session or a match and causing a soccer player to miss the following session(s) (Hawkins and Fuller, 1999; Orchard, 2001), and the injury prevalence was calculated from the total players in both the first and the second divisions who at least, sustained one or more soccer injury at any time (of training or competition). These definitions limited the comparability of this study with many similar studies because the other studies included the issue of seeking medical attention in injury definition (Frantz *et al.,* 1999 and Woods *et al.,* 2002) as well as the issue of 1000 playing hours in calculating injury prevalence (Dvorak, 2000; Morgan and Oberlander, 2001; and Rahnama *et al.,* 2002). The raised issues of injury and injury prevalence definitions could not be ruled out due to the nature of this study.

The Test Statistic CHI-Squared ($\chi 2=9.874$) calculated within the injuries reported in this study showed that the number of injuries sustained during training and the number of injuries sustained during competition were related ($p=0.0017$). However, there was a higher significance ($p<0.005$) that more injuries occurred during training than during competition. Similar findings have been reported in a previous study (Heidt, Sweeterman, Carlonas, Traub and Tekulve, 2000). In contrast Chomiak, Junge, Peterson and Dvorak (2000) and 5 out of 7 Rwandan team medical practitioners, reported that soccer injuries were more prevalent during competition than training

sessions. The contrasts from the team medical practitioners could be explained by the fact that in the Rwanda soccer context, team medical practitioners are not often present during training and consequently some injuries may occur in their absence. The authors in a previous study also agree that the limited training attendance of team medical practitioners may lead to underestimation of minor injuries causing players to miss one or two training sessions (Arnason *et al.,* 2004). The authors further stated in their study that, only physical therapists were present before, during and after matches and that, very few teams had a team physician present during matches or training sessions. In Rwanda therefore, if medical practitioners are absent during training sessions, it is due to lack of finances in the team and consequently the inability to employ team medical practitioners.

Given the fact that the second division teams are more in number than the first division teams, it can be assumed that each team from the second division played more competitive matches than a first division team, hence the possibility to encounter more injuries. Nonetheless, the first division sample showed a higher (70.8%) overall injury prevalence than the second division sample overall injury prevalence of 65.4%. This could be explained by the fact that the first division players are subjected to a higher level of competition than the second division players, hence the susceptibility to more injuries.

The study revealed that the common types of injuries Rwandan soccer players sustained were ligament sprains (26%), contusions (21%) and fractures (13%) followed by joint swelling / inflammation (8%), bruises (8%), strains (8%), and subluxation

(8%) in second category. Previous studies have found injuries classified as strains, sprains, or contusions as representing 69-81% (Hawkins and Fuller, 1999; Hawkins *et al.,* 2001; and Rahnama *et al.,* 2002) of all injuries, which is higher than the total of the respective injuries (55%) in this study. This may probably be explained by the fact that, the level of competition was higher in those studies than it is in Rwanda. Contrary to the current study, the onsets of bruises and joint swelling or inflammation were not found as common injuries as recorded in another soccer study (Frantz *et al.,* 1999). Although fractures were relatively uncommon among soccer injuries (AAP, 2000), this study revealed that fractures fall in the first category, of most common injuries.

The definition of injury severity adapted in this study was the same as the one used in other studies (Hawkins and Fuller, 1999; Hawkins *et al.,* 2001 and Woods *et al.,* 2002). The injury was classified as slight/minor, moderate, major and severe/serious depending on the length of time needed for recovery. The time for recovery is two to three days for slight/minor, four to seven days for moderate, one to four weeks for major, and more than four weeks for severe or serious injuries. The study revealed that the soccer injuries were more moderate than minor ones and more severe contrary to what had been found in other studies (Hawkins *et al.,* 2001; and Rahnama. *et al.,* 2002). However, this comparison was only based on separate training and competitive injuries (Figure 4.4). The results of this study further revealed that the training injuries were more severe than the competitive injuries at the 10% level of significance (two-sided). The consideration of first injuries has been adapted in order to minimize recall bias, which could have resulted from a repetition of injury or lack of differentiating between an acute and an overuse injury. Due to lack of complete rehabilitation and

early return to sport activity, a minor injury can be followed by a major injury, with a number of these being of the same type and location (Woods *et al.,* 2002). The severity, which is more prominent in training than in competition, could occur due to unsafe playing surfaces, lack of appropriate training equipment as well as negligence of some pre- and post-soccer sporting activities, which play a big role in injury occurrence during training sessions in Rwanda.

Injuries to players can have a significant effect on the performance, results, and morale of the team, which also impacts on the financial status of the team (Woods *et al.,* 2002). As a consequence of injury severity in this study, more than half of the players missed at least one training session and one competitive match. In addition, a considerable number of players missed up to seven training days and one to two competitive matches. Moreover, with a congested Rwandan soccer league calendar as reported by some team medical practitioners, a team loosing (a) key player(s) for long periods justifies the impact of injury severity on soccer sporting activity in Rwanda.

The body sites prone to soccer injuries did not differ from those found in various literatures. By summing up injury frequencies reported to ankle, knee and other remaining lower extremity parts, the findings of this study agreed with similar studies that have found lower extremity injuries as representing 60%-87% of the total injuries incurred by soccer players (AAP, 2000; Hawkins *et al.,* 2001; Lyon, 2001; Morgan and Oberlander, 2001; Rahnama *et al.,* 2002). However, the findings of this study disagree with studies conducted by Lyon (2001), Morgan and Oberlander (2001), and Rahnama *et al.* (2002), reporting that the knee was the most affected joint followed by the ankle

joint to agree with Frantz *et al.* (1999) and Hawkins and Fuller (1999), who found the most affected joint was the ankle followed by the knee. The study further revealed that the ankle and knee were highly affected compared to the frequencies reported in studies with the same agreements (Frantz *et al.,* 1999 and Hawkins and Fuller, 1999). In addition to that, the findings indicated that the first division players presented a higher prevalence of ankle and knee injuries than the second division prevalence. Taken as a whole however, the researcher believes that those differences were due to the fact that prevention measures are well implemented in developed countries compared to Rwanda. Generally and specifically in Rwanda, more attention (financial support, playing environment, equipment, etc.) is given to the first than the second division.

5.4 THE USE OF PROTECTIVE EQUIPMENT AND INJURY MECHANISMS

Protective equipment has been designed to shield various parts of the body against injury without interfering with the sporting activity. Protective equipment can also be used on return to activity after injury in situations where direct contact may aggravate the injury (Brukner and Khan, 2003). However, the use of protective equipment by Rwandan soccer players was very critical.

Despite the importance of shin guards in injury prevention and their compulsory wearing in both training and competitions as recommended by FIFA in 1990, the study revealed that only 15 out of 273 players were prevalent users of shin guards and 205 players were using it only in competitive matches and not in training. Those who used

shin guards were very few compared to the situation reported in previous similar studies (Ekstrand, 1982; Hawkins and Fuller, 1998a). Therefore, the link between the infrequent usage of shin guards in training and lower extremities training injuries suffered by Rwandan soccer players might be hypothesized since a lack of, or inadequate use of, shin guards was associated with 4% of lower leg injuries sustained in the senior amateur soccer players surveyed in the study of Ekstrand (1982). In the study of Hawkins and Fuller (1998a), fifty-three players said that they were not encouraged by the coaching staff to wear shin guards during training. The limitation of this study was that there was no question addressing the reasons of non-usage of shin guards within soccer players' questionnaire. However, further studies should find out whether the financial standards and low emphasis on wearing the shin guards during training sessions are related to the current results.

Generally, it is believed that taping and bracing of a joint helps to reduce the range of movement at that joint and therefore helps to reduce the risk of severity of injury. Taping during every training session is expensive and requires the assistance of an experienced person to apply the tape. However, the application of semirigid orthosis is less expensive in the long term, and can be applied by the soccer players with ease and without assistance. McGrath and Ozanne-Smith (1997), reported that a study conducted by Surve *et al.,* in 1994 evaluated the effect of semi-rigid ankle orthosis (Sport-Stirrup) on the incidence of ankle sprains in soccer players during one playing season. Their findings stated that there was a significant reduction in the incidence of ankle sprains in players with a history of using the orthosis compared to those not using the orthosis. The incidence of ankle sprains was significantly higher in the non-braced,

previously sprained group compared to the non-braced group without a previous history. The present study indicated that 65 out of 273 players were prevalent users of ankle protections and more than half (151 out of 273) of players were infrequent users of ankle protections. Therefore, given the fact that the ankle was revealed as most affected body part in this study, it can be believed that the lack of usage of the ankle protections could influence the occurrence and re-occurrence of ankle injuries to Rwandan soccer players without ruling out the role that other factors such as playing surfaces and shoes could have played.

Appropriate shoes in football should be of adequate depth in the upper part, have a rigid heel counter, have sufficient forefoot flexibility, have a wide sole, be slightly curved in shape and the 'stops' or cleats should be placed to allow adequate forefoot flexibility (Brukner and Khan, 2003). This study, however, revealed that few players (56 out of 273) were prevalent users of appropriate shoes and 36 players were using appropriate shoes only in competitive matches and not in training. In the study conducted by Ekstrand and Gillquist (1983) on 180 male soccer division players, 13.3% of injuries resulted from the combination of playing surfaces and inferior footwear. Ekstrand (1982) further specified that the traumatic injuries, such as knee sprains, were usually due to twisting of the knee when the foot wearing a shoe with screws in the cleats was fixed to the ground. Since this study did not qualitatively check the footwear, and only reported what the players assumed to be "good", there is a limited comparison with other studies. However, the condition of playing surfaces, as the most causal factor to influence injury as reported by team medical practitioners, combined with the cost of appropriate footwear and lack of usage of ankle protections

could contribute to injury occurrence in Rwandan soccer players in general, but also to ankle and knee injuries specifically.

