The prevalence, risk factors and management of musculoskeletal injuries in male amateur indoor soccer players in the eThekwini Municipality

By

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I, Caleb Nair, do declare that this dissertation is representative of my own work in both conception and execution (except where acknowledgements indicate to the contrary)

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DEDICATION

This dissertation serves as evidence of putting God first in everything. All my skills, talent and success can only be attributed to my Heavenly Father and His Son. There is no value in anything, if Christ is not in it.

“But more than anything else, put God's work first and do what he wants. Then the other things will be yours as well.” – Matthew 6:33

This dissertation is dedicated to my family. To my father and mother, who sacrificed endlessly for me, the magnitude of my appreciation and gratitude cannot be expressed. Let your lives be the greatest sermon ever preached. I love and cherish the both of you. This is for you.

I also dedicate this to my sister, Trinity Nair. Let this be an example of not being defined by your environment and circumstances. Thank you for your compassion and the laughs.

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ABSTRACT

Background: Soccer is a popular sport played and viewed globally. Furthermore, indoor soccer has been gaining popularity, especially in South Africa. Investigating the prevalence and risk factors of musculoskeletal injuries associated with indoor soccer, creates an awareness among health practitioners and players, especially when there is limited literature on this sport.

Aim: The aim of this study was to determine the prevalence of musculoskeletal injuries, the associated risk factors and effective management of musculoskeletal injuries in amateur male indoor soccer players in the eThekwini Municipality, Durban, South Africa.

Methodology: The study utilized a quantitative paradigm and a cross-sectional survey design. A total of 166 male participants, between the ages of 18 and 40 years, were recruited for this study. The sample population included amateur indoor soccer players from the eThekwini Municipality. The survey was distributed via links in which participants completed the survey. Data were analyzed using SPSS version 26 and exported into Microsoft Excel.

Results: A total of 89 participants sustained musculoskeletal injuries due to indoor soccer. This resulted in a prevalence rate of 74.2% which indicates more than half of indoor soccer players sustain musculoskeletal injury. Muscle strains are seen as the most common injuries by accounting for 32.6% of the total injuries. The study further revealed that players are more likely to sustain an injury through twisting and turning playing mechanisms as 20.2% of injuries were sustained due to this mechanism of play. Playing with a chronic condition was regarded as a significant risk factor for musculoskeletal injuries. While 58.4% of injured participants implemented a management protocol, 38.5% utilized a home remedy as their management protocol.

Conclusion: This study revealed that high musculoskeletal injury prevalence rate exists among amateur indoor soccer players, in the eThekwini Municipality. Male indoor soccer players are commonly prone to muscle strains and sprains with the knee being the most common site of injury. The twisting and turning playing mechanism

utilized in indoor soccer appears to be a common mechanism that predisposes players to musculoskeletal injury. Players with chronic conditions should play with caution as chronic conditions may predispose players to injuries and exacerbate health conditions. Urgent measures are required to educate indoor soccer players on injuries and effective management as the results demonstrated high rates of injury and poor management protocols.

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CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION

This chapter introduces the study by providing a background and highlighting the rationale. Within this chapter, the aims and objectives are also outlined, as well as the flow of the dissertation.

1.2 BACKGROUND

Soccer is one the most common sports played globally (Goto and King 2019). The popularity of soccer is based on the fact that it requires minimal equipment and can be played indoors or outdoors (Stone *et al*. 2016). This sport can be physically demanding on the cardiovascular and musculoskeletal systems (Goto and King 2019). Soccer players are required to perform a combination of discontinuous sprinting and endurance running, and thus need to maintain a decent level of fitness (Sentsomedi and Puckree 2016). Soccer serves as an excellent activity to improve and maintain fitness levels, and thus having a positive effect on your health (Naser, Ali and Macadam 2017).

The sport is widely played on both professional and amateur levels. However, at any level, there are always physiological demands that are needed to be met by the players (Ekblom 1986). Falling short of these demands can be attributed to many factors that could possibly predispose the player to injury (Ellapen *et al.* 2014). Intrinsic and extrinsic risk factors influence the prevalence of injuries in this sport (Ryynänen, Börjesson and Karlsson 2018). Intrinsic risk factors include age, body mass and chronic conditions, while the extrinsic risk factors include playing surfaces, duration of the match and ball contact (Ryynänen, Börjesson and Karlsson 2018).

1.3 AIM OF THE STUDY

The aim of this study was to determine the prevalence of musculoskeletal injuries, the associated risk factors and effective management of musculoskeletal injuries in amateur male indoor soccer players in the eThekwini Municipality.

1.4 STUDY OBJECTIVES

Objective one

To determine the period (1 year) injury prevalence of musculoskeletal injuries in amateur indoor soccer players.

Objective two

To determine selected intrinsic (age and health conditions) and extrinsic risk factors (footwear, playing position and surfaces) associated with injury in amateur indoor soccer players.

Objective three

To investigate the injury management protocols used by amateur indoor soccer players.

1.5 RATIONALE BEHIND THE STUDY

Soccer arrived in South Africa in the nineteenth century, where it was played among the British soldiers (Goldblatt 2007). Over the years, the simplicity of kicking of a ball in an open field with the objective to score a goal, has developed into a sport that has become so popular in South African culture (Sartori 2019). This sport is played at professional and semi-professional levels and, more frequently, on amateur (recreational) levels (Luo *et al.* 2018).

The global popularity of amateur soccer serves a significant purpose as a form of fitness to those who can only choose to participate in one form of exercise (Castagna *et al.* 2007). The growth of soccer participation has been attributed to the relative simplicity of the game, lack of expense of the equipment and the accessibility to play both outdoors and indoors (Metzl and Micheli 1998). Indoor soccer has progressively become more popular amongst the soccer community in South Africa (Pelak 2010; Gobind 2017).

Indoor soccer is played on a 38-42m x 18-25m artificial turf that is walled off by a solid structure (Barbero-Alvarez *et al.* 2008). The reduced space allows for the ball to stay within the indoor arena and requires less running distance to allow for continuity of the game without disruptions. Amateur indoor soccer players are not

required to affiliate themselves with a club to play. This has made playing soccer extremely convenient for the average person.

The forty-to-sixty-minute matches allow players to perform at higher intensities for a shorter duration than the traditional ninety-minute outdoor soccer matches. Most amateur players take advantage of this short-played version of soccer to improve on their health and well-being (Castagna *et al.* 2007).

Epidemiological evidence suggests physical activity provides long-term health benefits and potentially protects against cardiovascular, metabolic and pulmonary diseases (Pedersen and Saltin 2015). However, despite the increased popularity and benefits from indoor soccer, the rise of injury prevalence has also been of concern (Nilsson, Östenberg and Alricsson 2016). Stubbe *et al.* (2015) explained that poor knowledge and education of the risk factors and effective management of soccer injuries may be the reason for the relatively high prevalence and incidence of injuries in the amateur soccer community.

The level of play and skills of a player may influence the prevalence of injuries (Stubbe *et al*. 2015a). The physiological demand of soccer on the body is high due to the combination of movements and the endurance required (Sentsomedi and Puckree 2016). Additionally, professional players tend to perform at greater intensities based on the knowledge that there are medical professionals on demand to assist with injuries (Calligeris, Burgess and Lambert 2015). However, amateur players may not have the same benefits or the knowledge of management protocols yet they still perform at high intensities (Niyonsenga and Phillips 2013).

There is great emphasis placed on the importance of identifying the relationship between risk factors and injuries amongst players (Fuller and Drawer 2004). Due to the paucity in the literature on the prevalence, risk factors and effective management of injuries in amateur indoor soccer players, understanding these factors will greatly contribute to the South African soccer communities. This information may also be beneficial to healthcare practitioners to provide adequate treatment protocols and it may allow for optimal patient education.

1.6 CONCLUSION

1.6.1 Structure of Dissertation

The subsequent chapters will be structured as follows:

Chapter Two will present the literature review and provide an overview of indoor soccer. This will be followed by an analysis of the current and past literature on the prevalence, risk factors and effective management of indoor soccer injuries.

Chapter Three will detail the methodology of the study which will achieve the aims and objectives. All study designs, measurements, methods and techniques will be explained.

Chapter Four will expound the results of this study.

Chapter Five, which will discuss the results in terms of the current literature.

Lastly, Chapter Six will provide a conclusion, along with the limitations related to the study and present the recommendations that have stemmed from the investigation.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews the factors that contribute to the topic of this study. It will provide a brief introduction to soccer and indoor soccer, the incidences and prevalence of indoor soccer injuries, the risk factors associated with indoor soccer injuries, and the effective management of any injuries sustained. It concludes with the relevance of this literature in the healthcare community.

2.2 INTRODUCTION TO SOCCER

Soccer can be deemed as one of the most popular sports played globally, with approximately 270 million people participating in this sport (Count 2006). Between 2000 and 2006, the international soccer governing body, Federation Internationale de Football Association (FIFA), recorded a 9% increase of total players involved in soccer (Count 2006). The influence of televised soccer and professional players has increased the number of spectators and players. According to the 'Big Count', a global consensus of soccer players, there has been an increase of 7% in the total unregistered soccer players (Count 2006). Whilst the total population of players in South Africa remains unknown, there is a total of 2200 professional players who participate in South Africa (Sartori 2019).

The introduction of soccer in South Africa dates back to the nineteenth century where it was most commonly played amongst the British soldiers (Goldblatt 2007). Over the years, it was adopted into the South African culture and has had a tremendous impact on the nation. Sport, in general, has played a pivotal role in South Africa and has bridged the gap between the cultural and ethnic divides that was created during apartheid (Keim 2006).

Soccer has traditionally been played on an open grass-field, but since the nineteenth century, soccer has been developed into many variations, such as indoor and beach soccer, played amongst the diverse population of South Africa (Kubayi *et al.* 2017). However, traditional outdoor soccer and the increasingly popular indoor soccer are the two most played forms of soccer.

Outdoor soccer is played on a large, rectangular grass-pitch that is approximately 100-110m x 64-75m in size (Gorostiaga *et al.* 2009). On either end of the pitch lies a rectangular goalpost that should be approximately 7.32m x 2.44m. During a regulated game, players run a distance of approximately 10km in two 45 minute halves (Stølen *et al.* 2005). The team is divided into defenders, midfielders and strikers and a goalkeeper. Soccer boots/cleats are used as a form of protective equipment for the players' feet, especially when kicking with large forces and the studs provide traction when running and stopping to prevent slipping (Conenello 2010).

Indoor soccer uses the principles of outdoor soccer as its foundation, but indoor soccer is played on a 38-42m x 18-25m artificial turf or solid surface that is fenced by a solid wall/structure along the perimeter to prevent the ball from being played outside of the field (Barbero-Alvarez *et al*. 2008). The teams usually compete for 50-60 minutes, divided into equal halves (Putukian *et al.* 1996). The goalposts tend to be much smaller in size than those used outdoors, as indoor soccer requires less players. The teams comprise of five to seven players with similar field positions as traditional soccer.

Players are not required to wear a specific type of shoe on the field but it is a requirement to protect their feet from getting injured. Soccer cleats are the most common footwear used, but amateur players are not obligated to use cleats which may precipitate injury due to nonconformity, especially when trying to shoot (Livesay, Reda and Nauman 2006; Gdovin *et al.* 2018).

2.3 PROFESSIONAL AND AMATEUR SOCCER PLAYERS

Soccer players are either professionals or amateurs. According to FIFA regulations, a professional soccer player is defined as one who has a written contract with an established soccer club and receives an income that would pay the player's expenses. Players who do not have a written contract or receive an income from alternative sources would be considered amateurs (Castro 2019). Amateurs may also be referred to as recreational players, as the primary focus of these individuals is for leisure or to improve on health (Luo *et al.* 2018).

Professional players contribute much of their time to physical conditioning and sport-specific training, whereas most amateur players attribute a soccer match to their weekly exercise regime (Michailidis 2018).

Soccer has a high physiological demand on a player's body and mind. Lam *et al.* (2017) explained that professional players portray a consistent level of aggression and passion when playing, unlike amateur players who display various levels of aggression or passion. Amateur soccer is most often used for its social and health benefits as it requires no affiliation to a soccer club (Krustrup *et al.* 2009; Luo *et al.* 2018).

2.4 BIOMECHANICS OF SOCCER

Soccer biomechanics include kicking and running and are important because of their influence on the development of injury. The various running phases include a swing and support phase (Howe and Hanchard 2003). Support begins at foot strike, which is the point at which the foot makes contact with the ground and ends when the foot leaves the ground, known as the toe-off (Howe and Hanchard 2003). In this motion, the gluteal and hamstring muscles are activated to result in a hip extension, with the gastrocnemius muscle causing plantarflexion at the ankle to result in a good toe-off (Howe and Hanchard 2003).

The swing phase is marked by the psoas and iliacus muscle flexing the hip and dorsiflexion of the ankle due to the action of the anterior tibialis (Howe and Hanchard 2003). The quadriceps then extend the swinging leg to prepare for a foot strike where the hip and knee are flexed and the ankle is dorsiflexed (Howe and Hanchard 2003). Most of the body weight is concentrated over the foot strike as the body moves over the ankle joint due to the momentum (Howe and Hanchard 2003). A proportional relationship exists between the speed of running and the length of strides, but when running with a ball, shorter strides are taken (Howe and Hanchard 2003). This is necessary for quick directional changes when running.

Due to the nature of soccer, players are required to run at high intensities and agility which allows them to change their direction of running when needed (Bangsbo 1992). This is a necessity if players want to be successful against their opponents. This is known as change of direction runs (Jones, Bampouras and Marrin 2009).

Successful directional runs may be regulated by a number of physical and technical attributes, which include linear sprinting acceleration, eccentric and concentric strength and power and reactive strength (Young, James and Montgomery 2002). Jones, Bampouras and Marrin (2009) concluded that linear sprint acceleration/speed was found to be the most influential factor in directional changes.

Although the biomechanics of soccer is the same for both indoor and outdoor, to be an effective and successful player on an indoor field, a player is required to perform several sprints, jumping, quick change of direction and successful kicking (shooting). For this type of performance, muscular strength plays an important role (Panchuk and Glab 2015).

Studies have identified that there is a relationship that exists between dynamic muscle strength and the speed which players require for sprinting and generating the force for kicking the ball (Dowson *et al.* 1998; de Lira *et al.* 2017). de Lira *et al.* (2017) discovered lower strength values for quadriceps femoris muscles in futsal players compared to outdoor and beach soccer players. This was an expected result as futsal matches are played in a restricted space where the distance covered for kicking, shooting and running is shorter compared to outdoor soccer, but the literature suggests that thigh muscle ratios lower than 0.6 are associated with a higher prevalence of injuries (Coombs and Garbutt 2002; Ruas *et al.* 2015; de Lira *et al.* 2017). Similar to indoor soccer, this is possibly due to continuous and/or excessive playing, with minimal rest periods in between, which leads to fatigue and inevitably, higher injury rates (Thorpe *et al*. 2017).

2.5 PREVALENCE OF INDOOR SOCCER INJURIES

In soccer, an injury can be defined as any physical complaint that has been sustained by a player, encountered during a soccer match or training, irrespective of any medical assistance (Fuller *et al.* 2007a).

In Brazil, Ribeiro and Costa (2006) investigated the number of injuries per futsal (indoor soccer) game in professional players. The results revealed that approximately two injuries occurred per game, where at least one injury resulted in the removal of a player from play (Ribeiro and Costa 2006). The knowledge of injury prevalence in amateur indoor soccer players is very limited and has not been widely

investigated. However, Sousa, Rebelo and Brito (2013) also revealed that, in one season, 57% of amateur indoor soccer players sustained injuries in Portugal. It was further reported that of the 57% of the players who sustained injuries in one season, 79% of those injuries were traumatic, whilst 21% were overuse injuries (Sousa, Rebelo and Brito 2013).

Whilst the popularity of indoor soccer is increasing in African countries, literature still remains scarce on injury surveillance and prevalence rates, therefore the need to investigate the injury rates is warranted. This places a great risk on amateur indoor soccer players as they are participating without adequate knowledge of injury risk and management.

Professional and semi-professional players contribute much of their time to physical conditioning and sport-specific training, whereas amateur players attribute their time to playing for leisure and exercise (Michailidis 2018). This statement serves as a reason as to why less-skilled players may have a greater risk of injury compared to more experienced players (Bahr and Krosshaug 2005; de Gouvêa *et al.* 2017).

