UNIVERSITY OF EDUCATION, WINNEBA

FACTORS CONTRIBUTING TO SPORTS INJURIES AMONG SENIOR HIGH ATHLETES IN COMPETITION IN AKUAPEM MUNICIPALITY

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DECLARATION

Student's Declaration

I Sedegah Michael Mawuli, declare that this thesis, with the exception of the quotations and references contained in published and unpublished works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature ……..……

Date ……...

Supervisor's Declaration

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidance for supervision of thesis as laid down by the University of Education, Winneba.

Supervisor"s Name: Dr. Emmanuel Osei Sarpong

Signature ……..……

Date ……..

DEDICATION

I dedicate this noble piece of work to God Almighty for His protection and guidance throughout this program. I also dedicate it to my dear Abi and my lovely kids, Seyram Delali and Salasi.

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ABSTRACT

Sports injuries among student athletes in high schools has become prevalent in most developing countries. The study explores the risk factors influencing sports injuries and identifies those who sustained injuries in high schools‟ competitions in the Akuapem Municipality. Drawing on literature from sports injuries, 610 student-athletes were used to understand how they sustained various injuries during schools‟ sports and games. Using cross-sectional survey, the study reveals how wounds, knee injury, muscle cramps and thigh injury are common injuries often sustained in their sports and games in the municipality competition. Physiological factor was the most contributive resulting from the number of games played by student athletes which significantly influenced sprain, strain, dislocation and nose bleeding injuries among them. Results recorded low correlation accounting for 9% occurrence of sports injuries in the Akuapem Municipality. Further research is recommended in other districts to have a general approach to remedy some of these sports injuries noticed in their sport competitions.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Participation in sports and physical activities may have different meaning to people why they involve themselves. Others derive pleasure and relaxation, competition, socialization, maintenance and improvement in fitness and health). Thus, physically active lifestyle is important for all age groups (Thompson et al., 2010). Bahr and Holme (2003) described participation in regular physical activity as a means of reducing the risk of premature death, heart disease, hypertension, cancer, obesity and diabetes mellitus. However, participation in sports is normally associated with the risk of injuries which in some cases lead to permanent disability, while other prevalent injury types such as hamstrings, strains or anterior cruciate ligament may lead to career ending, and to post- career disability (Bahr & Holme, 2003).

Sports injuries are significant cause of concern for athletes, sports enthusiasts, society and parents (Ward, 2004). Developing treatment methods for injuries remain an important goal rather than to prevent injuries since sports and injuries are inseparable. It has been recognized through injury surveillance that sports injuries constitute a threat to athletes‟ health, and the causes must be established as a step towards its prevention (Indrioadottir et al., 2015). Several situations can result in sports related injuries, and awareness of these causes can prevent its occurrence (Bahr & Krosshaug, 2005). Peterson et al. (2016) described the causes of sports injuries as being improper equipment, fatigue, poor warm up, activities not acquainted and new activities. Certain sports are more prone to injuries due to the nature, intensity and demands involved in participating in such sports like football, volleyball and basketball (Emery

& Tyreman, 2009). According to Barlly and Shem (2007), warming up delivers blood and oxygen to the various muscles which allow the body to function efficiently to prevent injury occurrence.

Research into sports injury occurrence recognized two groups of risk factors which are intrinsic and extrinsic factors (Ekstrand, et al., 2011). Intrinsic factors can simply be explained as factors that emanate from the individual to bring about sports injuries. It refers to the personal contributions to injuries (Ekstrand, et al., 2011). This can be categorized into biological factors such as age, sex, body composition, health status, physical fitness, anatomy and skills level, and psychological factors such as motivation, stress, anxiety, aggression and fear. External factors explain the environmental factors that contribute to athlete injury which are considered to be certain sports type, intensity and frequency of training session, warmth, humidity or coldness of the weather, special equipment or type of surface the activity is practiced on (van Beijsterveldt et al., 2011). In another vein, Wiese-Bjornstal (2009) stated that extrinsic factors can be classified into physiological and sociocultural factors. Sports injuries result from a complex interaction of multiple risk factors and events of which only few have been identified based on the model (Meeuwisse, 2007). The theoretical model described external risk factors as those that act on the predisposed athlete from outside and are classified as enabling factors, in that they facilitate the manifestation of injury.

Sports injuries apart from the factors can be identified by types which include acute and chronic injuries (Griffin et al., 2020). Acute injuries occur due to sudden trauma to the tissue, with most of the symptoms of the injuries presenting themselves almost immediately, while chronic or overuse are caused by repeated overuse of muscle

group or parts as results of poor techniques and structural abnormalities (Kerssemakers et al., 2009).

Sports injuries occur during competition and practice which can affect athletes and the competition as a whole (Darrow et al., 2009). The various effects can be categorized in reference to the athlete and the competition which can be psychological, performance, and cause financial effect. Furthermore, it can increase fear of injury in the athlete. Brewer (1994) argued that an athlete‟s fear of injury can cause anger and depression. The effect can be seen on the financial aspect for treatment on the side of the athletes where money will have to be spent to promote recovery.

Preventing or reducing the risk of injury occurrence to athletes needs the understanding of the nature of training, equipment consideration, nature of events and athletes‟ state of mind and other considerations which can be organized properly to minimize and prevent injuries (Hachigian- Gould, 2016). Modifying certain rules and regulation in some sports discipline to reduce the risk of sustaining injuries in sporting activities. (Theisen et at., 2014). Strict application of the Laws of the Games is an important means of injury prevention, (Junge & Dvorak, 2013).

Lack of effective monitoring in Senior High School sports has prevented the identification of factors and causes of sports injuries in the Akuapem Municipality. Student athletes are being discouraged by their parents and caretakers due to financial burden incurred from sports injuries sustained during training and competition. Hence, the need to examine the factors contributing to sports injuries among Senior High School athletes in the Akuapem Municipality in order to reduce the factors causing the injuries during sports.

1.2 Statement of the problem

Student athletes from Senior High Schools in the Akuapem municipality normally get injured during inter school competition and these are attributed to several causes. Sports injury types like fracture, dislocation and hamstring could be among the common injuries in their sports competition. Some of these injuries can force athletes to quit participating recreation pursuit which may hinder their dream of becoming professional athletes in future. Welton et al. (2018) identified fracture, dislocation and wounds injuries in high school competitions, but their study focused on schools in the United States. This has resulted in permanent damage and disability in some cases of these student athletes. Some of these injuries sustained by student athletes during such tournaments are mostly acute or chronic injuries and are mainly caused by situations like improper equipment, inadequate training, fear, and the nature of some of the games or activities (Kerssemakers et al., 2009). Theisen et al. (2014) also indicated the factors of sports injuries among the youth as the intrinsic and extrinsic factors, but their study was centered on Europe. Several analyses and measures such as ensuring proper and effective warm ups before games and proper officiating for games have been ensured but have not been able to curb the problem of injury occurrences. This situation sometimes creates financial burden on parents of these student athletes in the municipality, hence parents are reluctant to allow their wards to participate in school sports. Students also show lack of interest and motivation to participate in Senior High School sports due to all these reasons. Studies have not been carried out in the area of sports injuries among student-athletes in the Akuapem Municipality and Ghana as a whole. The occurrence of these injuries and the effects, in spite of all these preventive measures motivated the researcher to assess risk factors contributing to

sports injuries among Senior High School athletes in competition in the Akuapem municipality of Ghana.

1.3 Purpose of the Study

The purpose of this study was to assess factors contributing to sports injuries in High School tournaments in the Akuapem Municipality.

1.4 Objectives of the study

The objectives of this study were to:

1. Assess the types of sports injuries associated with Senior High School tournament.
2. Examine factors contributing to student-athlete‟s sports injuries in Senior High schools.
3. Examine the difference between the number of events and the types of sports injuries sustained.
4. Assess the differences between genders on the factors contributing to sports injuries.
5. Investigate the correlation between the factors contributing to sports injuries and injury occurrence.

1.5 Research questions

1. What types of sports injuries do athletes sustain in Senior High school competition?
2. What factors contribute to sports injuries in Senior High school competition?
3. What are differences in the number of events on the type of sports injury sustained in Senior High School competition?

4. What are the differences in genders on the factors contributing to sports injuries in Senior High school competition?
5. What is the correlation among the factors contributing to sports injuries and injury sustenance?

1.6 Significance of the Study

The results of the study may bring out some unnoticed factors that influence sports injuries in High School competition to aid organizers to deal with it. The outcome of the study may also outline and inform the organizers of such tournaments on the effective ways of planning games and matches. Again, the results of the study may educate organizers on the types of injuries to expect during such competitions, and to design an appropriate first aid mechanism to deal with them. Furthermore, the outcome of the study may seek to inform physical education teachers and coaches on the appropriate approaches to choose in managing student athletes, and also to prepare them adequately before such competitions. The results of this study may again help organizers and physical education masters to manage and minimize the rate of injury occurrence in such tournaments. The results of this study may also help physical education teachers to have and keep a detailed record on the injuries sustained during such tournaments. Lastly, the results of this study may help other researchers to look at other aspects of sports injuries as a whole.

1.7 Delimitation of the Study

This study focused on Senior High School athletes in the Akuapem Municipality, Eastern Region of Ghana. The survey was carried on Senior High Schools in the Akuapem Municipality. Quantitative survey design was used to collect data for the study.

1.8 Limitation of the study

The findings of this study were limited to only schools in the Akuapem Municipality of Ghana and not inferred beyond the scope. Also, participants did not respond positively to the answering of the questionnaire and therefore affected the study because census sampling technique was used.

1.9 Definition of Terms

Competition: An activity in which someone is trying to win something or be more successful than someone else.

Pleasure: The feeling of excitement satisfaction and enjoyment.

Risk factor: A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury

Relaxation: The state of been free from tension and anxiety**.**

Socialization: The activity of mixing socially with others.

Sports injuries: These injuries refer to the kinds of injury that occur during sports or exercise.

Surveillance: The careful watching of someone, especially by an organization.

Tournament: Series of contests between a number of competitors, competing for an overall prize.

CHAPTER TWO

LITERATURE REVIEW

This chapter deals with reviewing what has been done and carried out in reference to sports injuries. It explains and reviews researches under the following areas.

1. Factors that influence sports injuries
2. Causes of sports injuries
3. Types of sports injuries
4. Preventions and management of sports injuries
5. Effects of sports injuries
6. Conceptual framework
7. Summary

2.2 Factors that influence sports injuries

Zech, and Wellmann (2017) in their study on the perception of football players regarding injury risk factors and prevention strategies recorded that, the athletes generally believed multiple intrinsic and extrinsic factors could be responsible for the occurrence of lower extremity injuries, including contact, physical fatigue and muscle impairments. Only few respondents considered neuromuscular and postural control impairments as major risk factor for injuries. Nearly all athletes perform stretching before a match or practice in order to prevent injuries although no scientific evidence exists for this measure. Other frequently performed prevention strategies are specific warm up exercises and taping / bracing. The results show that athletes in general are positively disposed towards injury prevention. This study identified both intrinsic and extrinsic factors as contributive factors to sports injuries and this exhibit similarities with reference to the same factors under review. In this research, cross-sectional

survey design was employed to identify the factors of sports injuries and also on young athletes but the study involved some professional participants.

On sports injuries in high school athletes, MaGuine (2006) came out with risk factors for injuries to the ankle, head, and knee have been identified, to a limited degree. Upper-extremity injury risk factors are less well known. There is a need for high-quality prospective studies to further identify injury risk factors and injury-prevention strategies for high school athletes. His study identified common injuries similarly to the once anticipated in study being carried out. Although the study was carried out on high school student athletes, it focused and conducted in the United states.

Another study by Alizadeh et.al. (2012) on injury occurrence and psychological risk factors, Pearson correlation analysis revealed significant relationships between injury occurrence, cognitive anxiety and somatic anxiety but no significant relationship was found with self-confidence. It can be concluded that cognitive and somatic anxiety may increase the injury occurrence due to poor concentration and physiological changes. The findings support suggests that psychological factors can be used to predict injury occurrence, and anxiety was the predictor of injuries in junior football players. This study took into consideration, only the psychological factors of sports injuries although the focus was on high school athletes. The participant of the study were only football players instead involving other games.

Similar study on injuries among university athletes by Lemoyne et al. (2017) reported that student athletes sustained over two injuries per year. Significant differences were found for sport category and type of injury. No differences were observed regarding antecedent sport participation. The study suggested that injuries profile differ according to the type of sports played by athletes with acute injuries mostly associated

with team sports. The similarly utilized cross- sectional survey design for the data collection but it was carried with university athletes as participants.

Dyakova et at. (2017) on sports injuries in students registered are existing injuries related to sports and it is found that some of the methods and means of treatment and prevention are not well known to students-athletes. The survey results make it necessary to seek and implement academic practice methods and tools to facilitate the recognition of sports injuries and upgrading of skills for the protection of their own health. Their study focused on the recognition of the different approaches and methods of preventing and the treatment of sports injuries in students. Sports injury prevention and treatment is a vital aspect of the injury mechanism since its surveillance will minimize its occurrence and promote recovery to enable athletes to play and participate again in sports. This study employed mixed method approach of data collection and university athletes were used as participants for the study.

