

**INJURY OCCURRENCE AMONG RUGBY PLAYERS IN SECONDARY SCHOOLS IN
CENTRAL UGANDA IN THE YEAR 2019 RUGBY LEAGUE**

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DECLARATION

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DEDICATION

This dissertation is dedicated to all educational and sports institutions especially rugby playing secondary schools, universities, clubs and all individuals who were paramount up to its completion. Among them are the supervisors, my family and all friends.

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ABSTRACT

Sport is a leisure activity in which humans find amusing or entertaining. Sports like soccer, rugby, basketball are continuously growing and becoming popular. The increase in popularity has raised participation in form of leisure, winning medals and economic benefits. The increase in participation has led to increase in injury occurrence risks especially in the sport of rugby. Rugby is physical contact and collision sport with massive support worldwide. Rugby has been identified and ranked among the highest risky sport and contributor to injuries worldwide. However, there is little literature and no study evidence has been done to document injury occurrence among rugby players in secondary schools in central Uganda in the year 2019 rugby league. The goal of this present study was to establish the occurrence of injuries among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league. The study objectives were to establish the common types of injuries, to determine the intrinsic and extrinsic factors attributed to injury occurrence among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league. A cross-section study was conducted involving instrument which collected data concerning socio-demographic information, common injuries, time of their occurrence, intrinsic and extrinsic factors associated with injury occurrence and strategies to reduce injuries on 234 respondents. 198 were male rugby players and 36 administrators. Data was analyzed thematically and using cross tabulation method. Results indicated that majority of respondents in this study were 18 years and above making 272 (58%) compared to those of 17 years and below. A total of 358 injuries were recorded during this study and 339 (95%) were soft tissue and 19 (5%) were hard tissue injuries. Majority of the soft tissue injuries were bruises at 114 (34%) followed by 64 (19%) strains and 14 (74%) dislocations. 208 (58%) injuries occurred during second half of matches and 150 (42%) injuries occurred in the first half. Intrinsic factors were the primary causes of injuries whereas extrinsic factors also contributed. Wrong execution of rugby skills was noted as the most intrinsic factor for injury occurrence at 227 (97%) respondents out of 234 and failure to use safety gear was also noted as the most extrinsic factor to attribute to injuries and 234 (100%) supported it. 234 (100%) supported use of safety gears and 227 (97%) supported execution of the right techniques of the game as the best strategies to reduce injury occurrence. It was concluded that injury occurrence during this league was high compared to other studies elsewhere. In addition, majority of the injuries were soft tissue, minor and moderate especially due to the wrong execution of rugby skills. This meant that the medical officers have got a lot of work to attend to these rugby players especially during the course of matches.

CHAPTER ONE: INTRODUCTION

1.0 Background to the study

The word "sport" comes from the old French desport meaning "leisure", (Veronique, 2016), with the oldest definition in English from around 1300 being "anything humans find amusing or entertaining" (Steinberg, 2018). The historical sport in which people participated in include, Ultimate, Pickle ball, Cross net, and Axe Throwing (Kahn, 2016).

However, the world of sports is continuously growing and becoming popular. Among the growing and popular sport include, soccer, cricket, rugby football, basketball, hockey, tennis, golf and athletics (Staff, 2021) have increased support in this last three decades (Melissa, 2016).

Currently, sports participation is no longer focused at leisure and having only fun (Aksoy, 2019), but winning medals, becoming famous, and other economic benefits (Eime, 2015). Participation in sports helps in keeping healthier heart, reduced risk of diabetes (Malm, 2019). In addition, it also helps to reduce the risks of premature mortality rate, obesity, and colon cancer, which are dependent on one's life-style (Eime, 2013). Furthermore, participation in sports helps in weight management, strengthens bones, muscles and increases chances of living longer (Reiner, 2013).

These benefits have enhanced global support and participation in different sports at all levels (Coenders, 2017). This has also increased injury risks and occurrence in the sports in which people participate in and support (Myer, 2016). Therefore, this current study

aims at looking for injury occurrence among rugby players in secondary schools in central Uganda in the year 2019. The sport which the study has emphasized on is rugby.

Rugby is among the most popular team sports played worldwide throughout youth to senior levels (Hislop, 2017). It is ranked second in participation rates only to soccer as a football code (Grant et al., 2013). Rugby is a physically demanding sport characterized by massive physical contact, collisions and aggression as a result of contesting for possession of the ball (Veitch & Weir, 2016). It is played using an oval ball mainly using hands and legs (Hislop, 2017).

Rugby is said to have originated at Rugby School in Warwickshire, England, in 1823 (Hanazono Rugby Museum). It was basically grounded on kicking the ball, rather than passing it with hands (Veitch & Weir, 2016). One day during a game of football, William Webb Ellis decided to pick up a ball, run with it towards the goal and put it on ground (Collins, 2017). This was done every time he would catch the ball ignoring and in violation of the rule (Collins, 2020), and that's how rugby started (Collins, 2009). Although there is very little evidence to support this theory, the Rugby World Cup Trophy is now named after William Webb Ellis.

Rugby is played at amateur level, semi-professional, and professional level (Helme & Emmonds, 2019). There are two main types of rugby that is to say, rugby league which is played by two teams fielding 13 players aside (Nauright, 2011) and rugby union (Drawer, et al. 2016). Rugby Union is now amongst the most played and watched sports in the world (Nauright, 2017). It is played by 15 or 7 players a side (McKittrick, 2016). In the game of rugby union in 15 aside, the team comprises of eight forwards (wearing

jerseys numbered 1–8) and seven backs (numbered 9–15) (A Beginner's Guide to Rugby Union, 2013).

The Forwards are made of two Props, one Hooker, two-second Rowers, and one Lock which are mostly involved in large number of physical collisions and aggressive tackles (Quarrie, 2012). The Backs sector consist of one Halfback, one standoff No. 8, two Centers, two Wings and one Full Back who spend more time in free running but are also involved in tackles and collisions (Hpkins & Gil, 2012).

In addition, there may be up to eight replacement players "on the bench", numbered 16–23 and are not restricted to a single position, although they generally specialize in just one or two that suit their skills and body types (King et al., 2010). The different skill sets and body types, generally lead players to specialize in a limited number of positions (Freitas, 2019). Furthermore, during general play, as long as players are not off-side, they may be positioned anywhere on the field. It is during set pieces like scrum down and line-out that the positions are enforced (Freitas, 2019).

During the match, rugby players can be substituted temporarily or permanently at any time (Michael, 2019). This can be due to a tactical play by coaches to delay and disrupt the game pace, it can be because of a bloody injury and severe injuries especially head injuries and fractures (Lacome, 2015). Each position demands certain skills, character and roles to play on the field (McKittrick, 2016)

Since rugby birth in around 1823, a lot of changes, innovations and renovations have occurred over time in the rules and style of play (MacQueen & Dexter, 2010). Over recent decades, participation in rugby sport has been increasing over time (Lunn & Kelly, 2019).

Currently, a new global study from Nielsen has recorded 877 million followers and 405 million fans of rugby union worldwide in 2019, up 11 per cent and 18 per cent on 2018 figures respectively (Nielsen, 2019). Unprecedented growth is driven by uplift in women's interest and participation in the sport along with surging enthusiasm in rugby's emerging nations. Nielsen also added that Rugby World Cup 2019, the first held in Asia, broke fan engagement records and boosted rugby's profile across the continent. In a game-changing year for the sport, there was a significant increase in the perceived attractiveness of the sport resulting in a sharp increase in interest, inspired by the rise of women in rugby and a trail-blazing Rugby World Cup 2019 in Japan (Lunn, 2019).

Countries such as France, New Zealand, Russia, Wales, Australia, Republic of Ireland, United Kingdom, South Africa, Brazil, India and several Pacific island nations, including Fiji, have dramatically increased their participation and support (Lunn, 2019). Rugby union participation is higher in England than any other nation with an estimated total of 2.1 million players (Kevin, 2020). England has its own structure of youth RU, known as age-grade rugby (Greg, 2020), whereby players participate within annual-age categories including under 13 years of age, and under 18 years of age (Dale, 2020).

In Uganda, rugby started in the early 1930's, there was one rugby club called the "Uganda Rugby Football Club", which later became "Uganda Kobs Rugby Football Club" and then its name, was changed to "Kampala Kobs Rugby Football Club" (Kizza, 2020). Most rugby games were played in Entebbe (SZN Admin, 2015). Rugby union was introduced by the British during colonial rule in 1950s (Kizza, 2020). The Uganda Rugby Football Union (URFU) as it was known then was formed in 1955 (https://en.wikipedia.org/wiki/Rugby_Union_in_Uganda). The games of that time were

frequently played between representative sides from Kenya and Tanganyika but most notably against the Royal Navy and some British and South African Universities. Uganda played their first international game against Kenya in 1958 in Kampala. Uganda lost scoring 11 points to 21 for Kenya ([https://en.wikipedia.org/wiki/Uganda national rugby union team](https://en.wikipedia.org/wiki/Uganda_national_rugby_union_team)). They have not yet qualified for the Rugby World Cup. Uganda competes annually against Kenya in the Elgon Cup and Africa cup. The Rugby Cranes won the Confederation of African Rugby (CAR) in 2007 ([https://en.wikipedia.org/wiki/Rugby union in Uganda](https://en.wikipedia.org/wiki/Rugby_union_in_Uganda)). There are other rugby competitions that competed in locally like the Nile Special Club champions league, Inter Universities Rugby games, the Senior Secondary Schools Rugby League and the Tag rugby (Isabirye, 2018).

The Uganda Senior Secondary Schools Rugby League officially started in 1997 under the governing body Uganda Senior Secondary Schools Rugby Association (USSSRA) in conjunction with the Uganda Rugby Union, the National governing body (URU). It was started with an aim of promoting rugby among young youth especially in secondary schools and communities (URU). In addition, it was started so as to feed the national teams and rugby clubs with young players at different age groups. Furthermore, this league was started targeting traditional secondary schools like Namilyango College, Kings College Budo, St. Mary's College Kisubi, Kololo High School, Makerere College School and others because they had good facilities and others had already started playing in different national competitions. This league competition, all age groups at secondary schools level compete for trophies at 15 years and below category, 17 years and below and 19 and below category. At secondary schools level domestically, this rugby league is

the second in support and spectating after Copa Coca Cola Football tournament for secondary schools (Uganda Rugby Union report, 2018). It is played annually and currently the best secondary schools represent their regions or districts in the annual Uganda Senior Secondary Schools Association Championship (USSSA) currently known as the Fresh dairy Championship (USSSA, Report, 2018)

However, with the global increase in numbers in rugby participation and support from junior, amateur, semiprofessional and professional levels, the heightening in injury occurrence has also increased (Rafferty, 2019).

Sports injuries are broadly categorized into soft and hard tissue (Miller, 2020). According to Mylonas (2021), soft tissue injuries affect muscles, ligaments, tendons, fascia, bruises, strains, sprains, and tears. On the other hand, hard tissue injuries affect bones which results into fractures and dislocations (Bailey, 2010). Traumatic brain injury (TBI) is another potential type of sports injury and these injuries may range from mild to severe. (Davis, 2021). They are acute and chronic (Myklebust & Bahr, 2013). An injury that occurs suddenly, such as a sprained ankle caused by an awkward landing, is known as an acute injury (Brooks & Kemp, 2011). On the other hand, chronic injuries are the ones caused by repeated overuse of muscle groups or joints (Brooks & Fuller, 2006).

The Behavior-Change Theories and Methods to Injury Prevention by Andrea Carlson Gielen, and David Sleet, (2003) states that, reducing the burden of injury is an international health goal, one that requires an interdisciplinary perspective. Injuries, whether self-inflicted, inflicted by others, or unintentional, have one thing in common: they are largely preventable (Muula, 2013). Behaviors that give rise to violence and injury are amenable to preventive intervention (Glanz et al., 2016), just as are many of

the behaviors that give rise to diseases. Thus, behavioral science is an integral part of a comprehensive injury prevention strategy (Glanz et al., 2015).

Applications of behavioral science to injury prevention lagged behind other approaches during the last half of the 20th century (Gielen, 2003). Despite recognition by injury control professionals of the importance of behavioral research in injury prevention (Winston, 2010), behavioral solutions to preventing injury were deemphasized until recently (Sleet, 2003). Historically, little scholarly attention has been paid to understanding determinants of injury-related behaviors or how to initiate and sustain behavioral changes (Towner et al., 2001). Interventions often seemed to have been based on simplistic assumptions that changing people's awareness about the injury problem would change their behavior (McGlashan and Finch, 2010). Many authors have noted the need to improve behavioral interventions by using better empirical data about determinants of behavior as well as theories and frameworks pertaining to change in health behavior (Angell, 2013). A growing body of work is emerging that demonstrates the positive impact of using behavioral science approaches in order to both understand and reduce injury risk behaviors (Finch, 2010). In this study, the role of behavior changes in injury prevention is described and illustrates how the application of selected behavior-change theories to injury problems, within the context of a health promotion framework, can contribute to the enhancement of injury prevention programs (Gielen & Sleet, 2003).

Not only rugby sport with injury risks, higher incidences of sports injury occurrence have been reported mainly in full-contact team sports (Fuller et al., 2015). The examples of such sports include Australian football (Australian Rules football).

It's a full contact sport involving explosive running (Milanese, 2019), change of directions, jumping, stopping, aggressive tackling, sudden and severe collisions as well as kicking and handling thus leading to many injuries recorded (Bailey, 2010). In addition, this sport reports record high levels of injury occurrence from both contact and noncontact mechanisms at senior levels (Magarey, 2015).

Another sport known as Rodeo, where the environment is completely unforgiving, and there is limited protection as humans compete with animals in a traditional way. In such an environment, the potential for severe injuries is imminent (Meyers & Laurent, 2010). As the rate of sport participation steadily increases around the globe, so too does the frequency of sport injuries (Caine, & Maffulli, 2006).

Boxing is another contact sport where the participant's sole goal is to punch his opponent (Bromley, 2018). It doesn't come as a surprise that this isn't an injury free sport (Dixon, 2021). Statistics reveal that 90% of boxers suffer brain damage during the course of their career (Bytom, 2020). They could even be prone to diseases like Parkinson's or Alzheimer's later in their lives (Castellani, 2017). The most common boxing injuries are bruising to the face, hands and ribs, fractures (Potter, 2011), cuts, dislocation (Loosemore, 2017) and concussion (Siewe, 2014).

Another contact sport is soccer, where injury occurrence is also at an increase (Anderson, 2014). This sport requires total physical fitness of an individual like speed, endurance, and strength (Jemni, 2018). Injuries in soccer occur during contact (Dai, 2014) and non-contact mechanisms in course of contesting for the ball (Walden, 2015). According to Watson & Mjaanes (2019), participation in youth soccer in the United States continues to increase steadily, with a greater percentage of preadolescent participants than perhaps any

other youth sport. Despite the wide-ranging participation in organized sports, injuries occur and represent a threat to the health and performance of young athletes (Yu, 2007). Youth soccer has a greater reported increasing injury rates than many other contact sports, according to recent studies (Watson *et al.*, 2019).

Children are particularly at risk for these types of sports injuries, but adults can get them too (Heitz, 2018). Medical investigation of any sports injury is important, because you may be hurt more severely than you think (Bailey, 2010). For example, what seems like an ankle sprain may actually be a bone fracture (Mellet, 2013). It is important that the governing bodies of these sports proactively manage the injury risks associated with every aspect of their sport (Fuller *et al.*, 2015).

Despite the fact that all types of sports have a potential for injury, whether from the trauma of contact with other players or without contact, or from overuse or misuse of a body part (Lankhorst, 2019). This has not been the trend with Rugby union in recent years because of several rule modifications and the 1995 advent of professionalism (Brooks, 2008).

Trends in rugby union injury epidemiology indicates higher incidence of injury than other team sports (MacQueen, 2010), an apparent increase in injury risk in professional and amateur games since the advent of professionalism, significantly higher incidence of injuries during matches compared with training, and a high proportion of tackle injuries (Brooks & Kemp, 2008).

Increased physiological demands are a key factor in the increasing injury occurrence among junior athletes to reach elite level (Booth, 2017). This has prompted them to often have high load, intensive and longer training periods causing higher injury rates (Gabbett,

2016). In addition, the demand for improved performance has also contributed to the subsequent rise in chronic and overuse injuries experienced by athletes across all ages and levels of play (Ekstrand, Waldén, & Hägglund, 2016; McGuine et al., 2017).

The increased high game intensity heightens the risks of acquiring injuries in rugby the game (Pollock & Kirkwood, 2016). Rugby is invariably characterized by frequent player-to-player contact events incorporated within intermittent bouts of high intensity activity (Quarrie, 2016), even though the playing laws and match durations vary throughout the younger age groups in comparison with the adult game, injuries still occur (Roberts, Trewartha, Higgitt, El-Abd, & Stokes, 2008).

In addition, the high numbers of collisions and extremely hard body contacts tackles have contributed increased public concern at youth level due to the associated risks of injury to players perceived as being too high (Carter, 2015). Furthermore, the aggressive nature of the sport with hard physical body collisions (Glassbrook, 2019) and high speed are the major sources of injuries to players in this sport (McKittrick, 2016).

It has also been revealed that musculoskeletal injuries commonly occur in rugby due to the physical nature of the game (Williams et al., 2017).

Lack of conditioning (Kemp *et al.*, 2013), and improper forms of skill execution (Fuller et al., 2015) and failing to warm up also increases the risk of rugby injuries (Davis, 2020). In addition, poor technique and structural abnormalities can also contribute to the development of chronic injuries (Aicale, 2018).

Differences in fitness and skill levels (Yeomans, 2018), ground conditions (Nyagetuba, 2015), refereeing standards (Kordi, 2013), attitudes towards aggression and violence contribute to injuries in rugby (Cusimano, 2016).

In addition, although non-modifiable, age is one of the most straightforward risk factors to assess and can be used to identify at-risk subgroups within a population for the occurrence of rugby injuries (Bleakley, 2011)

Several studies have been conducted and have revealed a number of injury incidences in rugby in

different areas. Williams et al. (2013) conducted a meta-analysis of injury patterns across senior professional men's Rugby, with pooled estimates indicating an overall match injury incidence rate of 81 injuries/1000 player-match-hours (95% CL 63-105) and a mean severity of 20 days for match injuries (95% CL 14-27). Concussion has the highest match injury incidence, with the English Rugby Football Union (RFU) reporting a rate of 15.8/1000 player-match-hours in 2015/2016 (Rafferty et al., 2019).

This contrasts with earlier injury surveillance in 2006 reporting concussion incidence to be 1.4/1000 player-match-hours within South African professional rugby union (Holtzhausen, 2006), In addition, some studies in the Scottish league comparing junior teams and the senior teams, found the injury incident rate was higher in the senior team compared to the junior teams (Nicol et al., 2010; Sharp, Murray & Macleod, 2001; Garraway & Macleod, 1995). This shows that high injury incident rates are recurrent themes of injury epidemiological studies in the sport of rugby (Gabbett, 2000). Freitag and colleagues' meta-analysis (2015b) revealed an overall match injury incidence rate of 27 injuries/1000 player-hours (95% CL 13-54) in youth Rugby, irrespective of injury definition. This figure is greater than match (game) injury incidence values in youth ice hockey (9/1000 player-hours – medical attention / time-loss injury definition applied)

(Emery & Meeuwisse, 2006) and soccer (16/1000 player-hours – time-loss injury definition applied) (Junge, Cheung, Edwards, & Dvorak, 2004a), but noticeably lower than injury incidences in youth Australian Rules Football (77/1000 player-hours – medical attention definition applied) (Romiti, Finch, & Gabbe, 2008), and high school American Football (84/1000

player-hours – medical attention / time-loss injury definition applied) (Meyers & Barnhill, 2004).