2.6 RISK FACTORS ASSOCIATED WITH MUSCULOSKELETAL INJURIES SUSTAINED IN INDOOR SOCCER PLAYERS

Ryynänen, Börjesson and Karlsson (2018) suggested that risk factors should be classified into two groups: intrinsic and extrinsic. Intrinsic risk factors relate to the players' biological and physiological characteristics, whereas extrinsic risk factors reflect on the playing surfaces and external variables (Dvorak *et al.* 2016).

2.6.1 Intrinsic Risk Factors

2.6.1.1 Age

Age variance in amateur soccer players is widely varied. Injury profiles may also vary depending on a player's age. In the 1992-1993 UEFA (Union of European Football Association) Champions League, it was reported that the peak value of players were between the ages of 26 and 30 years old (Kalén *et al.* 2019). Thereafter, professional players are advised to consider retirement as the frequency of injuries sustained may increase and recovery may be prolonged, which could possibly lead to long-term conditions (Drawer and Fuller 2002).

Whilst there is a paucity in the literature about the influence of age on amateur soccer players, Lindenfeld *et al.* (1994) reported higher rates of injury amongst amateur indoor soccer players who are 25 years of age and older. The authors also mentioned that the level of experience and skill varies amongst amateur players, and hence increased injury rates. Younger players perform at their peak levels in speed, skill and aggression, whereas older players may compensate for their lack of speed by playing more aggressively, ultimately resulting in injury (Lindenfeld *et al.* 1994; Kalén *et al.* 2019).

2.6.1.2 History of Injuries

Ekstrand and Gillquist (1983) contributed to soccer injury literature through injury analysis, acknowledging that minor injuries may predispose players to moderate or severe ones. The high rate of injury recurrence in soccer players is possibly attributed to inadequate management and rehabilitation or incomplete healing (Inklaar 1994). These statements were supported by Al Amer and Mohamed (2020), who investigated the risk factors that contribute to ankle injuries in soccer. The results revealed previous injuries, lack of stretching and poor education on injury prevention as significant risk factors.

Amateur soccer players enter the sport with limited knowledge of the risk factors and effective management of injuries (Gorostiaga *et al*. 2009). Niyonsenga and Phillips (2013) reported high injury rates in Rwandan female amateur soccer players, and established that a history of injury and the poor management of previous injuries were considered as risk factors for injury. The literature also supports the notion that previous injuries do not necessarily have to be anatomically related to influence the risk of injury of another site or type (Hägglund, Waldén and Ekstrand 2013; McCall *et al.* 2015).

Previous injuries, or injuries that have been poorly managed, are an established intrinsic factor in football injury literature (Dvorak *et al.* 2016). Without correct management, sustained injuries may become an ongoing event in their matches and reduce the quality of play (Serner *et al*., 2015). There is a paucity in the literature that educates amateur players on correct training, awareness of muscle overuse, and the importance of correct management and rehabilitation of injuries (Stubbe *et al*. 2015a). This makes the history of an injury an important and critical risk factor in

the development of any new injury. This will be more prominent in the amateur population as soccer is played more recreationally in this group.

2.6.1.3 Health Conditions

The relationship between physical activity and health has been extensively researched. Several studies support the promotion of physical activity to improve on health, increase fitness and release stress (Castagna *et al.* 2007; Ellapen *et al.* 2010; Khan *et al.* 2012). However, when analysing injuries in indoor soccer, the fact that there is a close relationship between the player's level of health, fitness and functional capabilities should be considered (Panchuk and Glab 2015).

Individuals who are deemed physically unfit are at an increased risk of coronary heart diseases and other co-morbidities, such as hypertension, diabetes mellitus, hypercholesteremia and obesity (Moore *et al.* 2016). South Africa is infamous for its mortality profile in 2010, where 43.8% of deaths were linked to communicable diseases and further increased to 51.0% in 2016 (Ellapen *et al.* 2021). Cases of overweight and obesity were also estimated to be prevalent in one third of the male population in South Africa, where physical inactivity was the primary reason (Puoane *et al.* 2002).

An investigation on the effects of recreational soccer in middle-aged sedentary men found that recreational soccer provides many health benefits by lowering blood pressure, improving VO_{2max} and lowering body fat percentage (Beato *et al.* 2017). However, almost 10% of the study population could not complete the study due to musculoskeletal injuries that prevented the players from participating (Beato *et al.* 2017). Whilst this may not seem relatively high, it can also be considered that Beato *et al.* (2017) has not considered the true nature of amateur soccer, where teams are mixed with players ranging from different ages, level of fitness and skills.

Sudden and sharp increase in loads has been the fundamental nature of indoor soccer. However, there is limited literature on investigating the effect it has on sedentary individuals and the risk of musculoskeletal injuries.

2.6.2 Extrinsic Risk Factors

2.6.2.1 Playing Surfaces

Soccer has repeatedly been acknowledged as one of the most popular sports played globally. Low-costs, minimal equipment and easy accessibility to play have been the evident reasons as to why soccer remains a popular sport (Green 1953). Soccer has also evolved from playing on outdoor surfaces to indoor surfaces.

Natural grass has been the traditional choice of playing surface for matches and training, but the advantage of indoor soccer is that players to play on various surfaces (Fujitaka *et al.* 2017). Indoor soccer can be played on artificial or synthetic turf, natural grass, wooden surfaces or asphalt (Brito, Krustrup and Rebelo 2012; López-Fernández *et al.* 2019). These surfaces offer many advantages, such as longer playing hours, lower maintenance costs, adaption to different environmental conditions and serve as multipurpose playing fields (Fuller *et al.* 2007a, 2007b; Lanzetti *et al.* 2017).

In the late 1960s, the first artificial turf was developed to replicate the characteristics of natural grass (Dragoo and Braun 2010). Bramwell, Requa and Garrick (1972) studied 26 high school soccer teams in Seattle, USA and compared injury rates between the soccer played on first generation artificial turf and natural grass. In this study, the first generation artificial turf presented with a higher injury rate (0.76 per game) compared to natural grass (0.52 per game) (Bramwell, Requa and Garrick 1972). From the 1960s, there was continuous development in artificial turf which resulted in a new artificial turf called “third-generation (3G)” turf, which is the one in current use world-wide (Meyers 2010; Lanzetti *et al.* 2017). That turf is characterized by 40mm long, wide-spread fibres of polypropylene or polyethylene, which is filled with graded silica sand and cryogenically ground rubber granules (Meyers 2010). This creates a higher friction co-efficient, which allows a greater ground reaction force, accommodates for sudden turns and changes in direction and sprinting, hence limiting excessive slips or sliding from taking place (Laible and Sherman 2014).

The development of third generation artificial turf has raised many concerns over injury rates in the soccer community. This led to several studies investigating and comparing the injury rates between third generation artificial turf and natural grass.

The majority of the studies presented with similar findings which concluded that there was not a significant difference in the overall injury rates between third-generation artificial turfs and natural grass (Fuller *et al.* 2007a; Meyers 2010; Ekstrand, Hägglund and Fuller 2011).

2.6.2.2 Footwear

Footwear in soccer is an important factor during indoor soccer matches (Panchuk and Glab 2015). With the correct footwear, the player can make efficient contact with the ball, visualise the ball's location on the foot and maintain agility (Panchuk and Glab 2015). Conversely, nonconformity to correct footwear may predispose players to injuries by altering the biomechanics and shoe-to-surface relationship (Livesay, Reda and Nauman 2006).

Soccer cleats are frequently used during matches and training due to their specific design to assist with foot and ankle stabilisation, whilst allowing the player to perform soccer-specific skills by allowing for a strong push-off in any direction without slipping (Sterzing 2016). Natural grass-style soccer boots have longer but fewer studs, whereas artificial turf soccer boots are shorter, rounder and have many studs (Bjørneboe, Bahr and Andersen 2010).

On artificial turf, the turf shoes appears to be the best choice to prevent injuries related to repetitive impacts and the ability to reduce ankle and knee injuries during rotational movements in comparison to soccer cleats (Queen *et al.* 2008; Stefanyshyn, Lee and Park 2010). Queen *et al.* (2008) made this conclusion by comparing four types of Nike soccer shoes (bladed, firm ground, hard ground and turf shoes) on artificial turf among recreational soccer players. The authors discovered that turf shoes reduce the force and pressure beneath the metatarsal heads, which therefore could minimise the risk of metatarsal injury (Queen *et al.* 2008).

Sterzing *et al.* (2011) investigated ball handling and performance of German soccer players wearing different footwear (normal outdoor soccer shoe, a nonspecific indoor court shoe and barefoot) which reported less confidence shown when receiving and passing the ball when players used non-specific footwear and players who were barefoot (Sterzing *et al.* 2011). The accuracy of kicking, passing and

handling of the ball was superior with soccer specific footwear than non-specific footwear and barefoot (Sterzing *et al.* 2011).

Regardless of the benefits, amateur players are able to select their own footwear to play based on comfort and are not limited to sport-specific footwear (Gdovin *et al.* 2018). Affordability for correct footwear also plays a role amongst amateur players, especially in South Africa.

2.7 MANAGEMENT OF INJURIES

The management of soccer injuries is considered an integral part in a player's soccer experience (Panchuk and Glab 2015). An emphasis is placed on the effective management of injuries to improve physical efficacy and prevent significant injury to achieve optimal results in performance (Panchuk and Glab 2015). Players are exposed to a variety of management options which include manual therapy (physiotherapy, chiropractors or biokineticist), self-treatment (resting, ice and/or topical ointments), pharmaceuticals and medical doctors (Panchuk and Glab 2015; Bello *et al.* 2020).

Preventing injuries and reducing time away from matches is a common goal between players and physicians. Whilst indoor soccer presents with a large percentage of contact injuries, non-contact injuries are also present and should be controlled (Sousa, Rebelo and Brito 2013; Walls *et al.* 2016). Brukner (2012) postulated that musculoskeletal injuries require an active and passive rehabilitation to ensure optimal return-to-play functions and to reduce the re-occurrence of injuries. Without correct management, sustained injuries may become an ongoing event in their matches and reduce the quality of their play (Serner *et al*. 2015).

The preferred choice of treatment in players varies, depending on the level of soccer played. van Beijsterveldt *et al.* (2014) reported at least 60% of amateur Dutch soccer players sustained an injury in the season, where at least 54% of the injuries required medical attention and 3% of the injuries were hospitalised. It was also reported that ice/cooling and physical therapy were considered the most popular treatments after sustaining an injury (van Beijsterveldt *et al.* 2014). However, Khan, Khan and Hawlader (2019) revealed that 47.4% of injuries sustained in amateur soccer players in Bangladesh, required medical care from physicians, whereas 39.6% of players

reported to physiotherapists after sustaining a knee injury. A plausible reason for this contrast may be attributed to the geographical location of these studies. The level of education in sports rehabilitation and management amongst amateur soccer players in developing countries differs from that in developed countries (Niyonsenga and Phillips 2013).

The choice of treatment prescribed by physiotherapists for musculoskeletal injuries are stretches, exercises, cryotherapy and rest (Muralidharan, 2019). A comparative study on Indian soccer players with Achilles' tendonitis, found cryotherapy to be a better option in myofascial trigger point release than ultrasound and stretching (Muralidharan, 2019). Players who sustain injuries most often present with decreased flexibility and limited range of motion (Bradley and Portas, 2007). Although chiropractic treatment may not be the most popular management option in literature, there is evidence to support its use and benefits (Deutschmann, Jones and Korporaal 2015).

Through chiropractic adjustments at significant levels, the effects can result in an increased range of motion (ROM) in important joints (sacroiliac and hip joints), and increased kicking velocity and speed (Deutschmann, Jones and Korporaal 2015; Rehman 2015). Chiropractic treatment and management can improve ROM and muscle torque, reducing the incidence of injuries (Sandell, Palmgren and Björndahl, 2008; Rehman, 2015). However, studies on chiropractic treatment and management in soccer players are limited.

Injury management and recovery are essential to indoor soccer players. Even more so, amateur indoor soccer players require precise information about their injuries, management options, and an accurate return-to-play rehabilitation programme to ensure a speedy recovery back onto the field (Roderick, Waddington and Parker 2000). Furthermore, the financial capabilities of South African amateur indoor soccer players to receive medical attention cannot be negated. This creates the necessity for viable management and rehabilitation of indoor soccer injuries to be investigated, as highlighted by numerous studies (Niyonsenga and Phillips 2013; Muralidharan 2019; Bello *et al.* 2020).

2.8 SUMMARY OF LITERATURE

Through this chapter, the evidence of soccer popularity in both spectatorship and participation has been shown. The definitions of professional soccer and amateur players have been highlighted to understand the study sample. Whilst professional soccer has been extensively researched, there still remains large gaps in the literature investigating the risk factors of amateur soccer players on both outdoor and indoor fields in South Africa.

The population of South Africa is diverse in age, ethnicity and health conditions. Also, there are many gaps in socio-economic standing, separating many South Africans, which may contribute to the lack of understanding of sport-related injuries and their management. The majority of the studies in this literature review were conducted in highly developed countries, where injury rates were relatively low, as compared to the studies conducted in developing countries, such as Nigeria, Rwanda, Swaziland and South Africa, where the prevalence of injuries was higher.

This study identifies areas within the indoor soccer community where there is little to no knowledge on injury and its management. Therefore, this study will contribute to the existing body of literature by creating an awareness of injury prevalence in indoor soccer players and the management protocols that amateur players implement. By understanding this information, this creates the necessity for the development of injury prevention strategies and awareness amongst players and health practitioners to manage these injuries.

2.9 CONCLUSION

In this chapter, an understanding of soccer gameplay was highlighted, and outdoor and indoor soccer was differentiated. Furthering an understanding indoor soccer, the literature has also reported on the prevalence of indoor soccer injuries and the risk factors that are associated with musculoskeletal injuries sustained.

The following chapter will highlight and explain the methodology process that was utilized in this study.

CHAPTER THREE: METHODOLOGY

3.1 INTRODUCTION

This chapter will present and discuss the research methods and data collection tools used in this study.

3.2 STUDY DESIGN

The study utilized a quantitative paradigm and a cross-sectional survey design. A quantitative study encompasses a variety of methods regarding the investigations of social phenomena with the use of statistical or numerical data (Watson 2015). A cross-sectional survey design suited this study as the primary purpose of this design was to obtain information describing the characteristics of a large population (Ponto 2015).

3.3 STUDY POPULATION

The study sample was amateur male indoor soccer players in the eThekwini Municipality of KwaZulu-Natal, South Africa.

3.4 PARTICIPANT RECRUITMENT

The recruitment process involved the use of advertisements (Appendix A). The advertisement was posted and shared on social media platforms (Instagram, WhatsApp and Twitter), sports groups (with the permission of the administrator) and via email.

3.5 SAMPLING

3.5.1 Sample Size

The population of indoor soccer players at an amateur level is large due to no formal affiliation needed to any club. The total indoor soccer population of 510 players was

determined by the number of teams that entered the different leagues, which operate at the selected indoor soccer venues in the eThekwini Municipality district. As a result, based at a 95% confidence interval with a precision (half-width) of 5%, the sample size for this study was 166 participants (Esterhuizen 2019).

3.5.2 Sample Characteristics

3.5.2.1 Inclusion Criteria

- Participants who were over the age of 18
- Participants who are were not affiliated to a professional soccer club/training.
- Participants who played a minimum of three soccer matches within a 1-year period
- Participants who read and agreed to the informed consent (Appendix C) and letter of information (Appendix B) forms.

3.5.2.2 Exclusion Criteria

- Soccer players who were affiliated to a professional soccer club.
- Participants who participated in the focus and pilot group procedures.

3.5.3 Data Collection Tool

The questionnaire used in this study was constructed using the guidelines of the Oslo Sports Trauma Research Centre's (OSTRC) Overuse Injury Questionnaire. The standard methods of injury registration uses a time-loss injury definition which may be inadequate in many injury studies (Clarsen, Myklebust and Bahr 2013). The overuse injury questionnaire demonstrates more advantages over the standard method, as it allows for the use of a broad injury definition and expresses injuries using prevalence rather than incidence (Clarsen, Myklebust and Bahr 2013). The demographic questions were formulated by reviewing the work of Sentsomedi and Puckree (2016). The questions were structured around the work of Kubayi *et al*. (2017), who developed questions relating to soccer characteristics (such as the position played, the use of cleats vs. no cleats, etc.).