In a study by Caine et al. (2008), on injury in child and adolescent sports indicates that few modifiable injury risk factors have been statistically evaluated, and not many studies have been designed to determine the effect of injury prevention measures in pediatric sports. This played a contributive role in the work by discussing some of the risk factors that contribute to sports injuries among children and adolescent. Although their focused was on children and adolescent, epidemiology study design was employed.

Eapen (2014) on the Prevalence of Sports Injuries in Adolescent Athletes reported that, 300 got injured previously and recently. 149 (32.3%) athletes had both previous and recent injuries, 88 (19.1%) had only previous injury and 63 had only recent injury. Boys injured at a more frequency than girls. Lower limb injuries were found to be more common. Various factors like psychological issues, previous injury, ground,

BMI were significantly correlated with injury. Prevalence of sports injuries was 65% in this study. Injury risk factors found in this study were male gender, age, psychological and stress related issues, previous injuries. This study identified only psychological factors as the only contributive factor to sports injury although it was conducted on adolescent.

In 2020, Sollerhed et al. acknowledged a higher prevalence of injuries in leisure time than in Physical Education in their study on adolescent physical activity – related injuries in school. Two groups with high PE injury rates were identified: highly active in both school PE and leisure-time sports and b) highly inactive in both contexts. There were no differences between girls and boys. Task-oriented adolescents were more prone to injury. Renewed inadequately recovered leisure-time injuries among highly active adolescents, and injuries among fragile inactive adolescents unfamiliar with exercise. Physical education and sports both involve physical activities and as such are related with reference to injury occurrences. The types of injuries and their corresponding risk factors in physical education similar to that in sports competitions. Although their study focused on adolescent and with survey approach, it was solely based on physical education.

Dobnik (2015) in his study reported that, majority of article authors (7) in selected studies shared the opinion that rather than in girls, injuries were more common in boys. One of the authors claimed that the factor of gender carries no substantial emphasis. The highest number of physical/sports activity-related injuries occurred in older children and adolescents. One of the selected studies found that overweight youth develop a higher risk of sports injuries. The opinions of the authors differ when it comes to the level of physical/sports activity. Some authors conclude that children who are more active suffer fewer injuries, while other authors believe that the actively

involved children could be subjected to a higher number of injuries. Younger children (up to the age 12) are subjected to injuries while involved in an unorganized type of activity, whether during active games outside or inside, walking or running freely. Older children and adolescents (aged above 12 years) sustain injuries more often in an organized type of activity. The study although focused on children and youth, but different design and approach was used. Also, the participants were normal students and not student athletes.

Frisch et al. (2011) in their study also indicated injury rate of 1.65 injuries per athlete; injury incidence was 3.72 injuries/1000 h. The risk of injury was six times higher (CI95% (4.70–8.12)) in competition than in training (13.60 and 1.96 injuries/1000 h, respectively). Two thirds of the injuries were of intrinsic nature (27% progressive and 40% acute non-contact injuries). In team sports athletes having sustained at least one intrinsic injury had, compared to those with no intrinsic injury, a lower number of practice sessions per day (0.83 versus 0.89 sessions/day; p=0.023), a higher percentage of intense sessions (40 versus 30%; p=0.007), a higher number of intense sessions per day (0.33 versus 0.27 sessions/day; p=0.047) and a higher proportion of days with two intense sessions (5.7% versus 2.7%; p=0.007). The study concentrated on young athletes but utilized epidemiology study design and was also not carried in Ghana.

Results from Kucera et al. (2018) risk factor for incident injury in youth soccer showed that, more than half self- reported an injury history (59.7%). Overall, the unadjusted incidence rate was 4.6 (95% confidence interval (CI) 4.3 to 4.9) incident injuries per 1000 athlete-exposures. Multivariate generalized Poisson regression modelling indicated that players with one previous injury had a twofold greater risk of incident injury (IRR = 2.6; 95% CI 2.0 to 3.3), and those with two or more previous

injuries had a threefold greater risk of incident injury (IRR = 3.0; 95% CI 2.3 to 3.8) compared with athletes with no previous injuries. This research was done on the youth but was solely carried out on soccer players. Prospective cohort design was also used to collect data on the topic.

The results from a study by Norcross et al. (2016) showed that of the 66 coach respondents, 52% reported being aware of IPPs; 21% reported using an IPP with their team; and 9% reported having their student-athletes perform the IPP exactly as designed. No apparent differences in the attitudes toward the importance of injury prevention or the effectiveness of IPPs were identified between coaches that did and did not adopt an IPP. Perceptions that efficacious IPPs do not offer a relative advantage over coaches' existing practices, do not align with coaches' needs (compatibility), and are difficult to implement in their setting (complexity) emerged as key factors underlying coaches' decisions not to adopt a program. Of those that did report adopting an IPP, just 43% (6/14) reported implementing the program as designed. In conclusion, improving preventative practices of high school coaches requires more than improved dissemination to increase coach awareness. To improve the rate of IPP adoption and implementation fidelity, coach education should directly address issues related to relative advantage, compatibility, and complexity.

Another study by Atay (2014) came out that, incidences of injuries to the neck, shoulder, elbow, hand, wrist, superior dorsal region, waist, hip-femur region, knee, and foot-ankle regions were not statistically significant. In conclusion, this study established that children participating in competitive sports are at risk of injury. The causes of injuries were examined to propose preventive measures to minimize their occurrence and severity. It should not be overlooked that injuries can occur more easily among children because their musculoskeletal system is not fully developed,

and coaches should be educated in the appropriate training intensities for children. Although the study employed survey design and was conducted on middle school children, the research did not really explain the various events on which it was done. Also, the study was carried out of Ghana.

Hopkins et al. (2007) conducted a study and indicated that, various measures of injury incidence are injury risk (proportion of athletes injured in a given period of training, playing, or other exposure time), injury rate (number of injuries per unit of exposure time), odds of injury (probability injury will happen divided by probability injury will not happen), injury hazard (instantaneous proportion injured per unit of time or mean injury count per unit of time), and mean time or mean number of playing exposures to injury. Effects of risk factors are estimated as values of effect statistics representing differences or ratios of one or more of these measures between groups defined by the risk factor. Injury risks and mean time to injury in each group can also be estimated and can give a better sense of the effect of a risk factor. Risk factors of sports injuries were identified in this study but three different design were employed to collect data. Non-experimental cohort, survey and case-control studies were used and also the study was not conducted in Ghana.

in a study by Kofotolis et al. (2007), 208 ankle injuries were recorded, of which 139 were ankle sprains. These led to 975 sessions lost (on average, 7 lost sessions per injury). Most incidents (80.6%) were contact injuries, occurring mostly in defenders. Injury rates were equal between games and practice, while 61.1% of injuries were observed toward the end of each half of the game ($P < .05$). The injury incidence rate was higher during the first 2 months of the season as opposed to the last month ($P < .05$). Multinomial logistic regression showed that previous ankle sprain ($P < .05$) was a significant predictor of ankle sprain injury. It was concluded that ankle sprain

injuries in amateur soccer players are primarily contact injuries, occurring mainly in defenders and during both games and practice. It appears that more injuries occur in players with previous ankle injury. Injury rates were higher toward the end of a game and chiefly occur during the first 2 months of the season. This study was also on amateurs, but on only male soccer. Descriptive epidemiology study design was used for data collection.

Vanderlei et al. (2014) reported that, injury rate per 1000 hours of exposure was 1.20 among the children and 1.30 among the adolescents. Age, anthropometric data, and training characteristics only differed with regards to the presence or absence of injuries among the adolescents. The most commonly reported characteristics involving injuries in both the children and adolescents were the lower limbs, training, non-contact mechanism, mild injury, asymptomatic return to activities, and absence of recurrence. In conclusion, the injury rate per 1000 hours of exposure was similar among children and adolescents. Nevertheless, some peculiarities among adolescents were observed with greater values for weight, height, duration of training, and weekly hours of practice. This study was carried out in Sao Paulo state in Brazil and also on adolescent, but epidemiology study design was used.

The results from Schwebel et al. (2007) on the behavioral risk factors for youth soccer (Football) injury showed that, greater skill and less experience playing soccer best predicted injury risk. Inhibition, aggression, and risk-taking did not emerge as predictors. In conclusion, results were discussed with respect to previous research in youth sport and general pediatric injury risk. Although this research focused on factors of sports injuries among the youth, it was basically on soccer. The age range was also below senior high students. Athletes, and also cohort design were used.

In 2016, Kahlenberg et.al., recorded an average total number of sports injuries experienced by athletes in the study was 1.7 per participant. 80.8% of respondents reported having sustained at least one sports injury. A higher total number of hours per year of sports participation and playing a contact sport were significantly associated with more reported lifetime sports injuries. Older age, playing a contact sport, and playing on a travel/club team were associated with students using NSAIDS for sports injuries. Older age, playing a contact sport, and doing cross training are also associated with having had surgery for a sports injury. It was concluded that although more hours of participation and playing a contact sport may lead to an increased number of injuries, this risk must be weighed against the myriad of benefits that sports provides for young athletes. In this research, survey design was employed and also on high school, but the study was not carried out in Ghana and Akuapem Municipality to be precise.

Ivarsson and Johnson (2010) suggested injury was significantly predicted by 4 personality trait predictors: somatic trait anxiety, psychic trait anxiety, stress susceptibility, and trait irritability in their study on the psychological factors as predictors of injuries among senior soccer players. Collectively, the predictors self-blame and acceptance could explain 14.6% of injury occurrence. More injuries were reported among players who scored high in daily hassles. The current study found a number of significant psychological predictors that increased the injury risk among adult male soccer players. One implication for both players and coaches is to be aware of identified variables and their impact on injury risk in order to prevent sport injuries. This study also employed descriptive survey design but it was on just the psychological factors of sports injuries.

In a study by Emery and Tyreman (2009), their outcome showed 60.85 injuries/100 students/year (95% CI 58.29 to 63.35) for students reporting at least one sport injury, 29.4 injuries/100 students/year (95% CI 27.08 to 31.81) for medically treated injuries, and 12.28 injuries/100 students/year (95% CI 10.64 to 14.07) for injuries presenting to a hospital emergency department. The greatest proportion of injuries occurred in basketball (14%), soccer (12%), hockey (8.6%) and snowboarding/ skiing (7.1%). In conclusion, the rates of participation and injury in sports was high in junior high school students. The study came out with some of the risk factors and also used descriptive survey design, but some of the participants were younger that senior high school student athletes.

Beachy and Rauh (2014) on the middle school injuries identified that, football had the highest injury rate for all injuries and for time-loss injuries. In matched middle school sports, girls exhibited a higher injury rate for all injuries and time-loss injuries than boys. Girls had a higher injury rate during practices than games for all sports. Only gymnastics had a higher game injury rate for girls. Practice and game injury rates were nearly identical for boys in all sports. Only football and boys' wrestling reported higher game injury rates. Tendinitis injuries accounted for 19.1% of all middle school injuries. The risk for sport-related injury at the middle school level was greater during practices than games and greater for girls than boys in sex-matched sports. Although this study was on some selected games and on some high schools, the design used was descriptive epidemiology study design.

Rachel et al. (2008) in their study indicated that, high school athletes participating in these 9 sports at participating schools sustained 4350 injuries during the 2005-2006 school year, which corresponds to an estimated 1 442 533 injuries nationally. The rate of injury per 1000 athlete-exposures was higher in competition (4.63) than in practice.

Of all sports, football had the highest competition (12.09) and practice (2.54) injury rates per 1000 athlete-exposures. Compared with injuries sustained during practice, higher proportions of competition injuries were head/face/neck injuries, particularly in boys' soccer and girls' basketball. Competition injuries were more likely to be concussions, especially in boys' soccer and girls' basketball. Higher proportions of competition injuries caused the athlete to miss more than 3 weeks of play, particularly in baseball and volleyball. In the research, the focus was on high schools, and also on five selected games (football, soccer, basketball, wrestling, and baseball). Also, survey design was utilized for the study and on student athletes, but it was carried out in the United States and also included some games which are not part of this study.

Chomiak et al. (2008) recorded 113 (16.5%) severe injuries. Ninety-seven severe injuries (86%) were able to be documented in detail. Trauma was the cause of 81.5% of the injuries and overuse was the cause of 18.5%. Joint sprains predominated (30%), followed by fractures (16%), muscle strains (15%), ligament ruptures (12%), meniscal tears and contusions (8%), and other injuries. Injuries to the knee were most prevalent (29%), followed by injuries to the ankle (19%) and spine (9%). More injuries occurred during games (59%) than in practice. Twenty-four percent of the injured players had suffered a previous injury of the same body part. Forty-six percent of injuries were caused by contact and 54% involved no body contact. Thirty-one percent of severe injuries were caused by foul play. From these results and the analysis of injuries in specific body parts, the following factors were determined to influence the occurrence of severe injuries: 1) personal factors (intrinsic): age of player, previous injuries, joint instability, abnormality of the spine, poor physical condition, poor football skills, or inadequate treatment and rehabilitation of injuries; 2) environmental factors (extrinsic): subjective exercise overload during practices and

games, amount and quality of training, playing field conditions, equipment (wearing of shin guards and taping) and violations of existing rules (foul play). In conclusion, the results generally concur with those of previous, similarly designed prospective studies, although the latter have not always specifically dealt with severe injuries. Classifying the risk factors into person-related (intrinsic) and environment-related (extrinsic) categories. This outlined the factors of sports injuries but it was carried among only football players. Some of the participants were also older that the age range of high school student athletes.