Moreover, the pooled estimate from youth Rugby is one-third of that which was calculated in professional Rugby (Williams et al., 2013). It is evident that data concerning players' injuries at all levels such as professionals, semi-professionals, amateurs and youth leagues is not well coordinated (Hoskins et al., 2006).

An initial study in Scottish community Rugby identified that players aged 25-29 years were at three-times greater risk of injury when compared with players aged younger than 16 years, albeit without accounting for confounding factors (Lee & Garraway, 1996). This finding was not upheld by a study in New Zealand community Rugby players, which showed that the association between age and injury risk between youth and adult age groups was not sustained following multivariate adjustment for other risk factors such as playing level and previous injury history (Quarrie et al., 2001). More recently, research conducted in a similar demographic of New Zealand community Rugby players did identify an association between increasing injury risk from 13-15 year-olds to >35 year-old players after adjusting for other significant risk factors (Chalmers, Samaranayaka, Gulliver, & McNoe, 2012). The increased risk in adult Rugby compared

with youth playing levels may be the result of differences in the general physical demands of match-play (Austin, Gabbett, & Jenkins, 2011; Read et al., 2017; Roberts et al., 2008), Furthermore, at amateur level there is evidence of more injuries especially in poorer performing clubs (Rafferty, 2019), but recent research has shown injury prevalence and incidences being the same at all the levels of play (Darrall-Jones, Jones, & Till, 2015). Ljungqvist (2009) cautions that all athletes would want to perform to the best of their ability but injuries prevent them, and there is no guarantee that these injuries will occur but measures should be put in place, such that when this does occur it is handled professionally.

There is even evidence to state that there is little information concerning injury occurrence among rugby players (McIntosh, 2005) in secondary schools in Uganda (URU). The scanty studies showed and reported in literature in Uganda are about incidences of injuries in rugby at national teams (<https://kawowo.com/2020/03/29/uganda-rugby-cranes>) and most of the studies are carried out on professional players, semiprofessional players, as well as rugby competitions among youth and at secondary schools in South Africa (Constantinou, 2015) and developed countries such as New Zealand (Quarrie, 2017), Wales, USA (Sabesan, 2016), England (Hislop, 2017), France (Lipert, 2021), Australia and many more (Hislop, 2017). Therefore, the need for this new study is required

1.2 Statement of the Problem

Rugby is associated with an increase in number of injuries due to increase in its participation (Sabesan, 2016). The increase in participation has been noticed after introduction of sevens tournaments, increase in funded incentives like employment as a

career, offering trophies, money, bursaries and many more (Benson, 2014). This also resulted into increase in injury occurrence which reduce players' performance, scare them from continuing with the sport, limiting new players to join and affect the credibility of the sport in general (Herman, 2012). The current reports indicate that most injuries occur at amateur level where young players begin from (Yeomans, 2018). To this effect, World Rugby (WR), the international governing body for rugby union (rugby), and many Member Unions have established risk-based approaches to the management of rugby injuries (Fuller, 2016). For example, the World Rugby Union (WRU) came up with variations in the safety rules and strategies in under 19 rugby (Lopez, 2020) to reduce on the rate of injury occurrence among rugby players worldwide (WRU, 2019). Despite the initiatives and changes being made in the rules at amateur and professional rugby union football, injury profiles have not changed. It is assumed that some of these injury occurrence risks can be avoided and reduced because some are self-inflicted while others are inflicted from external environment. This can be achieved if all rugby stake holders like referees, coaches, managers, organizers and others work together

In Uganda, there is also increase in participation in rugby at all levels which in turn heighten the rates of injury occurrence. Un like in Uganda, several studies about injury occurrence in rugby at various levels have been carried out in many countries like South Africa, Wales, England and many more (James, 2014b; James, 2014a). The Uganda Rugby Union (URU) in conjunction with the Uganda Senior Secondary Schools Rugby Association (USSSRA) is the governing bodies responsible for to the implementation of the World Rugby Union safety rules and strategies in the secondary schools' rugby league. Despite the recommended safety rules and strategies being in place to be

implemented and followed, little is known regarding the continuous increase in occurrence of injuries among rugby players in secondary schools in central Uganda. This study therefore, sought to establish the common types of injuries and the factors attributed to the occurrence of these injuries in the year 2019 rugby league.

1.3 General objective

This study sought to establish the injury occurrence among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league.

1.3.1 Specific objectives

The study was guided by the following objectives:

1. To establish the common types of injuries among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league.
2. To determine the intrinsic factors attributed to injury occurrence among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league.
3. To establish the extrinsic factors attributed to injury occurrence among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league.

1.4 Research questions

The study was guided by the following questions:

1. What are the common types of injuries among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league?
2. What are the intrinsic factors attributing to injury occurrence among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league?

3. What are the extrinsic factors attributed to injury occurrence among rugby players in Secondary Schools in Central Uganda in the year 2019 rugby league?

1.5 Significance of the study

The study provides information for coaches to help them prepare their team players in accordance to the safety rules and guidelines put in place by the world rugby union in order to minimize injury occurrence in the sport. This helps the coaches to advise and equip the players with safety gear like mouth guards, head masks and knowledge about the safety.

In addition, coaches get important information about injuries and factors attributing to their occurrence. This guides them on how to handle each situation thus improving their training programs through proper skill teaching leading minimizing of injury occurrence in rugby.

The study provides important information to head teachers and games teachers of schools that participate in rugby to adopt the safety requirements, procedures and equipment of the players through including them in their budgets, recruiting well qualified and equipped rugby coaches for proper management of players thus minimize injury occurrence cases among them.

The study also equips the medical officers of schools and community who participate always in rugby with more information about rugby injuries and factors attributed to their occurrence so as to properly manage injury cases and risks attributed in the sport.

Rugby players in this study will understand more on injuries and how they can be intrinsically and extrinsically be inflicted. This will enable them to be more conscious about them and devise means of avoiding them.

The Uganda rugby union will use this information to strengthen the implementation of the safety rules and strategies. This will be achieved while addressing rugby stake holders like referees, sponsors, institutions of learning, rugby clubs management and players on issues concerning rugby injuries and factors associated to their occurrence.

The government through the ministry of education and sports and the national council of sports will be in position to use this research study findings when making policy reforms like sports safety policies especially in contact sport like rugby. For example sports reforms of safety can be made with reference to this research study findings and recommendations.

Finally, other researchers will use this study findings, recommendations and conclusions from on line publications, Uganda Rugby Union and from libraries of institutions of learning for comparison purposes so as to come up with concrete new studies about injury occurrence .

1.6 Conceptual Frame Work

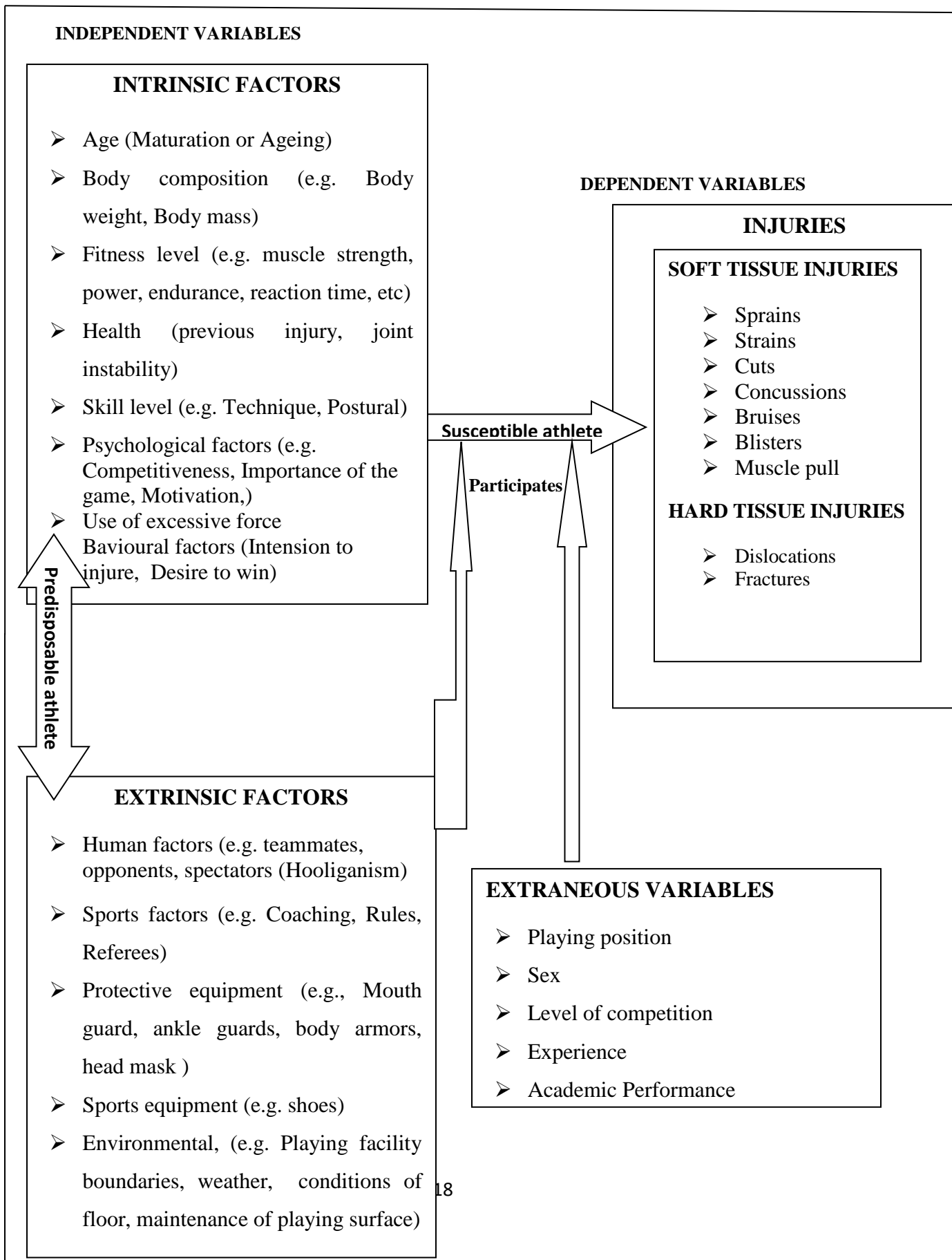


Figure 1.1 Indicates injury occurrence and the factors which attribute to their occurrence.

Figure 1.1. Conceptual framework was adopted from a dynamic, recursive model of etiology in sports injury by Meeuwisse et al (2007) and an Injury Causation Model which was originally described by Meeuwisse (1994) and adapted and expanded upon by Barr and Krosshaug (2005) and finally modified by the current researcher.

Meeuwisse et al (2007) on risk factors and injury mechanisms in sports injuries focused on the intrinsic and extrinsic risk factors for injury and developed a dynamic, recursive model of aetiology in sports injury. This injury prevention model from Meeuwisse et al (2007) highlights the fact that “adaptations occur within the context of sport (both in the presence and absence of injury) that alter risk and affect aetiology in a dynamic, recursive fashion.” It is suggested that one should look further than the initial risk factors preceding an injury and consider how these risk factors may have changed during various cycles of training or participation.

In addition, Meeuwisse (1994), Barr and Krosshaug (2005) in Injury Causation Model noted that sports physiotherapists and other sports professionals recognize that the identification of the causes of injury is an important step in injury prevention as this can lead to the development of effective injury prevention programs and this model may guide sports professionals. Furthermore, it is important for sports professionals to know why certain athletes may be at risk of injury risk factors and how injuries occur (injury mechanism), in order to understand the causes of sports injuries Barr and Krosshaug (2005). They also added that, sports injuries are rarely the result of a single factor, and can

generally be attributed to an association of circumstances. Also, keep in mind that an athlete's risk of injury is not a constant and is likely to change over time.

The study on risk factors and injury mechanisms in sports injuries is related in a number of ways with this new study on injury occurrence among rugby players in secondary schools in central Uganda in the 2019 rugby league. The new study conceptual framework indicates the injuries and the factors attributing to injury occurrence in rugby among rugby players. The factors are the independent variables and broadly categorised into to intrinsic and extrinsic factors. Intrinsic factors are defined as factors associated with the athletes' individual characteristics, such as anthropometric measurements, nutrition and psychological factors and on the other hand, extrinsic factors are defined as factors related to the environment, climate, equipment and training.

Intrinsic factors of the study include; Age, this can lead to injury occurrence depending on maturation or ageing athletes. It is assumed that young aging athletes are more susceptible to injuries than the mature. This is because everything on them is still growing like the bones, muscles, tendons, ligaments and other components. Also their skills at a young age may not be guaranteed compared to mature. Body composition is another factor which intrinsically can contribute to the occurrence of injuries. For example body weight, this can be in excess, normal or underweight. Fat mass, can also be either abnormal or normal, Body Mass Index (BMI) being normal or abnormal, and anthropometry issues can all contribute to injury occurrence. Another factor is fitness levels; this is the ability of a player to be in position to play a match or a number of matches with ease, this majorly can only be applicable when one's fitness level is good. Fitness can be in form of muscle strength, power, endurance, reaction time, and many

more. The moment the fitness level demands contribute to injury risks. In addition, Health factor in form of previous injury or joint instability also puts rugby athletes at injury risks. Playing with injury, it refers to engage in play when one has not fully recovered from a previous injury. Or, how ever much one recovers from previous but engages back to participate, there is always a felt risk factor of being reinjured. Skill level factors, this can be looked at in form of specific technique execution. Playing techniques, this is how a skill is executed during a game of rugby like during tackling, scrum down, line outs, and mauls. Postural stability is also under skill level factors, this how a rugby player positions himself during skill execution like during a scrum down, line out, running. Psychological factors can contribute to injury occurrence risks due to the competitiveness, importance of the game or motivation levels may lead to the use of excessive force during participation. Bavioural factors like intension to injure and desire to win greatly also contribute to the impact of injury occurrence risks.

The extrinsic factors are defined as factors related to the environment, climate, and equipment and training in which rugby players participate under which contribute to injury occurrence risks if not properly put into considerations. According to this new study, they include the following; Human factors, these can be in form of teammates, opponents, spectators. Injuries can occur through these factors for example teammate can inform their colleague to injure their opponents in order to have a softer ground for the rest of the matches. They have a belief that when they injure some it becomes easy to win over a match. Opponent players in addition may resort to play roughly in the match and in the way to retaliate, they end up injuring themselves and opponent players in that manner. Furthermore, spectators also contribute to injury occurrence sometimes through

hooliganism. They sometimes inspire their team players to injure opponent players because they not like them but in some cases they even injure themselves. In addition sports factors also contribute to injury occurrence risks. These can occur due to the actions of the referees, coaching, and rules of the game. For example, referee may be biased and fails to handle the game well after being bribed or having a side they wish a win. If the opponent team realizes that the referee is not fair to the calls made, it may annoy them, become aggressive and start playing roughly putting players on the risks of getting injuries. Coaches may also put their players at a risk of getting injuries through tasking players what they can manage or something out of game context. This can be through asking players to injure what they call better players from opponent side so as they handle the game, emphasizing a wrong technique of the game, it can also be a motivational prize from the coach like when you win something for you is waiting. All such actions from coaches can be put into action by players thus injury occurrence. The rules of the game also has some skills which put players at risks of getting injured if not appropriately executed, for example during the skill f line out, some players fall down badly, during a scrum down, it can collapse in, tackling can be done wrongly and all instances can greatly contribute to injury occurrence. Furthermore, Protective equipment factor, these are items which are used in rugby in order to provide a protective cover to different parts of the body during participation. For example mouth guard, ankle guards, body armors (shoulder pads, chest pads), head mask and others if not used, then rugby players are likely to have more chances of getting injured compared to those who use them. Another factor is sports equipment; these are used by rugby players during participation. For example the kind boots that they use can attribute to injury occurrence,

shoes/ boots with high or long or un balanced studs can attract injuries to users, also over fitting boots can cause corns and blisters to feet of rugby players. The environmental factors refer to the area of play and the surrounding of playing rugby area, for example playing facility fixtures and fittings such as goal posts, boundaries, weather, conditions of floor, and maintenance of playing surface. These environments can attribute to injuries in rugby, for example if the goal posts are not padded, they become very dangerous to players. With weather, in case rugby is played when it's too hot, players can get dehydrated leading to cramps. On the other hand, if it rains heavily, then the surface may be too slippery susceptible to injury risks. Also if the playing surface is rough such as, without grass, with rocky parts and debris can lead to injuries in rugby. If there are pot holes in the field of play, they may lead players to step into them hence injuries such as fractures, strains and others.

Furthermore, the injuries are the dependent variable and they are broadly categorised into soft tissue and hard tissue injuries. Soft tissue injuries are the ones that affect the flesh and include sprains, this is an injury of ligaments due to over stretching or tearing it. Strains are injuries that damage the tendons and muscles. A bruise , this is a common skin injury that results in a discoloration of the skin and blood from damaged blood cells deep beneath the skin collects near. Cuts ,this occurs when the flesh is striked with a sharp material and results into a cut. Concussions refers to a situation which results from a blow on the head or collision with the head and affects the right performance of the brain. Blisters, these are small pockets of fluid that usually formed in the upper layers of skin after it's been damaged and muscle pulls are strains that results into pain and may limit movement within the affected muscle group. On ther hand, the hard tissue injuries are the

ones that affect the bones such as, dislocation; this refers to when a bone moves from its original position. Fractures, refer to the crack or breaking of a bone partially or completely.

The extraneous variables such as the playing position, sex, level of competition, experience and academic performance. The playing position can lead to injuries in rugby, a rugby player plays either either a back or front role during a match. Some of the specific positions include, props, franker, winger, number 8 and more. This therefore means that the position one plays requires specific characters, tactics and abilities. For example wing players should always be sprinters and good kickers, these normally suffer injuries because of being tackled while making runs and this happens to other players while executing their roles. Sex of the rugby participants can also results into injury occurrence. Everyone can get inured in rugby but female have higher chances of being injured than male. This can due to the number of demands in rugby like speed, strength, power, endurance and others. This may make female players to be at a higher risk than male. In addition, the level of competition in rugby has also different risk levels to injury occurrence. These being secondary schools, they are still playing at amateur level and injury occurrence at amateur level is still high, this is due the low levels of caoching programs they get, limited techniques and tactical skill, poor equipment and facilities and many more, therefore such factors can not be under estimated. Furthermore, experience in the sport of rugby matters a lot in relation to the risks of injury occurrence. It is estimated that the more experience one gets in this sport, the more he can have higher chances of avoiding injuries. The players in this study have have not played rugby for long. Some its their first time/ year of participation in this competition, others two years,

three and above. Being that still they don't get regular trainings, their experience still remains wanting. Therefore, being that they have not played rugby for long, their fitness levels, skills, techniques and other requirements are still low a factor that can contribute to higher chances of picking injuries. Finally, being a schools' league, academic performance also attribute to injury occurrence. The playing schools in this league are traditional academic giants in Uganda and the academic competition at one time cause these students always to be at logger heads and when they meet in any activity like sports, they tend to play aggressively to show that they can be giants both in academics and sports. Therefore, the aggressive play of show offs on certain occasions causes injury occurrence in rugby.

1.7 Scope of the study

The study was delimited by the following;

1.7.1 Geographical scope

The research study was carried out in schools within the districts of Kampala, Wakiso and Mukono. These are located in Central Uganda and Uganda is one of the five countries making the East African region.

1.7.2 Time scope

Data was collected from February to April 2019. This was the period when the rugby secondary schools' league was played.

1.7.3 Content scope

The research study covered the types of injuries, the intrinsic and extrinsic factors for

the occurrence of injuries among rugby players in secondary schools in central Uganda.

1.8 Limitation of the Study.

The study was limited by following;

Weather was one of the limitations during the study. Sometimes when it rained during matches and the referees used not to stop the matches. Being that almost all rugby facilities had no shades nearby to watch from while it was raining; it made the researchers not to observe well some instances and missed some recordings of the games for some minutes due to the rains.