Table 3.1: Questionnaire reference list

Questions	References
Section A: Demographics (age, ethnicity, occupation, height, weight, co-morbid conditions).	(Sentsomedi and Puckree 2016)
Section B: Risk factors (injury type, injury severity, classification, history of previous injuries).	(Clarsen, Myklebust and Bahr 2013), (Kubayi *et al.* 2017)
Section C: Management of musculoskeletal injuries (mechanism of injury, region, management).	(Khan, Khan and Hawlader 2019)

3.6 RESEARCH PROCEDURE

3.6.1 Focus Group

A focus group was utilized in this study to have an organized discussion regarding the views, attitudes and experiences towards the topic and to ensure internal validity of the questionnaire (Newcomer, Hatry and Wholey 2015). The focus group was not used as a data collection method but as a means of validating the research tool as piloting before the data collection (Casey and Krueger 1994).

3.6.1.1 Inclusion Criteria

- Participants over the age of 18.
- The people who read the letter of information (Appendix F) and signed the confidentiality agreement (Appendix H) and informed consent (Appendix G) were allowed to participate.

3.6.1.2 Exclusion Criteria

- Potential participants who were viable for the pilot study or main study.

3.6.1.3 Focus Group Procedure

The focus group was conducted as follows:

- A date, venue, and time was set in place.
- According to Salant and Dillman (1994), 6-11 participants are required to show the best results. Therefore, the focus group included a quantitative

researcher, two research supervisors, a master's research student, two amateur indoor soccer players and a chiropractor who has dealt with soccer injuries.

- The participants were contacted, and their permission was granted to be a part of the focus group.
- Thereafter, the participants were requested to read and sign the letter of information (Appendix F), the confidentiality agreement (Appendix H) and the informed consent (Appendix G).
- The researcher read out each question of the questionnaire aloud, and a discussion per question took place amongst the group to discuss the relevance of the question to the aims and objectives of the study.
- Any changes to the questions were agreed upon by the focus group.
- Upon completion, the focus group participants were thanked.
- The meeting was recorded in both written and audio formats for reference and accessibility when needed by the researcher and/or supervisors.
- After correcting the questionnaire, the post-focus group questionnaire (Appendix L) was then developed.

3.6.2 Pilot Study

A pilot study was utilized in this study to assess the feasibility of the questionnaire being used on a full scale. The purpose of the pilot study was to identify forthcoming problems within the study itself. The pilot study criteria are outlined below.

3.6.2.1 Inclusion Criteria

- Participants over the age of 18
- Those who have participated in a minimum of one indoor soccer match.
- Participants who have read the letter of information (Appendix I) and signed the informed consent form (Appendix J).

3.6.2.2 Exclusion Criteria

- Those who no longer wish to participate in the pilot study.
- Those who have participated in the focus group and possible participants for the main study.

3.6.2.3 Pilot Study Procedure

The pilot study was conducted as follows:

- The participants who were utilized in the pilot study were amateur indoor soccer players who mirrored the participants of the main study.
- The two pilot study participants were contacted via email and social media to identify any logistical errors.
- The participants were required to read and complete the letter of information (Appendix I) and sign the informed consent form (Appendix J).
- Thereafter, an online link was provided to the participants to access the post-focus group questionnaire (Appendix L).
- A comment box was made available to the participants to comment on the questionnaire and provide suggestions.
- These suggestions were then taken into account, which then produced the main study questionnaire.

3.6.3 Main Study Procedure

- The participant recruitment was completed through the use of digital advertisements (Appendix A).
- Social media platforms were utilized to engage with potential participants for the study.
- Participants were able to access the questionnaire online via a link.
- Every participant who accessed the link was required to read and agree to the letter of information (Appendix B) and informed consent form (Appendix C).
- After completion of the letter of information and informed consent, the participant was granted access to complete the questionnaire and submit.
- Once the questionnaire was completed and submitted, it was captured on the QuestionPro website. This was only accessible by the researcher once the study was completed.
- The completed informed consent forms (Appendix C) were also stored on a data sheet via the QuestionPro website that was only accessible by the researcher.

- Once the data collection was completed, the questionnaires were captured and exported into excel spreadsheets for data analysis.
- After data analysis, the completed questionnaires were printed, and kept in safe storage.

3.7 DATA MANAGEMENT

The coded responses from the questionnaire data were captured into a Microsoft Excel database. The participants were assigned study identification numbers for anonymity. The data were stored on the primary investigator's password protected computer and only shared with the statistician and research supervisors. The data were imported into SPSS version 26 (IBM SPSS v26) for analysis.

The prevalence of musculoskeletal injuries was reported as a percentage, with 95% confidence intervals. The descriptive analysis was also used to summarize the management protocols reported in the subgroup of those who were injured. The risk factors for musculoskeletal injuries were assessed for the pre-specified independent variables using bivariate tests initially. Chi square tests were used in the case of categorical or binary independent variables, while t-tests were used where the independent variables were continuous and normally distributed. For non-normally distributed variables, non-parametric Mann-Whitney tests were used. Finally, independent variables showing association with the outcome at $p<0.1$ were further assessed using multiple logistic regression to adjust for confounding. The adjusted estimates remaining in the model were reported as odds ratios and 95% confidence intervals.

3.8 ETHICAL CONSIDERATIONS

The ethical considerations that were applied to the study included:

- In this study, autonomy was maintained by the participants, allowing themselves to withdraw from the study if they so wished, even if the letter of information (Appendix B) and informed consent (Appendix C) were signed, at any time, without having to give a reason. The principle of autonomy refers

to a person's right to make decisions and act on them freely, without any interference or influence (Cummings and Mercurio 2010).

- In this study, all participants were selected randomly with non-bias decisions towards religion, gender or ethnicity. This kept in line with justice. The principle of justice is to distribute the benefits equally amongst the study population and to treat all participants in a similar manner (Cummings and Mercurio 2010).
- The principle of beneficence balances the benefits of treatment against the risks and cost (Andersson *et al.* 2010). Beneficence was accounted for as the study focused on the contributory risk factors of indoor soccer injuries and the effective management of the injuries. The results gathered may provide the indoor soccer community with information about the occurrence of injuries amongst players, and the management specific for indoor soccer injuries, which will benefit the profession.
- The principle of non-maleficence is based on the avoidance of causing harm to participants (Andersson *et al.* 2010). Non-maleficence was accounted for by no harm being done to participants.
- All completed questionnaires, letters of information and informed consent have been kept separate and in safe storage to ensure confidentiality. All data collected will be stored for a duration of 5 years.

3.9 CONCLUSION

This chapter highlighted the type of research methodology used in this study. It also outlined the characteristics of the study population, the development of the questionnaire used, and the methods used to statistically analyze the data. Lastly, the chapter explained the ethical principles that were adhered to in this study. Chapter four will present the results of this study and chapter five will discuss the results.

CHAPTER FOUR: RESULTS

4.1 INTRODUCTION

This chapter will present the results of the statistical analysis from the data collected. These results will be explained and depicted in the form of tables and graphs.

4.2 SAMPLE SIZE AND RESPONSE RATE

The required sample size for this study was 166 participants. The study received a total of 166 responses, to which the inclusion and exclusion criteria were adhered. However, 46 responses were negligible due to incompletion of the questionnaire. Therefore, only 120 responses were valid and complete, which gave the study a response rate of 72%.

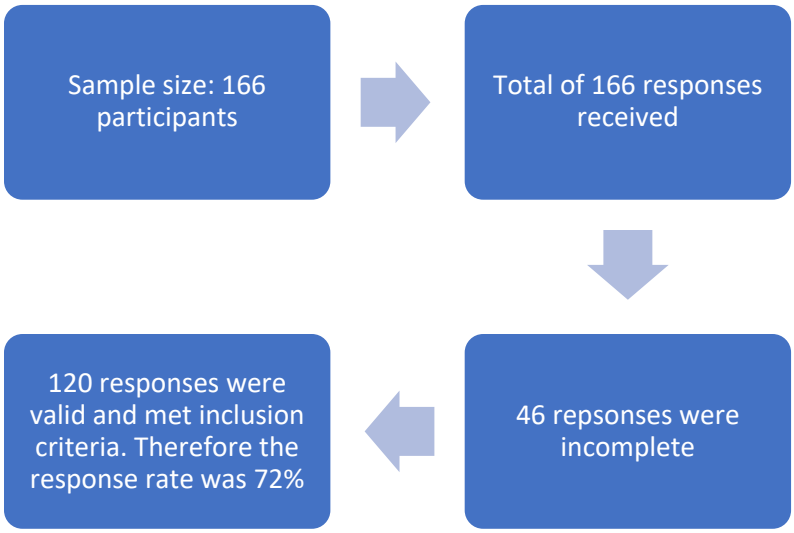

Figure 4.1: Sample size and response rate

4.3 RESULTS

The results were examined according to the demographics of the participants; the prevalence of musculoskeletal injuries; the anatomical location of the injuries; the nature and mechanism of the injuries; secondary injuries; any risk factors and the effective management of injuries.

4.3.1 Demographic Characteristics of Participants

The demographic factors of the participants were age, race, height and body mass, health conditions.

4.3.1.1 Age

The common age group of the study sample was between 20-24 years of age, accounting for 32.5% of the total sample population, which is depicted in Table 4.1.

Table 4.1: Age

Age	No. of participants	Percentage
Between 20-24 years	39	32,50%
Between 35-40 years	25	20,83%
Between 25-29 years	25	20,83%
Between 30-34 years	18	15,00%
Less than 20 years	13	10,83%
Grand Total	**120**	**100,00%**

4.3.1.2 Race

In this study, responses were collected from various race groups. The results revealed that the Asian/Indian group accounted for 53.3% of the total study population. This is shown in Table 4.2 below.

Table 4.2: Race

Race	No. of participants	Percentage
African Black	36	30,00%
Asian/Indian	64	53,33%
Mixed	10	8,33%
Other	2	1,67%
White	8	6,67%
Grand Total	**120**	**100,00%**

4.3.1.3 Height and Body Mass

This study also recorded the participants' height and body mass. It was found that the mean of height was 172.8cm and mean weight was 76.4kg. These findings yielded the mean body mass index (BMI) of 25.67kg/m2, which is summarized in Table 4.2.

Table 4.3: Height, body mass and BMI

Statistics				
		Height (cm)	Body Mass (kg)	BMI
N	Valid	120	120	120
	Missing	0	0	0
Mean		172.88	76.488	25.6731
Std. Deviation		7.997	15.2306	5.32865
Minimum		154	52.0	10.38
Maximum		200	120.0	44.08

4.3.2 Prevalence of Musculoskeletal Injuries

This study investigated the prevalence of musculoskeletal injuries in amateur male indoor soccer players.

4.3.2.1 Period Prevalence

The period prevalence (one year) of musculoskeletal injuries in amateur male indoor soccer players was investigated in this study. The results reported a period prevalence of 74.2% (95% CI 66% to 81%) in amateur male indoor soccer players, which is depicted in Table 4.3.

Table 4.4: Period prevalence of musculoskeletal indoor soccer injury

		Count	Column N %	95.0% Lower CL for Column N %	95.0% Upper CL for Column N %
Have you sustained any injuries from indoor soccer?	No	31	25.8%	18.6%	34.2%
	Yes	89	74.2%	65.8%	81.4%
	Total	**120**	**100.0%**	**.**	**.**

4.3.3 Anatomical Location of Injuries

This study investigated players who have sustained injuries (74.2%) and were required to plot the location of the injury on a diagram. The results depict the knees to be a common site of injury, accounting for 20.8% of injury location. These results are shown in Figure 4.1 below.

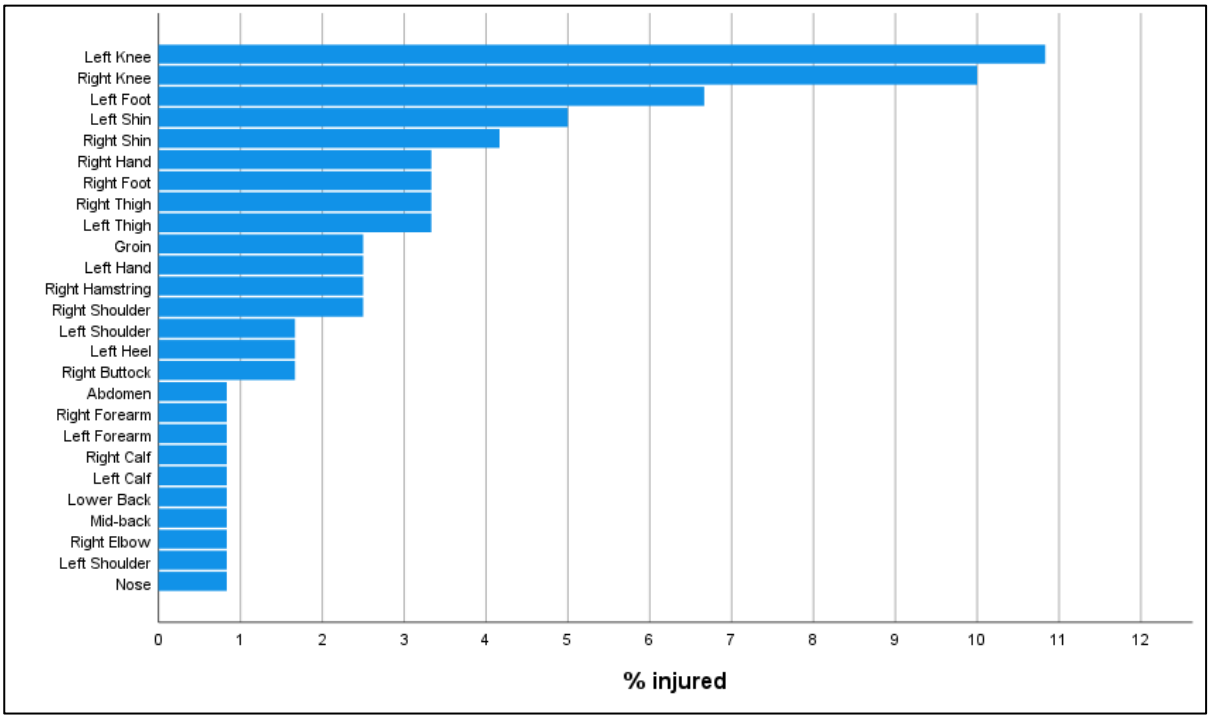

Figure 4.2: Anatomical site of injury

4.3.4 Nature and Mechanism of Injuries

The study revealed that 32.6% of injuries were reported as muscle strains. It was further revealed that 20.2% of participants sustained injuries through a twisting and turning movement during a match.

These findings are depicted in Table 4.4 below.

Table 4.5: Nature and mechanism of injury

		Count	Column N %
	Bruise/Wound	14	15.7%
	Dislocation	7	7.9%
	Fracture	7	7.9%
	Muscle strain	29	32.6%
	Other	5	5.6%
	Sprain	27	30.3%
	Total	**89**	**100.0%**
Mechanism of injury	Ball contact	1	1.1%
	Being tackled	16	18.0%
	Colliding with another player	12	13.5%
	Jumping and landing	7	7.9%
	Running	12	13.5%
	Saving the ball (Goalkeeper)	7	7.9%
	Shooting	4	4.5%
	Slip/Fall	9	10.1%
	Tackling	3	3.4%
	Twisting and turning	18	20.2%
	Total	**89**	**100.0%**
Has your injury affected your performance?	No	31	34.8%
	Yes	58	65.2%
	Total	**89**	**100.0%**

4.3.5 Secondary Injury

This study revealed that participants who have sustained injuries (n=89), had also sustained a secondary injury (n=47), which is depicted in Table 4.5 below.

Table 4.6: Secondary injury

Suffered injury due to indoor soccer?		Frequency	Percent
Valid	No	42	47.2
	Yes	47	52.8
	Total	**89**	**100.0**

4.3.5.1 Location of Secondary Injury

This study investigated participants who sustained secondary injuries (52.8%) and revealed the feet to be a common location of injury in more than 14% of players, which is represented in Figure 4.2 below.