In order to suggest preventive strategies specific to soccer, it is necessary to have detailed information on the injury mechanisms involved since injuries are often the result of the combination of internal risk factors, external risk factors and injury mechanisms (Andersen, Larsen, Tenga, Engebretsen and Bahr, 2003). The results of this study indicate that, being tackled; collision, landing and overuse mostly contributed to soccer injuries in both training and competitive sessions. However, in literature injury mechanisms have been divided into two categories, namely those resulting from contact with another player or the ball, and the others resulting from a non-contact mechanism. For the purpose of comparing this study to similar studies, injury mechanisms investigated as contact with player or ball, were tackled, collision, shooting, tackling, and heading. After wrapping up the total number of those mechanisms, the findings revealed that contact with another player or the ball constituted 48.3% of injury mechanisms. This is higher than what had been found in similar studies (Hawkins and Fuller, 1999 and Hawkins *et al.,* 2001). In contrast, the non-contact mechanisms assumed in this study, as landing, overuse, running, and turning and jumping, constituted lower frequencies of 33% than that what was found by Hawkins and Fuller (1999) and Hawkins *et al.* (2001) in their earlier studies.

According to the above-mentioned information attention has to be paid to the implementation of rules against foul playing, lack of strength and flexibility to time the tackles and avoid collision with the Rwandan soccer players of the first and the second

division teams. Given the fact that the non-contact mechanisms also represent a considerable frequency in injury occurrence, more emphasis must be put on the condition of the pitch, equipment as well as some soccer sporting programmes such as warm-up, cooling down, stretching and nutrition.

5.5 THE IMPACT OF SOCCER SPORTING ACTIVITIES

Prior to any sporting activity, a warm-up of at least 15 to 30 minutes is recommended (Brukner and Khan, 2003). However, the study revealed that although many players performed more warming up prior to competition than to training, a huge number spent more time (at least 15 minutes) prior to training compared to the number of players who spent the same time prior to competition. Therefore it could be assumed that the Rwandan soccer players are more predisposed to training injuries due to low warm-up intensity and more predisposed to competitive injuries due to short duration of warm-up activities. The lack of proper warm-up training intensity and good pre-match warm-up are due to the lack of awareness of the importance and benefits of warm-up in injury prevention on one hand, but could also be attributed to the fact that team member arrive late at the field on the day of the match. Therefore, players have less time to spend warming up and stretching.

A stretching programme is recommended prior to and after any sporting activity. The results of this study revealed that it was highly significant ($p < 0.001$) that, more players stretched prior to competition than prior to training. Therefore, injuries related to lack of sufficient stretching could be linked to the onset of more training injury prevalence than competition injury prevalence as revealed by the results of this study. A big

difference was also observed in stretching during the cooling down after training and competition. Only two players stretched more during the cooling down after the competition whereas 217 players stretched more during the cooling down after the training. The results of this study further revealed that, 39 players never stretched during the cooling down after training whereas the vast majority (241 out of 273 players) did not stretch during the cooling down after competition.

Flexibility and strengthening exercises were investigated by finding out how often they were performed either individually or in team sessions. However, no big difference was observed in performing those types of exercises at least twice per week individually or as a team. In the study conducted by Witvrouw *et al.* (2003), soccer players with lower flexibility in the hamstring and quadriceps muscles had a statistically higher risk for a subsequent musculoskeletal lesion. The results showed that some players never did those exercises either individually or in team training. Individually, 86 players never did any flexibility exercise whereas 69 reported as not doing it in team training. Individually, 87 players never did any strengthening exercise whereas 81 reported not doing it in team training. In comparison with a previous study, these numbers seemed to be higher than the findings of Hawkins and Fuller (1998a). However, the difference could have resulted from the big sample size used in the current study compared to the sample size used in the Hawkins and Fuller (1998a) study. This significantly indicates the level at which Rwandan soccer players are predisposed to injuries secondary to poor flexibility and strengthening exercises.

According to Brukner and Khan (2003), nutrition aids recovery from intense exercise by replenishing glycogen stores and by providing necessary protein and water. Referring to the findings on nutritional intake in this study, more attention was given to nutrition prior to or during competition than training. The results of this study revealed that prior to training (252 players) and after training (231 players), the vast majority of players never or at times consumed carbohydrates. Although more players reported that they often or always consumed carbohydrate prior to competition (210 players) and after the competition (130 players), there were still a considerable number of players who never or occasionally consumed carbohydrates prior to competition (63 players) and after competition (143 players). Furthermore, Brukner and Khan (2003) stated that large amounts of fluid might be lost during exercise, particularly with increasing intensity and in hot or humid conditions. The study revealed that more emphasis was put on the importance of water intake during competitions than during training sessions. More players estimated to get a sufficient quantity of water during the competitive than during training sessions. Finally the study revealed that more players (163) received no nutritional advice whereas 111 players obtained little or a lot of information about nutrition. If nutrition were to play a big role in injury prevention, this would explain the high injury prevalence reported in the current study generally and more training than competitive injuries specifically.

5.6 INJURY VERSUS PHYSIOTHERAPY SERVICES

No previous similar study has attempted to address the sustained injury and the accessibility and use of physiotherapy services before. This limited the comparison of the current study with previous ones. The study measured the treatment mode

approached by injured players. However, when one treatment was used, there was a possibility of also using other treatments. The study revealed that, physiotherapy was classified third as a method of management after medical and self-treatment. The third ranking of physiotherapy was similar to the findings observed in a previous report after self and traditional treatments (Hakizimana, 2002). The use of self-treatment did not explain the involved treatment means and its discussion was very limited in the present study. The players could mention self-treatment while medical, traditional or physiotherapy means were used. While there is no scientific evidence of the effectiveness of traditional treatment, Rwandan soccer players continue to use that treatment. This could probably be due to the fact that, either it is the cheapest treatment, players are not aware of the effectiveness of other treatments (medical and physiotherapy), or because no other treatments are available to players. Moreover, the study revealed that, only three players out of the 186 injured players did not apply any treatment.

The results of this study revealed that the majority of players (242 out of 273) reported that they never or only sometimes got access to physiotherapy services when required. The Test Statistic CHI-Square, $\chi 2= 7.3148$ (p-value= 0.0068) illustrated that there was a definite difference in the accessibility of physiotherapy services between the first and the second divisions. Apart from the few team medical practitioners available to team member, there could be many other factors that could influence inaccessibility. The findings of this study revealed that, financial means were the most significant reasons for inaccessibility to physiotherapy services among most soccer players, followed by ignorance and lack of information. These reasons were similar for both the first and

the second divisions. No significant difference (p-value=0.5924) was found when the Statistical Test CHI-Square, $\chi 2$=2.7968 was used to make these calculations. However, another Statistical Test CHI-Square, $\chi 2$=0.0003 (p-value=0.9873) assessed whether these physiotherapy services are used, if available, and the finding showed that both divisions utilized them in similar fashion. This shows that the Rwandan soccer players were willing to use and would benefit from physiotherapy services, if these services were accessible.

5.7 EFFECTIVENESS OF PHYSIOTHERAPY TREATMENTS

All physiotherapy treatment techniques reported in this study covered the three stages of injury countermeasures namely primary, secondary and tertiary. The primary injury countermeasures used in this study included techniques such as stretching and strapping which can also be used in the rehabilitation stage (tertiary injury countermeasures). Secondary injury countermeasures consisting of PRICER, matched with the use of joint mobilization, rest, ice compression, soft massage, compression and elevation treatment approaches which were mainly used in both training and competitive sessions in this study. Electrotherapy modalities such as heat, inferential, TENS and ultrasound were used for pain relief. That indicated that, soccer injuries sustained by Rwandan players sometimes required the intervention of electrotherapy modalities to relief pain. In comparison with other studies, the main physiotherapy treatments used in this study were similar to the ones used in sports injuries sustained at the Sixth All Africa Games (Jelsma *et al.,* 1997) and in injuries among adolescent soccer players during an interprovincial tournament in South Africa (Frantz *et al.,* 1999). The findings indicated that since there was no use of muscle stimulation,

splinting and crutch-walking techniques, it could be said that the injuries revealed in this study were not associated with muscle paralysis or lower limbs' fractures. Crutch walking should only be required in fractures management. However, as this study had no intention of going beyond the scope of physiotherapy treatment boundaries, referral as the final measure to take in PRICER, had to be considered since the injuries reported such as fractures and wounds require some medical attention even when physiotherapy could play a crucial role in further stage of rehabilitation.

The issue of injury severity versus mode of treatment approached in both training and competitive sustained injuries has been addressed in this study. The study revealed that physiotherapy treatment was considered secondly after medical treatment in most major and severe injuries sustained in both training and competitive sessions. Although, self-treatment seemed secondary too, in most moderate and minor training as well as competitive sustained injuries, its use and benefit are still critical. First of all, even if the treatment is so-called self-treatment, the researcher believes that medical or physiotherapy means could have been used. Secondly, where there is no "doctor", self-treatment might be the only way the injured players could help themselves. However, some other factors such as financial standards, ignorance and lack of information could have played a role in choosing self-treatment in moderate and minor injury treatment. In addition, some players neglected minor injuries as they were sometimes considered as part of the game.