Furthermore, the playing schools sometimes did not follow well the match fixtures schedules because of the schools programs like visitations and class meetings. This made the researcher sometimes not collect the data as per the fixtures due to such school programs. Time and money was wasted due to such circumstances of postponed matches. However, new fixtures for the postponed matches were given to the researcher for complete data collection.

In addition, the organizers also changed the venue in which semifinal matches were to be played from as per the fixtures. This made the researcher to bounce from the venue on the fixture to another venue and this wasted some minutes in travelling from one venue to another. However, the researcher communicated to the organizers and directions of the venue were given and data was collected accordingly.

1.9 Operational definitions of terms

Injury: This referred to all soft and hard tissue damages that rugby players suffered during the secondary schools' rugby league which was played from February to April 2019.

Rugby players: Students who played the sport of rugby in secondary schools in central Uganda during the rugby season that took place between the months of February up to April 2019

A secondary school: This referred to an organization that provides both lower and upper secondary education.

Intrinsic factors: These referred to all self-contribution factors that attributed to injuries during the secondary schools rugby league in the year 2019.

Extrinsic factors: Referred to all external factors that contributed to injuries during the secondary school rugby league in the year 2019.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

In this chapter, the researcher reviewed literature and related studies on objectives like, the common types of injuries, intrinsic and extrinsic factors attributed to occurrence of injuries and used to reduce occurrence injuries among rugby players in Secondary Schools in Central Uganda.

2.1 Common types of injuries among rugby players

Literature looked at soft and hard tissue types of injuries, and either the lower or upper body parts of the body were commonly affected by injuries.

Rugby as a game is characterized by different types of injuries (Collins et al., 2008). Haseloer et al. (2010) shows that rugby has the highest reported injury incidences than any other sport. The epidemiology of injuries has been extensively studied among professional and amateur players especially in developed countries (Kaplan et al., 2008).

Injuries in rugby can be categorized into both soft and hard tissue injuries. According to Finch (2006), rugby injuries are classified as soft tissue and hard tissue injuries.

2.1.1 Soft tissue injuries

A soft tissue injury is the damage of muscles, ligaments and tendons throughout the body (Norris, 2018). Common soft tissue injuries usually occur from a Contusions (bruises),Sprains, tendonitis, bursitis, stress injuries, strains, a one off blow resulting in a

contusion or overuse of a particular part of the body (Santos, 2019). Santos, (2019) added that soft tissue injuries can result in pain, swelling, bruising and loss of function.

About 55% of the injuries affecting professional players are closed soft tissue injuries (McManus, 2004). These are followed by all other injuries, divided into capsular/ligament sprains (20%–34%), muscle/tendon strains or tears (20%–29%), open wounds (12%–27%) and bruises/hematomas (10%–22%). In addition, Kigozi et al (2011) found that the most common injuries sustained by Uganda Rugby players are soft tissue injuries. Furthermore, it was revealed that soft tissue injuries were the highest sustained in the high school Zimbabwe rugby league 2015 (Chiwariidzo, 2015). It was also found out that the soft tissue injuries were the most common injuries that occurred during the world cup 2011 (Namadire, 2013). Finally, soft tissue injuries occurred during the international rugby sevens series from 2008-2013 (Fuller, 2015).

Concussions are some of rugby injuries and they occur after head collision. Rates of match play concussion have been recorded as rising in both the professional and community adult rugby union game (Rafferty, 2019). In the 2014–2015 professional season in England, there were 13.4 concussions recorded per 1000 player-hours for matches up from 5.1 per 1000 player-hours in 2011–2012, whereas the rate was 2.63 per 1000 player-hours in community match rugby in 2014–2015 compared with 1.37 per 1000 player-hours in 2011–2012 (Williams, 2016). An increasing awareness of concussion in the professional game by players, coaches, referees and medical staff is thought to explain some of the increase in rates (Smith, 2017).

Mcqueen & Dexter cited Best *et al* investigated on 546 elite players in two rugby seasons. The authors found that Hamstring injuries were 5.6 per 1000 hours of play

during match compared to 0.2 per 1000 hours during training. The risk of hamstring muscle injury was due to previous injury, this has been identified (Viljoen *et al.*, 2009) to be associated to the volume of training. However, hamstrings, calf, quadriceps, and ankle have been reported to be common to the Backs, and for the injury to hip flexors reported common during training sessions (Brooks, Kemp, Fuller & Reddin, 2005). Generally, thigh, knee, and ankle injuries are the commonest injuries in rugby union.

Brooks, Fuller, Kemp and Reddin (2005) reported thigh hematomas, and hamstrings affecting the Forwards and Backs respectively. The authors further reported the knee ACL and neck affected the Forwards. Gabbett (2003) and Oluwatoyosi & Owoeye, 2010 indicated that, 36.4% were muscle related injuries in all athletics games in Nigeria. And therefore, reported the nature of injuries were mostly muscular leading to strains, joints sprains and dislocations, the skin having more of lacerations, abrasions and blisters, and few brain concussions and bone fractures were reported as well. Nicole, Pollock, Kirkwood, Parekh and Robson (2011) reported the nature of sports injuries by locations such as more ligament sprains with 10%, concussion and muscle injury being 6%, and the least being bone fractures. King, Clark and Kellmann, 2010 reported that, most type of injuries were strains and contusions. Junge, Cheung and Dvorak reported strains, sprains and contusion were common to soccer and rugby football. In addition, the hamstring strain was the most common injury to affect England's World Cup winning squad back in 2003 (Sporri, 2019).

A study on injuries in rugby by Rasmus (2021) on Polish rugby players compared with French players found that training injury incidence (TII) and incidence proportion (IP)

were higher in Poland than in France ($p < 0.05$) with the sprain as the most frequent type of injury in all rugby players.

According to the National Institute of Arthritis and Musculoskeletal and Skin Diseases report there were more than 2.6 million children younger than 19 years of age who were treated in emergency departments for musculoskeletal injuries due to sport participation. Musculoskeletal injuries were also the most common reason for injury-related visits to primary care physicians. The most common injuries were sprains and strains, growth plate injuries, and repetitive motion injuries. Most injuries were reported in basketball followed by track and field, American football, baseball, softball, soccer and gymnastics.

According to Zhou, (2020), A total of 67 secondary ACL injuries (63 males, 4 females) were identified in professional athletes that participated in Australian Rules Football (AFL), Baseball, Basketball, American Football (Football), Hockey, Rugby, or Soccer at the time of injury. Of the secondary injuries documented, 55% were re-tears of soft tissues and 93% occurred in noncontact scenarios.

2.1.2 Hard tissue injuries

Hard tissue injuries involve damage to the bones or teeth and are caused as a direct result of force applied to the body, resulting in fractures, dislocations and other breakages (Aicale, 2018).

Hard tissue injuries cannot be ignored in sports including the game of rugby as par the study. According to McManus (2004), hard tissue injuries occurrences stand at, fractures (4%–14%), dislocations/subluxations (4%–10%) and finally, cerebral concussion (3%–10%) compared to soft tissue injuries. Furthermore, a review of all

seven series data revealed that the most common type of injury was joint dislocations for both back and forward players (Ilia et al., 2014). This was consistent with other data from the rugby World Cup 2011 (Brown et al., 2015). In addition, hard tissue injuries like dislocations, concussions and fractures are common in amateur rugby competitions than professional (Kaux et al., 2015). The rate at which these types of injuries occur however, have decreased in recent years (Collins, 2008), as the rules of the game relating to entry into the scrum have changed, to ensure greater safety for the players (Quarrie et al., 2013).

Furthermore, according to a study carried out between 2008 and 2011 in South Africa, the rate of acute spinal cord injuries with permanent neurological damage and traumatic brain injuries remains at 4.25/100,000 players (Verhagen et al., 2012). In addition, due to a low incidence of this type of injury and to a lack of epidemiological census, there exists an issue here to estimate exactly the number of injuries of cervical spinal cord in any given country (Freitag et al., 2015). In Uganda, Kigozi et al., (2011) found that hard tissue injuries sustained by Uganda Rugby players are at an increasing rate. Some injuries have more serious consequences than others. Spinal injuries can lead to catastrophic neurological consequences and deaths cases have been reported (Bleakley, Tully & O'Connor, 2011).

The epidemiology of injuries has been extensively studied among professional and amateur players especially in developed countries (Kaplan et al., 2008). Rugby as a game is characterized by different types of injuries (Collins et al., 2008). Haseloer et al. (2010) shows that rugby has the highest reported injury incidences.

Injury occurrence incidents can be divided depending to the parts of the body which are affected. The parts which are affected are either lower limbs or upper limbs. Furthermore, Haseler et al. (2010) categorized injuries into lower limb and on upper limb.

According to Fuller et al. (2007), the lower limb injuries were the most common among all players for the whole duration of the international rugby sevens series from 2008 – 2013. In addition, Lower limb injuries were also found to be the most common site of injury during the Rugby World Cup 2011 (Nemadire, 2013). Kigozi et al., (2011) found that the most common injuries sustained by Uganda Rugby players are lower limb 41.2%, upper limb 24.6%, head and neck 26.4%. In addition, Verhagen et al. (2012) reported that most injuries occurring during a match affect the lower limbs, followed by head and upper spinal injuries, the upper limbs and finally the torso.

On the other hand, Lopez et al. (2012) found that head and neck injuries were the most common site of injury among a cohort of American amateur sevens players during a tournament. Furthermore, it is important to note that, Best et al. (2003) found that head, neck and face injuries were the most common location of all injuries sustained. However, among professional players, the head is the part that is most often affected followed by the knees, thighs and ankle, then the shoulder, hand, leg and foot (Weidmann, 2012). It is important to note that, the head, neck and face injuries were the most common location of all injuries sustained during the related study that was carried out from South Africa rugby league during 2008-2011 (Best, 2003). In addition, during the rugby series league in New Zealand in 1999, upper limb injures were recorded more than the lower limb injuries (Durie, 2000). Furthermore,

Nemadire Z, (2013) revealed that head and shoulder injuries happened more in the Super 8 Rugby League world cup 2011 than the legs.

According to Bohu and Hager (2014), for five consecutive seasons, $1.5\pm 0.5\%$ of injuries reported by the French Rugby Union players were episodes of shoulder dislocation/ subluxation. The mean rate of shoulder dislocation/ subluxation in relation to all licensed players was $4.9\pm 2.8/10,000$ in women and $9.7\pm 2.9/10,000$ in men. Senior professionals had the highest risk and rugby school players had the lowest risk of shoulder dislocation/subluxation. The shoulder is a joint with the highest risk of dislocation during sports. The highest incidence was found in senior professionals, which is comparable to the results in the literature for all injuries.

Heidari, (2009) stated that there are around 14 cases of traumatic hip dislocations reported in literature during recreational sports like soccer, skiing, basketball, gymnastics, equestrian sports and even jogging. Only four have had associated fractures with the dislocation. In addition, Posterior fracture-dislocation of hip is uncommonly encountered in rugby injuries (Greer, 2009). Greer added that lower limb fractures account for two percent each in this sport. There is a range of upper extremity musculoskeletal injuries, with the more severe spectrum including clavicle and forearm fractures, gleno-humeral and acromio-clavicular subluxations or dislocations, and rotator cuff tears (McIntosh, 2010).

Rates of lower extremity injuries are slightly higher than for the upper limb. Severe lower extremity injuries include knee and ankle ligament injuries, ankle fractures, and tears of the anterior and posterior thigh muscles (Karger, 2005).

2.2 Time of occurrence of injuries among rugby players

Injury occurrences in sports can happen by either with contact or without contact (Mizobuchi, 2016) at any time of the game either first half or second half (Zhou, 2020).

According to Finch (2006), few injuries take place during the first half compared to second half. In addition, Durie (2000) on the other hand showed that most injuries take place during the second half (55% -70%) than in the first half (30% -45%). Furthermore, Freitag et al. (2015) noted that the number of injuries increases as the match progresses, but it appears that the most critical periods are the second and, above all, the fourth quarter (Nemadire, 2013).

Kaux , (2015) cited that more injuries take place during the second half (between 55% and 70%) than in the first half (between 30% and 45%). In addition, Tierney (2018) added that rugby union players sustain more injuries in the later stages of a game especially in the final quarter of the game than the first ($p=0.04$) and second ($p<0.01$).

Brooks, Fuller, Kemp and Reddin (2005) reported more injuries in the second half, especially in the last quarter of the game. Several authors (king, 2006) have suggested this, because in professional sports, winning is the order of the day. Gabbett (2003) reported more injuries in the first half of the game. It is likely that, in the power based games; players are stronger, and aggressive, so the chances of acquiring injuries are high. Nicol, Pollock, Kirkwood, Parekh and Robson (2011) reported 65.5% match injuries in second half but the authors carried out their study in the second half of the season. However, the author highlighted that injuries are more in the second round of the rugby

season, hence the motivation of the study period. Nevertheless, Garraway and Macleod reported more incidences of injuries in the first round of the season with a prevalence rate of 15.2 per 1000 hours, compared to the second half of the rugby season with a prevalence rate of 12.3 per 1000 player –hours. The same report by Grobler (2004) more injuries in the first season in the top-level high schools in South Africa when the author conducted controlled experiment on student, to investigate on the factors associated to cause of sports injuries in top level school in South African. In the study conducted by Sharp, Murray and Macleod (2001) reported 70% match injuries occurring in the second half compared to 30% in the first half, however the first half of the seasons registered more bleeding injuries compared to second half of the seasons. This was a cohort study of 7 years following senior clubs in the 8 divisions in Scotland.

According to McIntosh (2005), more injury rates in Australia rugby were reported between 7 and 18 injuries per 1,000 hours populations, 46% of game injuries were observed in the first half followed by second half. Contrary, majority of these injuries take place during the last 20 min of the game (35%) (Kaux, 2015). Achilles tendon injuries are more likely to occur in the first half of the game (Le Goff, 2015).

Haseler et al. (2010) also reveals that a lower proportion of ankle injuries occur during the first half compared those happening during second. The majority of these injuries take place during the last 20 minutes of the game (Kaux et al., 2015). He added that achilles tendon injuries are more likely to occur in the first half, while collateral ligament ankle injuries are more likely in the second half (Quarrie et al., 2013). The injury rate increases as the match progresses especially with the shoulders (Brown et al., 2015). Knee injuries most often occur in the second half (58%) and mainly during

the last 20 min of the match (32%), with a lower incidence at the start of the match (Lopez et al., 2012).

According to Fuller and Taylor (2013) most injuries occur more often in the third quarter of matches than other match periods, although the incidence rate is only possibly greater than the second and final quarter. In addition, injury incidences increase as playing standards increase (Lorenzenton & Wedren, 2007). Furthermore, Muma, Guthaiga and Saidi (2011) reported an incidence of 55.4 injuries per 1000 match player hours among amateur rugby sevens players during a tournament in the United States of America.

Much of muscular injuries and injuries to the head and neck are the most commonly sustained injuries in amateur rugby league and more often sustained in the latter stages of the season and during the second half of matches (Gabbett, 2015). He added that these injuries occur due to fatigue or accumulative microtrauma, or both. Furthermore, muscular injuries (haematomas and strains) are the most common type of injury (45.7 per 1000, 28.5%, $\chi^2 = 17.98$, $df = 7$, $p < 0.05$). Significantly more injuries occur in the latter stages of the season ($\chi^2 = 22.94$, $df = 1$, $p < 0.001$), with most injuries (70.8%, $\chi^2 = 162.29$, $df = 1$, $p < 0.001$) sustained in the second half of matches (Gabbett, 2015).

A comparison of incidence of injuries of amateur rugby union and soccer has indicated that injuries occur mostly in second half of the match than first half (Chalmers et al., 2012). In the same study, Fuller and Taylor (2013) found that rugby players sustained 1.5 times more than soccer especially in the second half of the match. They also had 2.7 times more match injuries than soccer players (Muma, Githaiga & Saidi, 2011).

Indeed rugby has consistently had the highest injury rate when compared to other sports like hockey and soccer as they occur throughout the match but the rate at which injuries occur in rugby is much more in second half than first half (Best et al., 2003).

According to the above reports, there are indications of disagreement about the incidences of rugby injuries during the seasonal periods, and tournament- match time. Several studies have indicated that the first half of the rugby union season has the highest risk to rugby injuries compared to the second season, and other authors have shown disagreement. In terms of match time, the several studies above have indicated that, players are more at risk of rugby injuries in the second half of the games, compared to the first half; however, other studies have reported significantly high incidences of rugby injuries in the first half.

2.3 Factors influencing occurrence of Injuries

The study factors which influenced injury occurrence were broadly categorized into intrinsic and extrinsic factors. Intrinsic factors included, Age (Maturation or Ageing), Body composition (e.g. Body weight, Body mass), Fitness level (e.g. muscle strength, power, endurance, reaction time, etc), Health (previous injury, joint instability), Skill level (e.g. Technique in tackling, Postural), Psychological factors (e.g. Competitiveness, Importance of the game, Motivation,), Use of excessive force, Bavioural factors (Intension to injure, Desire to win)

The extrinsic factors included Human factors (e.g. teammates, foul play, opponents, spectators (Hooliganism), Sports factors (e.g. Coaching or training program, Rules, Referees), Protective equipment (e.g., Mouth guard, ankle guards, body armors, head

mask), Sports equipment (e.g. shoes), Environmental, (e.g. Playing facility, playing position). Literature also revealed the same factors as they do influence injuries

2.3.1 Intrinsic factors

Tackling causes most injuries in rugby, the injury rate as the result of tackles can be divided as; tackles from the sides result into more injuries, followed by tackles from the front and least from behind (Lopez et al., 2012). In addition, Players who are tackled suffer more injuries than those who make tackles and the frequency increases for faster players (Fuller & Taylor, 2013). Furthermore,(Brown, Verhagen & Machelen, 2015) confirm a high rates of injuries among players being tackled from sides than those who tackle. The neck is the highly affected body part with injuries during tackles, followed by the head, the knee, the shoulder, the arms, the ankles and the thighs are least affected parts (Fuller & Taylor, 2013). A large proportion of dislocated shoulders occur during tackles (Querrie et al., 2007).In addition, Players who are tackled mostly suffered injuries to their lower limbs compared to their upper limbs and head (Fuller, 2008). It was also found out that tackles cause the largest proportion of knee injuries (Brown et al., 2015). Other research revealed that, players who were tackling mostly suffered injuries to their arms followed by the head and less suffer injuries on their lower limbs during American amateur sevens tournament (Fuller et al., 2007). Injuries are common during contact and tackling in particular. A higher proportion of injuries result from contact than noncontact mechanisms. Tackling, specifically, is the most common player activity at the time of injury and at the time of severe injury. Being tackled and tackling account for about half of high school and college football-related injuries (American Academy of Pediatrics).