In 2013, Vanderlei et al. on the characteristics and contributing factors related to sports injuries indicated that 19% frequency of injuries was found. Higher age, weight, height, body mass index and training duration values were associated with the occurrence of injuries. The most affected anatomic site was the ankle/foot complex (45 injuries, 36.3%). Direct contact and contactless mechanisms were the main causes of injuries (61 injuries; 49.2% and 48 injuries; 38.7%, respectively). Training was the moment in which most injuries occurred (93 injuries; 75%), independently of personal and training characteristics. In conclusion, injuries affected the ankle/foot complex with a greater frequency. Direct contact and contactless mechanisms were the most frequently reported and injuries occurred mainly during training sessions. Personal and training characteristics were contributing factors for the occurrence of injuries. The study employed survey design and on student athletes, but it only focused on the game of volleyball, and it was also carried out in Brazil.

Emery et al. (2005) carried out a study risk factors for injury and came out with an overall injury rate during the regular season as 5.59 injuries per 1000 player hours. Ankle and knee injuries were the most common injuries reported. Direct contact was reported to be involved in 46.2% of all injuries. There was an increased risk of injury

associated with games versus practices. The risk of injury in the under 14 age group was greatest in the most elite division. Having had a previous injury in the past 1 year increased the risk of injury. The outcome of this study exhibited much connection with reference to the types of sports injuries identified. Ankle and knee injuries are common injuries associated with adolescent athletes and are under consideration for the study. The focus of this study was only soccer and not the other sporting disciplines.

The results of Kontos (2004), indicated that low levels of perceived risk and estimation of ability were associated with a significant increase in risk of injury. Positive relationships between injury and both estimation of ability and overestimation of ability were supported. Estimation of ability was also positively related to risk taking. In the study, however, risk taking was not directly related to injury, nor were previous injuries. Girls reported higher levels of perceived risk and lower levels of risk taking than boys. However, boys and girls reported similar estimation of ability and overestimation of ability and subsequently incurred similar numbers of injuries. It was concluded that perceived risk and estimation of ability represent significant psychological risk factors for injury in adolescent sports. Sex differences in perceived risk, risk taking, and previous injuries should be considered when developing environmental and behavioral injury-prevention programs. The research focused rightly on adolescent sports but cohort study design was utilized instead.

Bell et al. (2016) reported that athletes in the high specialization group were more likely to report a history of overuse knee injuries (n = 18) compared with moderate (n = 8) or low specialization (n = 7) athletes (P = .048). Athletes who trained in one sport for more than 8 months out of the year were more likely to report a history of knee

injuries, overuse knee injuries, and hip injuries. Using the self-classification method, more participants self-classified as multisport (n = 213, 70.5%) than single sport (n = 89, 29.5%). Athletes from the small school were more likely to classify themselves as multisport (n = 128, 86%) (P < .001) than those from the large school (n = 85, 56%). In conclusion, classification method and school size influenced the prevalence of specialization in high school athletes. Highly specialized athletes were more likely to report a history of overuse knee or hip injuries. Participating in a single sport for more than 8 months per year appeared to be an important factor in the increased injury risk observed in highly specialized athletes. The study used cross sectional survey but was conducted outside Ghana.

A study by Sreekaarini et al. (2014) identified that, 300 injury previously and recently. 149 (32.3%) athletes had both previous and recent injuries, 88 (19.1%) had only previous injury and 63 had only recent injury. Boys injured at a more frequency than girls. Lower limb injuries were found to be more common. Various factors like psychological issues, previous injury, ground, BMI were significantly correlated with injury. It was concluded that, prevalence of sports injuries was 65% in this study. Injury risk factors found in this study were male gender, age, psychological and stress related issues, previous injuries. Although, the study was carried out on adolescent with the same design, was not carried out in Ghana and Akuapem to be precise.

2.3 Causes of sports injuries

Another study by Turbeville et al. (2003) on the risk factors for injury in high school football players indicates that the physical characteristics of players, such as body mass index and strength were not associated with risk of injury. However, more playing experience and a history of injury in the previous season were significantly

related to increased risk. Linemen were at the highest risk of injury, particularly knee injuries and season-ending injuries.

Jones et al. (2019) on football injuries also came out that, probability of sustaining a time-loss injury during a high-level youth season ranged between < 1% and 96% for under 9- to under 16-year age groups and 50% and 91% for under 18- to under 21-year age groups. Pooled estimates for total (training and match) incidence per 1000 h was 5.8 for youth players aged under 9 to under 21 years, 7.9 for older players (under 17-under 21 years) and 3.7 for younger aged players (under 9-under 16 years). Training injury incidence rate ranged from 0.69 to 7.9 per 1000 h for all age groups in youth football. Match injury incidence rate for high-level youth players ranged from 0.4 to 80.0 per 1000 h. Close to one-fifth (18%) of all high-level youth football injuries were classified as severe and required > 28 days recovery time. Muscle strain injury accounted for 37% of all injuries reported in youth football. High probabilities (> 90%) of sustaining a time-loss injury over one typical high-level football season were found. High-level youth players lose large portions of the seasonal development to injury, with players seemingly suffering long absences from training and matches, consequently affecting health and well-being and possibly burdening club/parental finances and healthcare systems. The focus of this study was only on football and not the other disciplines.

Le Gall et al. (2008) in their study on female football also indicated that 619 injuries were documented for 110 players (92.4%). Of these injuries, 64.6% (4.6/1000 training hours; 95% confidence interval and 35.4% were sustained during training and matches, respectively. The risk of injury was greater in the youngest (under age 15) group compared with the oldest (under 19) group. Traumatic injuries amounted to 536 (86.4%) and 83 (13.4%) were overuse injuries. There were 51.9% minor injuries,

35.7% moderate injuries, and 12.4% major injuries. Most injuries were located at the lower extremities (83.4%), with the majority affecting the ankle (n = 157). The most commonly diagnosed injury was ankle sprain (16.8%). Twelve anterior cruciate ligament ruptures were sustained, with the majority occurring during matches (n = 10; 1.0/1000 match hours; 95% CI, 0.4-1.6). Reinjuries accounted for 4.4% of total injuries, and September was the predominant month for injury (14.2%). Injuries, notably sprains, to the ankle were common in the outcome of this study. This study was carried out on only female football and also employed cohort study design.

In a study by Kahlenberg et al. (2014) conducted on the incidence of injury based on sports participation in high school athletes, it was revealed that athletes played an average of 1.6 different sports with an annual average of 504.3 ± 371.6 hours. The average total number of sports injuries experienced by these athletes were 1.7 per participant. 80.8% of respondents reported having sustained at least one sports injury. A higher total number of hours per year of sports participation and playing a contact sport were significantly associated with more reported lifetime sports injuries. Older age, playing a contact sport, and playing on a travel/club team were associated with students using NSAIDs for sports injuries. Older age, playing a contact sport, and doing cross training were also associated with having had surgery for a sports injury. It was concluded that although more hours of participation and playing a contact sport may lead to an increased number of injuries, this risk must be weighed against the myriad of benefits that sports provide for young athletes.

In a study by Clines et al. (2018) on influencing factors and rationale for the use of athletic trainers in secondary school athletic programs. The results showed that procurement of athletic training positions was influenced by various personnel, community organizations, and policy. Rationale for requiring ATs within athletic

programs included specialized training by ATs which was perceived to enhance safety and decrease liability. Participants viewed ATs as ideal athletic healthcare providers. Coaches were not supported as appropriate staff to fulfill this role. Financial and logistical challenges to the initiation and maintenance of AT positions were also discussed. Conclusions: The decision to utilize ATs is complex and influenced by multiple factors.

Brooks et al. (2018) conducted a study on knowledge, attitudes, and beliefs of youth club athletes toward sport specialization and sport participation. The outcome indicated that fewer than half of all athletes (45.8%) believed specialization increased their chances of getting injured either "quite a bit" or "a great deal." However, 91% of athletes believed that specialization increased their chances of getting better at their sport either "quite a bit" or "a great deal." Similarly, the majority of athletes believed that specialization increased their chances of making their high school team (80.9%) or a college team (66.9%) either "quite a bit" or "a great deal." Overall, 15.7% of athletes believed that they were either "very" or "extremely" likely to receive a college scholarship based on athletic performance. Highly specialized athletes were nearly twice as likely to have a high belief in receiving a college scholarship compared with low-specialization athletes (20.2% vs 10.2%, respectively; $\chi^2 = 18.8$; $P = .001$). It was concluded that, most youth athletes in this study believe that specialization increases their sport performance and ability to make not only a college team but also their high school team. Highly specialized athletes were more likely to believe that they will receive a college scholarship.

Ramirez et al. (2006) conducted a study on the injuries to high school football athletes in California. The outcome showed that players sustained 25.5 injuries per 100 players, 9.3 injuries per 10 000 player-hours, and 8.4 injuries per 100 session-hours.

Session rates were clear evenings (21 of 100). Offensive and defensive back fielders had about a 20% increased rate of injury compared with linemen. The adjusted injury rate for starters was 60% higher than the rate for nonstarters (relative rate, 1.6; 95% confidence interval, 1.4-1.9). They conclusion that risk profiles differed by experience, playing position, and surface types. They recommend future sports injury research that measures time-dependent exposures at the individual level and for various types of environmental playing conditions.

Shanker et al. (2007) carried out a research on the epidemiology of high school and collegiate football injuries in the United States, 2005-2006. The results showed that nationally, an estimated 517 726 high school football-related injuries (1881 unweighted injuries) occurred during the 2005-2006 season. The rate of injury per 1000 athlete-exposures was greater during high school competitions (12.04) than during practices (2.56). The rate of injury per 1000 athlete-exposures was also greater during collegiate competitions (40.23) than during practices (5.77). While the overall rate of injury per 1000 athlete-exposures was greater in the NCAA (8.61) than in high school (4.36), high school football players sustained a greater proportion of fractures and concussions. Running plays were the leading cause of injury, with running backs and linebackers being the positions most commonly injured. It was concluded that patterns of football injuries vary, especially by type of exposure and level of play.

In a different study by Meyer and Barnhill (2004) on the incidence, causes, and severity of high school football injuries on field turf versus natural grass: Findings per 10 team games indicated total injury incidence rates of 15.2 (95% confidence interval, 13.7-16.4) versus 13.9 (95% confidence interval, 11.9-15.6). Minor injury incidence rates of 12.1 (95% confidence interval, 10.5-13.6) versus 10.7 (95% confidence interval, 8.7-12.7), substantial injury incidence rates of 1.9 (95% confidence interval,

1.4-2.6) versus 1.3 (95% confidence interval, 0.8-2.1), and severe injury incidence rates of 1.1 (95% confidence interval, 0.7-1.7) versus 1.9 (95% confidence interval 1.2-2.8) were documented on Field Turf versus natural grass respectively. Multivariate analyses indicated significant playing surface effects by injury time loss, injury mechanism, anatomical location of injury, and type of tissue injured. Higher incidences of 0-day time loss injuries, noncontact injuries, surface/epidermal injuries, muscle-related trauma, and injuries during higher temperatures were reported on Field Turf. Higher incidences of 1- to 2-day time loss injuries, 22+ days-time loss injuries, head and neural trauma, and ligament injuries were reported on natural grass. The conclusion showed that, although similarities existed between Field Turf and natural grass over a 5-year period of competitive play, both surfaces also exhibited unique injury patterns that warrant further investigation.

2.4 Types of sports injuries

In a study by Karanfilci and Kabak (2013), on the analysis of sports injuries in training and competition for handball players, used the quantitative survey design on a total of 705 athletes. Researchers found that the min-max age range of sporters was 11-31, and the average age was 17.04±4.6, 69.08% of sporters who participated in the study were males, and 30.2% of them were females. 52.6% of the athletes reported that they got at least one injury in their sports life and 47.4% of them reported that they have had no injury. The injury incidence in relation to exposure in competition and training was 65% and 35%, respectively. The most popular incidence of injury in competition (37.8%) and training (45.8%) was sprain and it was determined that foot and ankle were the most commonly injured body parts. In conclusion; it is observed that the body parts mostly injured in handball are foot and ankle, knee, calf-thigh, shoulder and hand and wrist regions and so exercise programmes should be developed

to strengthen the muscles of these body parts which frequently have injuries to minimize injuries such as tears, strain, sprains, ligament ruptures and tendonitis due to overuse, except injuries such as contusion caused by the binary struggle, and the nature of the sport. The proprioception, tendon and ligament`s strengthening exercises for knee injury, foot and ankle which are mostly injured body parts must be added to the training program. Development of warm-up, cool-down and stretching exercises are necessary to prevent injuries caused by inadequate warm-up.