The severity of injury could play a role in treatment approaches. The results of the study therefore revealed that when all three treatments were not applied, the nothing-

missed proportion was very high (79%), consequently indicating a low severity. The rationale behind that low severity indicated that the degree of severity plays an important role in the choice of whom the player should approach for help.

Finally the study revealed the effectiveness of physiotherapy treatment. All (100%) team medical practitioners agreed that, the need for physiotherapy management in soccer injury was crucial. According to the injured players, the majority (70%) of the first division injured players confirmed that physiotherapy treatment was very helpful or was needed for their injuries whereas more than half (56%) of the players from the second division also agreed that physiotherapy treatment towards their sustained injuries was very much needed and helpful. The Statistical Test CHI-Square, $\chi 2=5.1459$ with p-value=0.0233, indicated that there was a significant difference between the first division players and the second division players as far as the need for physiotherapy treatment is concerned. The players in the first division (70%) were more aware of the benefits of physiotherapy treatment compared to the second division players (56%). This awareness could be linked to the fact to all available team medical practitioners reported in this study, none was from the second division team. Consequently, there could be lack of information about the sustained injuries and the right practitioner to approach for treatment after sustaining an injury.

The effectiveness of physiotherapy treatment as tri-dimensionally discussed above shows that the sustained soccer injuries, the effects of physiotherapy treatment matched with the sustained injuries, most severe training and competitive injuries were handled by physiotherapy treatment and finally, team medical practitioners and injured players

as concerned parties confirmed that physiotherapy was helpful and is essential for the treatment of sustained soccer injuries.

5.8 LIMITATIONS OF THE STUDY

- Comparison to similar studies is difficult due to the nature and adopted definitions of injury and injury prevalence.
- The soccer players' questionnaire did not assess the playing hours and exposure time, hence limited the current study to express prevalence and incidence as they are expressed in other studies.
- The types of injury would be more valuable in a prospective study.
- The intrinsic factors and extrinsic factors as causal factors of soccer injury occurrence approached partially (extrinsic factors) and not at all approached (intrinsic factors).
- The impact of lack of sporting activity during injury occurrence would be well investigated with a control group study.

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

In this final chapter, a summary of the main findings of the study is provided. Thereafter, a concise conclusion is drawn. To counter the epidemiology of soccer injuries in Rwanda, some suggested recommendations are made at the end of this chapter.

6.2 SUMMARY

The aim of this study was to identify common soccer injuries among the first and the second division soccer teams in Rwanda and to establish the need for physiotherapy injury countermeasures. To achieve this aim, identification and description of injury prevalence have been made, possible causal factors have been investigated and physiotherapy-soccer injury relationship has been established.

Generally, the findings of this study revealed that, injury prevalence was high (68.1%) and that the most affected body parts were the ankle followed by the knee. The common soccer injuries in Rwandan team were ligament sprains, contusions and fractures. The injuries sustained during training were more severe than the ones sustained during competition and most of the training injuries were moderate followed by major, minor and severe injuries whereas the most injuries during competition were major-moderate, followed by severe-minor.

This study also revealed that the mechanisms that seemed to play a big role in injury occurrence were being tackled, collision, landing and overuse. Furthermore, despite their evident role in injury prevention, the soccer players were still misusing the protective equipment as well as not putting emphasis on sporting activities. The possibility of a soccer player sustaining an injury due to lack of wearing protective equipment and poor performance of sporting activities is high.

This study revealed that, the access to physiotherapy services was still low. The soccer players reported lack of financial resources, ignorance and most of the time lack of information as the most leading reasons for the inaccessibility.

Lastly the study showed the effectiveness of physiotherapy treatments in three dimensions. Firstly, all physiotherapy treatment techniques utilized for the sustained injuries were similar to those utilized in management of sports injuries in other studies and the literature has shown the effects of those techniques along the injury healing process. Secondly, physiotherapy treatment was second mode of treatment used after medical, in most major and severe sustained injuries during training and competitive sessions. Finally, injured players that received physiotherapy treatment, as well as the team medical practitioners, had positively evaluated physiotherapy treatment. Taken as a whole therefore, the epidemiology of soccer injuries in Rwanda really warrants a need for physiotherapy intervention.

6.3 CONCLUSION

The common soccer injuries are highly prevalent to necessitate an urgent physiotherapy intervention. The type and severity of the common soccer injuries indicate their impact on the soccer sporting activity in Rwanda.

Although physiotherapy treatment showed its effectiveness to counter those common soccer injuries, Rwandan soccer players still do not visit physiotherapy services sufficiently for help. However, factors such as financial standards of soccer teams, ignorance of and lack of information to soccer players cannot be ruled out in improving the accessibility of physiotherapy services to soccer players.

The similarity of specific physiotherapy techniques utilized in treating soccer injuries with other studies, their effectiveness and the positive evaluation according to soccer players indicate the need for physiotherapy intervention.

Finally, considering the sample characteristics, sampling technique and the sample size of this study, the results of this study can be generalized. Therefore, the epidemiology of soccer injuries in Rwanda needs physiotherapy intervention.

6.4 RECOMMENDATIONS

To overcome those common soccer injuries, a contribution from all soccer parties is essential. Therefore the following recommendations are suggested:

1. The results of this study regarding the common soccer injuries, the most body parts prone to injuries, mechanisms as well as causal factors leading to injury occurrence need to be made available to all soccer stakeholders in Rwanda in the form of a workshop.

2. Soccer players need to be educated in the form of Health Promotion programmes about protective equipment, practice of sporting activities such as warm-up, cooling down, stretching, individual and team strengthening and flexibility exercise. Those programmes must also include carbohydrate and water intake, all prior to and after training and competitive sessions.

3. A session needs to be held with coaches to advocate the avoidance of over-training programmes, use of unsafe playing surfaces, and emphasise the use of protective equipment during both training and competitive sessions. The session must also highlight the sporting activities such as warm-up, cooling down, stretching, flexibility and strengthening exercises as well as nutritional advices for soccer players.

4. In Rwandan, and especially amongst medical practitioners in the soccer fraternity, health professionals need to be made aware of the role of physiotherapy in management of soccer injuries.

5. The Rwandan governing bodies of sports in general (MIJESPOC) and soccer specifically (FERWAFA) must encourage and facilitate the implementation of injury prevention strategies to counter the epidemiology of soccer injuries as revealed by the present study.

REFERENCES

American Academy of Pediatrics (AAP). (2000). Injuries in Youth Soccer: a subject review. *Pediatrics,* **105** (3): 659-662.

American Physical Therapists Association (APTA). (2001). What is Physical Therapy? (A guide to Physical Therapist Practice). *Physical Therapy,* **81** (1): 21.

Andersen, T.E., Larsen, Ø., Tenga, A., Engebretsen, L. and Bahr R. (2003). Football incident analysis: a new video based method to describe injury mechanisms in professional football. *British Journal of Sports Medicine*, **37**:226-232.

Arnason, A., Gudmundsson, A. and Dahl, H.A. (1996). Soccer injuries in Iceland. *Scandinavian Journal of Medical Sciences and Sports*, **6**:40-45.

Arnason, A., Sigurdsson, S.B., Gudmundsson, A., Holme, I., Engebretsen, L. and Bahr, R. (2004). Risk factors for Injuries in Football. *The American Journal of Sports Medicine*, **32**(1): 5-15

Bahr, R. and Holme, I. (2003). Risk factors for sports injuries-a methodological approach. *British Journal of Sports Medicine*, **37**:384-392.

Baker, J., Horton, S., Robertson-Wilson, J. and Wall, M. (2002). Nurturing Sport Expertise: Factors Influencing The Development of Elite Athlete. *Journal of Sports Science and Medicine*, **2**:1-9.

Brukner, P. and Khan, K. (2003). Principles of Injury Prevention in Clinical Sports Medicine. Sydney, Mc Graw-Hill Publishers.

CAF. (2004). Retrieved from http://www.cafonline.com/competition/caf_competitions/nations_cup/index.htm [17/1/2004 3:30 pm]

Caine, D.J., Caine, C.G. and Lindner, K.J. (1996). Epidemiology of sports injuries. USA, Human Kinetics Publishers.

Cambridge (Low price editions). (1996). Cambridge international dictionary of English. Guides you to the meaning. Cambridge: Press Syndicate of University of Cambridge.

CECAFA. (1999). Palmares CECAFA championship. Retrieved from http://www.rsssf.com/tablese/eastcentrafr.html [20/8/2003 5:25 pm]

Childs, S.G. (2002). Pathogenesis of Anterior Cruciate Ligament Injury. *Orthopaedic Nursing*, **21**(4): 35-41.

Chomiak, J., Junge, A., Peterson, L. and Dvorak, J. (2000). Severe Injuries in Football Players. Influencing Factors. *The American Journal of Sports Medicine,* **28** (5): 58-68.

COMESA. (2000). Retrieved from http://www.rsssf.com/tablesc/comesa00.html [15/8/2003 6:20 pm]

De Vos, A.S. (2001). Research at Grass Roots; A primer for the caring professions. Pretoria: Van Schaik Publishers.

De Vos, A.S. (2nd ed) (2002). Research at Grass Roots; For the social sciences and human service professions. Pretoria: Van Schaik Publishers.

Drawer, S. and Fuller, C.W. (2002). Perceptions of retired professional soccer players about the provision of support services before and after retirement. *British Journal of Sports Medicine,* **36**:33-38.