Kirkwood, Parekh and Robson (2011) reported most injuries as contact, with 62.1% due to the tackles, 24.3% rucking, and 8.1% being caused by other mechanisms. Vilojoen *et al.* (2009) have reported another cause of sports injuries in the sport of rugby as the training techniques, causing an over load of players, leading to overuse, exertion and muscle fatigue injury mechanisms. Junge, Cheung, Edwards and Dvorak (2004) reported two thirds of the injuries were contact with another player in rugby football, well as in soccer, and the cause and mechanisms of injuries were equally distributed among the sporting codes. In addition, Brooks, Fuller, Kemp and Reddin (2005) reported 72 % of the injuries were due to contacts with another player, and involved mechanisms such as tackles mostly to the Backs because of high kinetic energy as in running in an open play, such that any simple tackle would cause a miss match or training injury

Burger *et al.*, (2014) found that tournament players within 13 years of age and below grade had a higher probability of both all tackle-related injuries and time-loss tackle-related injuries than those below 18 years of age grade. Other research has found the proportion of tackle-related injuries of all injuries consistent across age ranges for head, face and neck injuries where a high percentage of injuries attributable to the tackle. Evidence for all ages below 13 (50%), below 15 (53%), below 18 (45%) and below 20 years at (49%)

In addition, analysis by Rosendahl and Strouse (2016) revealed that sports-related injuries like musculoskeletal injuries were influenced by age of participants. The report noted that younger athletes sustained relatively milder non-specific injuries compared to older athletes. Children under the age of 10 years were most likely to have contusions, mild sprains, and injury to growth plates. Furthermore, Garraway & Macleod (1995) indicated

that, the age group between 19-24 years had most of injuries with 18.39 percentage compared to below 16 years and above 34 years age groups with 3.7 and 13.6 % respectively. The contact injuries caused 49% of the injuries with the tackle, ruck, scrum, line out, and others causing 15%, 8%, 12%, 6 %, and 6 % respectively. Erasmus and Spammer (2007) indicated that previous injuries caused 80% of the intrinsic injuries among players of age group between 15-16 years. Kaux, (2015) found out that most injuries (70%) occur following contact with another player .Tackling causes most injuries (between 36% and 58%), 23%–29% in players who are tackled and 13%–27% in players tackling; the frequency increases for faster players .Other studies confirm a higher rate of injury in players being tackled .The injury rate as the result of tackles can be divided as follows: 39.1% for tackles Sports 2015, 324 from the side, 30.4% for tackles from the front, 26.2% for tackles from behind. Of injuries suffered during tackles, 22% were to the neck, head or face, 17% to the knee, 14% to the shoulder, 10% to the arms and hands, 8% to the ankles and 8% to the thighs .Players who were tackled mostly suffered injuries to their lower limbs (51%), in comparison with their upper limbs (15%) and head (17%), while players who were tackling mostly suffered injuries to their arms (35%), followed by the head (28%) and the lower limbs (27%).

Poor techniques of executing scrum racks and mauls: It is reported that injuries happen more during scrum, racks and mauls than running and changing directions causes fewer injuries (Freitag et al., 2015). In addition, Scrum injuries can potentially be more serious particularly in relation to entry into it (Finch, 2006). Furthermore, it is estimated that approximately 40% of all rugby-related spinal cord injuries can be attributed to the scrum (Durie, 2000). In relation also, during the engagement phase,

the forces generated at the interface between the two front rows during scrumming are considerable and include forces in multiple directions, mainly forward but also downward (Austin et al., 2011). However, due to factor that causes injuries, this is the reason of the changing rules of the game relating to entry into the scrum so as to avoid and reduce this type of catastrophic injury (Collins et al., 2008).

Contact is another factor attributing to injuries in rugby. The cause for around half of ankle injuries happens more due to contact incidents (Best et al., 2003). The majority of shoulders injuries occur during contact with another player (Collins et al., 2008). In addition, more injuries occur due to players' contact during play and 73% of contact injuries are the knee injuries (Brown, 2013). Furthermore, during the last World Cup in 2012, contacts caused more injuries during training than during matches (Fuller & Taylor, 2013).

Low fitness levels cause rugby injuries. Many players both at professional and amateur level suffer injuries due to their low fitness standards (Collins, 2008). Furthermore, a number of players were found not ready to play in the junior league in South Africa (Taylor, 2013). In addition Kigozi, (2011) reported that many rugby players are un fit to play rugby due to commitment from studies and work.

To classify sports injuries by sex and sport, Schroeder *et al.* (2015) conducted a retrospective cohort study that focused on older children (approximately 14–18 years of age) with overuse injuries. The authors collected data from the High School Reporting Information Online study generated in the 2006–2007 and 2011–2012 school years to assess a large national sample. Authors noted that the incidence of overuse injuries in young athletes is increasing overall, attributed to increasing participation and intensity of

high school sports. Their study found that incidence of acute traumatic injury was higher in boys compared to girls. They also found that girls had a higher rate of overuse injury, particularly within track and field and field hockey and girls sustained more overuse injuries of the lower extremities compared to boys. The greatest number of boys with overuse injuries was seen in swimming and diving. In addition, Analysis by Rosendahl and Strouse (2016) of sports-related injuries showed, sex was one of the factors influencing musculoskeletal injuries. They reported a sports injury incidence of 1 in 10 children per year with higher overall incidence and greater severity of injury in boys than girls.

2.3.2 Extrinsic factors

Injuries also occur as the result of foul play (Taylor, 2013). Foul play is rarely penalized by the referees (Chalmers et al., 2012). Head injuries and muscular contusions were found to occur more frequently in foul play than non-foul play (Ilia et al., 2012). During the last World Cup in 2012, foul play tackles caused the most injuries in matches (Fuller & Taylor, 2013).

The poor playing facilities also cause injuries in rugby. The playing facilities which were in poor conditions during the junior rugby league in Zimbabwe before 2015 caused more bruises among player than any other factor (Chiwariidzo, 2015). Few studies evaluate the impact of the grass on injuries in sports. In Rugby Union, only one was found (Collins et al., 2008). When a match takes place on grass, 26.9 injuries per 1000 match hours are recorded; on synthetic surfaces, injury rate seems to increase to 38.2 per 1000 match hours. However, further studies are needed to clarify the relation between the surface and injuries in Rugby Union

It was also noted that poor training programs used by coaches lead to injury occurrences. O'Coner, (2011) revealed that a number of players in rugby have sustained injuries because of the contributions of their coaches for using poor coaching programs. In addition, Fuller, (2013) noted how un qualified coaches led to severe injuries of their players especially at amateur levels. In addition, Vilojoen *et al.* (2009) reported another cause of sports injuries in the sport of rugby as the training techniques, causing an over load of players, leading to overuse, exertion and muscle fatigue injury mechanisms. Junge, Cheung, Edwards and Dvorak (2004) reported two thirds of the injuries were contact with another player in rugby football, well as in soccer, and the cause and mechanisms of injuries were equally distributed among the sporting codes.

Playing position also contributes to injury occurrence in rugby sport. The Forwards have been identified as the broad player position with greater risks to rugby injuries. Gabbett (2005) described the two broad positions of players such as Forwards; as all those players that participate in the scrum, and the Back players known as the Backs as those players all out of the scrum aspect of rugby football play.

Several authors (Brooks, Fuller, Kemp and Reddin (2005; King, Clark, and Kellmann, 2010; Gabbett, 2003) have identified Forwards, and the specific positions such as fly off, and hookers with more risk of rugby injuries. Gabbett (2003) reported Forwards with more injury risk, with 68 per 1000 player hours occurring among the Forwards compared to 57 per 1000 player hours occurring to the Backs. The above authors agreed that, specific positions such as hookers and outside center report more injuries. This is because they are in positions where they have to absorb and transfer greater forces during

scrumming, however the same authors added that, Right. Locks and flankers are also at risk of severe rugby football injuries.

Gabette (2005) urged that, hookers and props compared to the fullback and half Backs carry the highest risks of rugby injuries. Garraway and Macleod (1995) reported that Forwards compared to the Backs were three times more at risk to rugby footballs injuries during their study in Scotland. Sharp, Murray and Macleod (2001) reported 60% of the injuries occurring to the Forwards, during their investigation of Scottish rugby union for senior clubs. However, Nicole, Pollock, Kirkwood, Parekh and Robson (2011) reported 59.4% injuries among the Backs, and 40.6% among the Forwards. In the specific positions, these authors reported wings with most at risk of rugby injuries at 21.6% and centers with 18.9% of the total sports injuries (Garraway and Macleod, 1995). Sharp, Murray, and Macleod (2001) reported flankers, props centers and wings as risky positions. In another development Mahaffey *et al.* (2006) identified wings, centers and flankers. Holtzhausen, Schweltnus, Jakoet and Pretorius (2006) identified centers and full Backs with highest incidences of rugby injuries, in addition, centers and wings had the most intermediate and severe injuries.

Use of protective equipment like head gear reduces injuries in Australian football and rugby league (Patton, 2017). In addition, protective equipment affords the greatest potential for the protection of a player being able to avoid injuries in rugby and other sports (Lipert, 2021). Furthermore, the higher incidence of injuries is determined by failure to use protective gear. Use of these gear greatly prevent injury occurrence in rugby (McIntosh · 2005). Evidence also suggests there is variation in injury risk between .Players who wore headgear reported feeling safer, more confident (Barnes,

2017). Contrary, many parents may insist on their child wearing headgear in the belief they are reducing the injury risk, when in fact the opposite could be that wearing protective headgear may actually result in an increased risk of injury. This means that at the youth level, parents may insist on their child wearing headgear in the belief they are helping to reduce the injury risk, when in fact the opposite could be true (Pettersen , 2002).

2.4 Proposed strategies to reduce occurrence of injuries among rugby players

In order to reduce injury occurrence, a number of strategies were proposed to be put in place as also seen from the related literature. The following were the strategies; the law concerning the scrum should be emphasized, Rugby smart and Boksmart injury prevention programmes should be adopted, use of safety gears, coaches should equip players with the right techniques of executing rugby skills, planting grass in bare areas of rugby sports facilities.

First of all, the law concerning the scrum should be emphasized. According to Querrie et al. (2007), more stringent variations in the law particularly in the scrum have been implicated in the lower incidence among junior players (Brown et al., 2013). In addition, these variations in the laws include, not pushing a scrum more than 1.5m and not being able to wheel a scrum (Brown, 2013). In New Zealand these law changes have been found to reduce the incidence of spinal cord injuries among players (Chalmers et al., 2012).

According to Brown et al. (2013), injury prevention in all sports follow a certain sequence called ‘sequence of prevention’ model: There are four steps to the model

namely, establishing the magnitude of the sports injury problem, establishing the etiology and mechanism of the injury, introducing preventive measures and assessing the effectiveness of these preventive measures by repeating step 1. In addition, Rugby smart and Boksmart are two injury prevention programmes in New Zealand and South Africa that have been developed in line with the sequence of prevention model (bleakly, 2011). Furthermore, Brown et al, (2013) found that within just four years of implementation of the Boksmart program there was a significant reduction in serious injuries in South Africa (Querrie et al., 2007). The Rugby smart programme of New Zealand also had a similar success story (Lopez, Galano& Black, 2012). This is a practical guide for playing Smart rugby, the primary aim of BokSmart guide is to provide rugby coaches, referees, players, and administrators with correct knowledge, skills, and leadership abilities to ensure that safety and best principles are incorporated into all aspects of contact rugby practices or matches. In New Zealand they introduce rugby smart program 2001specifically targeting the prevention of catastrophic cervical injuries, the findings indicated that, in the period of four years, the prevalence of spinal injuries had reduced especially during scrumage (Quarrie, Gianoth, Hopkins & Hume cited by McQueen & Dexter, 2010). The findings indicated that, in the period of four years, the prevalence of spinal injuries had reduced especially during scrumage (Quarrie, Gianoth, Hopkins & Hume cited by McQueen & Dexter, 2010). The rule changes in England that “depower” the scrum in under-19 athletes in the 1980s-1990 are reported to have reduced the incidence of spinal injuries in some countries (Haylen, 2004).The techniques of tackling is very important in reduction of the sports injuries, McQueen & Dexter highlighted that, hookers have high risk of injuries because of their position is compromised, and also

coupled with compression forces at the scrum engagement. And back line (wings and full Backs) are at a risk of injuries because of the tackles, and occur frequently at high speed, therefore the technique of tackling is significantly very important to the coaches and the referee so as to prevent severe injuries amongst these players. Coaches must help in health promotion. In the study by Sharp, Murray and Macleod (2007) reported to have used the referee to record data on all the replaced players due to injuries 1990-1991 season, later in 1993-1994 a law allowing or accepting up to 3-4 replacements was passed.

Use of safety gear by rugby players was also proposed to reduce occurrence of injuries. Professional rugby players should have access to protective gears (Lopez et al., 2012). Furthermore, safety gears are well remunerated to offset the potential risks of injury (Querrie et al., 2007). In addition, Brown (2013) found that most injuries sustained by amateur rugby players are sometimes due to failure to use safety gears and usually result in a loss of training, playing and study. Worldwide preventive measures have been implemented by various unions to reduce the incidence and severity of injuries (Bleakley et al., 2011).

Coaches should equip players with the right techniques of executing rugby skills. In addition, According to Muma, Githaiga and Saidi (2011), injury prevention strategies to reduce the incidence and severity of rugby injuries include coaching on defensive skills, correct tackling technique, correct falling technique and methods to minimize the absorption of impact forces. Verhagen et al. (2012) argues that to reduce scrummaging injuries at lower rugby levels, props should crouch, touch, pause and then engage. This technique is called Depowering the Scrum. Kaplan et al. (2008)

asserts that another alternative is Sequential Engagement where the front rows engage first and then the second row joins in, so that a stable scrum is established. According to Fuller et al. (2007), physiotherapy can sort these injuries out now so that your chances of playing an uninterrupted season are much higher. Using the right techniques and equipment for the sport can help prevent injury (Marshall, 2005)

Planting grass in bare areas of rugby sports facilities. The comfort the playing facility may be, the lesser the incidences of occurrences of injuries in rugby especially bruises (Collins, 2008). Chiwaridzo, (2015) added that the surface of the playing facilities can facilitate the play with less impacts that cause injuries to player. He added that there were less injuries recorded during the rugby junior league which was played in Zimbabwe during the time when good facilities were used.

The use of proper diet and good hydration has been emphasized as way of preventing sports injuries, and increasing performance (Bahr, 2010; Bruckner & Khan, 2010). The BokSmart guide encourages the use of a diet that will provide a rugby player with nutrients that would meet the player's physical demands of practice, and still be able to provide enough energy for optimal performance when on match day. It further highlights that, compromised carbohydrates, proteins, fats, vitamins, mineral salts, and a slightest level of dehydration is likely to compromise focus, and hence impair performance.

The Proper training methods for a rugby football have been suggested to effectively prevent some types of injuries. Overuse or repetitive trauma injuries have been identified as the commonest type of injuries both in adults and in pediatric sports related events (Gabbett, 2003).

2.5 Related studies

A survey of netball injuries and conditions related to these injuries was conducted (Hopper, 1986) In 1983, during the winter Saturday afternoon season at the Western Australian Matthew's Netball Centre, 3108 players participated in the netball competition. The study examines the incidence of netball injuries and conditions related to these injuries. One hundred and fifty-eight injuries were surveyed throughout this fourteen week season. Each injured player filled in the first two pages of the questionnaire and the final page was filled in by the physiotherapist. Data was compiled and processed using the S.P.S.S. systems file including frequencies and cross tabulations. Many statistically significant results were recorded and recommendations for further investigation are included.

Basel et al. (2005) also conducted a study on Tennis injuries and the purpose of this chapter is to critically review the existing studies on the epidemiology of tennis injuries in pediatric athletes.. Data sources included published articles on pediatric tennis injuries, a previously published review by the authors and unpublished data. Most studies of tennis injuries show that they are of microtrauma origin, develop over time, and result in short times of absence from play. They involve all joints of the body, but have a higher incidence in the shoulder, back, and knee. Intrinsic and extrinsic risk factors may be related to the incidence of injury. Most injury studies in pediatric tennis players vary in the population studied, methods of injury evaluation, and risk factors studied. Prospective studies need to be done to completely discover all the factors involved in producing tennis injuries.

Bastos et al. (2014) conducted a study about young of both sexes practicing basketball are becoming more frequent and this consequently increases the risk of sports injury. The objective was to analyze the characteristics of injuries and associated personal and training characteristics in young basketball players. One-year retrospective cross-sectional survey with 580 basketball players was used. Basketball players were interviewed and questionnaires were used. A total of 167 of the interviewees reported injuries. Significant differences were detected regarding all variables and both sexes between athletes who had suffered injury and those who had not. A greater number of injuries occurred in females older than 14.44 years in comparison to younger females. In younger and lighter female athletes, the injuries were predominantly in the knee and ankle/foot. The male exhibited a greater risk of injury than the female. Greater age, weight and height were risk factors in both sexes. The most affected anatomic sites were the foot and knee.

Concerns about the significant injury risks in boxers was another related study which was conducted and the objective was to inform the continuing debate, updated information about the risk of injury for participants, and suitable means of modifying or preventing these risks, need to be identified. Data describing all professional boxing fight outcomes and injuries sustained during competition, from August 1985 to August 2001, were obtained from the Victorian Professional Boxing and Combat Sports Board. A total of 107 injuries were recorded from 427 fight participations, corresponding to an injury rate of 250.6 injuries per 1000 fight participations. The most commonly injured body region was the head/neck/face (89.8%), followed by the upper extremities (7.4%). Specifically, injuries to the eye region (45.8%) and concussion (15.9%) were the most common. About

three quarters of all injuries were lacerations/open wounds or superficial. No information was available on the mechanism of injury. Future research should collect information on the mechanism of injury, as this is crucial for the development and implementation of effective injury prevention strategies. A suggested boxing injury report form is provided to facilitate this.

Injuries in hockey were also conducted. Hockey, Canada's national sports probably the world's fastest team sport. The nature of the game makes injuries a common occurrence. This article reviews the literature on hockey injuries and identifies some of the changing trends over the past 15 years. Severity and incidence of injuries increase with the age and skill level of the player. There are fewer lacerations, eye injuries, and head injuries since helmets and facial protectors have become mandatory in minor hockey. However, there has been an increase in spinal cord injuries. Physicians who provide medical coverage for older adolescent and adult competitive elite hockey players should be proficient at assessment and acute care of patients with life-threatening injuries.

2.6 Summary

Literature revealed that common types of Injuries among Rugby Players were categorized into both soft and hard tissue injuries. Soft tissue injuries affected the fresh while hard tissue injuries affected the bones. Examples of soft tissue injuries were sprains, strains, bruises, cuts, muscle pulls and hard tissue injuries included dislocations, fractures and concussions. Furthermore,

Injury concurrence incidents affected both the lower limbs and upper limbs. Injuries occurred at any time of the game either during first half or second half of the game and

this was attributed to a number of factors. Both intrinsic and extrinsic factors attributed to injury occurrences if not properly paid much attention too. Intrinsic factors which led to injury occurrence included poor technique of executing rugby skills, low fitness levels, failure to put rugby safety protective gears, putting on inappropriate rugby equipment, foul play, poor feeding habits among others. Intrinsic factors that attribute to injuries in rugby included; poor playing facilities, poor training program, un fair officiating skills, un favorable weather conditions, hooliganism, un skilled medical personnel among others.

The proposed strategies to reduce occurrence of injuries among rugby players included Rugby smart and Boksmart injury prevention programmes, the law concerning the scrum should be emphasized, follow a 'sequence of prevention' model of four steps, establishing the magnitude of the sports injury problem, establishing the etiology and mechanism of the injury, introducing preventive measures and assessing the effectiveness of these preventive measures by repeating step 1. Also, use of safety gears by rugby players was also proposed to reduce occurrence of injuries, equip players with the right techniques of executing rugby skills, and Planting grass in bare areas of rugby sports facilities among others.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter focuses on the overall strategy of how the study was carried out and this includes the research design, population, sampling strategies, data collection methods and instruments, data quality control, procedure and data analysis which was used in the study.

3.1 Research Design

This was a cross sectional design. This is because data was collected from many different individuals at a single point in time. Also the variables which were the injuries and participation in rugby were observed without influencing them. This design was used because participants were selected basing on particular interest participating in rugby and also being applicable in education sector where this study was based as it targeted schools. Its data was collected from a large group and also examined injury occurrence in rugby only in 2019 rugby season. Both qualitative and quantitative data information was captured through questionnaires, interviews and observational. For example about injuries, time of their occurrence, factors influencing injury occurrence and strategies used.