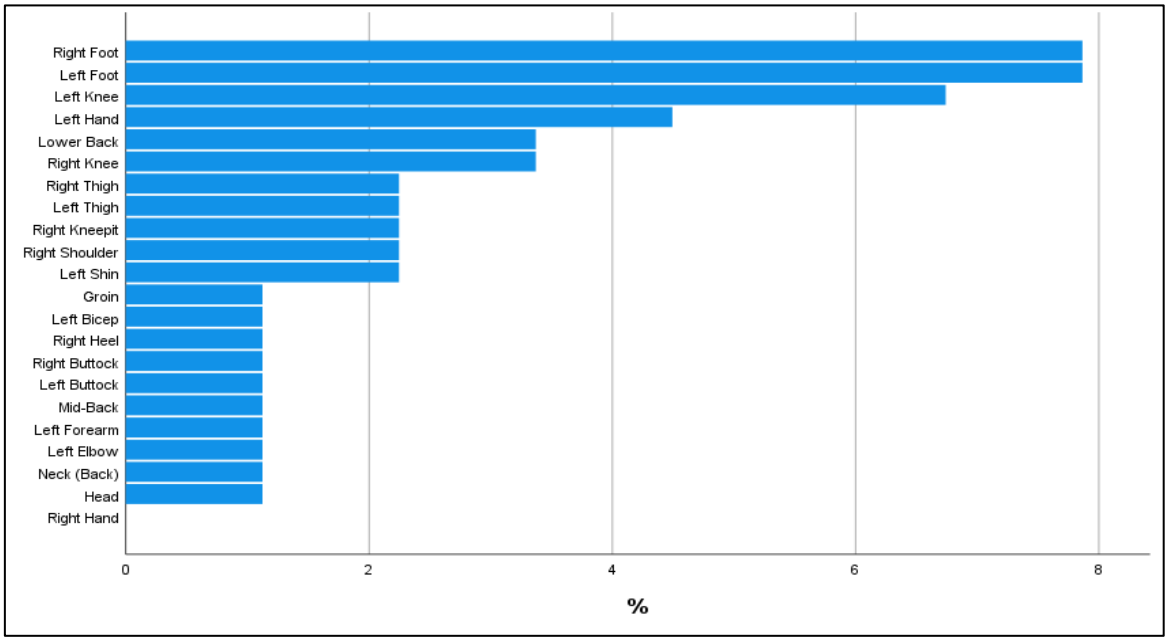

Figure 4.3: Anatomical site of secondary injury

4.3.5.2 Nature of Secondary Injury

In this study, the nature of secondary injuries was investigated. The results depicted sprains in 40.4% of participants (*n* = 47). These findings are shown in Table 4.6.

Table 4.7: Nature of secondary injury

Type of second injury		Frequency	Percent
Valid	Bruise/Wound	7	14.9
	Dislocation	1	2.1
	Fracture	2	4.3
	Muscle strain	17	36.2
	Other	1	2.1
	Sprain	19	40.4
	Total	**47**	**100.0**

4.3.6 Risk Factors

4.3.6.1 Position Played

There was no association between the position played and prevalence of injury (p=0.882). Table 4.7 shows that the proportion of participants who were injured were very similar across all positions.

Table 4.8: Position played and injury

Position played * Have you sustained any injuries from indoor soccer? Cross-tabulation					
			Have you sustained any injuries from indoor soccer?		Total
			No	Yes	
Position played	Defence	Count	5	20	25
		% within position played	20.0%	80.0%	100.0%
	Forward/ Striker	Count	5	16	21
		% within position played	23.8%	76.2%	100.0%
	Goalkeeper	Count	2	8	10
		% within position played	20.0%	80.0%	100.0%
	Midfield	Count	15	35	50
		% within position played	30.0%	70.0%	100.0%
	Wing	Count	4	10	14
		% within position played	28.6%	71.4%	100.0%
Total		**Count**	**31**	**89**	**120**
		% within position played	**25.8%**	**74.2%**	**100.0%**

4.3.6.2 Health Conditions

This study investigated the health conditions of the participants. The participants were questioned on their current health status by selecting any of the condition/s that they had been diagnosed. Upon analysis, it was noted that having a chronic condition may possibly increase the of musculoskeletal injury. In the study, 20 participants reported having a chronic condition in which 95% (19 participants) sustained an injury. When compared to participants without chronic conditions, only 70% sustained an injury. This was statistically significant (p= 0.020). The results are depicted in Table 4.15 below.

Table 4.9: Chronic conditions

Chronic conditions * Have you sustained any injuries from indoor soccer? Cross-tabulation					
			Have you sustained any injuries from indoor soccer?		Total
			No	Yes	
Chronic Conditions	No	Count	30	70	100
		% within chronic conditions	30.0%	70.0%	100.0%
	Yes	Count	1	19	20
		% within chronic conditions	5.0%	95.0%	100.0%
Total		**Count**	**31**	**89**	**120**
		% within chronic conditions	**25.8%**	**74.2%**	**100.0%**

4.3.6.3 Previous Injury

This study investigated participants who presented with previous injuries. The results reported that 52.8% of the injured participants (*n* = 47) had encountered a previous injury, as depicted in Table 4.9 below. Unfortunately, this question was not asked of the whole sample, and thus a comparative figure is not available for comparison in the uninjured participants.

Table 4.10: Previous injury

Encountered another injury due to indoor soccer?		Frequency	Percent
Valid	No	42	47.2
	Yes	47	52.8
	Total	**89**	**100.0**

4.3.6.4 Extra-Activities

This study investigated extra-activities in which players participate. The results reported 70.8% of participants perform an extra-activity. The study further investigated injuries that were sustained during these extra-activities: 41.6% of the participants reported no injuries, whilst only 30.3% reported injuries.

These findings are shown in Table 4.10 below.

Table 4.11: Extra-activities and injuries

		Count	Column N %
Do you participate in other activities?	No response	1	1.1%
	No	25	28.1%
	Yes	63	70.8%
	Total	**89**	**100.0%**
Select the type of activity	No other activity	25	28.1%
	Cricket	6	6.7%
	Cycling	3	3.4%
	Gym	21	23.6%
	Other	7	7.9%
	Rugby	4	4.5%
	Running	22	24.7%
	Swimming	1	1.1%
	Total	**89**	**100.0%**
Have you had any injuries from this activity	No other activity	25	28.1%
	No	37	41.6%
	Yes	27	30.3%
	Total	**89**	**100.0%**

4.3.6.5 Location of Extra-Activity Injuries

This study revealed the location of injuries sustained during extra-activities. The results reported that 4.5% of injuries were located at the right shoulder. Figure 4.3 depicts the anatomical sites of the sustained injuries.

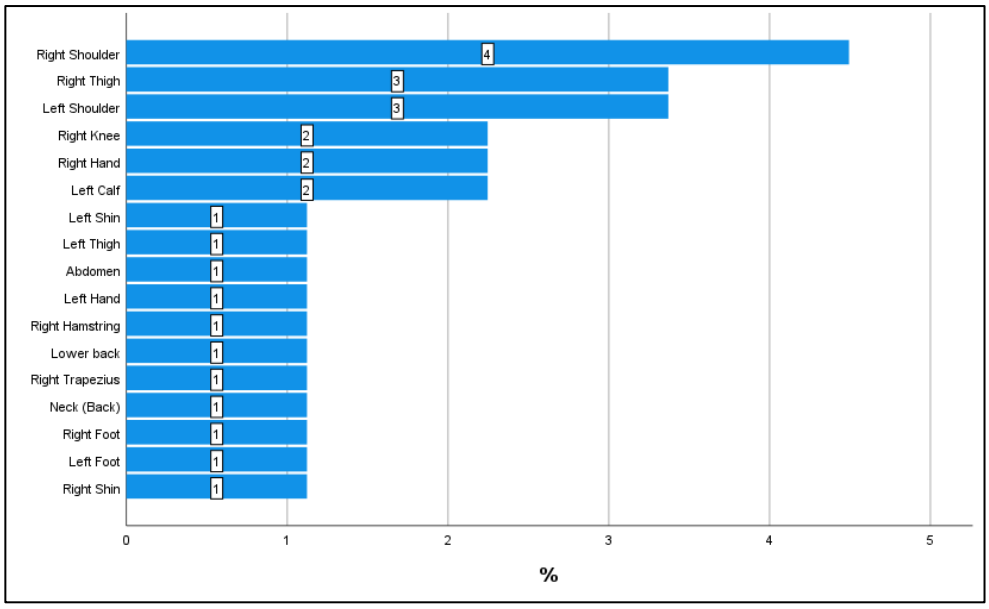

Figure 4.4: Anatomical site of extra-activity injuries

4.3.6.6 Frequency of Indoor Soccer

The study investigated the frequency of indoor soccer play amongst individuals. Players responded to this question by selecting the most appropriate answer by the provided options. This study revealed that there was no association between frequency of play and prevalence of injury (p=0.726). Table 4.11 shows that the proportion injured was very similar across all categories of frequency.

Table 4.12: Frequency of indoor soccer play

Frequency of play * Have you sustained any injuries from indoor soccer? Cross-tabulation					
			Have you sustained any injuries from indoor soccer?		Total
			No	Yes	
Frequency of play	2x per week	Count	6	24	30
		% within frequency of play	20.0%	80.0%	100.0%
	3x per week	Count	4	15	19
		% within frequency of play	21.1%	78.9%	100.0%
	More than 3x per week	Count	3	8	11
		% within frequency of play	27.3%	72.7%	100.0%
	Once a week	Count	18	42	60
		% within frequency of play	30.0%	70.0%	100.0%
Total		**Count**	**31**	**89**	**120**
		% within frequency of play	**25.8%**	**74.2%**	**100.0%**

4.3.6.7 History of Surgeries

In this study, a history of surgeries was investigated as a factor that may predispose players to injury. The study revealed that those who had surgery had an 84% prevalence of injuries, whilst those with no surgery had a 72% prevalence rate, which is depicted in Table 4.13 below. There was no association between having had surgery and injuries (p=0.233).

Table 4.13: History of surgeries

Surgeries * Have you sustained any injuries from indoor soccer? Cross-tabulation					
			Have you sustained any injuries from indoor soccer?		Total
			No	Yes	
Surgeries	No	Count	26	68	94
		% within surgeries	27.7%	72.3%	100.0%
	Yes	Count	4	21	25
		% within surgeries	16.0%	84.0%	100.0%
Total		**Count**	**30**	**89**	**119**
		% within surgeries	**25.2%**	**74.8%**	**100.0%**

4.3.6.8 Extrinsic Factors

This study investigated extrinsic factors that may predispose players to injuries. Participants were questioned on the footwear they used, the type of surface played on, equipment used and their participation in outdoor soccer. However, these factors were not associated with any injuries (p>0.05, data not shown).

4.3.7 Management of Injuries

In this study, the management protocols implemented by amateur male indoor soccer players were investigated. The participants were questioned if a management protocol was implemented after injury and the results revealed that of those injured (n=89), 58.4% of the participants had induced a form of management protocol. Table 4.14 below depicts the results.

Table 4.14: Management of injury

Did you treat the severe injury?		Frequency	Percent
Valid	No	37	41.6
	Yes	52	58.4
	Total	89	100.0

4.3.7.1 Performance

This study further investigated the association between performance and management. The results revealed that the participants whose injury had affected their performance (n = 58), 67% of those participants treated it, whilst if the injury did not affect their performance, it was less likely to be treated (42%). Thus, there

was a significant association between whether or not the injury affected performance and the likelihood of being managed (p=0.021). The results are shown in Table 4.15 below.

Table 4.15: Effect of injury on performance

Injury performance * treatment of severe injury Cross-tabulation					
			Did you treat the severe injury?		Total
			No	Yes	
Has your injury affected your performance?	No	Count	18	13	31
		% within has your injury affected your performance?	58.1%	41.9%	100.0%
	Yes	Count	19	39	58
		% within has your injury affected your performance?	32.8%	67.2%	100.0%
Total		**Count**	**37**	**52**	**89**
		% within has your injury affected your performance?	**41.6%**	**58.4%**	**100.0%**

4.3.7.2 Type of Injury

This study also investigated if there was an association between the type of injury sustained and its management. The results revealed that there was an association between the type of injury and effective management of the injury (p=0.043). Table 4.16 clearly depicts that dislocations were most likely to be treated (100%). The results also revealed that the participants who had sustained injuries, which were not included in the questioning, were also more likely to have a management protocol implemented (100%). These injuries included anterior cruciate ligament (ACL) tears, friction burns and patellar tendinopathy.

Table 4.16: Type of injury

Type of most severe injury * Did you treat the severe injury? Cross-tabulation					
			Did you treat the severe injury?		Total
			No	Yes	
Type of most severe injury	Bruise/ Wound	Count	6	8	14
		% within type of most severe injury	42.9%	57.1%	100.0 %
	Dislocation	Count	0	7	7
		% within type of most severe injury	0.0%	100.0%	100.0 %
	Fracture	Count	3	4	7
		% within type of most severe injury	42.9%	57.1%	100.0 %
	Muscle strain	Count	16	13	29
		% within type of most severe injury	55.2%	44.8%	100.0 %
	Other	Count	0	5	5
		% within type of most severe injury	0.0%	100.0%	100.0 %
	Sprain	Count	12	15	27
		% within type of most severe injury	44.4%	55.6%	100.0 %
Total		**Count**	**37**	**52**	**89**
		% within type of most severe injury	**41.6%**	**58.4%**	**100.0 %**

4.3.7.3 Type of Management

This study investigated the type of management protocols that were implemented by amateur male indoor soccer players, after sustaining an injury. The participants were required to select from a list of management options in the questionnaire. The results revealed that of the 52 participants that implemented a management protocol. Based on the 52 participants, 38,5% utilized home remedies as their management protocol. This included resting, ice and topical treatments (DeepHeat, Move, etc.). A further 30,8% visited a manual therapist and 17,3% visited a general practitioner. The remaining 13,4% resorted to other forms management (surgery and traditional healing) which is depicted in Table 4.17.

Table 4.17: Type of management

Type of treatment		Frequency	Percent
Valid	Doctor (GP)	9	17.3
	Home remedy (resting, ice, ointments (DeepHeat, etc))	20	38.5
	Manual therapy (physiotherapy, chiropractic, biokineticist)	16	30.8
	Other	1	1.9
	Surgeon	5	9.6
	Traditional healing	1	1.9
	Total	**52**	**100.0**

4.3.7.4 Management of Secondary Injury

This study also investigated the management protocols associated with a secondary injury. The results depicted that of the 47 participants with secondary injuries, 53% implemented a management protocol for these injuries, as shown in Table 4.18 below.

Table 4.18: Management of secondary injury

Did you treat the second injury?		Frequency	Percent
Valid	No	22	46.8
	Yes	25	53.2
	Total	**47**	**100.0**

4.3.7.5 Type of Management Used for Secondary Injury

The study revealed the common types of management protocols implemented by amateur male indoor soccer players, after sustaining a secondary injury. The results reported that of the 25 participants who implemented a management protocol for the secondary injury, 40% utilized a home remedy which included resting, ice and topical treatments (DeepHeat, Move, etc.). This can be seen in Table 4.19.

Table 4.19: Type of management used for secondary injury

Select the type of treatment used		Frequency	Percent
Valid	Doctor (GP)	7	28.0
	Home remedy (resting, ice, ointments (DeepHeat, etc))	10	40.0
	Manual therapy (physiotherapy, chiropractic, biokineticist)	8	32.0
	Total	**25**	**100.0**

4.4 CONCLUSION

This study investigated the prevalence, risk factors and effective management of musculoskeletal injuries in amateur male indoor soccer players in the eThekwini Municipality. The results demonstrated that there was an association between chronic conditions and sustaining injuries. The results also indicated that indoor soccer players are more likely to manage injuries that affect their performance and are more likely to seek medical attention after sustaining dislocations or ligamentous tears.

Chapter 5 will present the discussion of these results.

CHAPTER FIVE: DISCUSSION

5.1 INTRODUCTION

This chapter will focus on discussing the results found in this study in correlation to the objectives. These include determining the period prevalence of musculoskeletal injuries, the selected risk factors (intrinsic and extrinsic) associated with injury and investigating the management protocols in amateur indoor soccer players. This chapter will further unpack the results in conjunction to the literature highlighted in chapter two.