Dvorak, J. (2000). Editorial. (soccer research). *American Journal of Sports Medicine*. Retrieved from http://www.findarticles.com/cf_dls/m0918/5_28/67148122/print.jhtml [14/8/03 10:30 am]

Ekstrand, J. (1982). Soccer injuries and their prevention. Sweden: Linkoping

Ekstrand, J. and Gillquist, J. (1983). The avoidability of soccer injuries. *International Journal of Sports Medicine,* **4**(2): 124-128.

Fevre, D.J. (1998). Collision Sports: Injury and Repair. Butterworth Heinmann, Oxford.

FIFA. (2003). National Associations. Retrieved from http://apps.fifa.com/scripts/runisa.dll?m2:gp::67173+assoc/home+E+CAF+RWA [23/04/2003 2:20 pm].

Finch, C. (1997). An overview of Some Definitional Issues for Sports Injury Surveillance. *Sport Medicine,* **24**:157-163.

Flegel, J.M. (1997). Sport First Aid. The most practical first aid guide specifically for coaches. USA: Human Kinetics Publishers, Inc.

Fransisco, A.C., Nightingale, R.W., Guilak, F., Glisson, R.R. and Garret, W.E. (2000). Comparison of Soccer Shin Guards in Preventing Tibia Fracture. *The American Journal of Sports Medicine*, **28**(2): 227-233.

Frantz, J.M. (2000). *Prevalence and Incidence of Athletic related sports injuries in primary and high school children in the Cape Metropolitan*. Unpublished master's thesis. /Bellville/: University of The Western Cape.

Frantz, J.M., Amosun, S.L. and Weitz, W. (1999). Injuries among adolescent soccer players during an interprovincial tournament in South Africa. *South African Journal of Sports Medicine,* **6**(2): 13-15.

Goodman, C.C. and Snyder, T.E. (1995). *Differential Diagnosis in Physical Therapy. (*2nd ed.). USA, W.B Saunders Company.

Guskiewicz, K.M., Weaver, N.L., Padua, D.A. and Garrett, W.E. (2000). Epidemiology of Concussion in Collegiate and High School Football players. *The American Journal of Sports Medicine* **28**(5): 643-650.

Hackney, R.G. (1994). Nature, prevention, and management of injury in sport. (ABC of Sports Medicine). *British Medical Journal,* **308** (6940): 1356-1360.

Hakizimana, M. (2002). Football injuries and their management in Rwanda. A Research Report submitted in a partial fulfilment of the requirements for the award of the advanced diploma in physiotherapy. Kigali Health Institute. Unpublished.

Harner, C.D. and Rhin, J.A. (2003). What is New in Sports Medicine: Anterior Cruciate Ligament Research. *Journal of Bone & Joint Surgery, American Volume*, **85** (6): 1173-1182.

Hawkins, R.D. and Fuller, C.W. (1998a). A preliminary assessment of professional footballers' awareness of injury prevention strategies. *British Journal of Sports Medicine,* **32**:140-143.

Hawkins, R.D. and Fuller, C.W. (1998b). An examination of the frequency and severity of injuries and incidents at three levels of professional football. *British Journal of Sports Medicine,* **32**:326-332.

Hawkins, R.D. and Fuller, C.W. (1999). A prospective epidemiological study of injuries in four English professional football clubs. *British Journal of Sports Medicine,* **33**:196-203.

Hawkins, R.D., Hulse, M.A., Wilkinson, C., Hodson, A. and Gibson, M. (2001). The associated football medical research programme: an audit of injuries in professional football. *British Journal of Sports Medicine,* **35** (1): 43-48.

Heidt, R.S., Sweeterman, L.M., Carlonas, R.L., Traub, J.A. and Tekulve, F.X. (2000). Avoidance of Soccer Injuries with Preseason Conditioning. *The American Journal of Sports Medicine*, **28** (5): 659-662.

Jelsma, J., Dawson, H., Smith, G., Masaya, T. and Madzivire, D. (1997). Sports Injuries Sustained At The 6th All Africa Games. The Physiotherapy Perspective. *South African Journal of Physiotherapy*, **53**(3): 17-21.

Junge, A. and Dvorak, J. (2000). Influence of Definition and Data Collection on the Incidence of Injuries in Football. *The American Journal of Sports Medicine*, **28**(5): 40-46.

Kaufman, K.R., Brodine, S.K., Shaffer, R.A., Johnson, C.W. and Cullison, T.R. (1999). The Effect of Foot and Range of Motion on Musculoskeletal Overuse injuries. *The American Journal of Sports Medicine*, **27**(5): 585-593.

Kigali Health Institute. (2004). History. Retrieved from www.khi.ac.rw/ [19/09/2004 12:30 pm].

Levy, A.S. and Lohnes, J. (1996). Chondral delamination of the knee in soccer players. *American Journal of Sports Medicine*, **24**(5): 634-640.

Lyon, R.M. (2001). Prevent Injuries in Youth Soccer Players. Health Link.
MEDICAL COLLEGE OF WISCONSIN.
Retrieved from http://healthlink.mcw.edu/article/970072746.html [9/9/2003 11:00 am]

Marrku, J.J. and Matti, U.K.L. (1993). The Effects of Early Mobilization and Immobilization on the Healing Process Following Muscle Injuries. *Sports Medicine*, **15**(2): 78-89.

Maughan, R.J. (2000). Nutrition in Sport. Hong Kong, Blackwell Science Ltd.

McGonigle, T. and Matley, K.W. (1994). Soft Tissue Treatment and Muscle Stretching. *The Journal of Manual & manipulative Therapy*, **2**(2): 55-62.

McGrath, A. and Ozanne-Smith, J. (1997). Heading injuries out of soccer: A review of the literature. Monash University, Accident Research Center. Report No.125.

Mithoefer, K., Gill, T.J., Giza, E., Mandelbaum, B.R., Peterson, L. and Minas, T. (2002). Treatment of full-thickness articular cartilage lesions of the knee in high-demand athletes with autologous chondrocyte transplantation. Orthopaedic Journal at Harvard Medical School-annual publication. Retrieved from http://www.orthojournalhms.org/ojhms2002/manuscripts/manuscripts-05.htm [13/8/03 1:00 pm]

Morgan, B.E. and Oberlander, M.A. (2001). An Examination of Injuries in Major League Soccer. The Inaugural Season. *The American Journal of Sports Medicine*, **29** (4): 426 – 430.

Morgan, E. (2003). Be nice to your knees. *Joe Weider's Muscle & Fitness Hers*, **4** (4): 90-95.

Murphy, D.F., Connolly, D.A.J. and Beynnon, B.D (2003). Risk factors for lower extremity injury: a review of the literature. *British Journal of Sports Medicine,* **37** (1): 13 –17.

Nielsen, A.B. and Yde, J. (1989). Epidemiology and traumatology of injuries in soccer. *American Journal of Sports Medicine*, **17**: 803-807.

Nuhu, A. (2004). The profile of Football-related injuries among players in the first division of 2003 four male Rwandan teams. A Research Report submitted in a partial fulfilment of the requirements for the award of the advanced diploma in physiotherapy. Kigali Health Institute. Unpublished.

Office Nationale de la Population. (2002). 3rd General census of Population and Housing of Rwanda. Unpublished.

Orchard, J.W. (2001). Intrinsic and Extrinsic Risk Factors for Muscle Strains in Australian Football. *The American Journal of Sports Medicine*, **29**(3): 300-303.

Orchard, J. and Seward H. (2002). Epidemiology of injuries in the Australian Football League, seasons 1997-2000. *British Journal of Sports Medicine,* **36**:39-45.

Prentice, E.W. (1999). Rehabilitation Techniques in Sports Medicine. (3rd Ed.). USA: Edward G. Bartell.

Rahnama, N., Reilly, T. and Lees, A. (2002). Injury risk associated with playing actions during competitive soccer. *British Journal of Sports Medicine,* **36** (5): 354-359.

Rwandan Ministry of Health. (2000). Annual report. Rwanda. Unpublished.

The Economist (US). (2000). African soccer-In search of team spirit. *Economist Newspaper Ltd*, **354** (8156): 77.

United Nations International Children's Emergency Fund. (1998). Children and women of Rwanda, a situation analysis of social sectors. Rwanda. Unpublished.

Van Mechelen, W., Hlobil, H. and Kemper, H. (1992). Incidence, Severity, Aetiology and Prevention of Sports Injuries: A review of concepts. *Sports Medicine,* **14**:82-99.

Van Mechelen, W. (1997). The severity of sports injuries. *Sports Medicine*, **24**(3): 176-180.

World Health Organisation. (1986). Charter, 1st International Conference on Health Promotion. Ottawa, Canada. *HYGIE* VI, **2**:13-14.

Witvrouw, E., Danneels, L., Asselman, P., D'Have, T. and Cambier, D. (2003). Muscle Flexibility as a Risk Factor for Developing Muscle Injuries in Male Professional Soccer Players. *The American Journal of Sports Medicine*, **31**(1): 41-46.

Woods, C., Hawkins, R., Hulse, M. and Hodson, A. (2002). The Football Association Medical Research Programme: an audit of injuries in professional football - analysis of preseason injuries. *British Journal of Sports Medicine,* **36:** 436-441.

Zuluaga, M., Briggs, C., Carlisle, J., McDonald, V., McMeeken, J., Nickson, W., Oddy, P. and Wilson, D. (edit's). (1995). Sports Physiotherapy. Applied science and practice. Churchill Livingstone.