Shanmugam and Maffulli (2008) in their study reported that, in young athletes, as bone stiffness increases and resistance to impact diminishes, sudden overload may cause bones to bow or buckle. Fractures that are initially united with some deformity can completely remodel, and the bone may appear totally normal in later life. They identified that most injuries caused in children's sports are minor and self-limiting, suggesting that children and youth sports are safe. Their study outlined some of the causes of sports injuries children sustain in participating sports and physical activities. This study employed a comprehensive literature review and it was also conducted outside Ghana.

Soderman et al. (2001) reported that, the overall injury incidence rate was 6.8 per 1000 h soccer (games and practice) and the incidence rate of traumatic injury 9.1 and 1.5 per 1000 player-hours in games and practice, respectively. Sixty-three players (41%) sustained 79 injuries. Sixty-six percent of the injuries were traumatic and 34% were overuse injuries. Most of the traumatic injuries occurred during games. Eighty-nine percent of the injuries were located in the lower extremities and 42% occurred in the knee or ankle. The most frequent type of injury was ankle sprain (22.8%). Forty-one percent of the traumatic injuries and 56% of the ankle sprains were re-injuries. Most of the injuries were of moderate severity (52%), while 34% were minor and

14% were major. Most of the major injuries were traumatic such as knee ligament injuries and ankle sprains. Their study was conducted on soccer and also in Europe.

In a study by Loe et al. (2000) on risks and costs of knee injuries in male and female youth indicated that, females were significantly more at risk in six sports: alpinism, downhill skiing, gymnastics, volleyball, basketball and team handball. The incidences of knee injuries and of cruciate ligament injuries in particular, together with the costs per hour of participation, all displayed the same sports as the top five for both females and males: ice hockey, team handball, soccer, downhill skiing and basketball. Female alpinism and gymnastics had also high rankings. Knee injuries comprised 10% of all injuries in males and 13% in females, but their proportional contribution to the costs per hour of participation was 27% and 33%, respectively. From this study it can be concluded that females were significantly more at risk for knee injuries than males in six sports and that knee injuries accounted for a high proportion of the costs of medical treatment. Male and female were compared with reference to sport injury types and the various games they participate. Their considered events were different from this study.

Kakavelakis et al. (2003) also on Soccer injuries in childhood recorded that, incidence of injuries was 4.0 injuries per 1000 h of soccer time per player, and the most common types of injuries were sprains and strains. It was found that an increase of injury incidences occurred during practice. Fifty-eight injuries required medical assistance. The majority of injuries (80%) were located in the lower extremities. Collision with other players was the most common activity at the time of injury, accounting for 40% of all injuries. The study suggests that youth soccer is a relatively low risk sport. However, a substantial amount of injuries could be prevented. It is necessary to identify the risk factors, which are associated with these types of injuries.

This study came with some common injuries associated with soccer but their study was conducted in Greece.

Faunde et al. (2013) identified that, training injury incidence was nearly constant for players aged 13-19 years, ranging from 1 to 5 injuries per 1,000 h training. Match injury incidence tended to increase with age through all age groups, with an average incidence of about 15 to 20 injuries per 1,000 match hours in players older than 15 years. Between 60 and 90 % of all football injuries were classified as traumatic and about 10-40 % were overuse injuries. Most injuries (60-90 %) were located at the lower extremities with the ankle, knee, and thigh being mostly affected. The frequency of upper-extremity and head/face injuries was higher in those studies that analyzed match injuries only. The most common injury types were strains, sprains, and contusions (10 up to 40 % each). Fractures were more frequent in children younger than 15 years than in older players. About half of all time-loss injuries led to an absence from sport of less than 1 week, one third resulted in an absence between 1 and 4 weeks, and 10 to 15 % of all injuries were severe. Maturation status seems to have an influence on injury characteristics, although evidence is not conclusive at this time. This study also focused on only football and did not consider injuries with reference to the other sports.

On injury rates, risk factors, and mechanisms of injury, Emery and Meeuwisse (2006) came out with 216 players sustained a total of 296 injuries in the 2004-2005 season. The overall injury rate was 30.02 injuries per 100 players per season (95% confidence interval, 27.17-32.99) or 4.13 injuries per 1000 player hours (95% confidence interval, 3.67-4.62). Forty-five percent of all injuries occurred during body checking. Compared with the youngest age group, Atom, the risk of injury was greater in Pee Wee (relative risk, 2.97; 95% confidence interval, 1.63-5.8), Bantam (relative risk,

3.72; 95% confidence interval, 2.08-7.14), and Midget (relative risk, 5.43; 95% confidence interval, 3.14-10.17) leagues. The risk of injury in Pee Wee was greatest in the most elite divisions (relative risk, 2.45; 95% confidence interval, 1.15-5.81). Concussion, shoulder sprain/dislocation, and knee sprain were the most common injuries. the injury types identified in this study are similar to those under consideration. Although this study was carried out on adolescent, it employed descriptive epidemiology study design and also it focused on only hockey.

On injuries and risk factors, Beijsterveldt et al. (2014), concluded that 22.5% of the students had physical problems regarding injuries during the first month of the school year, and 11.2% of the students were ill. Their results showed that the risk of sustaining an injury and becoming ill is high for freshmen PE students. This study was although carried out on student, it was on physical education. Also, it did not really talk about the various types of sports injuries and the risk factors that contributed to them.

Carnduff et al. (2014) in their study reported that injury incidence proportion was 28.3 injuries/100 children/year. The medical attention was 9.8 injuries/100 children/year for males and 11.4 injuries/100 children/year for females. The highest for males occurred in soccer (26.0%), cycling (19.5%) and hockey (9.1%). The highest for females occurred in basketball (10.6%), soccer (10.6%), and dance (9.1%). Medical attention (10.6%) was lower than previously reported in adolescents (ages 12–18), suggesting less severe injuries in younger children. The greatest burden of sport injury occurred in soccer, cycling, and basketball. This study compared the injury incidence in male and female student athlete and in the various types of games. The outcome supported the study being carried out due to the similarities with reference to type of

sports considered. Their study utilized cross -sectional study design but the ages of the participants was low as compared this study.

Darrow et al. (2009) in their study on severe injuries among student athletes reported 1378 severe injuries during 3550141 athlete-exposures (0.39 severe injuries per 1000 athletic exposures). In their study, Football had the highest severe injury rate (0.69), wrestling (0.52), girls‟ basketball (0.34), and girls‟ soccer (0.33). The most commonly injured body sites were the knee (29.0%), ankle (12.3%), and shoulder (10.9%). The most common diagnoses were fractures (36.0%), complete ligament sprains (15.3%), and incomplete ligament sprains (14.3%). The rate in all boys‟ sports (0.45) was higher than all girls‟ sports (0.26). However, among directly comparable sports (soccer, basketball, and baseball/softball), girls sustained a higher severe injury rate (0.29) than boys (0.23). More specifically, girls‟ basketball had a higher rate (0.34) than boys‟ basketball. Their study concluded that severe injury rates and patterns varied by sport, gender, and type of exposure. This study recorded similar sports injuries to the once under consideration. This study employed epidemiology study design to collect data on a similar participant in United States.

Swenson et al (2013) in their study on knee injuries identified that knee injuries were more common in competition than in practice. It was also recorded that football had the highest knee injury rate followed by girls' soccer and girls' gymnastics. Girls had significantly higher knee injury rates than boys in sex-comparable sports (soccer, volleyball, basketball, baseball/softball, lacrosse, swimming and diving, and track and field). Knee injury patterns differ by sport and sex. Knee injury is common sports injuries among student athletes in both competition and training and as such, emphasis was placed on it as a major type to aid in this study. This study survey

design and on similar participants, if only focused on knee injury among student athletes.

Kerr et al. (2017) conducted a study on descriptive epidemiology of non–time-loss injuries in collegiate and high school student-athletes. The results indicated a total of 11 899 and 30 122 NTL injuries were reported in collegiate and high school student-athletes, respectively. The proportion of NTL injuries in high school student-athletes (80.3%) was 1.61 times greater than that of collegiate student-athletes (49.9%; 95% CI = 1.59, 1.63). The NTL injury rate in high school student-athletes was 2.18 times greater than that of collegiate student-athletes. Men's ice hockey and boys' football had the highest NTL injury rates among collegiate and high school athletes, respectively. Commonly injured body parts in collegiate and high school student-athletes were the hip/thigh/upper leg (17.5%) and hand/wrist (18.2%), respectively. At both levels, contusions, sprains, and strains were the most frequent diagnoses. Contact with another player was the most cited injury mechanism (college = 38.0%, high school = 46.3%). Researchers concluded that non–time-loss injuries compose large proportions of collegiate and high school sports injuries. However, the NTL injury rate was higher in high school than in collegiate student-athletes. Tracking NTL injuries will help to better describe the breadth of injuries sustained by athletes and managed by athletic trainers.

In another school of thought, Cassel et al. (2019) on the orthopedic injury profiles in adolescent elite athletes used a retrospective analysis from a sports medicine department found that a higher proportion of injury-events were reported for females (60%) and athletes of the older age group (66%) than males and younger athletes. The most frequently injured area was the lower extremity (47%) followed by the spine (30.5%) and the upper extremity (12.5%). Acute injuries were mainly located at the

lower extremity (74.5%), while overuse injuries were predominantly observed at the lower extremity (41%) as well as the spine (36.5%). Joints (34%), muscles (22%), and tendons (21.5%) were found to be the most often affected structures. The injured structures were different between the age groups ($p = 0.022$), with the older age group presenting three times more frequent with ligament pathology events (5.5%/2%) and less frequent with bony problems (11%/20.5%) than athletes of the younger age group. The injured area differed between the sexes ($p = 0.005$), with males having fewer spine injury-events (25.5%/34%) but more upper extremity injuries (18%/9%) than females. In conclusion, events of soft-tissue overuse injuries are the most common reasons resulting in orthopedic presentations of adolescent elite athletes. Mostly, the lower extremity and the spine are affected, while sex and age characteristics on affected area and structure must be considered.

Another study by Molinas et al. (2018) on ankle injuries associated with basketball practice used current situation and literature review approach for the study. Results showed that, initially 114 studies were obtained, of which 13 were selected applying the previously mentioned criteria. They observed the incidence of ankle injuries during basketball practice in different population groups, different levels of practice (professional and amateur) and during different periods of time. Among professional athletes, we could observe that ankle sprains account for more than 20% of the injuries suffered by athletes that they are accountable for almost 10% of the matches that a professional player loses because of an injury, and that only about half of them take place during a game, which increases the importance of injuries that occur during practice. When it comes to amateur level basketball, we can observe in several studies that, while the male population is more prone to need medical assistance for ankle injuries during the practice of this sport (from 18.3% of injuries associated with

basketball, up to 52%, according to the series), the female population has a greater predisposition for knee injuries (63% of injuries associated with basketball for only 21% of ankle injuries in some jobs). In conclusions, after analyzing the recent literature, we could draw among others the following conclusions: basketball is a sport which is closely linked to the appearance of ankle injuries; the most prevalent ankle injury is sprain; the incidence of injuries increases the higher the level of practice, being maximum in professionals; these injuries have an evident impact on the athlete"s usual sports and extra sports practice; and gender may have an influence on the joint affected by basketball related injuries. Basketball is a rising sport at the moment, with a great social and economic impact in the world of today. Its practice is becoming more frequent, and with it the incidence of injuries associated with it, especially those occurring in the ankle joint.

Mashimo et al. (2019) conducted a study on Monitoring the occurrence of pain symptoms in university female handball players. The results showed a total number of pains was 1698, and the pain incidence rate was 288.1 pains per 1000 player hours. In terms of body regions, the ankle (18.3%) was the most common, followed by the lower back (13.3%), foot (12.8%), Achilles tendon (9.2%), and thigh (8.9%). With regard to the relationship between pain and physical load, significant moderate or weak correlations were observed between handball (r_s=0.657), training (r_s=0.626), and on-court training (r_s=0.591) and overall pain occurrences. In terms of body regions, the ankle and thigh, significant moderate or weak correlations were observed with respect to all categories in on-court training. In conclusion, they found that pain occur frequently and athletes continue to compete in games despite experiencing pain. In addition, pain occurrence was related to physical load, indicating that the type of physical load depends on the body region.

Mónac et al. (2014) carried out a study on epidemiology of injuries in elite handball: Retrospective study in professional and academy handball team. Descriptive cross-sectional survey design was used for the study. The outcome showed a total of 57 injuries were recorded during 117,723 hours of total exposure. There was a mean team injury incidence of 4.9 injuries/1000 hours of total exposure. For the Senior A (Professional Senior) it was 4.3 (SD 1.8), Senior B (Amateur 18-28 years) 3.4 (SD 1.6), Youth (U-18 year) 5.6 (SD 1.4), Cadete A (U-16 year) 5.5 (SD 2.5), Cadete B (U-15 year) 5.7 (SD 3.2) and Infantil (U-14 year) 4.9 (SD 1.9). There were no statistically significant differences between categories, although senior teams had more hours of exposure compared to other teams ($P < .001$). The most frequently affected sites were ankle (18.1%), knee (15.3%), thigh (12.9%) and lumbar region (10.6%). The most common type of injury to all teams was the sprain (27.3%) and non-traumatic muscle injury (20.5%). Muscle injuries were more common at Senior "A" (Professional) level, but in lower level teams it was the sprain, although there are no significant differences between them. In conclusion, the pattern and incidence of injury in elite handball is uniform between teams from different categories at the same club; with a few differences between each other that you should take this into account to optimize a preventions programs in each category of elite handball training.