5.2 SAMPLE SIZE AND RESPONSE RATE

The sample size employed for this study was calculated at 166 participants to achieve a 100% response rate. However, due to 46 being negligible for statistical analysis, the study sample resulted in 120 responses, which resulted in a 72% response rate.

The population sample size is in keeping with a similar study performed by Sentsomedi and Puckree (2016), which focused on 197 high school female soccer players in the eThekwini Municipality. However, only 85 responses were eligible as many high schools did not grant permission or complete the questionnaire (Sentsomedi and Puckree 2016). The large sample size proved to be adequate due to the large number of indoor soccer players in the eThekwini Municipality (Sentsomedi and Puckree 2016).

The response rate for the current study was highly affected by the COVID-19 pandemic. The data collection process started during restricted lockdown levels where contact sport was prohibited. Participants were then required to complete questionnaires online which yielded a slow response rate.

5.3 DEMOGRAPHICS

5.3.1 Age

In this study, the association between the age groups of the population and injury were investigated. The results reported the 25-30 year old age group to have the highest injury rate, whilst players below the age of 20 (18-20) reported the lowest injuries sustained. According to Lindenfeld *et al.* (1994), the authors found the highest injury rates occur in age groups greater than 25 years of age. Khan, Khan and Hawlader (2019) also reported that the 27 year old age group had the largest percentage of knee injuries. The high injury rates in these age groups are mostly attributed to their level of skill, speed and aggression during matches (Lindenfeld *et al.* 1994; Khan, Khan and Hawlader 2019).

The present study also recorded a considerable number of injuries sustained by the 35-40 age group. This finding compliments the discussion of Lindenfeld *et al.* (1994) which suggests that older players compensate for their lack of speed and skill with aggression, which can result in increased injuries.

5.3.2 Ethnicity

Indoor soccer accommodates various ethnic groups, but the Indian/Asian ethnic group accounted for more than half of the population (53.3%) and the African Black ethnic group represented 30% of the total study population (Table 4.1). In Africa, soccer is popular among the Black ethnic group, in both the male and female genders (Sentsomedi and Puckree 2016). The high density of Indian/Asian players is possibly attributed to the province of KwaZulu-Natal having the largest percentage of that ethnic group compared to other provinces (SA 2012). These results may also indicate the popularity of indoor soccer amongst the Indian/Asian ethnic group.

5.3.3 Health Conditions

The presence of chronic conditions was deemed high in the study population, where 95% of participants with a chronic condition sustained an injury, as opposed to 70% of those without chronic conditions, as depicted in Table 4.15. The existence of comorbidities and chronic conditions appears to be crucial, as there is an increased risk of injuries and adverse events associated with vigorous exercise in comparison to a healthy population (Burr, Shephard and Riddell 2012; Mendes *et al.* 2013). Poor

blood circulation, absorption of sugar and being overweight are common signs and symptoms that exist in patients with comorbidities (Mendes *et al.* 2013). Therefore, these individuals may be predisposed to higher risks of musculoskeletal injuries as indoor soccer is regarded as a high-impact and high intensity sport that requires high physiological demands (Öncen and Tanyeri 2019). Whilst studies promote amateur soccer to confer various health benefits, the risk of injury should not be ignored in small sided soccer games (Bangsbo *et al.* 2015).

5.4 PREVALENCE OF MUSCULOSKELETAL INJURIES

5.4.1 Prevalence Rate of Injuries

As shown in Table 4.3, the study reports that 74.2% of the players sustained an injury at some point whilst participating in an indoor soccer game. These results are consistent with the findings of Gayardo, Matana and Silva (2012) and Sousa, Rebelo and Brito (2013). In both indoor soccer studies, the prevalence rate was reported to be greater than 50%, highlighting the intensity of play during indoor soccer matches.

Schippers and Leach (2020) discovered an injury prevalence rate of 23.6% in South African outdoor amateur male soccer players. The results of Schippers and Leach (2020) differ, as the authors studied outdoor soccer players. However, the demographics remain similar to the current study.

According to many authors, the African Black community portray greater levels of athleticism when compared to their White peers, as the African Black community report longer times to fatigue (Coetzer *et al.* 1993; Weston, Mbambo and Myburgh 2000; Jones, Ryan and Todd 2015). Based on this knowledge, it should be noticed that a higher prevalence rate of injuries exists where the percentage of African Black players remain relatively low.

5.4.2 Location and Mechanism of Injuries

This study reported that 20.8% of injuries were located at the knees. These results are consistent with the findings of Ekstrand and Gillquist (1982), Kordi *et al.* (2011) and Masenya (2019). However, this finding differed from Sousa, Rebelo and Brito (2013), Sentsomedi and Puckree (2016) and Lam *et al.* (2017), which reported the

thigh and ankle to be the most common sites of injury. The difference in the anatomical injury sites can be attributed to the mechanism of injury and level of play.

The current study revealed that twisting and turning (change of direction) (20.2%), appeared to be the most common mechanism of injury for amateur players. This movement places the knee at a greater biomechanical stress as it is the centre of the leg which accommodates large forces, thus increasing the risk of injury (Lees and Nolan 1998). Sousa, Rebelo and Brito (2013) and Lam *et al.* (2017) reported collision with another player (contact) to be the most common mechanism of injury. The findings in these studies may differ accordingly to the style and the nature of participants during matches.

5.4.3 Nature of Injuries

In this study, muscle strains (32.6%), followed by sprains (30.3%), were the most common types of injuries. These results compliment the findings of Bianco *et al.* (2016), where more than half (68.23%) of the injuries sustained were muscle strains. This was expected as soccer biomechanics requires agility, sprinting, flexibility and endurance (Bianco *et al.* 2016). This is supported by other studies regarding the injury mechanisms and the type (Sousa, Rebelo and Brito 2013; Bianco *et al.* 2016; Lam *et al.* 2017).

5.4.4 Performance

Performance during a soccer match can be greatly affected by the presence of injuries (Dupont *et al.* 2010). This study demonstrated that 65.2% of the injured participants (n = 58) reported that their injury had affected their performance (Table 4.4). In this study, it was difficult to identify to what degree the performance was affected, but Ribeiro and Costa (2006) found that more than 60% of indoor soccer players sustained contact injuries and were not removed from the game. This could potentially lead to severe traumatic injuries.

It should also be noted that participants who reported no affected performances from their injury (33%), were less likely to treat or manage the injury (42%) (Table 4.18).

Panchuk and Glab (2015) stipulated that harmony should exist between strength, speed and muscle flexibility for an athlete to have higher athletic performances. With this knowledge, an affected performance during match play is subjective and deeper

analysis is required to understand the magnitude of soccer-related injuries on a player's performance.

5.5 INTRINSIC RISK FACTORS

5.5.1 Position Played

Indoor soccer players have diverse positions and are more likely to play at multiple positions. This may contribute to the risk of injury (Sugimoto *et al.* 2018). However, in this study, there was no association between the position played and prevalence of injury, as seen in Table 4.7, where the prevalence of injuries were similar across all positions.

Hunt and Fulford (1990) investigated the risk of injury in comparison to player position. The findings of this study are inconsistent because Sugimoto *et al.* (2018) further explored this concept and discovered that the playing position had no influence on the risk of injury, but musculoskeletal injuries were more likely to be associated with body mass, age and BMI.

5.5.2 Footwear

Many studies concluded that shoe-surface interaction is highly important and can influence the risk of injury in a player (Stefanyshyn, Lee and Park 2010; Sterzing *et al.* 2011; Gdovin *et al.* 2018). Gdovin *et al.* (2018) also stipulated that no one type of footwear provides performance advantages when making soccer-specific footwear, as both shoes (cleated and non-cleated) have similar ground reaction forces and rate of force development. This indicates that agility is not dependant on the footwear. Dvorak and Junge (2000) also mentioned that injuries are influenced by intrinsic factors, such as a lack of experience, age and joint flexibility, combined with extrinsic factors, such as the surface and environmental conditions.

The current study reported no association between the type of footwear used and injury. The results further demonstrated that indoor soccer players used a variety of footwear and therefore injury prevalence could be high in this community. In contrast, there are still numerous studies that attribute the type of footwear used to greater risks of injuries (Livesay, Reda and Nauman 2006; Gdovin *et al.* 2018).

5.5.3 Playing Surfaces

Most participants in this study played on artificial turf, which is most likely to be third generation or fourth generation artificial turf, as these are the requirements at various indoor soccer venues in the eThekwini Municipality. In this study, it was found that the playing surface had no association with the risk of musculoskeletal injuries.

Previous studies (Emery and Meeuwisse 2006; Meyers 2010; Ekstrand, Hägglund and Fuller 2011; Lanzetti *et al.* 2017) reported no statistical significant difference in injuries between indoor or synthetic turf and to outdoor or natural grass surface. The authors also reported that there were no epidemiological evidence that suggests artificial turf increases the risk of injury compared to outdoor turf (Fuller *et al.* 2007a; Ekstrand, Hägglund and Fuller 2011; Sousa, Rebelo and Brito 2013). In contrast, Arnason *et al.* (1996) revealed a higher rate of injury on artificial turf when compared to outdoor grass. In comparison to Fuller *et al.* (2007a) and Ekstrand, Hägglund and Fuller (2011), Arnason *et al.* (1996) utilized first-generation artificial turf which resulted in a higher risk of injury.

Artificial turf or synthetic turf has been developed and modified over the years, and thorough investigations should therefore be conducted. Whilst there is epidemiological evidence that suggests low prevalence injury rates, studying the turf in various environmental conditions may provide deeper analysis when focusing on the prevalence of injuries.

5.6 EXTRA-ACTIVITIES

In this study, it was found that 71% of the injured participants engaged in an additional activity. Running (24.7%) and gym workouts (23.6%) appeared to be the most popular additional activities, but only 30% of those participating in extra-activities reported injuries (Table 4.10). The reported sites of injuries included the shoulders and thighs. The literature that focuses on the influence of extra-activities on soccer injuries is very limited. Whilst this study did not report high injury rates from extra-activities, these activities can contribute to injury prevalence and risk (Dvorak *et al.* 2016). The literature supports the notion that previous injuries do not have to be anatomically related to the current injuries sustained (Hägglund, Waldén

and Ekstrand 2013; McCall *et al.* 2015). Furthermore, minor injuries may predispose participants to major injuries (Ekstrand and Gillquist 1983).

The influence of extra-activities on soccer should be investigated, as McCall *et al.* (2015) suggests that minor injuries sustained may not be anatomically linked to major injuries, but present as a risk to predispose player's to injury.

5.7 MANAGEMENT OF INJURIES

Of the participants that sustained injuries (n = 89), more than half (58.4%) applied a form of management protocol. The type of injury was regarded statistically significant as participants who sustained dislocations and other injuries (ACL tears, ligament damage and tendinopathies) were most likely to have a management protocol (100%), whilst strain, bruises and sprains had a low response rate to management (Table 4.20). Of those participants who did report on having a management protocol, home remedies were the most common form of management (38.5%). However, seeking medical attention from a manual therapist (physiotherapist, chiropractor and biokineticist) was reported in 30.8% of participants (Table 4.22). These results are consistent with the findings presented by Sentsomedi and Puckree (2016) and Bello *et al.* (2020). In these studies, self-treatment was reported to be the most common form of management in more than 40% of the participants injured, followed by seeking medical attention from a manual therapist.

It is important to note that the choice of management is highly dependent on the player and can vary in different environments. This is supported by van Beijsterveldt *et al.* (2014), that more than half (54%) of the amateur soccer players acquired medical attention from a health practitioner. Conversely, in this study, only 17% of the participants visited a general practitioner for medical attention, as depicted in Table 4.22. This could be on account of the many factors in South African, like finance, accessibility, lack of health insurance or even not considering injury as an urgent factor.

The study population of Bello *et al.* (2020) and van Beijsterveldt *et al.* (2014) are very similar, where both studies examine amateur soccer players. However, the choice of management differs in both studies. The possible reason for this contrast

in management may be due to the location of the studies. Players from developed countries appear to have a greater understanding of injury management, as opposed to players from developing countries. Therefore, players from developed countries are aware of the necessary actions that should be taken when a mild or severe injury is sustained. Niyonsenga and Phillips (2013) also explained that developing countries lack the financial capacity to meet the demand for experienced medical personnel and amateur players may not have the financial capabilities to visit health practitioners regularly.

5.8 CONCLUSION

In this chapter, the results were discussed and compared to studies that provided relevant information that were relevant to this study. The participants between the age of 20-25 and 35-40 years old were mostly injured and having an existing chronic condition increased the likelihood of sustaining an injury. Furthermore, muscle strains appeared to be the most common type of injury but, if the player's performance was not affected, it was less likely to be treated through a management protocol. When a management protocol was used, home remedies were the most utilized form of management.

The following chapter will discuss the conclusion, limitations and recommendations for this study.

CHAPTER SIX: LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

6.1 INTRODUCTION

This chapter will discuss the limitations found in this study, as well as recommendations for future research and finally conclude this study.

6.2 LIMITATIONS

Participants over the age of 40 years old were excluded from this study and, therefore, a greater population of participants with chronic conditions were not included, which could possibly provide clarity on the association between chronic conditions and musculoskeletal injuries.

The study was dependent on the recall bias of participants to remember injuries sustained.

This study also negated professional players on the indoor soccer field. Including professional players would provide data that could be utilized to compare the differences amongst amateur players.

The Soccer Injury Consensus Statement questionnaire developed by Fuller *et al.* (2006) was not used for this study. Whilst the data collection tool used for this study is highly reliable and valid, the questionnaire developed by Fuller *et al.* (2006) provided increased validity.

The COVID-19 pandemic presented as a limitation by prohibiting contact sports during lockdown levels. Many players did not participate in matches due to cancellation which restricted a broad diversity in player characteristics.

6.3 RECOMMENDATIONS

Future research should focus on studies investigating amateur indoor soccer players in other regions of KwaZulu-Natal and the other provinces in South Africa. This

would be highly beneficial as there is a paucity of literature regarding indoor soccer in South Africa and to compare the findings with this study.

Studies should also provide more information on the various management protocols that players use. More importantly, the literature should also focus on identifying and comparing the management protocols utilized between professional and amateur soccer players. Identifying the management protocols will be beneficial to both players and healthcare providers.

Comparing the prevalence of injuries between outdoor and indoor turf in South Africa could provide more knowledge about artificial turf.

Identifying the risk factors of musculoskeletal injuries in indoor soccer among female players and various age groups may provide clarity on musculoskeletal injuries among other demographics.

6.4 CONCLUSION

This study utilized the aims and objectives as a guideline to explain and discuss the findings. This study reported a relatively high period prevalence (74.2%) for sustaining musculoskeletal injuries in amateur male indoor soccer players. The most common types of injury were muscle strains, followed by sprains. It was found that 'twisting and turning' (change of direction) appeared to be the most common mechanism of injury, with player collision, being a secondary mechanism. These movements most commonly affected the knee and ankle area.

Participants within the age groups of 20-25 and 35-40 years old, were at higher risk of injury. Furthermore, participants with chronic conditions were more likely to sustain injuries. It was also found that more than half of the participants had affected performances due to sustained injuries.

Players who sustained an injury that affected their performance were more likely to have a management protocol in place. The most common form of management were home remedies, followed by visits to a manual therapist. Further analysis also reported that muscle strains and sprains were less likely to be treated, whereas dislocations and fractures sustained by players, received complete medical attention. This study revealed that having a chronic condition and age are the most

prominent risk factors associated with indoor soccer amongst amateur male soccer players.

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APPENDICES

Appendix A: Advertisement

Appendix B: Letter of Information – Main Study

LETTER OF INFORMATION

Title of the Research Study: The risk factors, prevalence and management of musculoskeletal injuries in male amateur indoor soccer players in the eThekwini Municipality

Principal Investigator/s/researcher: Caleb Nair

Supervisor: Dr A. Abdul-Rasheed (MTech: Chiropractic)

Co-Supervisor: Dr C. Prince (MTech: Chiropractic)

Brief Introduction and Purpose of the Study: The aim of this study is to determine and investigate the prevalence, risk factors and the effective management of musculoskeletal injuries in amateur male indoor soccer players in the greater Durban area.

Outline of the Procedures: You will receive a questionnaire that needs to be completed, provided you have completed 3 indoor soccer matches over the last year. You will also be expected to complete and sign the informed consent form.