APPENDICES

APPENDIX A

November 2003

To,

His Excellence Ministry of Youth, Culture and Sports

Kigali – Rwanda

Excellence,

Re: Permission to conduct a research study

I am a Rwandan postgraduate student enrolled in the Physiotherapy (Masters) program at the University of the Western Cape – South Africa. I am expected to conduct research as part of the requirement for a M.Sc. (Masters) Degree in Physiotherapy. The title of my study is "Epidemiology of Soccer Injuries in Rwanda: A need for physiotherapy intervention".

Please find the attached letter of acceptance of my research proposal by the authorities of the University of the Western Cape. I hereby request permission to carry out the above-mentioned study in all first and second division male soccer teams in Rwanda.

It is hoped that the results of this study in Rwanda will contribute to information needed to design effective injury prevention programs for 1st and 2nd division soccer teams.

I would be very grateful if you would allow me to carry out the study during December 2003, January and February 2004. Participation in this study will be anonymous and voluntary and the information gathered will be treated with respect and confidentiality.

Hoping for your positive response

Sincerely,

Janvier Twizere

Supervisor: Mrs. José Frantz

APPENDIX C

6 November 2003
To,
The President of Rwandese football federation (FERWAFA)
P.o.Box. 2000
Kigali – Rwanda

Excellence,

Re: Permission to conduct a research study

I am a Rwandan postgraduate student enrolled in the Physiotherapy (Masters) program at the University of the Western Cape – South Africa. I am expected to conduct research as part of the requirement for a M.Sc. (Masters) Degree in Physiotherapy. The title of my study is "Epidemiology of Soccer Injuries in Rwanda: A need for physiotherapy intervention".

Please find the attached letter of acceptance of my research proposal by the authorities of the University of the Western Cape. I hereby request permission to carry out the above-mentioned study in all first and second division male soccer teams in Rwanda.

It is hoped that the results of this study in Rwanda will contribute to information needed to design effective injury prevention programs for 1st and 2nd division soccer teams.

I would be very grateful if you would allow me to carry out the study during December 2003, January and February 2004. Participation in this study will be anonymous and voluntary and the information gathered will be treated with respect and confidentiality.

Hoping for your positive response

Sincerely,

Janvier Twizere

Supervisor: Mrs. José Frantz

APPENDIX E

A questionnaire on Epidemiology of soccer injuries in Rwanda: A need for physiotherapy intervention.

Questionnaire No:……

Dear player,

Good day, my name is Janvier TWIZERE, I am a Rwandan postgraduate student enrolled in the Physiotherapy (Masters) program at the University of the Western Cape – South Africa. I am conducting a research survey as part of requirements for a M.Sc. (Masters Science) Degree in Physiotherapy. The title of my study is *"Epidemiology of Soccer Injuries in Rwanda: A Need for physiotherapy intervention"*. The findings of this study will contribute in planning effective injury prevention programmes among the 1st and the 2nd division soccer teams.

I kindly request for your participation in this study by completing the questionnaire with your views, according to the statements given in the questionnaire. The participation is voluntarily and the information given will be confidential. Do not write your name on this questionnaire.

It is hoped that the information you will give in this study, will be helpful in planning effective injury prevention strategies for Rwandan soccer players
Thank you very much for your cooperation.

Yours truly,

Janvier TWIZERE,
C/o Kigali Health Institute,
P.O. Box 3286
Kigali – Rwanda

Tel. (250) 5721272

Cell Phone 08516296

QUESTIONNAIRE FOR SOCCER PLAYERS

All questions are strictly confidential. Please be as truthful as possible and tick one box per question unless otherwise indicated.

PART A. IDENTIFICATION

1. Division: 1st ☐ 2nd☐ 2.Team name:……..
3. Player No:…… 4. Age:……..
5. Number of years as player in 1st or 2nd division:……
6. Playing position: Goalkeeper: ☐ Defender: ☐ Midfielder: ☐ Forward: ☐

PART B. HISTORY OF INJURY

In the answers you give below, consider only the information over the last 9 months (last season).

1. How many injuries have you got/received/sustained during training or competitive match that have resulted in you missing the following session(s)?

Training sessions: ☐Injuries

Competitive matches: ☐Injuries

2. Which body parts sustained injury? (One or more answers are possible).

Upper parts

Head: ☐ Face: ☐ Neck: ☐ Shoulder: ☐
Back: ☐
Chest: ☐ Upper arm: ☐ Elbow: ☐ Fore arm: ☐
Wrist: ☐
Hand: ☐ Finger: ☐

Lower parts

Pelvis: ☐ Buttock: ☐ Groin: ☐ Hip: ☐

Front thigh: ☐ Back thigh: ☐ Knee: ☐
Shin:☐

Calf: ☐ Ankle: ☐ Foot: ☐ Toe:
☐

3.Which were the injury mechanisms in the following periods? (One or more mechanisms are possible depending on the number of injuries).

Training session

Tackling: ☐ Tackled: ☐ Running: ☐ Shooting: ☐ Jumping: ☐
Landing: ☐ Heading: ☐ Turning: ☐ Collision: ☐ Overuse: ☐

Competitive sessions

Tackling: ☐ Tackled: ☐ Running: ☐ Shooting: ☐ Jumping: ☐
Landing: ☐ Heading: ☐ Turning: ☐ Collision: ☐ Overuse: ☐

4. How many training sessions and competitive matches did you miss last season as result of an injury?

Training sessions:

0: ☐ 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐
>5: ☐

Competitive matches:

0: ☐ 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐
>5: ☐

5. What kind of treatment did you receive following injuries? (One or more answers are possible).

Medical: ☐ Physiotherapy:☐ Traditional: ☐ Self treatment:☐
None:☐

6.If physiotherapy, what kind of treatment or advice did you receive following injury? (One or more answers are possible).

6.1.Physiotherapy treatment

Training session

Ice/cold: ☐ Compression: ☐ Elevation: ☐ Heat: ☐ Ultrasound: ☐ TENS: ☐ Inferential: ☐ Mus[3].stimulation: ☐

Joint mobs[4]: ☐ Massage: ☐ Deep frictions: ☐ Stretching: ☐ Exs[5]. Therapy: ☐ Strapping: ☐ Splinting: ☐ Crutch walking: ☐

Competitive sessions

Ice/cold: ☐ Compression: ☐ Elevation: ☐ Heat: ☐ Ultrasound: ☐ TENS: ☐ Inferential: ☐ Mus[6].stimulation: ☐

Joint mobs[7]: ☐ Massage: ☐ Deep frictions: ☐ Stretching: ☐ Exs[8]. Therapy: ☐ Strapping: ☐ Splinting: ☐ Crutch walking: ☐

6.2 Advice

Rest/No sport activity: ☐ Limited sport activity: ☐ Full sport activity: ☐

7. How long have you been unavailable for training or competitive matches because of injury?

Training sessions

	2-3days	4-7days	1-4weeks	>4weeks
First injury:	☐	☐	☐	☐
Second injury:	☐	☐	☐	☐
Third injury:	☐	☐	☐	☐

[3] : Muscle
[4] : Mobilisation
[5] : Exercises
[6] : Muscle
[7] : Mobilisation
[8] : Exercises

Fourth injury:	☐	☐	☐	☐
Fifth injury:	☐	☐	☐	☐

Competitive matches

	2-3days	4-7days	1-4weeks	>4weeks
First injury:	☐	☐	☐	☐
Second injury:	☐	☐	☐	☐
Third injury:	☐	☐	☐	☐
Fourth injury:	☐	☐	☐	☐
Fifth injury:	☐	☐	☐	☐

8. Did you get facilities to access physiotherapy services when required?

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

9. If no access to physiotherapy services, what were the reasons ?

Financial: ☐ Not informed: ☐ Absense of service: ☐ Ignorance: ☐

10. Do you think physiotherapy treatment was needed/helpful for your injuries?

Strongly agree: ☐ Very agree: ☐ Agree: ☐ Disagree: ☐ Strongly disagree: ☐

(100%) (75%) (50%) (25%) (0%)

PART C. PROTECTIVE EQUIPMENT

Training session

1. Do you wear shin guards?

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

2.Do you wear ankle protection?

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

3. Do you wear appropriate footwear/shoe?

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

Competitive matches

1. Do you wear shin guards?

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

2.Do you wear ankle protection?

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

3. Do you wear appropriate footwear/shoe?

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

PART D. INJURY COUNTERMEASURES PROGRAMMES

1. **Do you have a warm-up period prior to:**

Training

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

Matches

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

2. How long is your warm-up programme?

Prior to training

5min: ☐ 10min: ☐ 15min: ☐ 20min: ☐
>25min: ☐

Prior to matches

5min: ☐ 10min: ☐ 15min: ☐ 20min: ☐
>25min: ☐

3.Do you have a cool-down period at the completion of the following sessions?

Training

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐
Never(0%):☐

Matches

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐
Never(0%):☐

4. Do you stretch the major leg muscles in the following situations?

Warming-up prior to training

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐
Never(0%):☐

Warming-up prior to matches

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐
Never(0%):☐

Cooling-down after training

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐
Never(0%):☐

Cooling-down after matches

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐
Never(0%):☐

5. Do you undertake flexibility training (not included as part of a warm-up or cool-down)?

Times per week as part of a team session

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

Times per week as extra individual work

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

6. Do you perform/undertake strength training in the gymn?

Times per week as part of a team session

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

Times per week as extra individual work

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

PART E.NUTRITIONAL ADVICE

1. Do you consciously consume carbohydrate (e.g.: bread, pasta, rice, potatoes, chocolate, sugar) in the following situations?(provided by your team)

Pre-training

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

Post-training

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

Pre-match

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

Post-match

Always(100%):☐ Very often(75%):☐ Often(50%):☐ Sometimes(25%):☐ Never(0%):☐

2.What is the quantity of water intake during the following sessions?