3.2 Location of the study

This research study was conducted from the rugby playing secondary schools in the districts of Wakiso, Kampala and Mukono. These districts are located in Central Uganda in the East African region. The schools from this region were chosen because they are the

ones who have been annually subscribe to participate in the league and have been actively participating for a long period of time since the league started. Also these schools have been annually representing their districts in the National schools champion qualifiers for Federation of East Africa Secondary schools games and they have been performing well. In addition, the national champions have always been coming from the central region schools for over years (Uganda Senior Secondary Schools Association Report, 2018). Furthermore even the four slots for Federation of East Africa Secondary Schools games have been always taken up by these schools at an average rate of 75% and above. Therefore, schools from this region were selected basing on their regular activeness and good performance from National to international levels.

3.3 Target Population

The targeted population comprised of all rugby players and administrators in the rugby playing secondary schools in Uganda. There are 92 secondary schools in Uganda playing rugby (Edited Report, Uganda Secondary Schools Rugby Association, 2018). The rugby administrators were; rugby captains, games masters/ mistresses, medical officers, patrons and coaches.

According to Schools' Rugby Human Resource manuals (2016/17), there are 32 secondary schools playing rugby in central Uganda. However eight of them were selected because they are the ones which subscribe to play in the rugby league every year. These schools come from three districts of Wakiso, Kampala and Mukono. There is no any other school subscribed to participate in the league from any other district apart from the three mentioned above.

Table 3.1: Target population of the study

S/N	SCH	U15	U17	U19	Total	Games	Coach	Rugby	Medic	Captain	Total
	OOL	Team	Team	Team	players	Teacher		Patron			admins
1	A	25	25	25	75	1	1	1	1	1	5
2	B	25	25	25	75	1	1	1	1	1	5
3	C	25	25	25	75	1	1	1	1	1	5
4	D	25	25	25	75	1	1	1	1	1	5
5	E	25	25	25	75	1	1	1	1	1	5
6	F	25	25	25	75	1	1	1	1	1	5
7	G	25	25	25	75	1	1	1	1	1	5
8	H	25	25	25	75	1	1	1	1	1	5
Grand Total for Rugby players =>					600	Grand total rugby administrators=>					40
Grand Total for Rugby players + administrators									640		

3.4 Sampling procedure and sample size

Purposive sampling: The eight rugby playing secondary schools and 36 key informants were purposively selected. The eight schools were selected because they are ones who registered to participate in the league in central Uganda districts. Since the league started, eight has been the maximum number of schools which participate in this league. On the other hand, the 36 key informants who were selected based on the positions of responsibilities in the school sports environment. Each school has got a games teacher, a coach for rugby, a patron, a medical officer and a team captain. This makes five positions and when multiplied by the number of participating schools makes 40 in total. Basing on Krejcie and Morgan sampling table, 36 were enough samples for this purpose. These schools were named as A, B, C, D, E, F, G, and H according to the study. The participating schools were identified and named using letters because of different ethical

considerations whereby it could not be appropriate to mention the name of the school in some instances especially during presentation of findings. The key informants were rugby coaches, captains, games master/ mistress, medical officers and rugby patrons. These were purposively selected because they had vital information about the research study.

Snow balling was also used to select rugby playing students in the eight rugby playing schools which were in the league. In this way, the researcher used to identify one student from each participating school to get the names of the rugby captains of their teams of under 15, 17 and 19 years of age teams. When the names of the captains were given, then it became easier for the researchers to trace for those captains. After getting the captains they were used to locate their team players and this helped the researchers to reach other rugby players from each age category using that technique and that's how data collection from each participating school in this study.

Stratified random sampling technique was used whereby rugby players were grouped according to their age groups. This sampling technique was used to collect information from the selected age group members in this study in order to have fair and equal representation based on age category team. This technique is recommended by Tustin et al., (2005) because it gives each element in the population an equal chance of being selected and the results obtained are more generalizable.

In addition, the eight rugby secondary schools from three districts of Wakiso, Kampala and Mukono were sampled because they always participate in the rugby league and have been regular for a long period of time (Uganda Secondary Schools Rugby Association

manual (2017/18). Out of 600 rugby players, 234 were sampled and 36 out 40 rugby administrators were also sampled as presented from Krejucie and Morgan (1970) table of sample selection.

Table 3.2: Population and Sample size selection

Details	Sample size (N)	Sample (S)	Response	% age rate
Rugby players	600	234	198	85
Rugby administrators	40	36	36	100
Total number of respondents	640	270	234	87

According to the Table 2 above, the sample was arrived at in the study using the sampling table developed by Krejcie and Morgan in 1970. This sample size was representative enough to the entire study population. 270 questionnaires were issued to a sample of 234 rugby players and 36 rugby administrators during the rugby secondary schools' league that was played in the first term 2019. Out of 234 rugby players who were given questionnaires, 198 (85%) returned their questionnaire responses. 36 (15%) rugby players did not return their responses, they claimed that some of them were misplaced and others were spoilt by the rain because some data was collected from rugby grounds and it could rain sometimes being a rainy season. They also gave excuses that they were always up and down preparing for the matches and some could leave immediately after their matches. In addition 36 (100%) rugby administrators who were given questionnaires were all returned. All administrators returned questionnaires because during data collection, they were not so much busy and they were met on play

grounds and others were met as agreed upon. Overall, out of 270 respondents who were given questionnaires in the study, 234(87%) returned the questionnaires as shown in the table above.

3.5 Research instruments

The study used the observation check list, questionnaires and interview guide to collect data from the respondents.

3.5.1. Observation checklist: The instrument sought to gather data related to the different types of injuries, the time of their occurrence and factors attributed to injury occurrence. The researcher and other three assistants physically observed 23 rugby matches from different facilities of the eight secondary schools which participated in the league. Some matches of the semi-finals and finals were observed from two neutral grounds which were identified after group stages. Cameras were used to take pictures of some injuries that happened, record instances like line outs, pens and papers were also used to note injuries and time of occurrence.

3.5.2. Questionnaires: The self-administered questionnaires were used to collect data from rugby players and sports administrators. Questionnaires consisted of close and open ended questions (Amin, 2005). Questionnaires were used because they covered a large number of respondents in a relatively short time and they allowed respondents to give free and independent opinions. Four sections of the questionnaire gathered data related to demographic information, factors attributed to occurrence of injuries among rugby players and management strategies designed to reduce occurrence of injuries among rugby players.

3.5.3. Interview guide: The interview sessions were conducted to elicit information from key informants including rugby captains, games masters/ mistresses, medical officers, rugby patrons and coaches. Since these key informants had various commitments with limited time, the researcher opted to use the interviews. Interview Guide was structured and comprised of issues relating to the position, types of injuries, factors which attributed to injury occurrence, the time of injury occurrence and the strategies to reduce the occurrence of injuries. Respondents were interviewed face to face to obtain in depth information especially on the issues mentioned above.

3.6 Validity and Reliability of instruments

3.6.1 Validity

For validity of the questionnaire that was used to collect data, it was tested by first giving it out to my supervisors. There are also other two research consultants firms who were given these questionnaires to be able to assess the different items in it. Only items that were addressed as the objectives of the study were agreed upon to be used (Amin, 2005).

The observation checklist was checked to ascertain whether it included and covered all the types of injuries, factors attributed to injuries, the time at which these injuries occurred and the proposed strategies to reduce the occurrence of injuries.

All questions in the research instruments such as questionnaire, interview guide for the key informants were translated into ‘Luganda’ that is widely spoken in central Uganda and then back to English to ensure that the meaning of the questions was not altered. The same questions were also shared with my supervisors and they gave the same conclusions

thus making the instruments valid. This enabled the researcher to attain the right information as proposed before especially from the specific objectives.

3.6.2 Reliability

All data collection instruments were pretested through test re-test reliability before data collection process to ensure reliability. This was carried out with trained research assistants to test and re-test responses and results from those who were not part of the sample to assess consistence of the findings. Test re-testing of the instruments was carried out on the national rugby clubs junior players like Pirates, Entebbe Mongers and Buffalos during the pre- league matches before the schools league started. In addition, another test re-test was carried out during the international tournament annually hosted by Uganda. This tournament involves Uganda rugby cranes, Zimbabwe rugby team and Madagascar. Before any international match kicks off, there used to have first junior matches to entertain the fans before big events. This enabled researchers to re-test the tools. This was carried out before the schools league started and therefore, the test re-test was carried out from two different tournaments and the same results were obtained hence making data collection tools reliable in the study.

3.7 Data collection Procedures

An introductory letter was obtained from the department of Sports Science Kyambogo University after approval of the proposal from the supervisors. The letter was presented by the researcher to the head teachers of the rugby playing secondary schools to ask for permission to conduct the research study in their schools. Upon accepting the research the study to be carried out, head teachers recommended the researcher to work closely with

the games teachers for maximum support. The games teachers notified all the respondents such as rugby players, patrons and school medics to cooperate and support the researcher during the study.

The observation checklist was used to collect data especially on the types of injuries, the time of their occurrence and strategies used to reduce injury occurrence. Much data was collected during match days. This is because researchers had to physically see the rugby matches before, during and after each game. 23 matches were observed throughout the league and observation was carried out using eyes to observe all instances while cameras were also used at this stage to record the instances and taking up pictures like on injuries that happened, techniques used during matches and the strategies used to reduce injury occurrence such as warm up and cool down sessions. During observation, the whole game could be recorded putting much emphasis on key issues in the specific objectives. Researchers on key issues like injury occurrence were moving closer to the scene to observe clearly and ask some questions especially from the medical offers who were attending to injuries.

Interviews were carried out both on appointments and also during the match days. Appointment interviews were mostly carried out with games teachers, rugby patrons and coaches. This is because they had little time during match days and they were interviewed after the matches and on agreed days without matches. Rugby captains and medical officers were interviewed during the days of matches because they used to arrive before matches start and could leave after matches. This means that they had enough time to take on interviews but more especially before matches began. 36 interviews were carried out they used to take between 15-20 minutes per person. During interviews the

research assistants used to help like in recording, taking pictures and noting down some information shared.

In addition, interviews were based on the common injuries in rugby, time of injury occurrence, factors contributing to injury occurrence and the strategies which can reduce injury occurrence in rugby.

Questionnaires were issued to rugby players and administrators such as rugby coaches, patrons, games masters, medical officers and captains from their schools. These questionnaires were to be picked on the match days. Other questionnaires were also issued on match days because during picking filled questionnaires, some claimed that they had forgotten theirs at school. They therefore asked for new questionnaires to be filled. Those who filled questionnaires from the play grounds returned them quickly because the researcher had enough writing material such as pens to offer to the respondents to fill them. This used to take between five to ten minutes. Some questionnaires which were not picked from the rugby grounds on match days were picked from schools on agreed dates from the respondents especially administrators. Information in the questionnaires comprised of demographic data and the study objectives such as common injuries, factors attributed to injury occurrence. There were both objectives and structured questions to allow respondents express their ideas without limit.

3.8 Data analysis and presentation

Qualitative data was analyzed thematically; thematic analysis was used while analyzing qualitative data types of injuries, time of injury occurrence, factors influencing injury occurrence and strategies to reduce injury occurrence. The data which was analyzed was

in form of texts which was collected through interviews. Here, the researcher closely examined the data to identify common themes, topics, and ideas. This was done through coding and generating themes. In addition, narrative analysis was also used by interpreting texts from questionnaires, interviews and visual data through observation especially on injuries and factors contributing to their occurrence. Qualitative data was presented through tables, develop themes, topics, classifications, categories, sub categories, and developed codes.

Quantitative data under this study was analyzed using cross tabulation method. Tables were used to analyze raw data after being categorized. Microsoft Excel's pivot table feature was used to do cross tabulation and after it was presented into tables. The data mainly was from specific objectives which covered common injuries and factors attributing to injury occurrence.

3.9 Ethical Considerations

The researcher put into consideration the rights of respondents and procedures required during the research study. Before carrying out any activity with the respondents during this study, researchers had to first request for consent from the head teachers of the playing schools to allow data to be collected from their institutions. The researcher explained to the head teachers on the benefits, the risks involved in this study and how the whole process was going to be conducted and its purpose. After the consenting the researcher to carry out the study, the researchers met the respondents and briefed them on the purpose of the study, its benefits and the challenges involved. Being that these are traditional rugby schools, most of them are boarding schools and a few are day schools.

The participants who come from day schools were requested to fill the consent form and take them home for their parents to complete and allow them to participate. Those from the boarding schools were consented by their head teachers and games teachers. Another good point to note is that these participating schools had already designed also consent forms to parents requesting them to allow their sons to participate in rugby sport. Therefore, those who were allowed by consent forms from parents were organised and data collection process started with them. In addition, researchers gave total assurance to respondents that all the information that was to be gathered was confidential and for educational purpose. After assurance, data was then collected using various tools such as interview guides, observational check lists and questionnaires with the aid of phones recorders, cameras and other stationary.

CHAPTER FOUR: PRESENTATION AND DISCUSSION OF RESULTS

4.0 Introduction:

This chapter under this study aimed at describing findings from injury occurrence among rugby players in secondary schools in central Uganda during the 2019 season. The findings and discussion of the results were obtained after carrying out intense data collection. During data collection, 23 observations were made from 30 matches that were supposed to be played. This was due to the fact that a school D did not present their under 17 years' team throughout the league. In addition, 36 interviews were carried out among the rugby administrators such as games teachers, coaches, captains, patrons and medical officers. Out of the 270 questionnaires sent out to collect data, 234 were returned and its data was retrieved and used in this study. Furthermore, this chapter presents the social demographic characteristics of respondents like the age and positions held in rugby. It also presents the study objectives such as common injuries as soft and hard tissue, the time of injury occurrence based on first and second half of the game, factors attributed to injury occurrence based on intrinsic and extrinsic factors and the strategies suggested to reduce injury occurrence among rugby players are presented and discussed.

Table 4.1 Socio-demographic characteristics of the study participants

Characteristic	Wakiso district	Kampala district	Mukono district	Total Frequency	Percentage (%)
Age of respondents					
15 years and below	22	10	5	37	16
16-17	38	13	10	61	26
18>	87	33	16	136	58
Total	147	56	31	234	100
Position held in rugby					
Player/student	129	46	23	198	84.6
Captain	5	2	1	8	3.4
Games Patrons	2	1	1	4	1.7
Medical officers	5	2	1	8	3.4
Games Mistresses	1	1	0	2	0.9
Games Masters	4	1	1	6	2.6
Coaches	5	2	1	8	3.4
Total	151	55	28	234	100

Socio demographic characteristics of respondents presented in frequency and percentages

From the Table 4.1, majority of the respondents 198 (84%) out of 234 were rugby players, this new study concurs with the same study which was carried out in Zimbabwe about the profile of injuries in high school rugby in 2014 season where majority of the respondents were rugby players (Masunzambwa, 2015). Eight (3.4%) medical officers

were from rugby playing schools, two (0.9%) were games mistress, eight (3.4%) were rugby coaches and six (2.6%) were games masters. In addition, out of 234 total respondents, 136 (58%) were 18 years and above. This result also concurs with the same study carried out by Chiwaridzo in 2014 about rugby injuries in high school where majority of respondents (68.4%) were senior players. This means that their experience in rugby league was much more than the other younger ones. 61 (26%) were ranging between 16-17 years and 37 (16%) were 15 years old and below. Furthermore, following the gender of games teachers, out of eight teachers, only two (25%) were female as games mistress and 6 (75%) were male working as games masters. This concurs with the study result carried out by Chiwaridzo et al., (2015) where male respondents were far higher than the female.

4.3 Common injuries in Rugby

Results from the study showed that soft tissue and hard tissue injuries occurred as indicated in the table below.

Table 4.2, shows common injuries, their frequency and percentage occurrence during the secondary schools rugby league.

Soft tissue injury	Injury Freq.	Percentage (%)
Bruises	114	34
Strains	64	19
Muscle pulls	50	15
Sprains	41	12
Nose bleeding	22	6
Blisters	21	6
Cuts	19	6
Concussions	4	2
Total soft tissue injuries	339	100
Hard tissue injury		
Dislocations	14	74
Fractures	5	26
Total hard tissue injuries	19	100

Common types of injuries presented in frequency and percentages

4.2.1 Soft tissue injuries

With the help of the observation checklist, out of the 358 total injuries that were reported, 339 (95%) were soft tissue injuries. The 339 soft tissues injuries observed included bruises, strains, muscle pulls, sprains, blisters, concussions and cuts. A number of rugby studies have showed similar findings where soft tissue and had tissue injuries occurred. Studies which have reported incidences of injuries in amateur rugby league (Swain, 2016), indicating differences in fitness and skill levels (Yeomans, 2018), ground conditions (Nyagetuba, 2015), refereeing standards (Kordi, 2013), attitudes towards aggression and violence (Cusimano, 2016), compared to professional rugby players, and

therefore injury rates are reported high in amateur rugby union players (King et al., 2010; Gabbett, 2000). In addition, although non-modifiable, age is one of the most straightforward risk factors to assess and can be used to identify at-risk subgroups within a population (Bleakley, 2011). Furthermore, An initial study in Scottish community Rugby identified that players aged 25-29 years were at three-times greater risk of injury when compared with players aged younger than 16 years, albeit without accounting for confounding factors (Lee & Garraway, 1996). This finding was not upheld by a study in New Zealand community Rugby players, which showed that the association between age and injury risk between youth and adult age groups was not sustained following multivariate adjustment for other risk factors such as playing level and previous injury history (Quarrie et al., 2001).

It was reported from the observation that soft tissue injuries were suffered most by the rugby players during the rugby league season. It was revealed that rugby players suffered 114 (34%), bruises out of 335 soft injuries observed during the study. Strains followed bruises and occurred 68 times (20%), muscle pulls occurred 50 times (15%), sprains 41 times (12%), nose bleeding also occurred 22 times (7%) and finally blisters and cuts occurred 21 and 19 times respectively (6% each). different rugby studies have showed similar findings about soft tissue injuries occurring far higher than the hard tissue injuries. Profile of Rugby Injuries in High School Zimbabwean Adolescents study carried out by Chiwaridzo, (2015) founded that soft tissue injuries were sustained more than the hard tissue injuries. Similarly, findings also appeared in the rugby world cup 2011 where Namadire, (2015) found out that soft tissue injury were sustained most.

In addition, findings from the questionnaires revealed that 169 (85%) out of 198 rugby players had ever suffered from soft tissue injuries. This was retrieved from the information where most respondents agreed that they had ever suffered from soft tissue injuries especially those that had played for more than one season. These rugby players who responded to have suffered soft tissue injuries before were mostly from under 17 and above 18 years teams' age category. This study therefore, concurs with other studies which report that rugby injuries increase with increasing age (Fuller, 2015). In addition, the same findings by Finch (2006) found out that both soft tissue and hard tissue injuries occur in sports .On the other hand, this new study is contrast with study finding by Masunzambwa, (2015) in the study conducted on profile of injuries where his findings showed young rugby players sustaining injuries than the senior players. On the other hand, rugby administrators also reported that they had ever seen soft tissue injuries occurring and all the responses were got from 36 (100%) questionnaires returned by administrators.

Furthermore, all the respondents who were interviewed reported that soft tissue injuries happen more than hard tissue. This concurs with the study finding by Fuller, 2015 during international rugby series from 2008-2013 which showed high rates of soft tissue injury occurrence. In this new study for example, one rugby administrator from a rugby playing school 'E' during the interview reported that,

“In most cases..... our players always get minor injuries.....like bruises, sprains, and blisters which our medical team handle instantly” .In addition a rugby captain from the school 'G' also reported that, *“Am very happy that the period I have been a captain of our team, we had suffered very many injuries..... but they are always*

minor which may not even limit some of the strong committed boys from continuing". "I have served as a medic since last season..... but we always receive more cases of soft tissue injuries and it's just on a bad day when a hard tissue injury may occur", (Report from a medical officer from school 'B'). Finally one young player from school 'A' of under 15 years team category said that, "I and my teammates suffer blisters during and after the match". This response concurs with a study finding carried out by Kigozi et al., (2014) on common injuries sustained by rugby players in Uganda where he founded those soft tissue injuries occurring at a higher rate. In addition, McManus, (2004) also found most soft tissue injuries occurring in the study he carried out about injuries. He added that, about 55% of the injuries affecting professional players are closed soft tissue injuries. These are followed by all other injuries, divided into capsular/ligament sprains (20%–34%), muscle/tendon strains or tears (20%–29%), open wounds (12%–27%) and bruises/hematomas (10%–22%) (McManus, 2004) added.