Inclusion criteria

- Participants must be over the age of 18
- Participants who do not belong to a professional soccer club/training
- Participants must have played a minimum of 3 soccer matches within the year
- Participants who have read and agreed to the informed consent (Appendix D) and letter of information (Appendix B) forms

Exclusion criteria

- Professional soccer players.
- Participants who do not sign and agree to the informed consent (Appendix D) and information form (Appendix B)
- Participants who partake in the focus group and pilot study

Risks or Discomforts to the Participant: There are no risks or risk of discomfort to you during this study.

Benefits: Your contribution to this study by participating, will help the Chiropractic field to gain a greater understanding about indoor soccer-related injuries. This will also help you, the player, to understand your injuries and health care management. This information will benefit the entire indoor soccer community.

Reason/s Why the Participant May Be Withdrawn from the Study: If you are non -compliant and have not completed at least 70% of the questionnaire, you will be withdrawn from the study

As a voluntary participant in this research study, you are free to withdraw from the study at any given time, without giving a reason for withdrawing and without consequence.

Remuneration: You will not be receiving any monetary or other type of remuneration for participation in this study

Costs of the Study: You will not be expected to cover any costs towards the study

Confidentiality: All patient information is confidential. The results of this study will be used for research purposes only. Only individuals that are directly involved in this study (Dr A. Abdul-Rasheed (MTech: Chiropractic), Dr C. Prince (MTech: Chiropractic) and Caleb Nair (myself)) will be allowed to access these records.

Persons to Contact in the Event of Any Problems or Queries:

Should you have any questions that you would prefer being answered by an independent individual, feel free to contact my supervisors on the following numbers Dr A. Abdul-Rasheed (Tel: (031) 3732102), Dr C. Prince (Tel: (031) 373 3005) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S. Moyo on 031 373 2577 or moyos@dut.ac.za.

Thank you for participating in my study.

Caleb Nair

Appendix C: Informed Consent – Main Study

INFORMED CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Caleb Nair researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **IREC 073/20**
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature/Right Thumbprint**

I, Caleb Nair, herewith confirm that the above participant has been full informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Appendix D: Letter of Information (isiZulu)

INCWADI YOLWAZI

Isihloko socwaningo/ sophenyo: Izici/ izinkomba zobungozi, ukwanda noma ubudlange kanye nokuphathwa noma ukwelashwa kwezinhlungu ezihlanganise imisipha, amamasela kanye namalunga omzimba ezibangelwa ukulimala kubadlali besilisa bebhola likanobhutshuzwayo/ lezinyawo elidlalelwa ngaphakathi noma endlini kuMasipala weTheku.

Umcwaningi/ umphenyi omkhulu: UCaleb Nair

Umphathi/ umbhekeleli wocwaningo: UDkt. A Abdul-Rasheed (i-MTech: yeKhayirophrakthikhi)

Umphathi owumlekeleli: UDkt. C. Prince (i-MTech: yeKhayirophrakthikhi)

Isingeniso kafushane kanye nenhloso yocwaningo/ yophenyo: Inhloso yalolu cwaningo ukuthola kanye nokuphenya ukwanda, izinkomba zobungozi kanye nokwelashwa kwezinhlungu ezihlanganise imisipha, amamasela kanye namalunga omzimba ezibangelwa ukulimala kubadlali besilisa bebhola lezinyawo elidlalelwa ngaphakathi endaweni yaseThekwini namaphethelo.

Uhlaka lwenqubo yocwaningo/ yophenyo: Uzothola inhlolomibuzo ekudingeka ukuthi uyiphendule/ uyigcwalise, emva kokuphothula ukudlala imidlalo emi-3 yebhola. Kuzophinde kufunakale ukuthi ugcwalise futhi usayine incwadi yesivumelwano esicatshangisisiwe.

Izinkomba zalabo abafanelekile ukuthi babambe iqhaza

- Ababamba iqhaza kumele babe neminyaka engaphezu kwe-18
- Ababamba iqhaza akufanele kube abantu abangamalunga enhlangano ethize yebhola eqeqeshiwe noma aqeqeshwayo ngokuzivocavoca okuthize
- Ababamba iqhaza kumele kube ngabantu asebedlale umdlalo webhola lezinyawo/ lika nobhutshuzwayo okungenani imidlalo emi-3 onyakeni
- Ababambiqhaza abaye bafunda futhi bavumelana nencwadi yesivumelwano esicatshangisisiwe (Isithasiselo C) kanye nencwadi yolwazi (Isithasiselo B)

Izinkomba zalabo abangafanelekile ukuthi babambe iqhaza

- Abadlali bebhola abaqeqeshiwe
- Ababambiqhaza abangasayini futhi bavume incwadi yesivumelwano esicatshangisisiwe (Isithasiselo C) kanye nencwadi yolwazi (Isithasiselo B)
- Yilabo ababambe iqhaza kucwaningo lokugxila nelokuhlola

Ubungozi noma Ukuphazamiseka kukambambiqhaza: Akukho ubungozi okanye ukuphazamiseka kuwe uma ubamba iqhaza kulolu cwaningo.

Inzuzo: Ukubamba kwakho iqhaza kulolu cwaningo kuzosiza umkhakha weKhayirophrakthikhi ukuthi ukwazi ukuqonda kabanzi ngokulimala/ ubuhlungu obubangelwa ukulimala okwenzeka ngesikhathi kudlalwa ibhola likanobhutshuzwayo okanye lezinyawo elidlalelwa ngaphakathi. Kanti futhi lokhu kuzosiza nawe njengomdlali ukuthi uqondisise kabanzi ukulimala kwakho kanye nezindlela zokwelashwa futhi nokuphathwa/ ukunakekelwa ngokwezempilo. Lolu lwazi luzophinde lube usizo/ inzuzo kuwo wonke umphakathi webhola likanobhutshuzwayo/ lezinyawo elidlalelwa ngaphakathi noma endlini.

Izizathu ezingenza ukuthi umbambiqhaza ahoxiswe ekubambeni iqhaza kulolu phenyo: Uma ungathobeli umthetho okanye ungenzi okufanele futhi ungaphendulanga okungenani ingxenye elinganiselwa kuma-70% yenhlolomibuzo, uzohoxiswa kulolu phenyo.
NJENGOMBAMBIQHAZA OYIVOLONTIYA KULOLU PHENYO, UVUMELEKILE UKUHOXA EKUBAMBENI IQHAZA KULOLU CWANINGO NANOMA YINGASIPHI ISIKHATHI OSITHANDAYO, NGAPHANDLE KOKUTHI UZE UNIKEZE ISIZATHU SOKWENZENJALO KANTI FUTHI LOKHU ANGEKE KUKUFAKE ENKINGENI.
Umholo/ umkomelo: Angeke kube khona mholo okanye imali ozoyinikezwa ngokubamba kwakho iqhaza kulolu cwaningo.

Inani elikhokhwa umbambiqhaza wocwaningo/ wophenyo: Ayikho imali ozoyikhokha ngokuhlanganyela okanye ngokubamba iqhaza kwakho kulolu cwaningo.

Ubumfihlo: Yonke imininingwane yeziguli izogcinwa iyimfihlo. Imiphumela yalolu cwaningo izosetshenziselwa ucwaningo kuphela. Yilabo bantu abathintekayo ngqo okanye abayingxenye yalolu cwaningo (uDkt. Abdul-Rasheed (i-MTech: yeKhayirophrakthikhi), uDkt. C Prince (i-MTech: yeKhayirophrakthikhi), kanye noCaleb Nair (mina) abanegunya/ abavumelekile ukufinyelela kulawa marekhodi.

Abantu ongaxhumana nabo uma unemibuzo noma izinkinga:

Uma unemibuzo ofisa/ othanda ukuthi iphendulwe umuntu ozimele, zizwe ukhululekile ukuxhumana nabaphathi bami kulezi zinombolo ezilandelayo uDkt. A. Abdul-Rasheed (i-Tel: (031) 3732102) noma Umlawuli wezimiso zokuhle kwezocwaningo weSikhungo ku 031 373 2375. Izikhalazo zingabikwa ku-DVC: Wezocwaningo, Nokusungula kanye Nezokuxhumana Ezingeni eliphezulu uSolwazi S Moyo kule nombolo 031 373 2577 noma moyos@dut.ac.za.
Ngiyabonga ngokubamba kwakho iqhaza kulolu cwaningo.
UCaleb Nair

Appendix E: Informed Consent (isiZulu)

IMVUME

Isitatimende semvumelwano yokubamba iqhaza kucwaningo/ kuphenyo:

- Mina ngiyaqinisekisa ukuthi umcwaningi; uCaleb Nair ungazisile ngenkambo, uhlobo, inzuzo kanye nobungozi balolu cwaningo- Inombolo yezimiso zokuhle yocwaningo: _____
- Ulwazi kanye nencazelo emayelana nalolu cwaningo ebhalwe lapha ngenhla (Incwadi Yolwazi kaMbambiqhaza) nayo ngiyitholile, ngayifunda futhi ngayiqondisisa.
- Ngiyaqonda ukuthi imiphumela yocwaningo, okubala imininingwane yami yobulili, iminyaka, usuku lokuzalwa, ama-inishiyali nokuthi ngiphethwe yini kuzosetshenziswa ngokungaziwa/ ngobumfihlo ukuze kwenziwe umbiko wocwaningo.
- Ngokubona izidingo zocwaningo, mina ngiyavuma ukuthi imininingwane yami etholakale kulolu cwaningo isetshenziswe ngu mcwaningi ohlelweni lwekhompiyutha.
- Ngingakwazi, kunoma yisiphi isigaba, ukuthi ngihoxise imvume nokubamba kwami iqhaza kulolu cwaningo ngale kwengcindezi.
- Ngibe nethuba elanele lokubuza imibuzo futhi (ngokuzikhethela/ ngokuzithandela kwami) ngiyafunga ukuthi ngikulungele ukubamba iqhaza kulolu cwaningo.
- Ngiyaqonda ukuthi lolo lwazi olusha, olubalulekile futhi oluthintana nokubamba kwami iqhaza ngenkathi kwenziwa lolu cwaningo ngizovumeleka ukulwazi.

_____	_____	_____	_____
Igama eliphelele	**loMbambiqhaza**	**UsukuIsikhathi**	**Isiginisha/Isithupha sakwisandla sokudla**

Mina, Caleb Nair ngiyaqinisekisa ukuthi lo mbambiqhaza ongenhla uchazeliwe kabanzi ngohlobo, inkambo kanye nobungozi balolu cwaningo olungenhla.

_____	_____	_____
Igama eliphelele loMcwaningi	**Usuku**	**Isiginisha**
_____	_____	_____
Igama eliphelele	**Usuku**	**Isiginisha likaFakazi (Uma kufanelekile)**
_____	_____	_____
Igama eliphelele loMnakekeli Osemthethweni	**Usuku**	**Isiginisha (Uma kufanelekile)**

Appendix F: Letter of Information – Focus Group

LETTER OF INFORMATION – FOCUS GROUP

Title of the Research Study: The risk factors, prevalence and management of musculoskeletal injuries in male amateur indoor soccer players in the eThekwini Municipality

Principal Investigator/s/researcher: Caleb Nair

Supervisor: Dr A. Abdul-Rasheed (MTech: Chiropractic)

Co-Supervisor: Dr C. Prince (MTech: Chiropractic)

Brief Introduction and Purpose of the Study: The aim of this study is to determine and investigate the prevalence, risk factors and the effective management of musculoskeletal injuries in amateur male indoor soccer players in the greater Durban area.

Outline of the Procedures: The focus group participants will be required to read and complete the Letter of Information (Appendix F), Informed Consent (Appendix G) and a confidentiality agreement (Appendix H) which states that all discussion within the focus group must be kept confidential. Each question from the questionnaire will be read out by the researcher, and the focus group will discuss the questions based on the relevance of the questions to the aims and objectives. The focus group may agree or disagree, or uncertain of the questions in the questionnaire. In order for a question to be included or excluded from the questionnaire, a vote will be taken, where favour is in the majority.

Inclusion criteria

- Participants over the age of 18
- Participants who have read the letter of information (Appendix F), confidentiality agreement (Appendix H) and signed the informed consent form (Appendix G).

Exclusion criteria

- Those who no longer wish to participate in the focus group
- Potential participants for the pilot and main study

Risks or Discomforts to the Participant: There are no risks or risk of discomfort to you during this study.

Benefits: Your contribution to this study by participating, will help the Chiropractic field to gain a greater understanding about indoor soccer-related injuries. This will also help you, the player, to understand your injuries and health care management. This information will benefit the entire indoor soccer community.

Reason/s Because the Participant May Be Withdrawn from the Study: If you are non -compliant and have not completed at least 70% of the questionnaire, you will be withdrawn from the study

As a voluntary participant in this research study, you are free to withdraw from the study at any given time, without giving a reason for withdrawing and without consequence.

Remuneration: You will not be receiving any monetary or other type of remuneration for participation in this study

Costs of the Study: You will not be expected to cover any costs towards the study

Confidentiality: All patient information is confidential. The results of this study will be used for research purposes only. Only individuals that are directly involved in this study (Dr A Abdul-Rasheed (MTech: Chiropractic), Dr C. Prince (MTech: Chiropractic) and Caleb Nair (myself)) will be allowed to access these records.

Persons to Contact in the Event of Any Problems or Queries:

Should you have any questions that you would prefer being answered by an independent individual, feel free to contact my supervisors on the following numbers Dr A. Abdul-Rasheed (Tel: (031) 3732102), Dr C. Prince (Tel: (031) 373 3005) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S Moyo on 031 373 2577 or moyos@dut.ac.za.

Thank you for participating in my study.

Caleb Nair

Appendix G: Informed Consent – Focus Group

CONSENT – FOCUS GROUP

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Caleb Nair, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **IREC 073/20**_,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, Caleb Nair, herewith confirm that the above participant has been full informed about the nature, conduct and risks of the above study.

Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Appendix H: Confidentiality – Focus Group

IMPORTANT NOTICE: This form is to be read and filled in by every member participating in the expert group, before the focus group meeting convenes.

CONFIDENTIALITY STATEMENT AND CODE OF CONDUCT: Focus group

1. All information contained in the research documents and any information discussed during the focus group meeting must be kept private and confidential. This is especially binding to any information that may identify any of the participants in the expert group.

2. None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this expert group.

3. The information from this focus group will be made public in terms of a dissertation/thesis and/or journal publication, which will in no way identify any of the participants involved in this expert group.

4. The returned questionnaires will be coded and kept anonymous in the research process.

5. The expert group may be either voice or video recorded, as a transcript of the proceedings will need to be made. The data will be stored securely under password protection.

6. All data generated from this expert group (including the recording) will be kept for five years in a secure location at Durban University of Technology and thereafter will be destroyed.

Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Please print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature: _____

Researcher's Name: _____ Signature: _____

Supervisor's Name: _____ Signature: _____

Appendix I: Letter of Information – Pilot Study

LETTER OF INFORMATION – PILOT STUDY

Title of the Research Study: The risk factors, prevalence and management of musculoskeletal injuries in male amateur indoor soccer players in the eThekwini Municipality

Principal Investigator/s/researcher: Caleb Nair

Supervisor: Dr A. Abdul-Rasheed (MTech: Chiropractic)

Co-Supervisor: Dr C. Prince (MTech: Chiropractic)

Brief Introduction and Purpose of the Study: The aim of this study is to determine and investigate the prevalence, risk factors and the effective management of musculoskeletal injuries in amateur male indoor soccer players in the greater Durban area.

Outline of the Procedures: The participants will be required to read and complete the Letter of Information (Appendix J) and Informed Consent (Appendix K). Thereafter the participant will be required to complete the questionnaire (Appendix I). The participant will then be required to complete a questionnaire evaluation form in order to identify any problems with the questionnaire (Appendix M).

Inclusion criteria

- Participants over the age of 18
- Those who have participated in a minimum of 1 indoor soccer match
- Participants who have read the letter of information and signed the informed consent form

Exclusion criteria

- Those who no longer wish to participate in the pilot study
- Those who have participated in the focus group and possible participants for the main study

Risks or Discomforts to the Participant: There are no risks or risk of discomfort to you during this study.