Training

Excellent: ☐ Very good: ☐ Good: ☐ Fair: ☐ Poor: ☐

Match

Excellent: ☐ Very good: ☐ Good: ☐ Fair: ☐ Poor: ☐

3. Are you given any nutritional advice on what to eat or to drink?

A lot: ☐ A little: ☐ None: ☐

THANK YOU VERY MUCH

APPENDIX F

QUESTIONNAIRE SUR L'EPIDEMIOLOGIE DES LESIONS DE FOOTBALL AU RWANDA : UN BESOIN DE L'INTERVENTION DE LA PHYSIOTHERAPIE

Numéro du questionnaire :……

Cher footballeur,

Je répond au nom de TWIZERE Janvier, étudiant de nationalité rwandaise inscrit au programme de maîtrise en physiotherapie à Western Cape University en Afrique du Sud.

Nous menons une recherche sur l'Epidemiologie des lésions sportives de football au Rwanda : un besoin de l'intervention de la physiothérapie, en vue de contribuer à l'élaboration des programmes efficaces de prévention des lésions dans toutes les équipes de football de 1 ère et 2 ème division.

Cependant, nous sollicitons votre participation dans cette recherche. Vous nous aiderez en complétant ce questionnaire selon les indications données. Votre participation est

volontaire et les informations fournies seront traitées confidentiellement. N'écrivez votre nom sur le questionnaire.

Nous vous remercions pour votre participation.

Twizere Janvier

C/O K.H.I

B.P 3286,

Kigali-Rwanda

Tél : (250) 572172

Portable : 08516296

I. QUESTIONNAIRE DES JOUEURS

Toutes les questions sont confidentielles et soyez sincère en répondant. Cochez dans une seule case sauf là où il y une indication contraire.

PARTIE A. IDENTIFICATION

1. Division: 1ère:☐ 2ième:☐ 2. Nom de l'équipe:……..

3. Numéro du joueur:…… 4. Age:……..

5. Nombre d'années étant comme joueur dans la 1ère ou 2 ième division……..

6. Poste: Gardien de but:☐ Défenseur:☐ Milieu du terrain:☐
Attaquant:☐

PARTIE B. HISTORIQUE D'UNE LESION / BLESSURE

Aux réponses en dessous, considérez seulement l'information de 9 mois derniers (saison passée).

1. Combiens de lésions as - tu eu pendant les séances d'entrainement ou de compétition qui t'ont empêché de participer aux séances suivantes?

Entrainement: ☐Lésions

Compétition: ☐Lésions

2.Quelle est la partie du corps lesée? (une ou plusieurs réponses sont possibles).

i. Membres supérieurs

Tête: ☐ Face: ☐ Nuque: ☐ Epaule: ☐

Dos: ☐

Poitrine: ☐ Bras: ☐ Coude: ☐ Avant-bras: ☐

Poignet: ☐

Main: ☐ Doigt: ☐

ii. Membres inférieurs

Pelvic: ☐ Fesses: ☐ Inguinal: ☐ Hanche: ☐

Cuisse ant.: ☐

Cuisse post:☐ Genou: ☐ Tibia: ☐ Mollet: ☐

Cheville: ☐

Pied: ☐ Orteil: ☐

3. Quels sont les mechanismes des lésions dans les séances suivantes? (un ou plusieurs méchanismes sont possible selon le nombre des lésions).

i. Entrainement

Taclant: ☐ Taclé: ☐ Courant: ☐ Tirant: ☐

sautant: ☐

Descente: ☐ Coup de tête: ☐ Tournant: ☐ s'entrechoquer:☐

inconnu:☐

ii. Compétition

Taclant: ☐ Taclé: ☐ Courant: ☐ Tirant: ☐

sautant: ☐

Descente: ☐ Coup de tête: ☐ Tournant: ☐ s'entrechoquer:☐ inconnu:☐

4. Combien de séances d'entrainements ou des matches que tu as raté la saison dernière à cause de la lésion?

i. Entrainement:

0:☐ 1:☐ 2:☐ 3:☐ 4:☐ 5:☐ >5:☐

ii. Compétition

0:☐ 1:☐ 2:☐ 3:☐ 4:☐ 5:☐ >5:☐

5. Quel est le type de traitement que tu as reçu après avoir eu une lésion?(Un ou plusieurs traitements sont possible).

Médicale: ☐ Physiothérapie: ☐ Traditionnel: ☐ Se soigner: ☐ Aucun: ☐

6. Si tu as consulté un physiothérapeute, quel est le type de traitement ou conseil qu'on t'a donné? (une ou plusieurs réponses sont possible).

6.1. Tretaiment physiothérapeutique

i. Entrainement

Froid: ☐ Compression: ☐ Elevation: ☐ Chaleur: ☐

Ultrasons: ☐ Tens: ☐ Inferential: ☐ Stim. mus: ☐

Mob. articulaire: ☐ Massage: ☐ Friction profonde:☐ Etirement: ☐

Ex. thérapeutiques: ☐ Bandages: ☐ Atelles: ☐ Béquilles: ☐

ii. Compétitions

Froid: ☐ Compression: ☐ Elevation: ☐ Chaleur: ☐

Ultrasons: ☐ Tens: ☐ Inferential: ☐ Stim. mus: ☐

Mob. articulaire: ☐ Massage: ☐ Friction profonde:☐

Etirement: ☐

Ex. thérapeutiques: ☐ Bandages: ☐ Atelles: ☐

Béquilles: ☐

6.2.Conseils

Repos/arrêt d'activité sportive: ☐ Activité sportive limitée: ☐ Continuer de jouer:☐

7. Combien de temps que tu t'es absenté aux séances d'entrainement ou de competition à cause de la lésion?

i. Entrainement

	2-3jours	4-7jours	1-4semaines	>4semaines
Première lésion:	☐	☐	☐	☐
Deuxième lésion:	☐	☐	☐	☐
Troisième lésion:	☐	☐	☐	☐
Quatrième lésion:	☐	☐	☐	☐
Cinquième lésion:	☐	☐	☐	☐

ii. Compétitions

	2-3jours	4-7jours	1-4semaines	>4semaines
Première lésion:	☐	☐	☐	☐
Deuxième lésion:	☐	☐	☐	☐
Troisième lésion:	☐	☐	☐	☐

Quatrième lésion: ☐ ☐ ☐ ☐

Cinquième lésion: ☐ ☐ ☐ ☐

8. As – tu eu l'accès aux services de physiothérapie toutes fois que tu en avais besoin?

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

9. Si pas d'accès aux services de physiothérapie, quelles sont les causes?

Financement: ☐ Pas informé: ☐ Absence de service: ☐ Ignorance: ☐

10. Penses-tu que le traitement physiothérapeutique était vraiment necessaris/primordial à tes lésions?

Totalement: ☐ (100%) Très : ☐ (75%) D'accord: ☐ (50%) Je ne suis : ☐ Totalement: ☐ d'accord contre (25%) pas d'accord (0%)

PARTIE C. EQUIPEMENT DE PROTECTION

i. Entrainement

1.Portes- tu les protège-tibia?

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

2. Portes- tu les chevilleres?

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

3. Portes - tu les souliers appropriés?

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

ii. Compétitions

1. Portes- tu les protège-tibia?

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

2. Portes- tu les chevilleres?

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

3. Portes - tu les souliers appropriés?

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

PARTIE D. LES PROGRAMMES DES MESURES LUTTANT CONTRE LES LESIONS

1. Fais –tu l'échauffement avant:

i. Entrainement

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

ii. Compétitions

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

2. Quelle est la durée de ton programme d'échauffement?

i. Entrainement

5min:☐ 10min:☐ 15min:☐ 20min:☐ >25min:☐

ii. Compétitions

5min:☐ 10min:☐ 15min:☐ 20min:☐ >25min:☐

3. As tu une période du retour au calme en terminant les séances suivantes?

i. Entrainement

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

ii. Compétitions

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

4. Fais - tu l'étirement des grand muscles de la jambe dans les situations suivantes?

i. Echauffement avant l'entrainement

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

ii. Echauffement avant les compétitions

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

iii. Retour au calme après l'entrainement

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

iv. Retour au calme après les compétitions

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

5. Est-ce que tu fais l'entrainement de flexibilité/souplesse (ne faisant pas partie d'échauffement ou de retour au calme)?

i. Fréquences par semaine en équipe

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

ii. Fréquences par semaine individuellement

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

6. Est-ce tu fais les exercices de tonification dans le gymn?

iii. Fréquences par semaine en équipe

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

iv. Fréquences par semaine individuellement

0: ☐ 1: ☐ 2: ☐ 3: ☐ >3: ☐

PARTIE E. CONSEIL NUTRITIONEL

1. Est-ce que tu consommes les aliments riches en carbohydrate (ex: pain, spaghetti/pasta, riz,patates/pomme de terre,chocolat, sucre) dans les périodes suivantes? (Prévus par l'équipe)

i. Avant l'entrainement

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

ii. Après l'entrainement

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

iii. Avant les compétitions

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

iv. Après les compétitions

Toujours:☐ (100%) Plus souvent:☐ (75%) Souvent:☐ (50%) Quelques fois:☐ (25%) Jamais:☐ (0%)

2. Quelle est la quantité d'eau que tu prends pendant les périodes suivantes?

i. Entrainement

Excellente:☐ Très suffisante:☐ Suffisante:☐ Insuffisante:☐ Minime:☐

ii. Compétitions

Excellente:☐ Très suffisante:☐ Suffisante:☐ Insuffisante:☐ Minime:☐

3. Est-ce qu'on te donne des conseils sur ce que tu manges ou bois?

Beaucoup:☐ Un peu: ☐ Aucun: ☐

MERCI BEAUCOUP

APPENDIX G

IBIBAZO KU CYOREZO CY'IMVUNE N'IBIKOMERE BY'ABAKINNYI B'UMUPIRA W'AMAGURU MU RWANDA : IKENERWA K'UBUVUZI BW'UBUGORORANGINGO

Nimero y'ibibazo :……

Muvandimwe mukinnyi,

Nitwa TWIZERE Janvier, nkaba niga Ubugororangingo (Physiothérapie) mu cyiciro cy'impamyabumenyi ihanitse muri kaminuza ya Western Cape, mu gihugu cy'Afurika y'Epfo.