4.2.2 Hard tissue injuries

Hard tissue injuries also affect rugby players during the league. This new finding concurs with Nemadire, (2013) where he revealed that head and shoulder injuries happened more in the super eight Rugby League World cup of 2011.

In this study, the researcher observed 19 (5 %) hard tissue injuries out of 358 total injuries that occurred during the 2019 secondary schools rugby league in central Uganda. This finding in the new study concurs with Quarrie et al., (2013) where findings revealed that hard tissue injuries have decreased in the recent years as a result of changing the rule of entry into the scrum which has given greater safety for rugby players. Hard tissue injuries included; dislocations, fractures and concussions. Dislocations were the most

hard tissue injuries that were suffered during the rugby league. Out of 23 incidences of hard tissue injuries which occurred, 14 (61%) were dislocation, five (22%) fractures and four (17%) concussions. This study finding concurs with findings made by Ilia et al. 2014 where his findings from all seven series rugby data revealed that the most common type of hard tissue injuries that occurred was joint dislocations for both back and forward players. In addition, other studies were consistent to concur with this new study where their findings such as the one of Brown et al. 2015 conducted during the 2011 rugby World cup that revealed that dislocation injuries were high. Furthermore, Kaux et al. 2015 findings also concurs that hard tissue injuries occurred in the studies carried out in amateur rugby competitions than professional competitions.

In addition, findings from the questionnaires of this current study showed that only 7 (3.5%) rugby players out of the 198 respondents indicated that had ever suffered from hard tissue injuries. This present study showed that most of the injuries were new. A finding in concordance with study results by Collins et al. (2010) which indicated that most of the rugby injuries are new. In addition, this study also concurs with Collins, (2008) where he commented about reduction of hard tissue injuries incidents due to improvement in the laws of the game for safety.

During interviews that were carried out one coach of school C responded that,

“Aaaaaah..... those injuries are not so common... I will not say that they don't happen, they do happen but they are not so common as compared to soft tissue injuries”. In addition, a nurse of the rugby school E also commented that, *“We rarely handle hard tissue injuries as they need more attention beyond school, therefore, we just recommend a victim to be referred to hospitals for scanning first”*. The findings of this

study concurred with those of McManus (2004) where he revealed that hard tissue injury occurrences stand at, fractures (4%–14%), dislocations/ subluxations (4%–10%) and finally, cerebral concussions (3%–10%).

In summary, the frequency of soft tissue injuries occurred during the league was 339 (95%) far higher than 19 (5%) hard tissue injuries which occurred. This contrasts with Kigozi et al. (2011) findings reported high rates of hard tissue injuries sustained by Ugandan rugby players.

4.3 The time period of injury occurrence among rugby players during the rugby league

Table: 4.3 shows the time period in which each soft tissue injury occurred, its frequency and percentage

Soft tissue injury	Injury freq.	1st half Freq. &%	2nd half Freq. & %
Bruises	114	47 (41%)	67 (59%)
Strains	68	24 (35%)	44 (65%)
Muscle pull	50	32 (64%)	18 (36%)
Sprains	41	16 (39%)	25 (61%)
Nose bleeding	22	14 (64%)	8(36%)
Blisters	21	3 (14%)	18 (86%)
Cuts	19	8 (42%)	11 (58%)
Concussions	4	2 (50%)	2 (50%)
Total	339	146	193

Table: 4.4 shows the time period in which each hard tissue injury occurred, its frequency and percentage

Hard tissue injury	Injury freq.	1st half Freq. & (%)	2nd half Freq. & (%)
Dislocation	14	3 (21%)	11 (79%)
Fracture	5	1 (20%)	4 (80%)
Total	19	4	15

Table: 4.5 shows the time period in which all injuries (soft and hard tissue) occurred, its frequency and percentage

Injury type	Injury freq.	1st half Freq. & (%)	2nd half Freq. & (%)
Soft tissue	339	146 (43%)	193 (57%)
Hard tissue	19	4 (21%)	15 (79%)
Total	358	150	208
Total percentage	100%	42%	58%

The observation check lists indicated that injuries in the sport of rugby happened both in the first half and second half of the match. It was recorded that both soft tissue and hard tissue injuries occurred. According to Table 4.3, out of the 339 soft tissue injuries that were recorded during the study, 146 occurred during the first half period of the matches and 193 occurred during the second half period of the matches. This study result concurs with that of Durie, (2000), showed that most injuries take place during the second half (55% -70%) than in the first half (30% -45%). In addition, out of the 339 soft tissue injuries, 114 were bruises, 68 were strains, 50 muscle pulls, 41 sprains, 22 nose bleeding, 21 blisters, 19 cuts and four concussions.

Furthermore, Out of 114 bruises which occurred, 47 (41%) happened in first half while 67 (59%) occurred in second half of the games. Freitag et al. (2015) noted that the number of injuries increase as the match progresses which concur with the similar results from the new study Out of 68 strain injuries, 24 (35%) occurred during first half while 44 (65%) percent. This result concurs with Kaux et al. (2015) noted that Achilles tendon injuries are more likely to occur in the first half than in the second half of the match. Of the 50 muscle pulls, 32 (64%) occurred during first half and 18 (36%) in second half. Finch (2006) stated that very many muscle pulls and nose bleeding occur in the first half of rugby matches compared to second half because of too much energy and speed at which players begin with before they get tired. During such instances, some players land into hard tackles due to speed used and end up bleeding from the nose. Out of the 41 sprains suffered, 16 (39%) occurred in first half whereas 25 (61%) occurred in second half of matches. Haseler et al. (2010) also revealed that a lower proportion of ankle injuries occur during the first half compared those happening during second. Of 22 nose bleeding injuries occurred, 14 (64%) occurred in first half and 8 making 36 percent occurred in second half. Out of the 21 blisters occurred, 3 (14%) occurred in first half and 18 (86%) occurred in second half. In addition, Fuller and Taylor (2013) also noted that most injuries occur more often in the third quarter of matches than other match periods, although the incidence rate is only possibly greater than the second and final quarter thus agreeing with the current study. Out of the 19 cuts occurred, 8 (42%) occurred in first half whereas 11 (58%) occurred in second half and of 4 concussions suffered during the study, 2 (50%) occurred during

each half time period. According to Finch (2006) study results concur with this study that few injuries take place during the first half compared to second half.

According to table 4.4, hard tissue injuries also occurred during both periods of the games. During the study, 19 hard tissue injuries were suffered and 14 of them were dislocations and five were fractures. In addition, out of the 19 total hard tissue injuries, four occurred in the first half and 15 happened during second half of games. Finch (2006) stated that few injuries take place during the first half compared to second half. Furthermore, out of 14 dislocation cases that occurred, three (21%) were in first half while 11 (79%) in second half and out of the five fractures, only one (20%) was in first half and four (80%) in second half. Freitag et al. (2015) noted that the number of injuries increases as the match progresses, but the most critical periods are the second and, above all, the fourth quarter (Nemadire, 2013)

According to table 4.5, it was revealed that during the study, a total of 358 injuries occurred. Out of the 358 total injuries, 339 (95%) were soft tissue and 19 (5%) were hard tissue injuries. In addition, out of the 339 total soft tissue injuries, 146 (43%) occurred in first half whereas 193 (57%) occurred in the second half of games. Out of the 19 total hard tissue injuries, four (21%) occurred in first half whereas 15 (79%) occurred in the second half of games. Furthermore, a total of 150 (42%) occurred in first half whereas 208 (58%) occurred in second half of games.

It was therefore revealed that injuries occurred more in the second half of the games than first half. This was found out after observing a total number of 358 injuries that occurred during the research study. Some studies found out that more injuries occur in the second half of games (Kaux et al., 2010). Kaux et al., (2010) added that rugby injuries are prone

during the second half between 55% and 70%. It is possible that players play a much more physical game towards the end of the game resulting in more injuries in that half (Hill, 2018). Second half injuries have been attributed to players increased work rate as they will be playing the last half of the game, slower reaction time, and decreased endurance or fatigue among players (Jones, 2021). Coaches should ensure that all players are adequately prepared for the physical nature of the matches by simulating match conditions at practice. Another study revealed that majority of these injuries take place during the last 20 minutes of the game (Kaux et al., 2015). This new study also concurs with Brown et al., (2015) where he revealed that injury rate increases as the match progresses especially with the shoulders. 46% of game injuries were observed in the first half followed by 40% in the second half, with 14% unknown (Bird et al., 2021). In addition, this new study concurs with a South African study conducted on the epidemiology of schoolboy rugby injuries by Roux et al (2012) found 71% injury prevalence in competitive matches in second half of matches.

Responses from interviews also showed that injuries occur at any time both in first half and second half of the game, all the eight coaches revealed that most injuries occur during the second half of the matches.

“Many players.....Pick up injuries during the second half of the game because the losing team is trying to press hard for a winand the winning team at that time is trying the defend the attacking team to keep the lead and end up getting a lot of injuries”
(Coach of school C).

“In many occasions....we get injuries when we are playing.....because we use a lot of force and we are always under instructions to injure good opponent

players.....so you can end up making a tackle actually you wouldn't have made if it was just not instructed" (Captain 19 years' team of school D). This interview result concurs with Lopez et al., (2012) result which showed that knee injuries most often occur in the second half (58%) and mainly during the last 20 min of the match (32%), with a lower incidence at the start of the match. Furthermore, Muma, Guthaiga and Saidi (2011) also reported similar incidences of 55.4 injuries per 1000 match player hours among amateur rugby sevens players during a tournament in the United States of America in second half of matches.

A patron from school 'G' went ahead to elaborate how these injuries frequently occur in that last half of the game especially in the dying minutes. Studies elsewhere by Durie, (2000) also found out that injuries mostly occur in the dying minutes of the second half of the match. He mentioned on importance of the match as the driving force that makes students to use a lot of energy and end up being injured.

"During the last half of the game..... players use a lot of energy to force results..... depending on how important that match can be..... in doing so....they end up injuring themselves" (Patron of school G). Fuller and Taylor (2013) findings found that rugby players sustained 1.5 times more than soccer especially in the second half of the match thus concurring with the new study findings. Chalmers et al., (2012) also noted similar results in the study, a comparison of incidence of injuries of amateur rugby union and soccer has indicated that injuries occur mostly in second half of the match than first half which concurs also with the new study results.

However, some medical officers who were interviewed noted that injuries especially muscle pulls happen more during first half than second half,

“It’s true that injuries happen at any time in any period during play but we handle muscle pulls cases more than any other injuries, however, this occurred to players who don’t get enough time to prepare before the match starts and this causes to much stress to muscles that had not prepared enough.” (Medical officer of school F). This result from the new study contrasted with studies by Nemadire, (2013) which revealed that the most critical periods are the second and, above all, the fourth quarter, while collateral ligament ankle injuries are more likely in the second half (Quarrie et al., 2013).

4.4 Factors attributed to injury occurrences among rugby players in secondary schools

The factors attributed to the occurrence of injuries among rugby players in secondary schools were categorized into intrinsic and extrinsic. Intrinsic factors included all instances which caused injuries from players’ own making such as foul play, using wrong techniques while executing a skill, poor feeding habits and low fitness levels. On the other hand, extrinsic factors were the ones which caused injuries indirectly such as poor coaching programs and wrong coaching techniques used by coaches, poor conditions of the fields of play, coaches’ encouragement to injure, failure to use safety gears, unfavorable weather conditions, hooliganism, unfair officiating and delayed first aid services.

Data from observation revealed that all factors contributed to injuries during the rugby league as discussed below into two broad categories.

4.4.1 Intrinsic factors

These factors included; Poor feeding habits, Low fitness levels, Foul play and using wrong techniques while executing a skill.

During observation, it was noted that players who looked to be lean with weak bodies were tackled frequently which indicated a sign that showed that their feeding habits were not good as required by rugby players. This sign was common from under 15 and 17 years teams where small players involved in injuries far much more than those who were muscular. Out of the 23 hard tissue cases which were noted in the league, 19 (83%) injuries involved players who were so lean, a factor which indicated that they were easier to be tackled and injured due to the physical requirements of the game. This new study concurs a number of studies which have been carried out such as Chiwaridzo, (2014) study carried out on profile of injuries among adolescents in Zimbabwe revealed that most of the injuries (48.3%) reported in that study involved tackles. The new study findings still consistent with the results reported for English youth male rugby players aged between 16 and 18 years by Palmer-Green et al. which found that tackle event contributed to 57% of match injuries. Other studies carried out by Fuller & Taylor, (2013) showed that players who are tackled suffer more injuries than those who make tackles and the frequency increases for faster players. (Querrie et al., 2007) noted that a large proportion of dislocated shoulders occur during tackles. (Fuller et al., 2007) found that players who were tackling mostly suffered injuries to their arms followed by the head and less suffer injuries on their lower limbs during American amateur sevens tournament thus concurring with the current study with injuries that result from tackling.

In addition, 199 (85%) out of 234 respondents agreed in questionnaires that poor feeding habits can greatly lead to injury occurrence in rugby because of the physical demands of the game. According to Close (2019), as the human performance become more advanced and elite athletes are becoming more dependent on their team nutritionists, it is becoming evident that proper nutrition is becoming essential for proper performance during practice and competition. Specific nutrients are critically more important for enhancing the quality of performance, conditioning, practice time, recovery from fatigue and avoiding sports induced injuries. Since athletes require more nutrients than the recommended daily allowance. It is important that they not only eat a well-balanced diet consisting of carbohydrates, proteins, fats, vitamins and minerals but meet the nutritional demands and supplementation required before and after vigorous activities. Therefore, this means that failure to feed on required nutritional demands can easily lead to sports injuries. This concurs with a study carried out by Lopez et al., (2012) who found most injuries in rugby as a result of tackles either from tackles from the sides result into more injuries, followed by tackles from the front and least from behind. Furthermore, eight coaches and four medical officers (33%) agreed with the poor feeding habits as they attribute to injuries during interviews carried out with them. The two coaches, one from school E and the other from school H added,

“The big challenge we face as we coaches....we know what to do....as far as the game of rugby is concerned but due to the nature of the league for students who are always at school...we don’t do what we are supposed to do.....for example the nature of the game demands these students to eat a lot however they don’t..., this makes them weak and easily vulnerable injuries” (Coaches of school E and H). Contrary, 16 rugby players

disagreed with the issue of feeding habits as it does not contribute to injury occurrence when responded from the questionnaires. On the other hand, research findings elsewhere concurs with study findings such as a study findings by Brown, Verhagen & Machelen, (2015) who confirmed a high rates of injuries among players being tackled from sides than those who tackle.

It was also recorded that rugby players also suffered injuries because of the low fitness levels. This was witnessed especially the rate at which 50 muscle pull injuries occurred during the league. This indicated that players came to play when they are not well warmed up, trained and not well prepared in general. In addition, results from questionnaires indicated that 220 (94%) out of 234 respondents agreed that rugby players suffer injuries because of the low fitness levels. Furthermore, when coaches were approached during interviews, six (75%) out of eight noted that low fitness levels put rugby players at high risks of injuries. Other studies elsewhere concurred with this new study findings where Collins, (2008) in his study noted that many players both at professional and amateur level suffer injuries due to their low fitness standards.

They added by complaining about the little time they get with players who are students and expected to commit more time to their academics. A coach of school 'A' said,

“This is a general problem which occur almost in every school, we don't train these players on daily basis and the only days we train them we are limited with the time they are supposed to be at the pitch.....therefore, we are forced to select them on the teams at the level they are.”. Another one added, *“Many of these players we use are students they are always occupied by studies, in so doing they get limited time for training as a matter of fact they end up playing when they are not physically fit....me as a*

coach I can't leave a talented player on bench because of fitness" (Coach of school C). Further concordance study with this new finding was found by Taylor, (2013) in the study carried out in the junior league in South Africa where a number of players were found not fit and not ready to play. In addition, a player revealed that some of them are new to the game of rugby however much they are passionate to play; they have not got enough time to learn and master the execution of different skills because they are not fit, but they are all put in the field of play, so many get injured when tackled by opponents because they are not fit.

"Our players are young and new in the game of rugby; they have not mastered well the right techniques of the sportBecause they have not been trained for enough time and....they are un fit that's why they are injured easily." (Captain of school F) In concordance, Kigozi, (2011) also reported that many rugby players are un fit to play rugby due to commitment from studies and work.

Another factor that contributed to injuries is foul play. This is when players intentionally decided to injure others especially during contact. This factor also agrees with that of Ilia where he revealed that head injuries and muscular contusions occur more frequently in foul play than non-foul play (Ilia et al., 2012). In addition, 213 (91%) respondents from questionnaires agreed that foul play causes injuries. This study finding also concurs with the one found by Chalmers et al., (2012) who noted that foul play is rarely penalized by the referees yet it contributes to injury occurrence.

In addition, results from interviews showed that 10 (28%) respondents from coaches and captains commented about the love to win the match causes foul play especially when one team is down and there is little hopes of winning, that's when they start to

play aggressively to opponents and injure them intentionally thus causing injuries to the opponents.

“...what I can say about injuries in this sport.....there is no single factor to explain all injuries in rugby.....because some of players are driven by desires to win the match....others are driven by the desires to show off in rugby by injuring others.”

(Patron of school B) This result finding in the new study also concurs with results from study which was conducted during the Rugby World Cup in 2012 by Fuller & Taylor, (2013).which revealed that foul play tackles caused the most injuries during matches.

Wrong execution of the skills like during tackling, scrum down, line outs, racks and mauls were also recorded as a major intrinsic factor that caused injuries among rugby players. 16 (4%) rugby players suffered sprains and strains injuries due to poor execution of scrum down, two suffered dislocations due to poor landing down from line outs, one got concussed due wrong tackling and eight suffered sprains and strains during racks and mauls when wrongly executed. This new study result concurs with the one by Freitag et al., (2015) in their study where they revealed that poor techniques of executing scrum, racks and mauls results into injuries more than running and changing directions. In addition, Finch, (2006) also concurred in his findings where he noted that scrum injuries can potentially be more serious particularly in relation to entry into it Furthermore, it is estimated that approximately 40% of all rugby-related spinal cord injuries can be attributed to the scrum (Durie, 2000). In addition, 227 (97%) out of 234 respondents from questionnaires agreed that wrong execution rugby techniques results into injuries. Furthermore, 23 (64%) rugby

administrators made it clear that wrong execution of the skills attribute to injuries during interviews. A coach from school B noted that,

“The new players are vulnerable to injuries because they don’t know well the right techniques of the game.” This result finding from the new study is similar with the one by Austin et al., (2011) found that, during the engagement phase, the forces generated at the interface between the two front rows during scrumming are considerable and include forces in multiple directions, mainly forward but also downward cause catastrophic injuries.