Another school of thought, Meeuwisse et al. (2003) carried out a study on rates and risks of injury during intercollegiate basketball. The outcome of the study indicated a total of 142 athletes sustained 215 injuries (44.7% of players injured) over the 2-year study period. The greatest number of injuries resulting in more than seven sessions of time loss involved the knee, whereas the most common injuries causing fewer than seven sessions of time loss involved the ankle. The most common mechanism of

injury was contact with another player, especially in the “key.” Injuries occurred 3.7 times more often in games than during practice. Centers had the highest rate of injury, followed by guards, and then forwards. The relative risk of reinjury was significantly increased by previous injuries to the elbow, shoulder, knee, hand, lower spine or pelvis, and by concussions. It was concluded that risk factors for injury were previous injury, games as opposed to practice, player position, player contact, and court location.

In a study conducted by von Rosen et al. (2018) on the high injury burden in elite adolescent athletes, a cohort study design was used. The results showed that among all athletes, 57.4% reported at least 1 new injury, whereas the 1-year injury prevalence was 91.6%. The overall injury incidence was 4.1/1000 hours of exposure to sport, and every week, on average, 3 of 10 (30.8%) elite adolescent athletes reported being injured. Of all injuries from which athletes recovered, 22.2% (n =35) resulted in absence from normal training for at least 2 months. Female athletes reported higher (P< .05) average weekly injury prevalence and substantial injury prevalence (injuries leading to a moderate or severe reduction in sport performance or participation or time loss) than male athletes. In conclusions, a considerable number of elite adolescent athletes were injured weekly, resulting in serious consequences for sport participation, training, or performance (or a combination of these). Appropriately designed interventions to prevent knee and foot injuries will target both the greatest number of injuries and the injuries with the most serious consequences in elite adolescent athletes.

Lislevand et al. (2011) carried out a study on Injury surveillance during a national female youth football tournament in Kenya. Survey design was employed to collect data for the study. The results showed that a total of 252 injuries were reported from

106 matches. The incidence of all injuries were 191.2 injuries. Most injuries allowed the players to continue to play. U13 players had an increased risk of injury compared to U16 players and O16 players. Fourteen injuries were expected to result in absence from play for at least 1-7 days. The injuries most commonly involved the lower limb (n= 184; 73%). A contusion to the knee (n=27; 11%) and ankle (n=26; 10%) were the most common specific injury types. Most acute injuries (188 of 238, 79%) were caused by player contact. In conclusion, the incidence of injuries among female youth football players in a national tournament in Kenya was high. U13 players had the highest injury risk. Contusions to the knee and ankle were the most common specific injury types. Most of the injured players had minor injuries and could continue to play, which is positive since football is used to develop individuals and communities.

In a study by Soligard et al. (2012) on the Injury risk on artificial turf and grass in youth tournament football, a prospective cohort design was used for the study. The total exposure to football was 62597 match hours; 6022 (10%) on artificial turf and 56575 (90%) on grass. A total of 2454 injuries were recorded; 206 (8%) on artificial turf and 2248 (92%) on grass. 272 of the injuries (11%) were expected to lead to absence from training and matches for at least 1 day. Of these, 25 (9%) occurred on artificial turf and 247 (91%) on grass. The overall incidence of injuries were 39.2 per 1000 match hours; 34.2 on artificial turf and 39.7 on grass. After adjusting for the potential confounders age and gender, there was no difference in the overall risk of injury 0.93 or in the risk of time loss injury between artificial turf and grass. However, there was a lower risk of ankle injuries, and a higher risk of back and spine and shoulder and collarbone injuries, on artificial turf compared with on grass. In conclusion, there was no difference in the overall risk of acute injury in youth footballers playing on third-generation artificial turf compared with grass.

Welton et al. (2018) carried out a study on the injury recurrence among high school athletes in the United States: A decade of patterns and trends, 2005-2006 through 2015-2016. Overall, 78,005 injuries were sustained during 40,195,806 AEs, for an injury rate of 19.41 per 10,000 AEs. Of these, 69,821 (89.5%) were new injuries, and 8184 (10.5%) were recurrent. The ankle was the most commonly injured body part among recurrent injuries, while the head/face was the most common body part that sustained new injuries. Ligament sprains were more often recurrent, while concussions were more commonly diagnosed as new, although concussions represented 16.7% of recurrent injuries. Trends for recurrent injuries over time were relatively stable. The proportion of athletes who had >3 weeks of time loss or medical disqualification (15.8% vs 13.3%; IPR, 1.19; 95% CI, 1.13-1.26) or who voluntarily withdrew from sport (2.5% vs 1.1%; IPR, 2.33; 95% CI, 2.00-2.73) was significantly greater for recurrent injuries than new injuries. Furthermore, a greater proportion of recurrent injuries resulted in surgery (8.1% vs 6.0%; IPR, 1.34; 95% CI, 1.24-1.46). Although only 10.5% of all injuries were recurrent, they more frequently resulted in missing >3 weeks of playing time and were more often managed surgically when compared with new injuries.

Higashi et al. (2015) conducted a study on musculoskeletal injuries in young handball players. Cross-sectional survey design was employed for the study. The results showed that most of the athletes were approximately 15 years old, had a body mass index, and was classified as normal, worked out at an average of 3 times a week and their weekly workload was approximately 8 hours and 30 minutes. The main injuries found were sprains and tendinopathies, with the ankle and knee being the most affected regions. Only the sport practice of over 6 years showed statistical relationship with previous injuries (p=0.032). The prevalence of injuries in the last 12 months in

this population was 53.60%. Although the study utilized survey design and was carried out on young players, it concentrated on handball.

Yard et al. (2009) conducted a research on a comparison of high school sports injury surveillance data reporting by certified athletic trainers and coaches. The result indicated that all enrolled ATs participated, compared with only 43.0% of enrolled coaches. Participating ATs submitted 96.7% of expected exposure reports, whereas participating coaches submitted only 36.5%. All ATs reported athlete exposures correctly, compared with only 2 in 3 coaches. Participating ATs submitted 338 injury reports; participating coaches submitted only 55 (16.3% of the 338 submitted by ATs). Injury patterns differed between AT-submitted and coach-submitted injury reports, with ATs reporting a higher proportion of ankle injuries and coaches reporting a higher proportion of knee injuries. The reports submitted by ATs and coaches for the same injury had low agreement for diagnosis and time loss, with only 63.2% and 55.3% of pairs, respectively, providing the same response. The ATs lacked more responses for demographic questions, whereas coaches lacked more responses regarding the need for surgery. It was concluded that whenever possible, ATs should be the primary data reporters in large, national studies. In high schools without access to an AT, researchers must be willing to devote significant time and resources to achieving high participation and compliance from other reporters.

2.5 Prevention of sports injuries

The outcome of the study by Mac Bain et al. (2012) indicated only 139 of 2525 articles retrieved met the inclusion criteria. Almost 40% were randomized controlled trials and 30.2% were cohort studies. The focus of the study was protective equipment in 41%, training in 32.4%, education in 7.9%, rules and regulations in 4.3%, and 13.3% involved a combination of the above. Equipment research studied stability

devices (42.1%), head and face protectors (33.3%), attenuating devices (17.5%) as well as other devices (7%). Training studies often used a combination of interventions (eg, balance and stretching); most included balance and coordination (63.3%), with strength and power (36.7%) and stretching (22.5%) being less common. Almost 70% of the studies examined lower extremity injuries, and a majority of these were joint (non-bone)-ligament injuries. Contact sports were most frequently studied (41.5%), followed by collision (39.8%) and non-contact (20.3%). In conclusion, the authors found only 139 publications in the existing literature that examined interventions designed to prevent sports injury. Of these, the majority investigated equipment or training interventions whereas only 4% focused on changes to the rules and regulations that govern sport. The focus of intervention research is on acute injuries in collision and contact sports whereas only 20% of the studies focused on non-contact sports. The study employed review design and was focused on injury prevention.

Vriend et al. (2017) came out with results showing that, a total of 155 studies included, mostly randomized controlled trials (43%). The majority of studies (55%) focussed on strategies requiring a behavioral change on the part of athletes. Studies predominantly evaluated the preventive effect of various training programme targeted at the „pre-event" phase ($n = 73$) and the use of equipment to avoid injury in the „event phase" ($n = 29$). A limited number of studies evaluated the preventive effect of strategies geared at rules and regulations ($n = 14$), and contextual modifications ($n = 18$). Studies specifically aimed at preventing re-injuries were a minority ($n = 8$), and were mostly related to ankle sprains ($n = 5$). In conclusion, valuable insight into the extent of the evidence base of sport injury prevention studies was obtained for 20 potential intervention strategies. The approach can be used to monitor potential gaps in the knowledge base on sport injury prevention.

Watson and Mjaanes (2019) reported that youth soccer has a greater reported injury rate than many other contact sports, and recent studies suggest that injury rates are increasing. Large increases in the incidence of concussions in youth soccer have been reported, and anterior cruciate ligament injuries remain a significant problem in this sport, particularly among female athletes. This study identified a number of modifiable risk factors for lower-extremity injuries and concussion, and several prevention programs have been identified to reduce the risk of injury. Rule enforcement and fair play also serve an important role in reducing the risk of injury among youth soccer participants. This report provides an updated review of the relevant literature as well as recommendations to promote the safe participation of children and adolescents in soccer. The study focused mainly on preventive mechanism and measure in reducing sports injuries among young athletes.

Gopfert et al. (218) on the prevention of sports injuries in children at school reported that robust, evidence-based policies for reducing injury risk in school sports are limited. Synthesis identified primary, secondary and tertiary injury prevention measures relating to people (staff, students and parents), systems, school physical environment and national-level factors. The study identified the various of levels of injury prevention but the failed to explain the real measures in preventing sports injuries. this study although focused on a similar sample group, it was carried out in the United States.

Timpka et al. (2017) in their study also showed that, each year, more than 1/200 person aged 0–59 years sustained at least one injury during football play that required emergency medical care. The highest injury incidence was observed among adolescent boys [2009 injuries per 100 000 population years (95% CI 1914–2108)] and adolescent girls [1413 injuries per 100 000 population years (95% CI 1333–

1498)]. For female adolescents and adults, knee joint/ligament injury was the outstanding injury type (20% in ages 13–17 years and 34% in ages 18–29 years). For children aged 7–12 years, more than half of the treated injuries involved the upper extremity; fractures constituted about one-third of these injuries. it was concluded that, one of every 200 residents aged 0–59 years in typical Swedish counties each year sustained a traumatic football injury that required treatment in emergency healthcare. Further research on community-level patterns of overuse syndromes sustained by participation in football play is warranted.

In study by Lee et al. (2019), their results showed a higher order themes (N = 7) including in-school and out-of-school motives and social cognitive factors and associated lower-order themes (N = 16), emerged from the analysis corresponding to constructs from trans-contextual model tenets. In conclusion, the current study is the first qualitative study to explore junior secondary school students‟ experience and perspectives on sport injury prevention, using trans-contextual model as a framework for investigation. The findings contribute to a better understanding on their motivational and social cognitive factors in adopting sport injury prevention. The content of the theme behavior also indicated the inadequacy of students‟ knowledge of effective sport injury prevention techniques, and underscored the importance of sport safety education.

Mugele et.al. (2018) reported that, of initial 6619 findings, 15 studies met the inclusion criteria. In addition, 13 studies were added from reference lists and external sources making a total of 28 studies. Of which, one used sports-specific, seven general and 20 mixed prevention strategies. Twenty-four studies revealed reduced injury rates. Of the four ineffective programs, one was general and three mixed. The conclusion indicated general and mixed programs positively affect injury rates.

Sports-specific programs are uninvestigated and despite wide discussion regarding the definition, no consensus was reached. Defining such terminology and investigating the true effectiveness of such IPPs is a potential avenue for future research.

Another school of thought by Alizadeh et al. (2012) indicated a Pearson correlation analysis revealed significant relationships between injury occurrence, cognitive anxiety and somatic anxiety, but no significant relationship was found with self-confidence. It can be concluded that cognitive and somatic anxiety may increase the injury occurrence due to poor concentration and physiological changes. The findings support suggested that psychological factors can be used to predict injury occurrence, and anxiety was the predictor of injuries in junior football players. The study rightly utilized survey design and it was on young athletes, but it only focused on the game of football. Also, the study was conducted on only the psychological aspects or factors of sport injuries.