Nkaba rero nkora ubushakashatsi ku bijyanye n'icyorezo cy'imvune n'ibikomere by'abakinnyi b'umupira w'amaguru mu rwanda : ikenerwa ry'ubuvuzi bw'ubugororangingo, kugirango hashakishwe icyakorwa kugirango hategurwe gahunda z'ijyanye no kurinda imvune n'ibikomere mu makipe yose y'icyiciro cya mbere n'icya kabiri.

Mu rwego rw'ubwo bushakashatsi rero, nkaba nagusabaga gusubiza ibibazo biri k'umugereka w'uru rupapuro, ukurikiza amabwiriza yatanzwe kuri buri kibazo. Gusubiza ibi bibazo ni ubushake bw'umuntu, ntabwo ari agahato. Ntiwandike izina ryawe kuri uru rupapuro kuberako ibisubizo utanga byose ari ibanga ryawe.
Tubaye tubashimiye ubufatanye muzagaragaza.

Twizere Janvier

C/O K.H.I

B.P 3286,

Kigali-Rwanda

Tél : (250) 572172

Portable : 08516296

IBIBAZO BY'ABAKINNYI

Ibibazo byose ni ibanga. Mugerageze kuvugisha ukuri bishoboka kandi mushyire akamenyetso kabigenewe mu kazu kamwe kereka ahatanzwe andi mabwiriza.

IGICE CYA MBERE. UMWIRONDORO

1. Icyiciro cya: 1□ 2 □ 2. Izina ry'ikipe:……
3. Nimero y'umukinnyi:…… 4. Imyaka:…….
5. Imyaka umaze ukina mu cyiciro cya mbere cyangwa cya kabiri……
6.Umwanya ukinaho: Mu izamu: □ Mu bakabiri: □ Hagati: □ Imbere: □

IGICE CYA KABIRI. IBIJYANYE N' IMVUNE/IGIKOMERE

Ku bisubizo mutanga ahakurikira, muvuge gusa ku bijyanye n'amezi icyenda ashize (Irushanwa rishize)

1.Wagize imvune/ibikomere bingahe mu gihe cy'imyitozo cyangwa se cy'imikino byatumye udashobora kuboneka muri gahunda z'imyitozo cyangwa se imikino zakurikiyeho?

i. *Imyitozo:* □(umubare w'imvune/ibikomere)

ii. *Imikino:* □(umubare w'imvune/ibikomere)

2.Ni ikihe gice cy'umubiri wagizeho imvune/ibikomere?(ibisubizo byinshi birashoboka).

i. *Igihimba*

Umutwe: □ Mu buranga: □ Ijosi: □
Urutugu: □ Umugongo: □ Igituza: □
Akaboko (ikizigira): □ Inkokora: □
Akaboko: □ Ubujana: □ Ikiganza: □
Urutoki: □

ii. Amaguru

Amayunguyungu: □ Ikibuno: □ Mu ntantu: □ Mu ihasha: □
Ikibero cy'imbere:□ Ikibero cy'inyuma: □ Ivi: □
Umurundi: □ Imbwana: □ Akabumbankore: □
Ikirenge: □ Ino: □

3. Ni ubuhe buryo wavunitsemo mu bihe bikurikira? (uburyo bwinshi burashoboka bitewe n'umubare w'imvune).

i. Imyitozo

Gutega:□ Gutegwa: □ Niruka: □ Nteye umupira:□
Nsimbutse: □
Kugwa:□ Guteza umutwe:□ Mpindukiye:□ Kugongana: □
Kwizana: □

ii. Imikino

Gutega:□ Gutegwa: □ Niruka: □ Nteye umupira:□
Nsimbutse: □
Kugwa:□ Guteza umutwe:□ Mpindukiye:□ Kugongana: □
Kwizana: □

4. Wasibye inshuro zingahe mu myitozo cyangwa se mu mikino y'amarushanwa aheruka bitewe n'imvune/ibikomere?

i. Imyitozo:

0:□ 1:□ 2:□ 3:□ 4:□ 5:□
>5:□

ii. Imikino

0:□ 1:□ 2:□ 3:□ 4:□ 5:□
>5:□

5. Ni ubuhe buryo wivuje ukimara kuvunika/gukomereka? (Uburyo bwinshi burashoboka).

Bwa kiganga:□ Ubugororangingo:□ Bwa Gihanga:□ Kwivura:□
Ntabwo: □

6. Niba warakoresheje ubugororangingo, ni ubuhe buryo bakuvuje cyangwa inama ki baguhaye? (uburyo bwinshi burashoboka).

6.1. Ubuvuzi bw'ubugororangingo

i . Imyitozo

Ubukonje: □ Gukanda: □ *Elevation:* □ Ubushyuhe: □
Ultrason: □ *Tens:* □ *Inferential:* □ *Stim. Musculaire:*□
Mob articulaire:□ *Massage:* □ *Friction profonde:*□ *Etirement:* □
Imyitozo: □ *Bandes:* □ *Atelle:* □ Imbago: □

ii. Imikino

Ubukonje: □ Gukanda: □ *Elevation:* □ Ubushyuhe: □
Ultrason: □ *Tens:* □ *Inferential:* □ *Stim. musculaire:*□
Mob articulaire:□ *Massage:* □ *Friction profonde:*□ *Etirement:* □
Imyitozo: □ *Bandes:* □ *Atelle:* □ Imbago: □

6.2. Inama

Ikiruhuko/guhagarika gukina: □ Gukina kuburyo bworoheje: □ Gukomeza gukina:□

7.Wamaze igihe kingana gite udakora imyitozo cg se udakina kubera imvune/igi(bi)komere?

i . Imyitozo

	Iminsi2-3	Iminsi4-7	Icyumweru1-4 Ibyumweru>4
Imvune ya mbere: □	□	□	□
Imvune ya kabiri: □	□	□	□
Imvune ya gatatu: □	□	□	□
Imvune ya kane: □	□	□	□
Imvune ya gatanu: □	□	□	□

ii. Imikino

	Iminsi2-3	Iminsi4-7	Icyumweru1-4 Ibyumweru>4
Imvune ya mbere: □	□	□	□
Imvune ya kabiri: □	□	□	□
Imvune ya gatatu: □	□	□	□

Imvune ya kane: □ □ □ □

Imvune ya gatanu: □ □ □ □

8. Wabonga uburyo bwo kwivuza muri serivisi y'ubugororangingo igihe cyose byabaga bikenewe?

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □

(100%) (75%) (50%) (25%) (0%)

9. Niba Ubwo buryo butarashobotse, ni iyihe mpamvu yabiteraga?

Amikoro:□ Kutabibwirwa:□ Nta serivisi ihari:□ Kutabimenya:□

10.Uratekereza ko ubuvuzi bw'ubugororangingo bwari bukenewe cyangwa se bwagufashije mu mvune wagize?

Ndabyemera:□ Ndabyemera:□ Ndabyemera:□ Simbyemera:□ Simbyemera: □

byimazeyo cyane mu rugero na busa

(100%) (75%) (50%) (25%) (0%)

IGICE CYA GATATU: IBIKORESHO BYO KWIRINDA IMVUNE/ IBIKOMERE

i . Imyitozo

1. Ujya wambara ibirinda ruseke?

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □

(100%) (75%) (50%) (25%) (0%)

2. Ujya wambara ibirinda akabumbankore?

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □

(100%) (75%) (50%) (25%) (0%)