Benefits: Your contribution to this study by participating, will help the Chiropractic field to gain a greater understanding about indoor soccer-related injuries. This will also help you, the player, to understand your injuries and health care management. This information will benefit the entire indoor soccer community.

Reason/s Why the Participant May Be Withdrawn from the Study: If you are non-compliant and have not completed at least 70% of the questionnaire, you will be withdrawn from the study

As a voluntary participant in this research study, you are free to withdraw from the study at any given time, without giving a reason for withdrawing and without consequence.

Remuneration: You will not be receiving any monetary or other type of remuneration for participation in this study

Costs of the Study: You will not be expected to cover any costs towards the study

Confidentiality: All patient information is confidential. The results of this study will be used for research purposes only. Only individuals that are directly involved in this study (Dr A. Abdul-Rasheed (MTech: Chiropractic), Dr C. Prince (MTech: Chiropractic) and Caleb Nair (myself)) will be allowed to access these records.

Persons to Contact in the Event of Any Problems or Queries:

Should you have any questions that you would prefer being answered by an independent individual, feel free to contact my supervisors on the following numbers Dr A. Abdul-Rasheed (Tel: (031) 3732102), Dr C. Prince (Tel: (031) 373 3005) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S Moyo on 031 373 2577 or moyos@dut.ac.za.

Thank you for participating in my study.

Caleb Nair

Appendix J: Informed Consent – Pilot Study

CONSENT – PILOT STUDY

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Caleb Nair, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **IREC 073/20**_____,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, Caleb Nair, herewith confirm that the above participant has been full informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

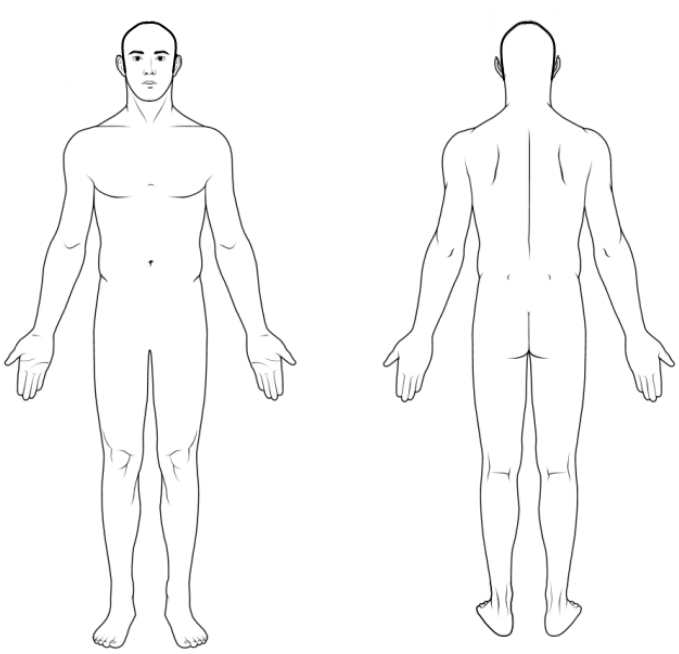
Appendix K: Post Focus Group Questionnaire

SECTION A					
DEMOGRAPHICS					
1. Age	< 20 years	20-24 years	25-29 years	30-34 years	35-40 years
2. Race/Ethnicity	Black	Asian	White	Mixed	Other
3. Job Description/Occupation					
4. **Height (cm)**					
5. Weight (kg)					
6. Do you have any chronic conditions (hypertension, diabetes, cholesterol, etc.)?	Yes		No		
If you've answered "No" to Question 6, please proceed to Question 8.					
7. Please select the relevant conditions (you may choose more than one)	Hypertension		Kidney disease		
	Diabetes		Asthma		
	Heart disease		High cholesterol		
	Cancer		Other		
If 'Other' was chosen, please specify					
8. Have you had any surgeries?	Yes		No		
If you've answered "No" to Question 8, please proceed to Section B.					
9. If yes, to Q8, please specify the surgery					

SECTION B						
PLAYER CHARACTERISTICS						
10. How often do you play indoor soccer?		1x per week	2x per week	3x per week	More than 3x per week	
11. What is your most often playing position?	Forward /Striker	Midfield	Wing	Goalkeeper	Defender	
12. Which type of shoes do you most often use during indoor soccer matches?	Indoor soccer boots	Outdoor soccer boots/ togs	Running shoes/ Trainers	Sneakers	Other	
If other, please specify						
13. What type of surface do you play indoor soccer on?		Astro Turf	Veldt	Natural grass	Other	
If 'other', please specify						
14. Do you also play outdoor soccer?		Yes		No		
15. Please select one of the following equipment used during your indoor soccer matches	Shin guards	Extra socks	Ankle/ Knee brace	Sports taping	None	Other
If other, please specify						
16. Have you sustained any injuries due to indoor soccer?		Yes		No		
If you've answered "No" to question 16, you have completed the questionnaire. You do not have to continue to the next section. Thank you for your participation.						

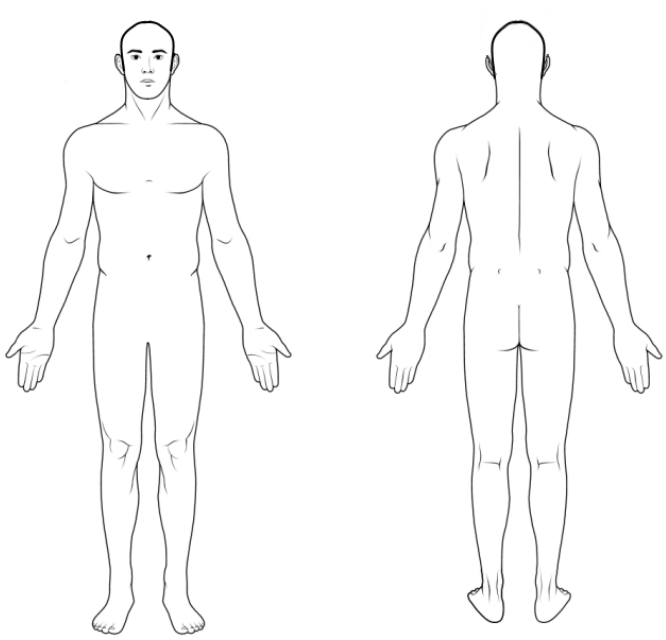
SECTION C

INJURY CHARACTERISTICS

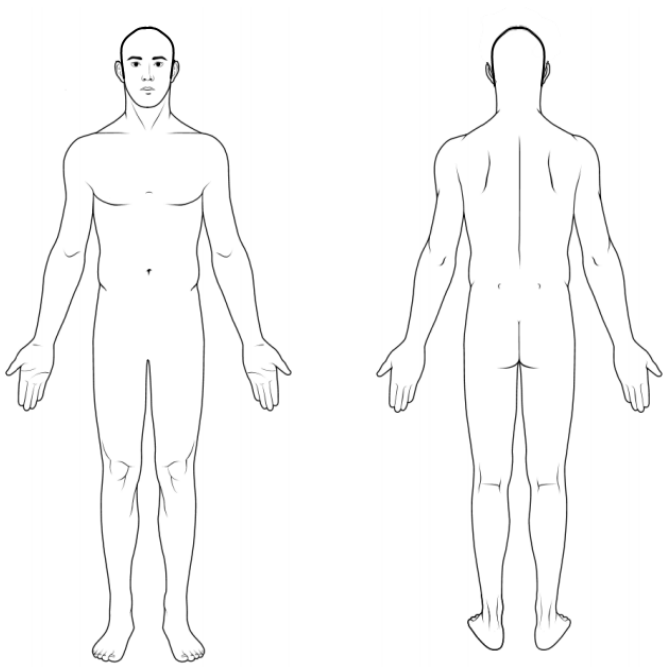
17. Please mark on the diagram provided where the most severe injury occurred **(You can only select one option)**						
18. Please select the type of the most severe injury	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other

19. How was the most severe injury sustained? **(Select one option)**	**Trauma (Non-contact)**	**Trauma (Contact)**	**Other (please specify, if this option is chosen)**
	Slip/fall	Tackling	
	Running	Being tackled	
	Twisting and turning	Colliding with another player	
	Shooting	Ball contact	

	Jumping and landing		Saving the ball (goalkeeper)		
20. Has your most severe injury affected your performance during indoor soccer matches?			Yes	No	
21. Did you have your most severe injury treated?			Yes	No	
If “no” to Question 21, please skip to Question 23.					
22. Please select the type of treatment that was used for the most severe injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)
23. Have you encountered more than one injury due to indoor soccer?	Yes		No		
If ‘no’ to Question 23, you may proceed to section D.					

24. Please mark on the diagram provided where the other injury has occurred **(You can only select one option)**						
25. Please select the type of injury encountered	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other
If 'Other', please specify						
26. Did you have your injury treated?	Yes			No		
If 'no' to the above question, skip to section D.						
27. Please select the type of treatment that was used for the injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)	

SECTION D		
EXTRA-ACTIVITIES		
28. Do you participate in any other activities/sport ?	Yes	No
If “no” to the above question, you have completed the questionnaire. Thank you for your participation.		
29. Please select the relevant type of activity/sport	Running	Golf
	Gym	Swimming
	Cycling	Cricket
	Rugby	Other
If ‘Other’, please specify		
30. Have you had any injuries from this activity/sport?	Yes	No
If “no” to the above question, you have completed the questionnaire. Thank you for your participation.		

31. Please mark on the diagram provided where the injury occurred **(Please select one option)**						
32. Please select the type of injury sustained from your activity/sport	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other
If 'Other', please specify						
33. Did you have the injury treated?	Yes			No		
If "no" to Question 33, you have completed the questionnaire. Thank you for your participation.						
34. Please select the type of treatment that was used for the injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)	

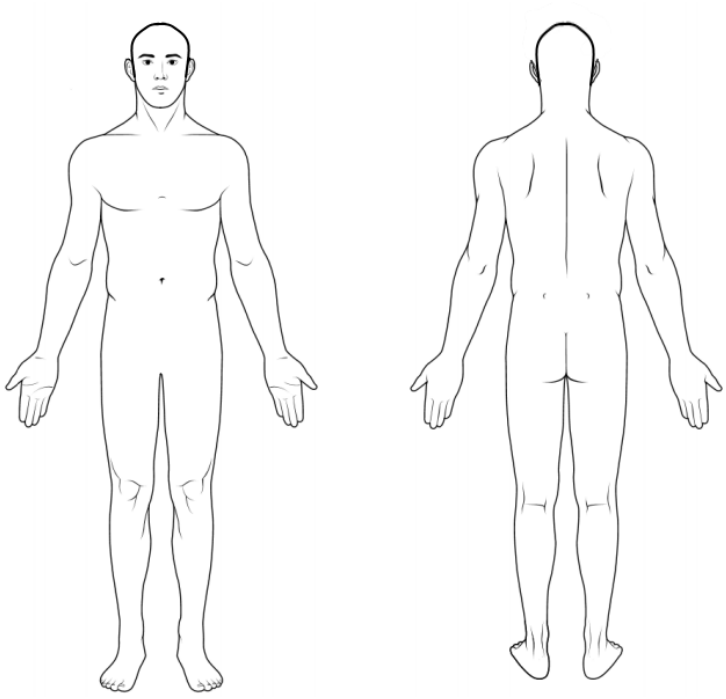
Appendix L: Post Pilot Group Questionnaire

SECTION A					
DEMOGRAPHICS					
1. Age	< 20 years	20-24 years	25-29 years	30-34 years	35-40 years
2. Race/Ethnicity	Black	Asian	White	Mixed	Other
3. Job Description/Occupation					
4. **Height (cm)**					
5. Weight (kg)					
6. Do you have any chronic conditions (hypertension, diabetes, cholesterol, etc.)?	Yes		No		
If you've answered "No" to Question 6, please proceed to Question 8.					
7. Please select the relevant conditions (you may choose more than one)	Hypertension		Kidney disease		
	Diabetes		Asthma		
	Heart disease		High cholesterol		
	Cancer		Other		
If 'Other' was chosen, please specify					
8. Have you had any surgeries?	Yes		No		
If you've answered "No" to Question 8, please proceed to Section B.					
9. If yes, to Q8, please specify the surgery					

SECTION B							
PLAYER CHARACTERISTICS							
10. How often do you play indoor soccer?		1x per week		2x per week	3x per week	More than 3x per week	
11. What is your most often playing position?	Forward/ Striker	Midfield		Wing	Goalkeeper	Defender	
12. Which type of shoes do you most often use during indoor soccer matches?	Indoor soccer boots	Outdoor soccer boots/togs		Running shoes/ Trainers	Sneakers	Other	
If other, please specify							
13. What type of surface do you play indoor soccer on?		Astro Turf		Veldt	Natural grass	Other	
If 'other', please specify							
14. Do you also play outdoor soccer?		Yes			No		
15. Please select one of the following equipment used during your indoor soccer matches		Shin guards	Extra socks	Ankle/ Knee brace	Sports taping	None	Other
If other, please specify							
16. Have you sustained any injuries due to indoor soccer?		Yes			No		
If you've answered "No" to question 16, you have completed the questionnaire. You do not have to continue to the next section. Thank you for your participation.							

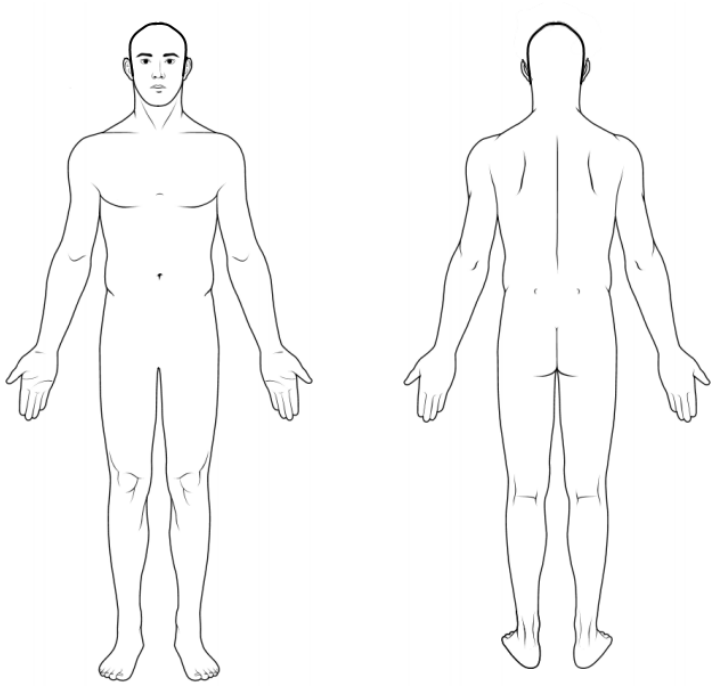
SECTION C

INJURY CHARACTERISTICS

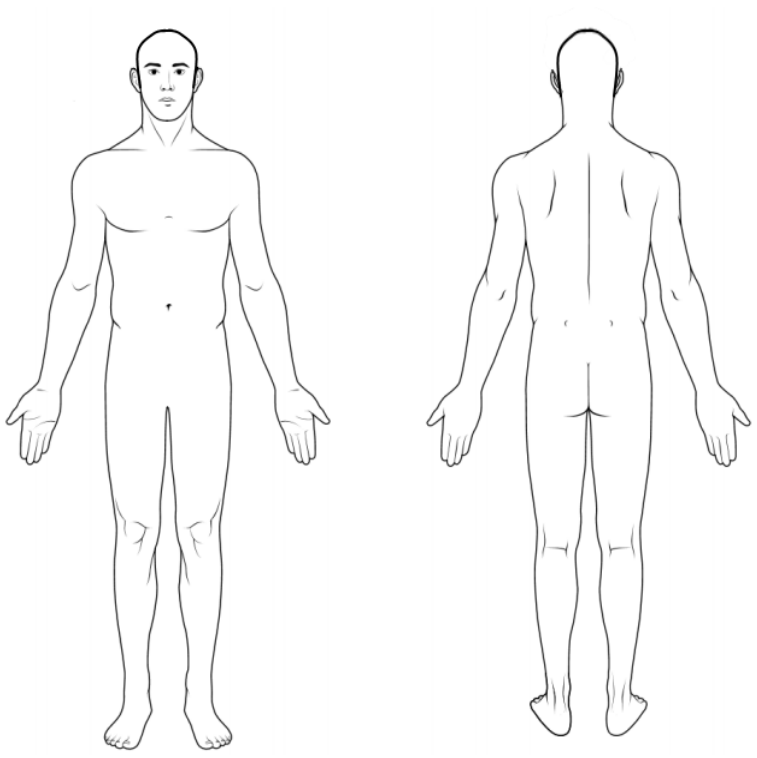
17. Please mark on the diagram provided where the most severe injury occurred **(You can only select one option)**						
18. Please select the type of the most severe injury	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other

19. How was the most severe injury sustained? **(Select one option)**	**Trauma (Non-contact)**	**Trauma (Contact)**	**Other (please specify, if this option is chosen)**
	Slip/fall	Tackling	
	Running	Being tackled	
	Twisting and turning	Colliding with another player	
	Shooting	Ball contact	

	Jumping and landing		Saving the ball (goalkeeper)		
20. Has your most severe injury affected your performance during indoor soccer matches?	Yes		No		
21. Did you have your most severe injury treated?	Yes		No		
If “no” to Question 21, please skip to Question 23.					
22. Please select the type of treatment that was used for the most severe injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)
23. Have you encountered more than one injury due to indoor soccer?	Yes		No		
If ‘no’ to Question 23, you may proceed to section D.					