Norcross et al. (2016) in their study recorded that, out of the 66 coach respondents, 52% reported being aware of IPPs; 21% reported using an IPP with their team; and 9% reported having their student-athletes perform the IPP exactly as designed. No apparent differences in the attitudes toward the importance of injury prevention or the effectiveness of IPPs were identified between coaches that did and did not adopt an IPP. Perceptions that efficacious IPPs do not offer a relative advantage over coaches' existing practices, do not align with coaches' needs (compatibility), and are difficult to implement in their setting (complexity) emerged as key factors underlying coaches' decisions not to adopt a program. Of those that did report adopting an IPP, just 43% (6/14) reported implementing the program as designed. In conclusion, improving preventative practices of high school coaches requires more than improved dissemination to increase coach awareness. To improve the rate of IPP adoption and

implementation fidelity, coach education should directly address issues related to relative advantage, compatibility, and complexity. Although in the study, cross-sectional design was used to identify injury prevention measures, it was not carried out in Ghana.

Emery (2005) on injury prevention indicated that that despite the diversity of injuries occurring in various pediatric sporting populations, the uniformity with respect to many of the risk factors identified in the literature is noteworthy (i.e. previous injury, age, sport specificity, psychosocial factors, decreased strength and endurance). The literature is significantly limited with respect to the prospective evaluation of risk factors and prevention strategies for injury in pediatric sport. The consistencies, however, between the adult and pediatric literature are encouraging with respect to prevention strategies involving neuromuscular training programs (i.e. balance training programs) to reduce lower extremity injuries in some sports and the use of sport-specific protective equipment (i.e. helmets). In conclusions, integration of basic science, laboratory and epidemiological research is critical in evaluating the mechanisms associated with injury and injury prevention in pediatric sport. The study was rightly carried on child and adolescent sports but database analysis was used for the study. This study was also carried outside Ghana.

2.6 Effects of sports injuries

In a study by Rosen (2017), the results indicated that average injury prevalence and substantial injury prevalence were in year one 31% and 15% and in year two 39% and 18%, respectively. During year two, 30% of the athletes were injured more than half of all reporting times and 10% reported substantial injury more than half of all reporting times. The recommended intake of fruits, vegetables, and fish was not met for 20%, 39%, and 43% of the adolescent elite athletes, respectively. The

recommended amount of sleep during week days was not obtained by 19%. Increasing the training load, training intensity, and at the same time decreasing the sleep volume resulted in a higher risk for injury compared to no change in these variables. The adolescent elite athletes who were interviewed experienced a loss of identity and described a sense of feeling lonely and excluded from regular sports involvements while dealing with the injury. Discrepancies in rehabilitation expectations between athletes and practitioners were expressed, where some athletes described that their rehabilitation was not adjusted to their needs and requested to receive an injury diagnosis in an early stage following injury. In conclusion, a considerable number of adolescent elite athletes are injured regularly, resulting in serious consequences on sports participation and performance. Sports involvement seems to constitute an important social component for an adolescent elite athlete, and being injured may lead to a loss of identity and experience of loneliness, self-blame or self-criticism. Medical teams accessible to all athletes at each National Sports High School are warranted to reduce the unhealthy behavior, injury risk and help athletes return to sports safely following injury. In the study, a survey design was used, but the study had other purposes aside the effects of sports injuries. Also, the study was not carried out in Ghana.

Crumps et al. (2008) on the effects of sports injuries identified that, the rate of injury was highest in European team handball (8.96%; 95% confidence interval (CI) 8.95-8.96) and lowest in swimming (0.62%; 95% CI 0.62-0.62). The highest direct medical cost was found for anterior cruciate ligament (ACL) injuries (1358 euros per injury) and the lowest for foot injuries (52 euros per injury). The direct medical cost extrapolated for the Flemish sports participants was 15,027,423 euros, which amounted to 0.07% to 0.08% of the total budget spent on healthcare. The indirect cost

extrapolated for the Flemish sports participants was 111,420,813 euros, which is about 3.4% of the costs arising from absenteeism from work. Their study indicated a negative effect of financial burden on teams.

In 2003, Abenrnethy and MacAuley carried a study on the impact of school sports injury and identified 194 student athletes aged 11-18 attended the accident and emergency department with an injury, 51% of which occurred during school sport. Injuries occurred most commonly in rugby (43%), followed by physical education and games together (17.5%). Most injuries were x rayed (72%). Just over 12% of pupils lost no time from sport, most (71%) were back to sport within three weeks, and 2.7% were injured for more than eight weeks. Sports injuries account for just over half of all injuries in secondary school children and cause significant disruption to school and sport and have important implications for the wider family. This study did not really identify the types of sport injuries although it was conducted on similar participant.

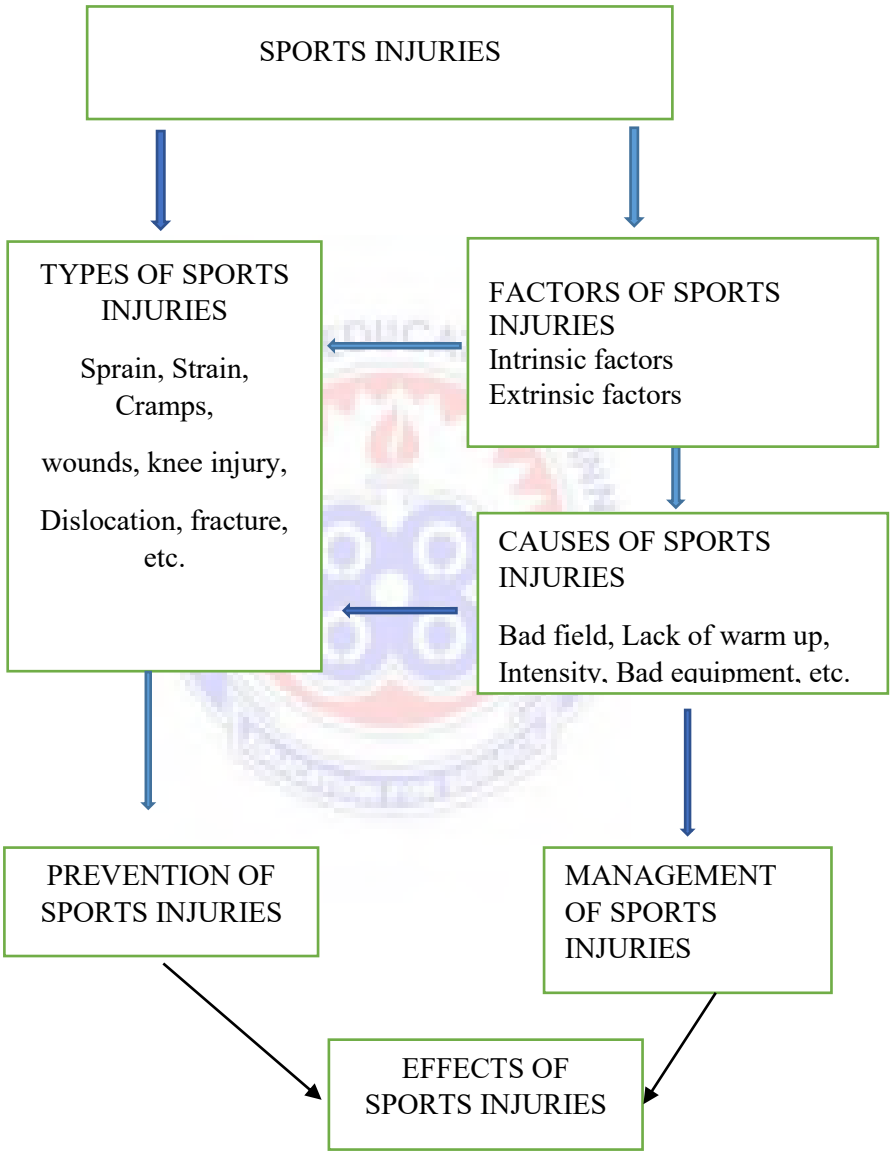
Indrioadottir et al. (2015) on the effects of sports injuries came out that, four hundred and forty participants (96%) had at some point in time participated in organized sports, but 277 (63%) were no longer practicing, more commonly (p=0.058) among girls (67.6%) than boys (58.8%). Thirty-seven (8.4%) dropped-out due to sport injuries. Of those participating in organized sports for the past 12 months, 51% required medical assistance at least once because of sport injuries. Multiple regression analysis revealed 5-fold increased risk for requiring medical assistance among those practicing more than 6 hours per week compared to those who practiced 6 hours or less (OR=5.30, 95% CI: 3.00 to 9.42). In conclusion, youth sport injuries are a significant problem that can cause drop-out from participation in sport. The study was carried out in the United States, and not in Ghana.

Another study by Karlsson et al. (2014) recorded that 55% male soccer players and 26% male controls had experienced groin pain, resulting in an odds ratio (OR) of 3.7 (95% CI 2.1, 6.6). The corresponding proportions were in female soccer players 28% and in female controls 13% giving an OR of 2.8 (95% CI 1.4, 5.8). When comparing the gender, the higher proportion of males than females that had experienced groin pain resulted in an OR of 2.9 (95% CI 1.9, 4.5) for male versus female soccer players and an OR of 2.6 (95% CI 1.1, 5.3) for male versus female controls. In conclusion, playing soccer and being of the male gender were factors associated with a higher risk of experiencing groin pain. The study was solely carried out on groin injury in soccer alone.

Welton et al. (2018) in their study showed 78,005 injuries were sustained during 40,195,806 AEs, for an injury rate of 19.41 per 10,000 AEs. Of these, 69,821 (89.5%) were new injuries, and 8184 (10.5%) were recurrent. The ankle was the most commonly injured body part among recurrent injuries, while the head/face was the most common body part that sustained new injuries. Ligament sprains were more often recurrent, while concussions were more commonly diagnosed as new, although concussions represented 16.7% of recurrent injuries. The proportion of athletes who had >3 weeks of time loss or medical disqualification (15.8% vs 13.3%; IPR, 1.19; 95% CI, 1.13-1.26) or who voluntarily withdrew from sport (2.5% vs 1.1%; IPR, 2.33; 95% CI, 2.00-2.73) was significantly greater for recurrent injuries than new injuries. Furthermore, a greater proportion of recurrent injuries resulted in surgery (8.1% vs 6.0%; IPR, 1.34; 95% CI, 1.24-1.46). In conclusion, although only 10.5% of all injuries were recurrent, they more frequently resulted in missing >3 weeks of playing time and were more often managed surgically when compared with new injuries. The rate of recurrent injuries has not increased over the past decade. The

research focused rightly on high school student athletes, but the design used was descriptive epidemiology design. Also, the study was conducted in United States instead of Ghana.

2.6 Conceptual Framework



The conceptual framework of this study simply talked about the relationship and the linkage between the various variables of sports injuries in reference to the topic of the study. It explained and talked about causes and factors of sports injuries

which leads to the types of sports injuries. It also looked at the effects of sport injuries and ways of preventing and managing these sports injuries sustained during competitions. Several literatures were reviewed in line of these variable in reference to the topic. The factors and causes of sports injuries brought about the various types of sports injuries. These types of injuries also contributed to various effects on athletes and the tournament as a whole simply because of lack of preventive measures and effective management to minimize and reduce sports injuries in the tournament.

2.7 Summary

Several literatures and studies were conducted on sports injuries in reference to their types, causes, factors, effects and preventive measures but they were conducted in different parts of the world. Similar and different study designs were employed in these studies but mostly with different participants. In spite of all these studies carried out on sports injuries, none of them was done in Ghana and in the Akuapem Municipality to be precise.

CHAPTER THREE

METHODOLOGY

This chapter deals with the systematic approach which was used in the collection of data. These included the research design, population of the study, sample and sampling techniques. It also involved data collection instrument, pilot test of the instrument and validity of the instrument. Lastly, it explains the reliability of the study, data collection procedure and data analysis.

3.1 Research Design

This research employed the descriptive cross-sectional survey design for the study whereby questionnaires were used as a source of data collection techniques (Theisen et al., 2014). This design is a type of survey normally carried within a short period of time. It was used because every tournament in the municipality produce different participants and wanted to collect data on their injury patterns during that period of time. This approach enabled the researcher to come out with the real risk factors that influenced injuries in senior high school tournament.

3.2 Population of the Study

The population of this study was all S.H.S athletes in the Akuapem Municipality. 1800 student athletes represented the population of the study of which 1000 (56%) were girls with the remaining 800 (44%) been boys. Athletes were used as participants for this research because they are the real participants in the tournament and had first-hand information about injuries since they normally suffer it.

3.3 Sample and sampling techniques

Purposive sampling technique selected 610 student athletes with experience of sports injury as participants for the study in the 2018/2019 academic year inter school

competition in the Akuapem municipality. Out of the total student athletes, 390 (63%) were girls and 220 (36%) were boys. The participants who played different selected games in the inter school competition were made to answer a set of questionnaires.