Playing before recovering from the previous injuries also was noted as another factor that causes injuries among rugby players. This information was noted from 16 (44%) rugby administrators during interviews. There are a number of players who play rugby when they are still suffering with injuries and this due to failure to follow them up and being strict on them thus ending up suffering long term injuries. This was noted from a medical officer of school B. A number of studies concur with this new study findings. Collins et al. (2015) noted that there is a huge need for continued monitoring of these injuries to minimize reoccurrence. However, it is notable that 37% of the reported injuries were recurrent cases. The reasons for the recurrences are unclear. One possible explanation could be premature return to competition or training before enough recovery time has elapsed. Another study finding by Chiwaridzo, (2014) on injury profile noted that most rugby injuries sustained in the league were mild in nature could have led to early return into training or competition before full recovery. According to Mahaffey et al. (2008) found that young players have a tendency to return to play when they ‘feel’ they have recovered. In addition, most of the injuries sustained in the league were attended to by

first nurse aiders. It is possible to speculate that the rugby players irrespective of severity of the injury were probably not receiving full rehabilitation of the injuries. Pressure from parents and coaches has also been cited as a reason for young players to return to rugby early before achievement of full recovery.

Six (17%) out of 36 respondents also noted that use of excessive force also cause injuries among rugby players while playing. This was captured during interviews with the rugby administrators. A coach from school H noted that many young rugby players think that a good tackle requires too much energy yet it's just a technique of doing it. Therefore, players also suffer from injuries because of use of too much energy during the game. This study result factor concurs with the one that Taylor carried out and found out that injuries also occur as the result of excessive use of force (Taylor, 2013).

4.4.2 Extrinsic factors

Extrinsic factors also caused injuries among rugby players during the league. These factors included; failure to use safety gears, poor conditions of the fields of play, poor coaching programs and wrong coaching techniques, un fair officiating, un favorable weather conditions, hooliganism ,coaches' encouragement to injure and delayed first aids services. The study findings were captured through observation, questionnaires and interviews with the respondents.

The findings from observation of the present study indicated that over 130 (66%) out of 198 rugby players did not have protective gear to use. Rugby protective gears include mouth guards, head gears, shoulder pads, and body amours. There were only 32 (16%) rugby players who had mouth guards, 19 (10%) out of 198 rugby players had the head

gears, 23 (12%) out of 198 had shoulder pads and 47 (24%) out of 198 players had body armour. This is why even a player from school C who sustained a tooth fracture injury had no mouth guard to protect himself. In addition, 11 (58%) out of the 19 players who sustained cuts injuries in the mouth had not put on mouth guards.

Figure 4.1: A picture indicating an incidence of a tooth fracture of a rugby player of school C



From the figure above, the rugby player sustained a hard tissue injury of a tooth fracture which occurred after sustaining a tackle from a player of school A. It was revealed that that player had not put on the mouth guard to protect his teeth. The present study finding concurs with other study findings which showed that 72% of the injured players were not wearing any protective equipment at the time of the injury by Masunzambwa, (2015) on profile of rugby injuries in Zimbabwe. His finding showed the importance of awareness campaigns in the schools on the risk of injury in rugby and the need to advocate for protective clothing. Other concordance study was by Mahaffey et al. who found 36% not wearing protective equipment at the time of injury.

In addition, findings from questionnaires reviewed that all the 234 (100%) respondents both players and administrators agreed that failure to put on rugby safety gears cause injuries in rugby. Furthermore, 30 (83%) respondents during interviews strongly

mentioned that failure to use safety gears causes injuries among rugby players compared to those who put on safety gears.

“As regards to injuries....I would say every player is at risk.....however.....injuries are most common among those students who don't use safety gears like gum shields/ mouth guards and body armors” (Medical officer of school E)

The poor rugby playing facilities were other factors which were observed during the rugby season that caused injuries. It was noted that out of the 10 rugby field which were used, one (10%) was in a very bad condition, four (40%) were in bad conditions, three (30%) average condition and two (20%) very good. The playing facilities which were in a very bad and bad condition had areas which were not covered with grass and the bare parts had also some smaller stones. This caused injuries and most noted were soft tissue injuries such as bruises and cuts. Out of the 114 bruises which were noted, 81 (71%) occurred from facilities which were in bad conditions and four (21%) cuts out 19 also happened from the same venues. Studies elsewhere concur with this new study such as the one carried out by Chiwaridzo, (2015) showed that the poor playing facilities also caused injuries during the junior rugby league in Zimbabwe before 2015 and this caused more bruises among player than any other factor in high school rugby. In addition, Lorenzeton et al, (2007) also noted similar result that when a match takes place on grass, 26.9 injuries per 1000 match hours are recorded; on synthetic surfaces, injury rate seems to increase to 38.2 per 1000 match hours.

The nature of this sport requires players sometimes to fall down as they make tries and during of protection of the ball, others fall to possess after being tackled. This attributes to injury occurrence in rugby.



Figure 4.2 Picture indicating one of the rugby fields which was in poor conditions

Figure 4.2 above indicates a rugby facility of school D that had small stones in patched areas. The bare areas showed caused the most incidences of bruises during the league from that facility.

Results from the questionnaires indicated that 227 (97%) out of 234 respondents agreed with this factor of poor facilities causing injuries in rugby. Some of these respondents were rugby players and others administrators. In addition, seven (88%) out of eight medical officials, five (63%) out of eight coaches, five (63%) out eight captains and two (25%) out of eight games teachers during the interviews strongly mention poor playing facilities as one of the major factor for mostly soft injury occurrences such as bruises and cuts. Furthermore, a medical officer revealed that;

“If we are to talk about factors attributed to injuries in the game of rugby, we can’t under look the playing surface because the nature of the game demands players to fall down whether they like or not” (Medical officer of school D). Collins et al. (2008) revealed similar findings in his study where he noted that there is a

significant difference between the occurrence of injuries when the match is played on different playing surfaces including grass and on ground (Collins et al.2008).

Another factor for injury occurrence was the poor coaching techniques and programs. This factor was observed causing injuries during the league (Coach of school, D). 37(19%) rugby players all from under 15 years teams used to carry out rugby skills wrongly such as poor techniques of tackling; poor line-outs and scrum downs were realized causing both soft tissue and hard tissue injuries. This observation result from the new study concurs with similar findings by Brown, Verhagen & Machelen, (2015) who confirmed high rates of injuries happening from players being tackled than those who tackle. Fuller & Taylor (2013) also found similar results where they noted that the neck can also be affected with injuries from tackling, followed by the head, knees, shoulders, arms, ankles and the thighs are least affected parts. In addition, on five occasions, teams were observed not warming up very well before the matches. Under 15 years teams of school A and D were realized two times not warming up, under 19 team of school B one time did not warm up before the match. This was due to late arrival for matches and failed to warm up well. This caused 22 (44%) muscle pulls cases only during those matches where players did not warm up out of 50 cases that happened during the league. Study result by O'Coner, (2011) concurs with new findings from this study which revealed that a number of players in rugby have sustained injuries because of the contributions of their coaches for using poor coaching programs. In addition, 215 (92%) out of 234 respondents from questionnaires agreed that poor coaching programs and techniques attribute to injuries. Furthermore,15 (42%) out of 36 respondents commented on the same factor that attributes also to

injuries in rugby. Fuller (2013) also concurred with the new study findings where he noted how unqualified coaches led to severe injuries of their players especially at amateur levels. In addition two (25%) captains out of eight also mentioned unprofessional coaches who train wrong skills and techniques of rugby, use players when they are not physically fit while others don't allow players to rest even when they have injuries and aren't even ready to play a factor that makes them to get secondary injuries that are difficult to rehabilitate in the long run. They also revealed that some coaches encourage players to retaliate and injure others. This was revealed during interview carried out with them.

“Many of these players we use are students they are always occupied by studies, in so doing they get limited time for training as almost all commit from their homes, this makes them always to delay whenever we are to have matches affecting our performance due to poor preparations before the matches that cost us injuries even a few minutes at the beginning of the match” (Coach of school E). Another coach revealed that some players are new to the game of rugby however much they are passionate to play; they have not got enough time to learn and master the execution of different skills, but they are all put in the field of play, so many get injured because they don't know how to tackle an opponent.

“Our players are young both in age and in the game of rugby, they have not mastered well the right techniques including when and how to tackle.....but we believe as time goes by they will improve and become better players” (Rugby coach of school G)

Un fair officiating was another factor that caused injuries among rugby players during the rugby season. It was also observed that referees during the game between school F and E during group stages and a game between school D and G involved un fair instances. The two centre referees who ignored fouls happened and left players angered and led them to retaliate against their opponents. This attributed to a number of injuries such as three (21%) dislocations and six (27%) nose bleeding out of 14 and 22 respectively injury cases. Similar results from other studies concurs with this new finding where Verhagen, (2012) found a number of injuries happening during the study about the incidence and severity of injuries in South Africa rugby. In addition, results from the questionnaires revealed that, out of 234 respondents, 208 (89%) agreed that un fair officiating causes injuries among rugby players. Furthermore, 13(36%) out of 36 respondents noted about officiating during interviews. In addition (75%) out of eight captains reported that biased referees influence them to play roughly against their fellow players and they cause injuries. They mentioned that they get angry when the referee seems not to be on their side. They added, it happens mostly when the referee favors the host teams against the visiting,

“When the referee seems not to be on our side....the only remaining option is to play roughly against our opponents and we end up injuring other players” (Captain of school C). This was noted during the interviews.

The playing time period or weather also caused some injuries among rugby players during the league. This was captured during observation where an incidence happened especially for matches played from midmorning up to around 3:00pm. During this time, it happened some times to be scorching sunshine that under 15 and under 17 years category

used play during that time. During a game which was played between school B and G, two players of under 15 years teams of school B were seen staggering and falling as they asked for help using sign language as they could be seen over punting too much requesting for water. In this situation they become so weak in that they were easily tackled and one of those players merely concussed. In addition, 27 (75%) out of 36 rugby administrators agreed that playing under too much sun shine could lead to injuries. 79 (81%) out of 98 players of under 17 and 15 years category and 61 (61%) out 100 under 19 years players agreed from questionnaire results that playing conditions especially too much sun shine cause injuries. Furthermore, during interviews, a captain of school B mentioned playing under intense sunshine cause injuries to them. He cited that playing under intense sunshine that always makes them feel dizzy during and after play. *“But even though...you don’t get wounds or fractures...still when we play during excessive sunshine....sometimes we feel dizzy during and after the match”* (Captain of school B). One medical officer added that, *“Playing under too much sunshine dehydrates an individual which makes him or her weak and susceptible to injuries.”* (Medical officer of school F)

Violence, aggression and hooliganism from spectators caused some injuries during the rugby season. A finding from matches observed, one player of school C was tackled badly by a player from school G and got dislocated, immediately was taken off the pitch. On return leg when the G visited C, spectators were heard singing as they were supporting their team requesting for a pay back to their player who was injured previously. They demanded for injuries and every time players could tackle an opponent could celebrate and ask for another turn. This caused 15 injuries during that game and

fortunately they were all soft tissue. In addition, out of the 234 respondents from the questionnaires, 206 (88%) agreed that hooliganism causes injuries. Furthermore, 10 (28%) out of 36 respondents noted that hooliganism cause injuries among rugby players. two patrons commented that the nature of the game is also quite dangerous; even some players encourage their fellows to play dangerously to injure their opponents, some rugby players are influenced by supporters to injure opponents.

“If you get a chance of listening to their conversations after the game.....you can hear comments like...I told you to hit the other guy but you refused.....huuu... I missed that guy but I wanted at least to go with his funny head” (Patron of school H).

Coaches' encouragement to foul in order to injure is another factor that cause injuries in rugby. Findings from questionnaires indicated that out of 234 respondents, 208 (89%) agreed that coaches contribute to injury occurrence in rugby through encouraging his team players to injure opponents. A study carried out by Chalmers, (2012) about the risk factors in rugby union football in New Zealand found that foul play is rarely panelized by referees which results into injuries thus concurring with the new study findings. In addition, 17 (47%) out of 36 respondents noted how coaches encourage their players to intentionally injure opponents during interview. A rugby captain of school G mentioned that some time coaches inform them to injure some unique opponent players in case they need positive results.

Delayed first aid was also another factor that causes injuries among rugby players. It was noted from the questionnaires that 204 (87%) respondents out of 234 agreed that delaying to offer first aid causes also injuries among rugby players. In addition, six (17%) out of 36 respondents commented that delayed first aid causes rugby injuries. A coach from

school B noted that some medical officers that move with the teams are not sure on what to do when a need arises to offer first aid, they always tend to delay a factor that may cause secondary injuries after failing immediate intervention. McManus (2004) concurs in his study about incidence of injury in elite junior rugby union where he noted about first aid being an important factor at reducing secondary injury occurrence in rugby.

4.5 Strategies to reduce injuries among rugby players in secondary schools

The study findings from the questionnaires, observation, and interviews came up with strategies to reduce injury occurrence in rugby such as use of appropriate training programs, executing proper techniques of the game, wearing of appropriate rugby equipment, adhere to the rules of the game, use of safety gears, having standby medical officials, fair officiating, planting grass in bare areas to keep the playing surface safe, employing qualified and skilled rugby administrators, encouraging more growth of the game from primary level, punishing heavily dangerous play, add under clothing on the uniform, use of sports nutritionists to work on players' diet, offer proper first aid, and participating in right age level teams category.

Findings from the questionnaires showed that out of 234 respondents, 226 (96.5%) agreed with the strategy of using appropriate training programs to reduce rugby injuries. Collins et al. (2008) study findings strategy concurred with the current study strategy where he recommended providing coaches with materials designed to help them run proper tackling drills, showing players videos and demonstrating proper tackling techniques.

In addition, with execution of the proper techniques of the game, out of 234 respondents, 227 (97%) agreed with the strategy of using proper techniques of the game. Studies

elsewhere by Collins (2008) concurred with the strategy of using proper techniques of the game where his findings suggested use of videos and demonstration while coaching proper techniques and also educating referees on the injury risks associated with unsafe tackling techniques. Another concordance study strategy with this new study was made by Muma, (2011) in his study suggested that through coaching defensive and preventive skills against injuries can be taught hence reducing injuries among players in the sport of rugby.

Furthermore, wearing appropriate rugby equipment was suggested to reduce injury occurrence from questionnaires. Out of 234 respondents, 222 (95%) agreed with the strategy to reduce injury occurrence. In the present study, wearing inappropriate rugby equipment contributed to a number of injuries. This was similar even by Brooks et al., (2013) who showed that the incidence of an injury to the player being tackled without appropriate rugby equipment was going higher.

Adhering to the laws of the game was another strategy suggested to reduce injury occurrence by respondents in the questionnaires. 227 (97%) out of 234 respondents agreed that adhering to the laws of the game reduce injury occurrence. A related study by Finch, (2006) on a study, 'A new framework for research leading to sports injury prevention' concurs with a new study strategy where it also mentions about following the laws of the game in a way to reduce injury occurrence among rugby players.

All 234 (100%) respondents from questionnaires strongly agreed that using safety gears reduce injury occurrences in rugby. This finding concurs with the same study findings carried out by (Lopez et al., (2012) who found that professional rugby players should have access to protective gears Furthermore, Querrie et al., (2007) added that safety gears

are well remunerated to offset the potential risks of injury. In addition, the study observed 32 (16%) rugby players out of 198 who had mouth guards, 19 (10%) out 198 rugby players had the head gears, 23 (12%) out of 198 had shoulder pads and 47 (24%) out of 198 players had body amours. These players who had the gears however much some got injuries but rate of their occurrence was minimal due to protection. This information finding of the new study agrees with Brown (2013) who found that most injuries sustained by amateur rugby players are sometimes due to failure to use safety gears and usually result in a loss of training, playing and study. Furthermore, 28 (78%) out of the 36 interview responses mentioned use of safety gears by rugby players could reduce injury occurrences. A captain revealed that safety gears being that they are personal, such as, mouth guards cannot be shared and therefore its good each to have. He added that, *“It’s good for every player to have those gears but they are expensive and sometimes we fear to tell our parents to buy for us because parents don’t like the sport and they cannot easily buy for us.”* (Rugby captain of school C). Bleakley et al., (2011) found similar results which concur with the new study stating that preventive measures have been implemented by various unions to reduce the incidence and severity of injuries worldwide.

Having standby medical officials was also suggested to reduce injury occurrence among rugby players. 211(90%) respondents out of 234 agreed with having standby medical officers can reduce injury occurrence in questionnaires. This new study concurs with that by Kaux, (2015) which he carried out on Epidemiological reveal of injuries in rugby union where it was noted that in order for rugby players to be safe on the field of play,

medical team always have to be on standby for any injury occurrence so as to reduce on further complications.

Finally, fair officiating was suggested to reduce injury occurrence among rugby players. Findings from questionnaires revealed that out 234 respondents, 220 (94%) agreed with the strategy that fair officiating can reduce on injury occurrence.

Furthermore, there are other strategies that were suggested during interviews with the rugby administrators. 32 (98%) out of the 36 interviews carried out with the rugby administrators strongly suggested the point of working on the playing facilities as a major strategy to reduce injury occurrence in rugby. A patron from school A and a rugby captain of the same school A suggested planting grass in bare areas in the fields of play could reduce on the injury occurrence. A number of studies with similar suggestions were carried out such as Collins, (2008) found out that the comfort the playing facility may be, the lesser the incidences of occurrences of injuries in rugby especially bruises. Chiwaridzo, (2015) findings also suggested similar strategy that the surface of the playing facilities can facilitate the play with fewer impacts that cause injuries to player. He added that there were less injuries recorded during the rugby junior league which was played in Zimbabwe during the time when good facilities were used.

Furthermore, a medical officer of school B appealed to all rugby playing schools to plant grass and also do all what it takes to ensure a good playing surface and above all keep the playing grounds should be safe and clean to avoid piercing objects that can cause soft tissue injuries that can be avoided. *“Schools should work on improving the surface of the playing grounds....to avoid the injuries that would arise in such a situation”* (Medical

Official of school B). In addition, “...*At most every our player is bruised and... I appeal to organizers to ensure that all playing schools’ play grounds are visited before the league commences to report on their situation as a way to reduce injuries which result from bad facilities*”. (Captain School F).

Another strategy suggested was employing qualified and skilled personnel in sports. 15 (42%) out of 36 respondents suggested that strategy during interviews. In addition, a captain of school A during an interview suggested that schools should employ and use professional coaches and sports doctors who are well equipped with the knowledge of the game and injuries so as they help in administering secondary medications, allocating player to play in the right category age, allowing players time to recover fully from previous injuries and approve them before returning back to play. “*What I can suggest to reduce injuries.....aaaaaaah.....schools should hire sports doctors to take care of the health of all rugby playing students instead of school nurses who are not even not passionate in the game who always tell us why don’t we find another sport apart from this risky one.*” (Rugby captain of school A). In addition, a coach of school H also added that the nurses have not done well so much as compared to men who are sometimes sent to us during the games to offer service, “*These guys act so professionary as they attend to injured players at a very first speed than these nurses who are just called and walk, being even a boys’ league I think men can work better than the women in medication.*”(Coach of school H). Furthermore, a medical official of school B suggested that rugby playing schools should incur some costs and hire professional coaches who will train the students very well even when they have just joined the sport of rugby as this will at least reduce those unintended or uncalled for injuries resulting from the negligence

of the coaches and players as well.

“Yeeeer.....definitely, schools should hire coaches who are on the point....than these coaches who have the love for money other than for the sport”

(Medical officer of school B)

It was also noted during an interview with a games mistress of school E suggested that rugby sport should be started where it is not played and be encouraged in primary schools to ensure that players get used to the basics and the nature of the sport as early as possible to avoid some injuries. In addition a patron said and suggested *“Ok.... about strategies..... “As I earlier told you about wrong execution of skills.....you find someone tackling with the head.... I can say that rugby should be introduced as early as possible like in primary level...to encourage early learning of the game ”* (Games mistress of school E). She added that each rugby playing school in the league should adopts to have a primary school attached to, it could quickly enable the sport to grow faster and reduce bias as basics are imparted early enough.

Seven (19%) respondents out of 36 suggested punishing strongly those who play dangerously against others could be one way of reducing dangerous play and injuries. This suggestion strategy concurs with Collins et al. (2009) where referees were encouraged to penalize players carrying out unsafe tackling when warranted. In addition, heavy punishments should be set including bans if found guilty as this will at least scare them from playing dangerously against their friends.