24. Please mark on the diagram provided where the other injury has occurred **(You can only select one option)**						
25. Please select the type of injury encountered	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other
If 'Other', please specify						
26. Did you have your injury treated?	Yes			No		
If 'no' to the above question, skip to section D.						
27. Please select the type of treatment that was used for the injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)	

SECTION D		
EXTRA-ACTIVITIES		
28. Do you participate in any other activities/sport?	Yes	No
If “no” to the above question, you have completed the questionnaire. Thank you for your participation.		
29. Please select the relevant type of activity/sport	Running	Golf
	Gym	Swimming
	Cycling	Cricket
	Rugby	Other
If ‘Other’, please specify		
30. Have you had any injuries from this activity/sport?	Yes	No
If “no” to the above question, you have completed the questionnaire. Thank you for your participation.		

31. Please mark on the diagram provided where the injury occurred **(Please select one option)**						
32. Please select the type of injury sustained from your activity/sport	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other
If 'Other', please specify						
33. Did you have the injury treated?	Yes			No		
If "no" to Question 33, you have completed the questionnaire. Thank you for your participation.						
34. Please select the type of treatment that was used for the injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)	

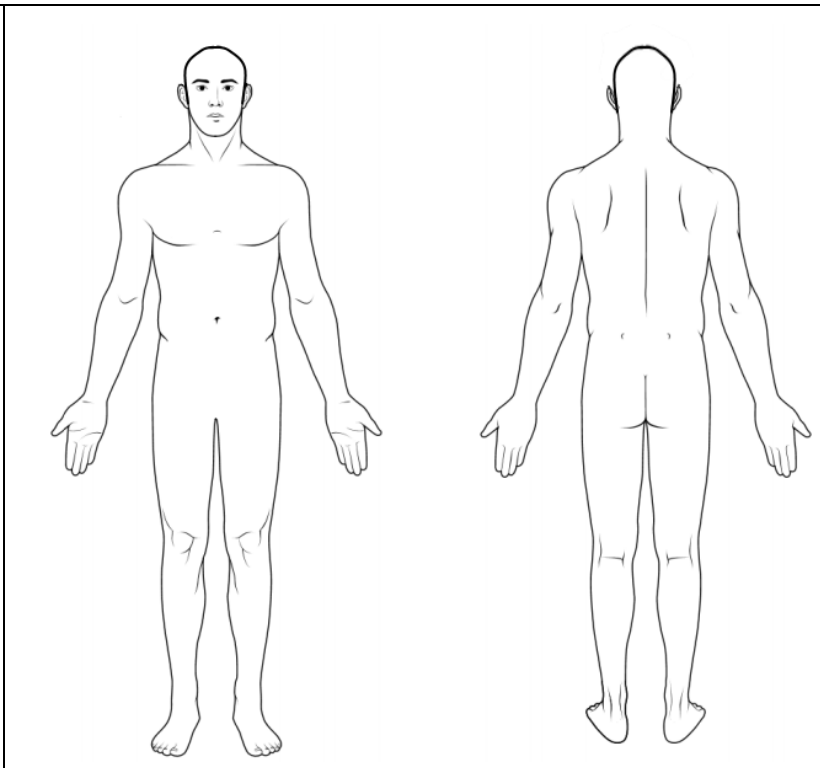
Appendix M: Final Questionnaire

SECTION A					
DEMOGRAPHICS					
1. Age	< 20 years	20-24 years	25-29 years	30-34 years	35-40 years
2. Race/Ethnicity	Black	Asian	White	Mixed	Other
3. Job Description/Occupation					
4. **Height (cm)**					
5. Weight (kg)					
6. Do you have any chronic conditions (hypertension, diabetes, cholesterol, etc.)?	Yes		No		
If you've answered "No" to Question 6, please proceed to Question 8.					
7. Please select the relevant conditions (you may choose more than one)	Hypertension		Kidney disease		
	Diabetes		Asthma		
	Heart disease		High cholesterol		
	Cancer		Other		
If 'Other' was chosen, please specify					
8. Have you had any surgeries?	Yes		No		
If you've answered "No" to Question 8, please proceed to Section B.					
9. If yes, to Q8, please specify the surgery					

SECTION B						
PLAYER CHARACTERISTICS						
10. How often do you play indoor soccer?		1x per week	2x per week	3x per week	More than 3x per week	
11. What is your most often playing position?	Forward/Striker	Midfield	Wing	Goalkeeper	Defender	
12. Which type of shoes do you most often use during indoor soccer matches?	Indoor soccer boots	Outdoor soccer boots/togs	Running shoes/Trainers	Sneakers	Other	
If other, please specify						
13. What type of surface do you play indoor soccer on?	Astro Turf	Veldt	Natural grass	Other		
If 'other', please specify						
14. Do you also play outdoor soccer?	Yes	No				
15. Please select one of the following equipment used during your indoor soccer matches	Shin guards	Extra socks	Ankle/ Knee brace	Sports taping	None	Other
If other, please specify						
16. Have you sustained any injuries due to indoor soccer?	Yes	No				
If you've answered "No" to question 16, you have completed the questionnaire. You do not have to continue to the next section. Thank you for your participation.						

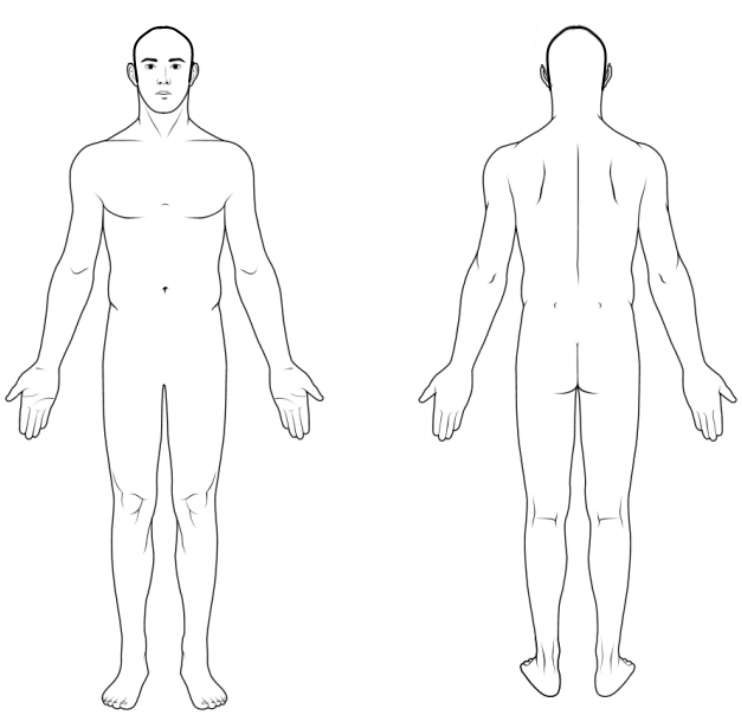
SECTION C

INJURY CHARACTERISTICS

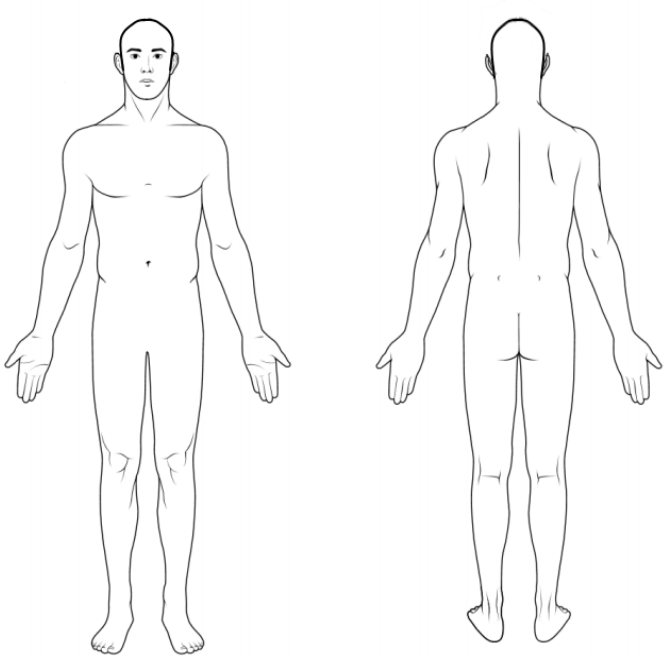
17. Please mark on the diagram provided where the most severe injury occurred **(You can only select one option)**						
18. Please select the type of the most severe injury	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other

19. How was the most severe injury sustained?	**Trauma (Non-contact)**	**Trauma (Contact)**	**Other (please specify, if this option is chosen)**
(Select one option)	Slip/fall	Tackling	
	Running	Being tackled	
	Twisting and turning	Colliding with another player	
	Shooting	Ball contact	

	Jumping and landing		Saving the ball (goalkeeper)		
20. Has your most severe injury affected your performance during indoor soccer matches?	Yes		No		
21. Did you have your most severe injury treated?	Yes		No		
If “no” to Question 21, please skip to Question 23.					
22. Please select the type of treatment that was used for the most severe injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)
23. Have you encountered more than one injury due to indoor soccer?	Yes		No		
If ‘no’ to Question 23, you may proceed to section D.					

24. Please mark on the diagram provided where the other injury has occurred **(You can only select one option)**						
25. Please select the type of injury encountered	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other
If 'Other', please specify						
26. Did you have your injury treated?	Yes			No		
If 'no' to the above question, skip to section D.						
27. Please select the type of treatment that was used for the injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)	

SECTION D		
EXTRA-ACTIVITIES		
28. Do you participate in any other activities/sport?	Yes	No
If “no” to the above question, you have completed the questionnaire. Thank you for your participation.		
29. Please select the relevant type of activity/sport	Running	Golf
	Gym	Swimming
	Cycling	Cricket
	Rugby	Other
If ‘Other’, please specify		
30. Have you had any injuries from this activity/sport?	Yes	No
If “no” to the above question, you have completed the questionnaire. Thank you for your participation.		

31. Please mark on the diagram provided where the injury occurred **(Please select one option)**						
32. Please select the type of injury sustained from your activity/sport	Strain	Sprain	Bruise/ Wound	Fracture	Dislocation	Other
If 'Other', please specify						
33. Did you have the injury treated?	Yes			No		
If "no" to Question 33, you have completed the questionnaire. Thank you for your participation.						
34. Please select the type of treatment that was used for the injury	Doctor (GP)	Surgeon	Manual Therapy (chiropractor, physio, biokineticist)	Traditional Healing	Home Remedy (rest, ice, ointment)	

Appendix N: Permission for Questionnaire – Kubayi

Friday, February 14, 2020 at 09:58:42 South Africa Standard Time

Subject: RE: Permission for questions
Date: Friday, January 24, 2020 at 10:49:10 AM South Africa Standard Time
From: Ntwanano Alliance Kubayi
To: caleb nair

Dear Caleb,

You are welcome to reference my work. However, it is difficult to recommend as I don't know the content of your study. Goodluck!

Regards,
Alliance

From: caleb nair <calebnair123@outlook.com>
Sent: Friday, 24 January 2020 10:46
To: Ntwanano Alliance Kubayi <KubayiNA@tut.ac.za>
Subject: Re: Permission for questions

Dear Alliance Kubayi
I apologize for the late response.

I may have not explained it clearly, but I am trying to develop a questionnaire for an injury profile, and I wanted to develop a few questions about the soccer players' characteristics (position played, height and weight).
From your study, **"Physical Performance and Anthropometric Characteristics of Male South African University Soccer Players",** your results included position played and few more measurements.
With my questionnaire, I needed to reference the questions from a valuable to solidify the questionnaire.
So, I came across your study and found it fitting to develop a few questions based on your results.

I hope I bring a bit more clarity to this. Also, I would appreciate any recommendations you have for me, with regards to any articles I should read or look into for my study.

Thank you
Caleb Nair

From: Ntwanano Alliance Kubayi <KubayiNA@tut.ac.za>
Date: Monday, January 20, 2020 at 8:23 AM
To: caleb nair <calebnair123@outlook.com>
Subject: RE: Permission for questions

Dear Caleb,

Thanks for the email. If I may ask, which questionnaire? Please send it to me so that I can confirm.

Regards,
Alliance

From: caleb nair <calebnair123@outlook.com>
Sent: Monday, 20 January 2020 07:44
To: Ntwanano Alliance Kubayi <KubayiNA@tut.ac.za>

Appendix O: Permission for Questionnaire – Dr Khan

Friday, February 14, 2020 at 09:56:43 South Africa Standard Time

Subject: Re: Permission for questions
Date: Wednesday, January 29, 2020 at 5:44:25 PM South Africa Standard Time
From: Jobir Khan
To: calebnair123@outlook.com

Dear Caleb Nair,

Thank you for your interest and asking for the approval.

It is our pleasure to let you know that you can use it according to your requirement.

Could youbplease mention your ne of institution and name of the supervisor?

I hope your successfull completion of your research work.

Regards,
Md Jobair Khan

Sent from Yahoo Mail on Android

On Wed, 29 Jan 2020 at 18:05, caleb nair <calebnair123@outlook.com> wrote:

> Dear Mr. Khan
>
> I am currently a chiropractic student from South Africa, completing my masters. Finishing off my research projects, I have started a study on "The prevalence, risk factors and management of indoor soccer male players".
>
> My study requires a questionnaire and I have viewed your approach to management questions in your study, "The epidemiological profile of knee injury pattern among different divisional football players"
>
> I would like to inform you that some questions in my questionnaire will be derived from your questioning. I trust to gain your approval for the use of the questions in my study.
>
> Your study was very good and I was amazed with the results.
>
> I trust to hear from you soon.
>
> Thank you
>
> Caleb Nair

Page 1 of 1

Appendix P: Permission for Questionnaire – Oslo Sports Trauma Research Center

Friday, February 14, 2020 at 09:52:41 South Africa Standard Time

Subject: RE: Approval of Questionnaire
Date: Wednesday, February 12, 2020 at 3:10:00 PM South Africa Standard Time
From: OSTRC sekretariat
To: caleb nair

Dear Caleb Nair,

You are more than welcome to use the questionnaire for your project!
An updated of the questionnaire will be published in BJSM within a few weeks.

Regards,

Tone Øritsland
Research coordinator
Oslo Sports Trauma Research Center

From: caleb nair <calebnair123@outlook.com>
Sent: onsdag 12. februar 2020 12:09
To: OSTRC sekretariat <OSTRC@nih.no>
Subject: Approval of Questionnaire

Dear Oslo Sports Trauma Research Center

I am currently a chiropractic student from South Africa, completing my masters. Finishing off my research projects, I have started a study on "The prevalence, risk factors and management of indoor soccer male players".
My study requires a questionnaire and I have viewed some of the questions that were postulated by your research center.

I would like to inform you that some questions in my questionnaire will be derived from yours. I trust to gain your approval for the use of the questions in my study.

I am truly amazed with the validity and reliability of your questionnaire based on other studies I have come across.

I trust to hear from you soon.

Thank you
Caleb Nair