3.4 Data Collection Instrument

In this study, questionnaire was used as instrument for collecting data. The researcher developed the Delali, Mawuli, Abiba. Seyram, Salali (DEMASS) inventory questionnaire instrument which was used to collect data. The questionnaire was made of three sections. The section A collected data on the demographic information of the participants and was made up of five items. The section B answered ten-item questions on the types of injuries sustained and it was measured in an ordinal scale. The section C was also made of sixteen-item questions on the factors and causes of sports injuries and was measured on a four-point Likert scale from strongly agree to strongly disagree. There were four items on each of the physiological, biological, psychological and sociocultural factors of sports injuries. The questionnaire had scoring key of four (4) as minimum and sixteen (16) as maximum for the section C of the inventory. After the final stage of the instrument development, the researcher used it to collect the data from the athletes.

3.5 Pilot Test of the Instrument

The designed instrument was pilot tested on an equivalent sample group at Winneba S.H.S to check the reliability of it. 50 student athletes from the five selected disciplines were used for the pilot test in Winneba S.H.S. of which 25 were girls and the remaining 25 were boys. Afterwards, the reliability of the instrument was calculated.

3.6 Validity of the Instrument

The developed instrument passed through all the levels of validity which were content validity, face validity and the construct validity phases. This instrument went through the content validity where the researcher developed several items on the instrument, the face validity where it was criticized by colleagues of the researcher. Lastly, the construct validity stage where it was be criticized by an expert in the area of sports science and other lectures of the Physical Education Department. These experts critiqued the items on the instrument with reference to the variables of the study.

3.7 Reliability of the Instrument

The reliability of the developed instrument was calculated after the pilot test at Winneba Senior High School using 50 student athletes with Cronbach"s alpha. The statistic on the 4 constructs or items on the questionnaire was 0.7 (r = 0.7) to a decimal place which met the standardize assumption of good reliability. This indicated a good reliability on the variables of the questionnaire. It means the DEMASS inventory questionnaire is highly reliable and could be used to collect data for the study on sports injury.

3.8 Data Collection Procedure

An introductory letter from the Head of the HPERS department, Winneba was sent to the Heads of the selected school, Head of the Physical Education Department, teachers and athletes of the various schools for permission to carry out the study. The data collection was carried out at the various schools. Questionnaires were deployed and answered by the student-athletes. The researcher used one week to obtain permission from all Headmasters of senior high schools and Heads of Physical Education Departments in the municipality. The researcher then trained 14 physical

education teachers as research assistants to help and direct student athletes on how to respond to the questionnaire. The various types of sports injuries were clearly explained to research assistants in other to assist the athletes respond to the questionnaire. The researcher with the aid of research assistants gave the questionnaires to the student athletes and allowed them to answer it within a period of 30 minutes. The researcher used four weeks to collect all the data from the 14 senior high schools in the Akuapem municipality with the aid of the research assistants.

3.9 Data analysis

Research Question 1

What types of sports injuries do athletes sustain in Senior High school tournaments?

In investigating the factors that contribute to sports injuries among athletes in SHS tournament, simple frequencies statistics was calculated.

Research Question 2

What factors contribute to sports injuries in Senior High school tournament?

To explore the types of injuries athletes sustain in SHS tournament, descriptive frequencies was calculated.

Research Question 3

What are differences in the number of events on the type of sports injury sustained in Senior High School tournament?

To investigate the differences between the number of events on the type of injury, Kruskal-Wallis was used.

Research Question 4

What are the differences in genders on the factors contributing to sports injuries in Senior High school tournament?

To explore the difference between genders on the factors contributing to sports injuries, independent sample T-test was calculated.

Research Question 5

What is the correlation among the factors contributing to sports injuries and injury sustenance?

To investigate the correlation between the factors contributing to sports injuries, Pearson‟s R was calculated.

CHAPTER FOUR

FINDINGS, ANALYSIS AND DISCUSION

4.1 Results and Discussions

Table 1: Ages of participants

Ages	Frequency	Percent
14-15	33	5.4
16-17	334	54.8
18-19	206	33.8
above 20	37	6.1
Total	**610**	**100.0**

The results from table 1 indicate a total number of 610 S.H.S student athletes who participated in the study. The participants ages range between 14 years and above. Ages that range between 14 and 15 were 33 (5.4%), 16 and 17 were 334 (54.7%), 18 and 19 were 206 (33.8%) and 20 and above were 37 (6.1%).

Table 2: Gender of participants

Gender	Frequency	Percent
Male	220	36.1
Female	390	63.9
Total	**610**	**100.0**

The data from table 2 showed that out of the total number, 220 (36.1%) were boys and 390 (63.9%) were girls.

Table 3: Number of games played by participants

	Frequency	Percent
1	218	35.7
2	221	36.2
3	104	17.0
4	48	7.9
5	19	3.1
Total	**610**	**100.0**

Results from Table 3 indicated 218 (35.7%) participated in only one game, 221 (36.3%) in two games, 104 (17.0%) in three games, 48 (8.9%) in four games and only 19 (3.1%) participated in five games.

Table 4: The number of times inured

No. of Times Injured	Frequency	Percent
Once	176	28.9
Twice	201	33.0
Three or more	233	38.2
Total	**610**	**100.0**

The results from table 4 showed on the injury record that 176 (28.9%) had been injured only once, 201 (33.0%) had been injured twice and with 233 (38.1%) sustaining injury more than twice.

Table 5: Data on sports injuries

Sport Injury Type	**Rank (%)**
Sprain	
Never, Rarely	62.2%
Sometimes, Often, Always	37.8%
Strain	
Never, Rarely	68.0%
Sometimes, Often, Always	32.0%
Dislocation	
Never, Rarely	70.0%
Sometimes, Often, Always	30.0%
Fracture	
Never, Rarely	68.7%
Sometimes, Often, Always	31.3%
Nose Bleeding	
Never, Rarely	74.2%
Sometimes, Often, Always	25.8%
Muscle Cramps	
Never, Rarely	43.9%
Sometimes, Often, Always	56.1%
Wounds	
Never, Rarely	32.2%
Sometimes, Often, Always	67.8%
Groin	
Never, Rarely	76.9%
Sometimes, Often, Always	23.1%
Thigh Injury	
Never, Rarely	44.9%
Sometimes, Often, Always	55.1%
Knee Injury	
Never, Rarely	34.9%
Sometimes, Often, Always	65.1%

In analyzing the frequencies on the types of sports injuries sustained in S.H.S competition from table 5, responses of never and rarely were added and compared to responses of sometimes, often and always. The results showed that wounds (67.8%), knee injury (65.1%), muscle cramps (56.1%) and thigh injury (55.1%) were more prevailing in S.H.S tournament than sprain (37.8%), strain (32.0%), dislocation (30.0%), fracture (31.3%), nose bleeding (31.3%) and groin injuries (23.1%). The prevailing injuries had higher values and percentages in reference to their ranking as compared to non-prevailing injuries which were ranked lower.

Table 6: Descriptive statistics of factors of sports injuries

Factors of Injuries	**N**	**Minimum**	**Maximum**	**Mean**	**SD**
Biological Factor	610	4	16	10.99	2.27
Psychological Factors	610	4	16	11.75	2.03
Physiological Factors	610	4	16	12.43	2.10
Sociocultural Factors	610	4	16	11.16	2.22

N represent the total number of participants

From table 6, the outcome of the descriptive statistics showed that physiological factors was considered by the student-athletes as the highly influential factor for sports injury than biological, psychological, and socio-cultural factors in S.H.S games in the Akuapem Municipality. The mean rank for the physiological factors was 12.43 which implied that the participants‟ response on that were between Strongly Agree and Agree. The others had 10.99, 11.75 and 11.16 for the biological, psychological and socio-cultural factors respectively which indicate that their responses were chosen between Agree and Disagree.

Table 7: Difference in the number of games played and type of injuries sustained

Injury Type	No. of Games Played	Percentage	Mean Rank
Sprain	1	15.7%	281.37
	2	16.2%	297.54
	3	18.3%	316.38
	4	21.7%	367.59
	5	27.8%	458.53
	Total	**100%**	
Strain	1	14.8%	270.21
	2	17.6%	303.11
	3	19.4%	339.56
	4	21.3%	350.51
	5	26.9%	438.05
	Total	**100%**	
Dislocation	1	18.2%	295.20
	2	17.2%	290.65
	3	20.2%	328.26
	4	21.2%	345.20
	5	23.2%	371.55
	Total	**100**	
Fracture	1	18.6%	295.42
	2	19.6%	299.75
	3	20.6%	316.69
	4	23.7%	359.55
	5	17.5%	290.32
	Total	**100%**	
Nose Bleeding	1	17%	286.33
	2	17%	299.69
	3	19.2%	320.57
	4	23.7%	352.03
	5	25.5%	393.00
	Total	**100%**	
Muscle	1	20.1%	311.22
Cramps	2	19.4%	296.93
	3	19.4%	302.75
	4	20.2%	313.17
	5	20.9%	335.29
	Total	**100%**	
Wound	1	20%	315.13
	2	18.7%	296.01
	3	18%	279.22
	4	20.7%	339.21
	5	22.6%	364.03

	Total	**100%**	
Groin	1	18.2%	293.12
	2	19.3%	307.71
	3	19.3%	305.46
	4	22.7%	339.82
	5	20.5%	335.29
	Total	**100%**	
Thigh Injury	1	19.7%	293.73
	2	21.3%	318.68
	3	21.3%	314.53
	4	18%	278.94
	5	19.7%	304.87
	Total	**100%**	
Knee Injury	1	18.6%	293.63
	2	19.3%	301.18
	3	20.7%	325.64
	4	19.3%	308.56
	5	22.1%	374.03
	Total	**100%**	

The results of the analysis from table 7 indicate that sprain, strain, dislocation and nose bleeding had statistically significant difference of the number of games played on the types of injuries sustained with all their *p* values less than *.05 ($p < .05$)* as compared to those of fracture, muscle cramps, wound, groin, thigh injury and knee injury which have their *p* values more than *.05 ($p > .05$)*. Therefore, participants who played more games perceived that the number of games played contributed to sustaining sprain, strain, dislocation and nose bleeding injuries. There was no difference in the opinions of participants who played more games and less games on the occurrence of fracture, muscle cramps, wound, groin, thigh injury and knee injury.

Table 8: Difference between gender on the factors of sports injuries.

Factors	Gender	N	Mean	S. D
Biological Factors	Male	220	11.29	2.336
	Female	390	10.82	2.130
Psychological Factors	Male	220	11.70	2.294
	Female	390	11.78	1.875
Physiological Factors	Male	220	12.45	2.292
	Female	390	12.41	1.989
Sociocultural Factors	Male	220	11.26	2.418
	Female	390	11.09	2.101

N represents the total number of participants

From the table above all the remaining factors have their *p* values of more than *.05 (p > .05).* apart from the biological factors. The analysis showed a statistical significance difference between male and female on the biological factors, *t (608) = 2.54, p < .05.* The data indicate that Male *(M=11.29, SD=2.33)* perceived biological factors to influence sports injuries more than Female *(M=10.82, SD=2.13).* No statistical significance difference was found in any of the other factors of injury.

Table 9: Correlation between the factors of sports injuries

	Biological Factors	**Psychological Factors**	**Physiological Factors**	**Sociocultural Factors**
Biological Factors	1	.32	.26	.27
Psychological Factors	.32	1	.30	.33
Physiological Factors	.26	.30	1	.31
Sociocultural Factors	.27	.33	.31	1

The analysis from the table 9 showed a highly statistical correlation between the variables. Their *p* values are equal to *.01 (p =.01).* The data indicated a low

correlation of *(r =.3)* between all the factors. The Coefficient of Determination (CoD) which is interpreted as $r^2 = .9$ and is equivalent to 9%. Therefore, all the factors of sports injury contributed only 9% between them on occurrence of sports injuries in the Akuapem Municipality.

4.2 Types of Sports Injuries

Student-athletes sustain different types of sports injuries during preparation and competition stages. The most prevailing sports injuries sustained by student athletes in the S.H.S competition were wounds, thigh injury, muscle cramp and knee injuries as the prevailing injuries. The frequencies of occurrence of these injury types identified from the results which were 67.8%, 65.1%, 56.1% and 55.1% respectively indicated higher incidence in S.H. S tournament in the Akuapem Municipality. Other sports injuries like sprain, strain, dislocation, fracture, nose bleeding and groin were minimal in occurrence. Students normally sustained these injuries due to several reasons attributed. Student-athletes normally were made to play series and several matches in a day by organizers of these competition and even in the sun and sometimes in the rain. This approach was adapted to enable them finish the competition within a week. Interactions with physical education teachers indicated that, student athletes were not taken through proper training and conditioning to prepare them for such multi-games in the competition. Also, these games were regularly played on bad pitches and court hence leading to injuries among athletes. Furthermore, student athletes mostly used inappropriate equipment like bad footwear to play and perform in such competitions. Students were sometimes made to participate in such tournament with stress and tiredness, and these really expose them to injuries.