“The bad thing many of the students intentionally injure their colleagues in the name of making tackles.....so me I think officials should start putting in place those punishments for those who injure us intentionally” (Patron of school D). Furthermore, a

captain of school H added that setting up strict laws is important to punish players who play dangerously because some of them intentionally play purposely to injure others. This suggestion strategy still concurs with the one by Querrie et al. (2007) where he requested that the law concerning the scrum should be emphasized by bringing more stringent variations in the law particularly in the scrum implicate the lower incidences of injuries among junior players (Brown et al., 2013). In addition, these variations in the laws include, not pushing a scrum more than 1.5m and not being able to wheel a scrum (Brown, 2013). In New Zealand these law changes have been found to reduce the incidence of spinal cord injuries among players (Chalmers et al., 2012).

Another strategy suggested was putting on leggings to cover their full legs especially to protect the knees which are vulnerable to bruises. This suggestion was appealed by a captain of school D and his patron (6%) to the organizers of the league during an interview. The captain added that organizers of the league should kindly allow us putting on long under garments to cover the whole legs and reduce on bruises especially when we fall down while making a try, when we are in a ruck and also during a scrum. *“Man.... we have suffered with bruises and what identifies a true rugby player at our school is the number of bruises from the knees and elbows”* (Captain of school D). This strategy concurs with another study strategy suggestion by Brown (2013) emphasized use of safety gears because he found that most injuries sustained by amateur rugby players are sometimes due to failure to use safety gears and usually result in a loss of training, playing and study.

A patron of school G suggested of hiring professional sport nutritionists to ensure that players are fed very well so as to have strong muscles and bones. This was noted during

an interview. In addition, *“Rugby playing schools should hire professional nutritionist to help these students get the right quantity of food their bodies need to play the game because these players use a lot of energy and sometimes their diets are poor making them weak and susceptible to injuries”* (Games teacher of school H)

Two (6%) respondents out of 36 suggested that offering proper first aid could reduce injury occurrence among rugby players. A medical officer of school H mentioned that some of the medics don't know well this sport and its related injuries, therefore, sometimes they are not sure on the right first aid to offer. A related study by Fuller et al. (2007), suggested that physiotherapy can sort these injuries out now so that your chances of playing an uninterrupted season are much higher and this can be adopted to reduce injury occurrence. In addition similar suggestions related to handling of injuries by medical officers from other studies by Brown et al. (2013) suggested that injury prevention in all sports follow a certain sequence called 'sequence of prevention' model: (32) There are four steps to the model namely, establishing the magnitude of the sports injury problem, establishing the etiology and mechanism of the injury, introducing preventive measures and assessing the effectiveness of these preventive measures by repeating step 1. In addition, Bleakly, (2011) also suggested that Rugby smart and Boksmart are two injury prevention programmes in New Zealand and South Africa that have been developed in line with the sequence of prevention model

Planting grass was still observed as a strategy on improving the surface of the playing grounds to reduce injury occurrence in rugby. Five (50%) of the 10 fields of play had been covered fully with grass a factor which meant that injury occurrence on such fields was minimal compared to the five (50%) other facilities which were in bad conditions.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter presents the summary, conclusion and recommendation of the study.

5.1 Summary of findings

5.1.1 Common injuries in rugby

It was revealed from the study that both soft and hard tissue injuries occurred. Soft tissue injuries such as sprains, strains, bruises, cuts, nose bleeding, muscle pulls and blisters occurred as well as hard tissue injuries such as dislocations, fractures, and concussions. In addition, soft tissue injuries occurred more than the hard tissue injuries and bruises were the highest soft tissue injuries followed by strains, muscle pulls, sprains, nose bleeding, blisters and cuts. Dislocations were the highest hard tissue injuries followed by fractures and concussions.

5.1.2 Timing of injury occurrence

Findings also revealed that both soft and hard tissue injuries occurred. This means that injuries can occur at any time during the game. However, injuries occurred mostly during the second half of the matches compared to first half.

5.1.3 Factors attributed to injury occurrences among rugby players in secondary schools

The factors attributed to the occurrence of injuries among rugby players in secondary schools were categorized into intrinsic and extrinsic. Intrinsic factors such as foul play,

using wrong techniques while executing a skill, poor feeding habits and low fitness levels. On the other hand, extrinsic factors included poor coaching programs and wrong coaching techniques used by coaches, poor conditions of the fields of play, coaches' encouragement to injure, failure to use safety gears, un favorable weather conditions, hooliganism, officiating and delayed first aids services. The study findings therefore, showed that intrinsic factors were the primary causes of almost all the types of injuries in the games of rugby compared to extrinsic factors.

5.1.4 Strategies to reduce injuries among rugby players in secondary schools

The study findings suggested that planting grass in bare areas, wearing safety gears, employ qualified and skilled rugby coaches and doctors, encouraging more growth of the game from primary level, punishing heavily dangerous play, add under clothing on the uniform, use of sports nutritionists to work on players' diet, offer proper first aid and participate in right age level categories as strategies to reduce injury occurrence,

5.2 CONCLUSION

This study concluded that soft tissue injuries occurred far higher than the hard tissue injuries. Injuries occurred more in second half and intrinsic factors attributed to primary causes of all types of injuries in the games of rugby. Planting grass in bare areas, wearing safety gear, employ qualified and skilled rugby coaches and doctors were suggested as the major strategies to reduce injury occurrence among rugby players in secondary schools in central Uganda.

5.3 RECOMMENDATIONS

With reference from the study findings, the recommendations were based on, rugby

players, the schools management, the league organizers, the government and further researchers

5.3.1 Recommendations for rugby players

All rugby players should be sensitized on all common injuries related in the sport of rugby, their primary causes, how and when these injuries occur and the strategies or solutions to reduce on the occurrence. This will ground rugby players with proper knowledge of the game and keep them aware on what to do, how to do it and when to do it especially before, during and after the matches.

5.3.2 Recommendations for the schools' managements

All school managers especially the head teachers, human resource and the appointing committees should recruit and employ qualified personnel in the activities of sports. For example game teachers and patrons should need to have qualification in physical education, sports science and sports management. These can take on the roles of sports management and care for sports facilities like the rugby grounds to ensure that they qualify the right standards than having just sports teachers who just love sports but with less information. Such personnel have a wider knowledge of sports and can really help to reduce on injury occurrence.

In addition, coaches and medical officers need to have certified coaching and practicing licenses respectively with good reports. This will improve on the proper handling and management of players when comes to sports. Furthermore, Schools where foods and nutrition is taught should involve those teachers in the sports department to help in the

proper feeding of athletes, and those without that program. This will reduce injury occurrence when implemented.

5.3.3 Recommendations for the league organizers

The Uganda senior secondary schools rugby association organizing committee with the Uganda rugby union, the organizers of this league should make sure that those policies which are put in place to help on reducing injury occurrence are strongly emphasized. For examples, referees could be urged not to allow any player without right protective gears such as mouth guards to participate in the game. This message will enable schools to put safety gears in their budgets thus reducing on injuries.

In addition, the organizers especially the Uganda rugby union should also organize competitions at primary levels to encourage pupils start building confidence in this sport early enough. This in future will reduce on the rate of injury occurrence.

5.3.4 Recommendation for the government

The government through the national council of sports should work closely with Uganda revenue authority to make safety gears for sports tax free so that more are imported into the country at cheaper prices.

5.3.5 Recommendations for other researchers

All students who study sports related courses at any level should carry out research in the sports area. This will help to reduce on the challenges that are affecting sports not only in Uganda but also in the whole world

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APPENDIX II: CONSENT LETTER

KYAMBOGO UNIVERSITY
P.O BOX 1, KYAMBOGO
FACULTY OF SCIENCE, SPORTS SCIENCE DEPARTMENT

10TH NOVEMBER, 2018

THE HEAD TEACHER,
RUGBY PLAYING SECONDARY SCHOOL

Dear Sir,

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL

My name is Muyanja Ronald, a Master of Science in Sports Science student at Kyambogo University. The research I wish to conduct for my master’s thesis states ‘Injury occurrence among rugby players in secondary schools in central Uganda in the year 2019 rugby league’. The study will be conducted under the supervision of Dr. Kasule George Wilson, Assoc. Prof. Constance Nsibambi, and Prof. Edwin K. Wamukoya.

I am hereby seeking your consent to allow me collect relevant data from your institution specifically from your games teachers, medical officers, rugby patrons and coaches, captains and players.

I have provided a copy of my thesis proposal which includes measures to be taken and a copy of approval letter from the university introducing me to collect data.

Upon completion of this study am under taking, I will provide a copy of complete thesis too your institution. If there is any other information that may be required from me, kindly contact me on +256 700799164/ 779495090 and mronnie13@gmail.com

Thank you very much for time and consideration in this study

Yours sincerely

.....

Muyanja Ronald

KYAMBOGO UNIVERSITY

APPENDIX III

Self-administered Questionnaire for rugby players in rugby playing schools

Dear rugby student,

You have been selected to take part in this study, “INJURY OCCURRENCY AMONG RUGBY PLAYERS IN SECONDARY SCHOOLS IN CENTRAL UGANDA IN THE YEAR 2019.” You are therefore kindly requested to respond to the following questions honestly and to the best of your knowledge. The information given will be confidential and only for academic purposes.

Instructions

Tick in the box provided your best option and you can write your opinion where applicable

A. Demographic information

1. Age Group (years)

15 and Below

16 -17

18and above

3. Period for which you have played rugby in this school (Number of years)

Less than a year

1-2 years

3-4 years

Above 5 years

4. Position of play on the pitch

Back Player

Forward player

5. Which is your biggest tournament you have ever played?

Schools' league

Nationals

East Africa games

6. Have you ever suffered any injury while playing rugby either during training or match comp?

Yes

No

7. If yes, how many times have you suffered injuries while engaging in rugby in the last period?

Less than 3

3-5

5 and above

8. Did you get any first aid?

Yes

No

9. If yes, did you get further medical attention?

Yes

No

Section B: injury occurrence among rugby players

9. This section presents the specific objectives as indicated below.

Use the key to answer the following question by ticking, SA (Strongly Agree), A (Agree), NS (Not Sure), D (Disagree), SD (Strongly Disagree),

B1	Factors are associated with injuries among rugby	SA	A	NS	D	SD
B1.1	Failure to use rugby safety gears					
B1.2	Wrong execution of techniques of the game					
B1.3	Low fitness levels of players					
B1.4	Dangerous foul play					
B1.4	Poor feeding habits of the players					
B1.5	Poor conditions of playing facilities					
B1.6	Inappropriate training program					
B1.7	Unfavourable playing time					
B1.8	Use of inappropriate rugby equipment					
B1.9	Encouraging injured players to continue playing					
B1.10	Un favourable weather conditions					
B1.11	Wrong coaches' tactical play					
B1.12	Delayed administration of first aid					
B1.13	Hooliganism					
B1.14	Un fair officiation					

B1.15 State any other factors not mentioned above associated with injury occurrence among rugby players in secondary schools in central Uganda.....

B2	Management strategies put to reduce on injury occurrence among rugby players	SA	A	NS	D	SD
		5	4	3	2	1
B2.1	Appropriate training programmes					
B2.2	Execution of proper techniques of the game					
B2.3	Ensure proper positioning during game play					
B2.4	Appropriate rugby equipment					
B2.5	Adhere to the rules of the game					

B2.6	Use rugby safety gears					
B2.7	Standby first aid administration					
B2.8	Fair officiation					

B2.8 State any other managerial strategies that can be applicable to reduce injury occurrence among rugby players in secondary schools in central Uganda.....

Thank you

APPENDIX IV:

Self-administered Questionnaire for rugby administrators in rugby playing schools in central Uganda

Dear rugby administrator,

You have been selected to take part in this study, "INJURY OCCURENCY AMONG RUGBY PLAYERS IN SECONDARY SCHOOLS IN CENTRAL UGANDA." You are therefore kindly requested to respond to the following questions honestly and to the best of your knowledge. The information given will be confidential and only for academic purposes.

Instructions

Tick in the box provided your best option and you can write your opinion where applicable

A. Demographic information

- 1. Gender : Male Female
- 2. I am, A
Games master Coach Games prefect Patron
Medic
- 3. I have served in this position for;
Less than a year 1-3years Over
3years
- 4. Which is the biggest rugby tournament that your school has ever participated in?
5. Schools league Nationals East Africa
games
- 5. Have you ever observed an injury or injuries in rugby sport happening?
Yes No
- 6. If yes, was there any first aid that was provided?
Yes No
- 7. Was there any other further medical attention that was offered to injured player after first aid?
Yes Not aware No

Section B: injury occurrence among rugby players

This section presents items on injury occurrence among rugby players in Secondary Schools in Central Uganda and is divided into different parts namely, common factors associated with injuries and the common management strategies designed for injuries among rugby players in Secondary Schools in Central Uganda.

Use the key to answer the following question, SA (Strongly Agree), A (Agree), NS (Not Sure), SD (Strongly Disagree), D (Disagree)

B1	Factors are associated with injuries in rugby	SA	A	NS	D	SD
B1.1	Failure to use rugby safety gears					
B1.2	Wrong execution of techniques of the game					
B1.3	Low fitness levels of players					
B1.4	Dangerous foul play					
B1.4	Poor feeding habits of the players					
B1.5	Poor condition of playing facilities					
B1.6	Inappropriate training program					
B1.7	Unfavourable playing time					
B1.8	Use of inappropriate rugby equipment					
B1.9	Encouraging injured players to continue playing					
B1.10	Un favourable weather conditions					
B1.11	Wrong coaches' tactical play					
B1.12	Delayed administration of first aid					
B1.13	Hooliganism					
B1.14	Un fair officiation					

B3.13 Identify other factors not mentioned above which are associated with injury occurrence among rugby players in central Uganda.....

B2	Management strategies put to reduce on injury occurrence among rugby players in secondary	SA	A	NS	D	SD
		5	4	3	2	1
B2.1	Appropriate training programmes					
B2.2	Execution of proper techniques of the game					
B2.3	Ensure proper positioning during game play					
B2.4	Appropriate rugby equipment					
B2.5	Adhere to the rules of the game					
B2.6	Use rugby safety gears					

B2.7	Standby first aid administration					
B2.8	Fair officiation					

B2.8 State any other managerial strategies that can be used to reduce injury occurrence in rugby.

.....

‘END, THANK YOU’

APPENDIX V: Key informant interview guide for students in rugby playing schools

Dear rugby student, my name is.....am a research assistant working with the team that is assessing INJURY OCCURRENCY AMONG RUGBY PLAYERS IN SECONDARY SCHOOLS IN CENTRAL UGANDA. You have been selected purposively because of the knowledge you seem to be having about the study we are conducting. You are therefore kindly requested to respond to the following questions honestly and to the best of your knowledge. The information given will be confidential and only for academic purposes.

1. How old are you, kindly tell me your age in complete years
2. For how long have you played and which position do you play in this sport of rugby?
3. What challenges do you face while playing this sport of rugby?
4. On the issue of injuries, what are the common types of injuries player face while playing rugby?
5. When do they always occur?
6. What do you think are the factors attributed for the occurrence of these injuries among players?
7. What do you think should be done to ensure that these injuries reduce among players?

APPENDIX VI: Key informant interview guide for rugby administrators

Dear rugby administrator, my name is.....am a research assistant working with the team that is assessing INJURY OCCURRENCE AMONG RUGBY PLAYERS IN SECONDARY SCHOOLS IN CENTRAL UGANDA. You have been selected purposively because of the knowledge you seem to be having about the study we are conducting. The information given will be confidential and only for academic purposes. You are therefore kindly requested to respond to the following questions honestly and to the best of your knowledge.

1. How old are you, kindly tell me your age in complete years
2. What position do you hold in the sport of rugby?
3. What challenges do players always face while playing this sport of rugby?
4. On that point of injuries, what do you think are the common injuries players always suffer while playing rugby
5. When do they always occur?
6. What do you think are the possible causes of these injuries among players
7. What should be done to reduce the occurrence of these injuries among players

APPENDIX VII: Observation check list

The common types of injuries and the timing of injuries among rugby players in Secondary Schools in Central Uganda

Injury	First half		Second half		Grand total	%
	No. of time	Total	No. of time	Total		
Concussions						
Sprains						
Strains						
Bruises						
Fractures						
Cuts						
Dislocations						
Nose bleeding						
Tooth fracture						
Hamstring injury						
Groin injury						
Tendinitis injury						
Medial tibia stress syndrome						

- The factors associated with injuries among rugby players in Secondary Schools in Central Uganda?

No	The following factors are associated with injuries among rugby players in Secondary Schools in Central Uganda							Use a tick where applicable
1	The training program							
a	Poor warm- up phase							
	Appropriate time		Inappropriate time		Appropriate drills		Inappropriate drills	
b	Conditioning exercises							
	Appropriate time		Inappropriate time		Appropriate drills		Inappropriate drills	
c	Warm down/ cool down							
	Appropriate time		Inappropriate time		Appropriate drills		Inappropriate drills	
2	Coaching techniques of the game							

a	Tackling	Appropriate		Inappropriate					
b	Scrum down	Appropriate		Inappropriate					
c	Line-outs	Appropriate		Inappropriate					
d	Rucks and mauls	Appropriate		Inappropriate					
3	Playing time								
a	Morning								
b	After noon								
c	Evening								
4	Foul play during training or match								
	Biting		Scratching		Over lifting		Fighting		Others
	Squeezing/pressing delicate parts								
5	Conditions of the rugby pitches								
a	Bare parts of the field								
b	Debris								
c	Pot holes and ditches								
d	Un padded goal posts								
6	Encouraging injured players to continue playing								
	By the coach			By spectators			By teammates		
7	Use of rugby safety equipment								
a	Mouth guards	Appropriate			Inappropriate				
b	Head gears	Appropriate			Inappropriate				
c	Shoulder pads	Appropriate			Inappropriate				
d	Body armours	Appropriate			Inappropriate				
8	The weather conditions during the game								
a	Sunny								
b	Rainy								
c	Cloudy								
9	Pressure from the coaching team for a win								
10	Feeding habits of the players								
a	Muscular								
b	Lean								
11	Fitness levels of players								
a	Endurance	Low		Average			High		
b	Strength	Low		Average			High		
c	Flexibility	Low		Average			High		
d	Reaction time	Poor		Average			Good		
	Agility	Low		Average			High		
	Power	Low		Average			High		*****
	Speed	Low		Average			High		
12	Hooliganism								
13	Officiation								
	Fair			Un fair					
14	First aid								
a	First aid kit								
	Fully equipped			Moderately equipped			Not well equipped		
b	Medical officers/ first aiders								

	Available	Not available	
No	The common management strategies put to reduce on injury occurrence among rugby players in secondary schools in central Uganda		Tick where applicable
1	Follow a structured training and game situation programme		
a	Warm- up		
b	Conditioning		
c	Game situation		
d	Warm down/ cool down		
2	Execute proper and safe techniques when tackling apart from the neck and head		
a	Tackling from the front		
b	Tackling from the side		
c	Tackling from behind		
3	Learn proper positioning during game to minimize risk moves		
a	Back line positions		
b	Forward positions		
4	Proper scrum down		
a	Proper rhythm from the referee		
b	Proper crouch		
c	Proper bind		
d	Proper set		
5	Execute proper line outs		
6	Participate at a level consistent with age and ability adhering to the rules for the game		
a	15 years and below category		
b	17 years and below category		
c	18 years and above category		
7	Use of good safety gears		
a	Mouth guards		
b	Head gears		
c	Shoulder pads		
d	Under body armour		
8	Offering proper first aid		
a	Team doctor/ nurse		
b	Use of neck holder		
c	Use of pain killers		
d	Use massaging gels		
e	Use of dressings		
f	Use of disinfectants		