3. Ujya wambara inkweto zabugenewe zimeze neza?

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □

(100%) (75%) (50%) (25%) (0%)

ii. Imikino

1. Ujya wambara ibirinda ruseke?

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

2. Ujya wambara ibirinda akabumbankore?
Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

3. Ujya wambara inkweto zabugenewe zimeze neza?
Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

IGICE CYA KANE: GAHUNDA Y'IBIRWANYA IMVUNE

1. Ese urishyushya mbere ya:

i. Imyitozo
Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

ii. Imikino
Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

2. Ese gahunda yawe yo kwishyushya imara igihe kingana iki?

i . Imyitozo
5min:□ 10min:□ 15min:□ 20min:□ >25min:□

ii. Imikino
5min:□ 10min:□ 15min:□ 20min:□ >25min:□

3. Ese ugira igihe cyo gukora imyitozo nyoroshyamubiri mu gihe urangije gahunda zikurikira?

i . Imyitozo
Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

ii. Imikino

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

4. Ese ukora imyitozo yo kurambura imikaya minini y'ukuguru mu bihe bikurikira?

i . Kwishyushya mbere y'imyitozo

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

ii. Kwishyushya mbere y'imikino

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

iii . Imyitozo nyoroshyamubiri nyuma y'imyitozo isanzwe

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

iv. Imyitozo nyoroshyamubiri nyuma y'imikino

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

5. Ese ukora imyitozo yongera kugororoka (ariko itari mu ijyana no kwishyushya cyangwa se nyoroshyamubiri)?

i. Inshuro mu cyumweru mu ikipe

0: □ 1: □ 2: □ 3: □ >3: □

ii. Inshuro mu cyumweru ku bwawe/ ku giti cyawe

0: □ 1: □ 2: □ 3: □ >3: □

6. Ese ukora imyitozo ikomeza umubiri muri gymn?

iii. Inshuro mu cyumweru mu ikipe

0: □ 1: □ 2: □ 3: □ >3: □

iv. Inshuro mu cyumweru ku bwawe/ ku giti cyawe

0: □ 1: □ 2: □ 3: □ >3: □

IGICE CYA GATANU: INAMA ZEREKEYE IMIRIRE

1.Ese ubona ibiryo-nterambaraga (urugero: umugati, makaroni,umuceri,ibijumba/ibirayi/, shokola, isukali) mu bihe bikurikira? (ubihawe n'ikipe)

i . Mbere y'imyitozo

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

ii . Nyuma y'imyitozo

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

iii. Mbere y'imikino

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

iv. Nyuma y'imikino

Buri gihe:□ Inshuro nyinshi:□ Mu rugero:□ Rimwe na rimwe:□ Nta na rimwe: □
(100%) (75%) (50%) (25%) (0%)

2. Ese unywa amazi angana iki mi bihe bikurikira?

i . Imyitozo

Ahagije byimazeyo:□ Ahagije mu rugero:□ Mu rugero:□ Ntahagije:□ Make cyane:□

ii. Imikino

Ahagije byimazeyo:□ Ahagije mu rugero:□ Mu rugero:□ Ntahagije:□ Make cyane:□

3. Ese uhabwa inama yerekeye ibyo kurya cyangwa kunywa?

Nyinshi: □ Nkeya: □ Ntazo: □

MURAKOZE CYANE

APPENDIX H

A questionnaire on Epidemiology of soccer injuries in Rwanda: A need for physiotherapy intervention.

Questionnaire No:……
Dear medical practitioner,

Good day, my name is Janvier TWIZERE, I am a Rwandan postgraduate student enrolled in the Physiotherapy (Masters) program at the University of the Western Cape – South Africa. I am conducting a research survey as part of requirements for a M.Sc. (Masters Science) Degree in Physiotherapy. The title of my study is *"Epidemiology of Soccer Injuries in Rwanda: A Need for physiotherapy intervention"*. The findings of this study will contribute in planning effective injury prevention programmes among the 1st and the 2nd division soccer teams.

I kindly request for your participation in this study by completing the questionnaire with your views. The participation is voluntarily and the information given will be confidential. Do not write your name on this questionnaire**.**

It is hoped that the information you will give in this study, will be helpful in planning effective injury prevention strategies for Rwandan soccer players

Thank you very much for your cooperation.

Yours truly,

Janvier TWIZERE,

C/o Kigali Health Institute,

P.O. Box 3286

Kigali – Rwanda

Tel. (250) 5721272

Cell Phone 08516296

Presentation of the questionnaire

QUESTIONNAIRE FOR TEAM MEDICAL PRACTITIONNER

PLEASE ANSWER ALL THE QUESTIONS

1. Name of the team :……

2. What is your qualification?……
……
……

3. What is your experience in sport medicine**?……..**
……
……
……

4. What kind of injuries is common in your soccer team?
……
……
……
……

5. What are the causes of those injuries?
……
……
……
……

……

6. Do you think there are also other underlying predisposing factors to those injuries?

……
……
……
……

7. When you compare the injuries occurring during training session and those occurring
during matches, what are the most prevalent?

……
……
……
……

8. Make a list of the most affected body parts. Start with the most affected to the less
affected one.

……
……
……
……
……
……

9. Are there some preventive programmes or measures the players are thaught before
any kind of session?

……
……
……
……
……

10. What is the most useful treatment that you use in the management of those injuries?

……
……

11. How do you undertake the rehabilitation of the injured players? (Treatment, expected recoveries period, follow up, allow the players to return to sport activity, etc…)

……
……
……
……

……
……

12. Is there any follow up during and after both training and competition period?

……
……

13. How is your collaboration with technical staff in terms of handling injured players?

……
……
……
……

14. Do you have in your treatment plan the physiotherapy treatment?

……
……

15. If yes, explain how is the access of players to that kind of treatment

……
……

16. As a medical practitioner, how do you find the role of physiotherapy treatment of soccer injuries?

……
……
……
……

17. Do you think there is really a need for physiotherapy injuries countermeasures in common soccer injuries in your soccer team?

……
……
……
……

18. Elaborate on the kind of other advices that you give to your players.

……
……
……
……
……
……

19. Are there some difficulties do you meet in accomplishment of your task? If yes which ones?

……
……
……
……
……
……

20. What kind of advices could you bring to the intention of club's leaders, coaches, as well as Rwandese Federation of Football amateur for the well being of Rwandan soccer player?

……
……
……

THANK YOU VERY MUCH

APPENDIX I

QUESTIONNAIRE SUR L'EPIDEMIOLOGIE DES LESIONS DE FOOTBALL AU RWANDA : UN BESOIN DE L'INTERVENTION DE LA PHYSIOTHERAPIE

Numéro du questionnaire :……

Cher Soigneur de l'équipe de football,

Je répond au nom de TWIZERE Janvier, étudiant de nationalité rwandaise inscrit au programme de maîtrise en physiotherapie à Western Cape University en Afrique du Sud.

Nous menons une recherche sur l'Epidemiologie des lésions sportives de football au Rwanda : un besoin de l'intervention de la physiothérapie, en vue de contribuer à l'élaboration des programmes efficaces de prévention des lésions dans toutes les équipes de football de 1 ère et 2 ème division.

Cependant, nous sollicitons votre participation dans cette recherche. Vous nous aiderez en complétant ce questionnaire. Votre participation est volontaire et les informations fournies seront traitées confidentiellement. N'écrivez votre nom sur le questionnaire.

Nous vous remercions pour votre participation.

Twizere Janvier

C/O K.H.I

B.P 3286,

Kigali-Rwanda

Tél : (250) 572172

Portable : 08516296

QUESTIONNAIRE POUR SOIGNEUR DE L'EQUIPE DE FOOTBALL

Répondez à toutes les questions s'il vous plaît.

1. **Nom de l'équipe**……

2. Quelle est votre qualification ?……
……
……

3. Quele est votre expérience dans le domaine de la médecine du sport ?
……
……
……
……
……
……

4. Quelles sont les lésions sportives les plus fréquentes dans votre équipe de football ?
……
……
……
……
……
……

5. Quelles sont les causes de ces lésions sportives?

……
……
……
……
……
……

6. Pensez-vous qu'il y a aussi d'autres facteurs prédisposant à ces lésions sportives ?

……
……

Si oui, lesquelles ?

……
……
……
……
……
……
……

7. Quand vous comparez des lésions sportives survenant lors des entraînements et celles survenant lors des matchs ; d'après vous, quelles sont les plus fréquentes ?

……
……
……
……

8. Faites une liste des parties du corps les plus affectées par ces lésions sportives en commençant par les plus affectées aux moins affectées.

……
……
……

……

……
……

…….

……
……

9. Y a-t-il des mesures ou programmes préventives aux lésions sportives que les joueurs sont enseignés avant d'entamer n'importe quelle séance sportive ?

……
……
……
……
……
……

10. Quel est le traitement le plus utilisé dans la prise en charge de ces lésions sportives ?

……
……
……

11. Comment planifiez-vous la réhabilitation des joueurs blessés (traitement, le temps de guérison, suivi, permettre les joueurs à retourner aux activités sportives, etc…)

……
……..
……
……..
……
……..

12. Faites-vous un suivi des joueurs pendant et après les entraînements et la période de compétition ?……
…….

13. Comment est-il votre collaboration avec le staff technique de l équipe en ce qui concerne les joueurs blessés ?

……
……
……

14. Avez-vous un traitement physiothérapeutique dans votre plan de traitement ?

……
……

15. Si oui, expliquez l'accès des joueurs à ce type de traitement.

……
……
……
……
……
……

16. En tant que practitien de carrière médicale, comment trouvez vous le rôle de la physiothérapie dans le traitement des lésions sportives en football ?

……
……
……
……
……

17. Pensez-vous qu'il ya réellement un besoin / une nécéssité de l'intervention de la physiothérapie dans le traitement pour lutter contre les lésions les plus fréquentes en football dans votre équipe ?

……
……
……
……
……

18. Parlez sur les conseils que vous donnez à vos joueurs.

……
……
……
……
……

19. Y a-t-il quelques difficultés que vous rencontrez dans l'accomplissement de vos tâches ?……..Si oui, les quelles sont ?

……
……
……
……

20. **Quels conseils apporteriez-vous à l'intention des présidents des équipes, entraîneurs et à la Fédération Rwandaise de Football Amateur pour le bien être d'un footballeur rwandais ?**

.....
.....
.....
.....
.....
.....

MERCI BEAUCOUP.