The outcome of this study in reference to the types of injuries confirms what was identified by Andersen et al. (2004), who also identified ankle, knee and thigh injuries as the dominant injuries with higher percentage value of 56%, 58% and 29% respectively in their study according to their sustaining rate. In addition, Lawrence et al. (2016) on the influence of risk factors national football league rate also had the same outcome in reference to the types of injuries sustained. However, Mashimo et al. (2019) in their study identified different findings contrary to that of this study. They came out with ankle, lower back, knee and thigh injuries as the common sports injuries in study on university female handball players. Higashi et al. (2015) and Lislevand et al. (2011) who also identified only knee and ankle injuries as the most prevailing and common injuries in their studies. In conclusion, wounds, thigh injury, muscle cramp and knee injuries were identified as common and most prevailing injuries among student athletes in the Akuapem Municipality.

4.3 Factors Contributing to Sports Injuries

Factors influencing sports injuries in tournaments and competitions have been explained and classified differently by different studies. Researches carried out on similar and different participants showed different contributive risk factors to sports injuries. The outcome of this study identified physiological factors as highly contributive to sports injuries than biological, psychological and sociocultural factors in S.H.S tournament in the Akuapem Municipality. Student athletes normally played their games on bad pitches and terrible court and these always exposed and made them sustained injuries regularly. Mostly, these organized games for student athletes are played in the sun and sometimes in the rain. Athletes are normally injured due playing in these harsh conditions. Furthermore, athletes are made to use inappropriate and unsuitable equipment to participate in these organized games because the various

schools are unable to purchase the right equipment for usage. Athletes always sustained injuries for wrong equipment for games and not wearing protective materials for such games.

The outcome of this study confirmed the findings of a study by Lawrence et al. (2016) which identified weather conditions which comes under physiological factors as the most influential factor to sports injury. Also, Chomiak et al. (2008) came out with a bit of similarity in findings to this study. They identified physiological factors as a contributive factor to injuries in their study on Severe injuries in football. Opposingly, and on similar studies on high school athletes and on adolescent sports, Saragiotto et al. (2013) and Vanderlei et al. (2014) also explained only biological and sociocultural factors as the common contributive factors to sports injuries. Also, Chomiak et al. (2008), and Zech and Wellman (2017) who also came out with biological, physiological and sociocultural factors as contributive factors to injuries which were contrary to the outcome of this study. Another research by Kontos (2004) and Schwebel et al. (2006) also identified only psychological and biological factors respectively in their study as factors that contribute to sports injuries. Although, all the remaining factors were identified as contributive, physiological factors was highly influential to sustaining of injuries among student athletes in the Akuapem Municipality.

4.4 Differences in number of events on the type of injury sustained

It is perceived and believed that the types of sports or events played by athletes normally influenced and contributed to the sustenance of sports injury but this study has clearly exhibited that not only the type of sports and the events influence sports injury. The number of different events or games played by an athlete in particular

competition had direct influence on not just injuries but the specific type of injury sustained by the athletes. The results of this study indicated clearly, the impact and influence of playing or participating in several games on sports injuries. It was indicated in the study that those who participate in more events differ in opinion with those who participate in single events on the type of injury and therefore sustained sprain, strain, dislocation and nose bleeding. The study identified these types of sports injuries with student athletes who participated in more than one event. The outcome of this this study showed clearly that those who participated in more events and their opposing counterpart sheared the same opinion on the occurrence of fracture, muscle cramps, wound, groin, thigh injury and knee injury as injuries which are not based on the number of events by athletes. These injuries sustained were mainly attributed to physiological factors according to the findings of the study. It was perceived that these injuries occurred as result of bad nature of playing area, using unsuitable equipment and poor weather condition causes more injuries in municipality. Also, these sports injuries were common as a result of student-athletes playing and participating in several contact games during such competition.

Chomiak et al. (2008) in their study came out with a bit similarity on the types of sports injuries normally suffered by athletes as in strain, fracture, sprain and contusion but their study was on the game of football and could not be substantiated on the number of games played. The results of this study contradicted what was found out by Welton et al. (2018) on a similar participants of student athletes in United States. They identified ankle injury, concussion and sprain as common injuries although they did no categorically link them up with the number events student athletes participate inn. Also, Andersen et.al. (2018) on high school athletes in the U.S identified ankle, thigh and knee injuries as the prevailing injuries but did not also linked it with the

number of games or events played by athletes. In the same vein, Karanfilci and Kabak (2013) also came out with ankle, knee, calf and thigh injuries as the most common injuries although their study did not involve different events. Lastly, Junge et al. (2006) identified only contusion and ankle injuries although athletes performed different single games and event in Olympic games. They showed incidence, diagnosis and causes of injuries differ substantially between the team sports and the number of games played. In conclusion, the number of games and event played by an individual really influenced the type of injury sustained.

4.5 Differences of gender on the factors contributing to sports injuries

It was realized in this study that all the factors of injury played a key role in the injury rate among student athletes in the Akuapem Municipality. The findings of the study with reference to the perception of the athletes in terms of gender on the factors of sports injuries was clearly explained. The analysis showed a statistical significance difference between male and female only on the biological factors with its significant value at less than *.05 ($p < .05$).* All the remaining factors have their *p* values at more than *.05 ($p > .05$)* and therefore sheared common opinion of male and female on the physiological, sociocultural and psychological factors of sports injury. Different opinions by males and females were sheared on only the biological factors simply because of the differences in the genetic make-up, body types, muscle sizes, fitness levels and ages of these student athletes. It is believed that, females mostly have relatively loose muscles as compared to males and also, do normally not have high fitness level due to their attitude towards training. Males also naturally have thicker and stronger muscles than females and therefore, have the ability to withstand vigorous activities unlike females.

The results of this study compliment what was identified by Von Rosen et al. (2018) in their study on adolescent athletes. Similar finding of their study indicated that, female athletes reported higher *(p < .05)* average weekly injury prevalence and substantial injury prevalence (injuries leading to a moderate or severe reduction in sport performance or participation or time loss) than male athletes. Also, Beachy and Rauh (2014) on the Middle School injuries came out with the analogy that girls (females) exhibited higher injury rate in all injuries than boys (male). Dobnik (2015) and Screekaarini et al. (2014) also identified a significant difference in opinions about injury. They recorded that; injuries are more common with boys than girls in competition which contradict the findings of this study. In conclusion, females normally get injured easily than male due to the vast difference in their biological factors and make up.

4.6 Correlation between the factors contributing to sports injuries

According to the outcome of this study, several factors contributed and influenced sports injuries in senior high school tournament in the Akuapem Municipality. These factors were categorized into biological, psychological, physiological and sociocultural factors. These contributive factors all contributed one way or the other to athlete injury sustenance and they exhibited strong relationship between them in reference to injury. The data indicated a low correlation of *(r =.3)* between all the factors. The Coefficient of Determination (CoD) which is interpreted as $r^2 = .9$ and is equivalent to 9%. Therefore, all the factors of sports injury contributed only 9% between them on occurrence of sports injuries in the Akuapem Municipality. This simply meant that, the various factors of injuries shear minimal relationship between them on the injury occurrence among student athletes in the Akuapem Municipality. Stress level of athletes and the poor nature of field showed little relationship between

them on injuries in the municipality. Also, the ages of the athletes exhibited no relationship with the nature of officiating in reference to injuries in the Akuapem municipality.

In a study by Screekaarini et al. (2014) on a similar participant of adolescent athletes, the findings strongly supported that of this study. They identified a high correlation between the psychological factors, physiological factors and biological factors as factors that influence sports injuries. The study showed high statistical correlation between the variables. In the same vein, Chomiak et al. (2008) also came out with sociocultural factors, physiological factors and biological factors as influential factors to sports injuries and also realized significant relationship and correlation between them in reference to sports injuries. on the other hand, Kahlenberg et al. (2014) in their study came out with a significant relationship between biological and sociocultural factors only as factors that influence sports injuries which was in contrast to what was identified in the study. The factors of injuries showed minimal relationship between them on injuries in the municipality.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1 Summary

Several athletes have suffered different types of injuries and these are attributed to a variety of causes and factors. Although, certain preventive measures were ensured to minimize these injury occurrences, they affected these athletes and the competitions as a whole. The purpose of this study was to assess the risk factors influencing sports injuries in high school tournament in the Akuapem Municipality. The study also identified certain prevailing types of injuries.

A conceptual framework of this study showed clearly the themes and the relationships between them in reference to sports injuries and these included types, causes, factors, effects and preventions of sport injuries. Several literatures were reviewed in line with these themes. Descriptive survey design was employed for the study whereby a self-developed questionnaire was used as a source of data collection techniques on 610 student athletes. The data collection procedure and the data analysis were clearly explained.

The study identified wounds, knee injury, muscle cramps and thigh injury as common injuries in the municipality. Physiological factors were also identified as the most influential factor to sports injuries. Also, the number of games and events contributed to sprain, strain, dislocation and nose bleeding injuries. Males and females had differences in opinions with reference to only the biological factor of sports injuries. Lastly, the study recorded low correlation between the factors and therefore contributed only 9% between them on occurrence of sports injuries in the Akuapem Municipality.

5.2 Conclusion

All the factors of injuries in one way or the other contributed to sports injuries in the Akuapem municipality, physiological factor was identified as most influential factor to injuries. Also, wounds, knee injury, muscle cramps and thigh injury came out of the study as the most prevailing sports injuries among senior high student athletes. Playing several games contributed to injuries like sprain, strain, dislocation and nose bleeding injuries. Males perceive biological factors to be influential to injuries than females. There was a low correlation between the factors on sports injuries.

5.3 Recommendation

The results of this study have identified several ways of dealing with sports injuries in the municipality, Ghana and the world as a whole. Physical education periods and weekends can be used for advance training of student-athletes to prepare them adequately for competition. Physical education teachers and organizers must advice student athletes to use appropriate equipment for the various games and events. Furthermore, organizers can introduce league systems of competition to be played over the whole semester period to enable athletes to get enough rest and recover for subsequent games or events. Again, student-athletes must be encouraged to participate in not more than three events in such competition. In addition, well trained medical expert must always be available at such competitions to administer first aid treatment to student athletes who sustain injury. Also, it is recommended that schools and their physical education teachers should keep records of injuries sustained training and competitions. Lastly, more studies must be conducted on other aspects of sports injuries and in other places to uncover more knowledge.

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APPENDIX

UNIVERSITY OF EDUCATION, WINNEBA

PHYSICAL EDUCATION

SPORTS INJURIES QUESTIONNAIRE

This questionnaire is designed to obtain your opinions about sports injuries. Please respond in a way that shows what you perceive to be most representative of your current opinion or perception. The data collected will be used for academic purpose only. A high level of confidentiality will be assured. Your time and effort in completion of this questionnaire is greatly appreciated.

The questionnaire contains three sections. Section A requests background information. Section B asks your opinion about the type of injuries sustained during sports competition or tournament. Section C solicits your opinions about the factors of sport injuries in competitions or tournaments.

SECTION A

Demographic Information

Directions: Please tick your response

AGE 14-15 ☐ 16-17 ☐ 18-19 ☐ Above 20 ☐

GENDER: Male ☐ Female ☐

HOW MANY GAMES DO YOU PLAY? 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

HAVE YOU BEEN INJURED BEFORE Yes ☐ No ☐

HOW MANY TIMES HAVE YOU BEEN INJURED? Once ☐ Twice ☐

Three or more ☐

If you have been injured before, kindly answer and complete the Section B and the Section C part of the questionnaire

SECTION B

Instructions: Please circle your response on the types of sports injuries sustained during sports competition from the scale below.

Scale A=Always O=Often S=Sometimes R=Rarely N=Never

	Rate / Frequency of occurrence				
Type of injury	Always	Often	Sometimes	Rarely	Never
Sprain	A	O	S	R	N
Strain	A	O	S	R	N
Dislocation	A	O	S	R	N
Fracture	A	O	S	R	N
Nose bleeding	A	O	S	R	N
Muscle cramp	A	O	S	R	N
Wound	A	O	S	R	N
Groin	A	O	S	R	N
Thigh injury	A	O	S	R	N
Knee injury	A	O	S	R	N

SECTION C

Instructions: Please indicate the extent to which you agree or disagree with each statement by circling the appropriate response to each of the statement.

Scale: SA = Strongly Agree A= Agree D= Disagree SD= Strongly Disagree

1	Athletes sustain injuries due to their age	SA	A	D	SD
2	Tension among athletes do not cause injury	SA	A	D	SD
3	Playing on a bad area or field causes injury	SA	A	D	SD
4	Playing several games in a day without rest do not causes injury	SA	A	D	SD
5	Poor officiating causes injury	SA	A	D	SD
6	Sex of the athlete does not contribute to his/her injury rate	SA	A	D	SD
7	Fear causes most athletes to get injured	SA	A	D	SD
8	Athletes cannot sustain injury due to their footwear	SA	A	D	SD
9	Using wrong or heavy equipment results in injury	SA	A	D	SD
10	Coaches attitude lead to injury	SA	A	D	SD
11	Athletes who are not healthy and fit sustain injury easily	SA	A	D	SD
12	Aggression do not cause most injuries in games	SA	A	D	SD
13	Athletes who are under stress get injured easily	SA	A	D	SD
14	Weather conditions do not cause injury among athletes	SA	A	D	SD
15	Playing games at high intensity causes injury	SA	A	D	SD
16	Lack of skills and techniques by athletes do not cause injury frequently	SA	A	D	SD