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FACTORS AFFECTING RISK MANAGEMENT IN THE TEACHING AND LEARNING OF VOLLEYBALL IN SENIOR HIGH SCHOOLS IN THE GA SOUTH DISTRICT OF GREATER ACCRA REGION, GHANA.

CHARLES INKUM

2014

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A Thesis in the Department of Health, Physical Education, Recreation and Sports, Faculty of Science Education, Submitted to the School of Graduate Studies, University of Education, Winneba in Partial Fulfilment of the Requirements for Award of the Master of Philosophy (Physical Education) Degree.

DECEMBER, 2014

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DECLARATION

STUDENT'S DECLARATION

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

SIGNATURE: ……

DATE: ……

SUPERVISOR'S DECLARATION

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

NAME OF SUPERVISOR: DR. W.W. AGBEKO

SIGNATURE: ……

DATE: ……

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ACKNOWLEDGEMENT

This research work would not have been successfully completed without the kindness and support from Almighty God. My immeasurable appreciation goes to Dr. W.W. Agbeko. He willingly and painstakingly supported me with constructive criticism and specific feedback throughout each stage of the study. His high level of suggestions and directions in the selection and arrangement of research materials made this study successful. To the following lecturers Dr. Baba, Professor Pufaa, Professor J.O. Ammah and Dr. Akuffo, I say a big thank you for your free consultation and support. I owe special thanks to Simon Kormla Donkor and Lawson Gordon Nyavor, colleagues in the Department whose constructive criticisms enabled this work to be in this form. My sincere and profound gratitude goes to my wife, Millicent, my children, Aseda and Adom Inkum for their never – failing support, love and co-operation throughout the study.

Finally, I owe gratitude to authors whose books and research works have been consulted in the writing of this research work.

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DEDICATION

This project work is dedicated to my wife and children for their physical and spiritual support, not forgetting Mr. E. C. Koto, Madam Philippa, Madam Sabina and Maa Theresa Addae.

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ABSTRACT

The study was carried out to investigate the factors affecting risk management in Senior High School in the Ga South District of the Greater Accra region. The study was carried out to investigate the factors affecting risk management in the teaching and learning of volley ball in Senior High Schools in the Ga South District of the Greater Accra Region. In using simple random sampling technique, the researcher considered gender as a factor. Therefore, the sample size has equal number of boys and equal number of girls specifically fifty boys and fifty girls. Ten senior high schools were randomly selected for the study. Random sampling technique was used to select 10 students from ten schools. The major instrument used for the study was a 15 item questionnaire whose information was in line with the research objectives. The research revealed that higher levels of injury were associated with lower levels of risk management practices and procedures. In addition, factors such as lack of education, use of inappropriate protective equipment, use of unsuitable facilities and the absence of proper supervision affect the risk management in volleyball activities. Resultant injuries experienced by respondents during volleyball activities were ankle sprains, back pain, fractures, shoulder injuries, finger injuries, knee injuries, concussions and stress injuries. It is recommended that schools are to provide proper facilities and safety gear such ask knee pads, volleyball shoes, ankle braces and socks for volleyball players to use in order to prevent injuries.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Physical activity contributes to students' physical, academic and social well-being and thus is an important part of the educational programme (National Association for Sport and Physical Education, 2001). The physical education program is deemed to include those physical activities, developmental games and sports that occur in instructional time during the school day. White & Cardinal (2003) recognize that no physical education activity is entirely risk-free. Therefore, the potential benefits and risks of a particular activity must be weighed to determine the appropriateness of the activity. Risk management in physical education activities has become a vital factor in promoting safety for all who participate at every level in sports. It is important, even crucial that resources for risk management are available to set policies and procedures for physical education teachers and students.

Volleyball is an active and competitive sport with many rewards including fitness, increased motor skill functions, and hand-eye coordination (Life 360 Inc. 2010). An athlete interested in the sport of volleyball should be aware not only of the many benefits the sport has to offer, but also be aware of the potential injuries related to the sport. To the ordinary observer, volleyball safety is all about two very important concepts; how to keep participants safe while playing, and things that participants can do to prevent injury. Although volleyball accounts for just a small percentage of all organized sports injuries, participation in the sport is on the rise (Life 360 Inc, 2010). Life 360 Inc. goes on to state that the more athletes participate in the sport, the higher the risk of injury to the volleyball players as they repeatedly use their shoulders for spiking and blocking, overuse injuries of the shoulder are common. Sprains and strains,

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most often around ankle, also occur. Finger injuries such as dislocations and tendon tears frequently occur during setting and blocking. Volleyball requires players to be aware not only of the ball, but of the other players, boundaries and the net. Some of the most common injuries that occur while playing volleyball include sprains, blunt force injuries and joint or repetitive motion injuries (Life 360, 2010). It is expected that volleyball players will be in a quick moving environment with plenty of different actions occurring simultaneously. Jumping and landing impacts are part for the course in a game of volleyball and the most common injury occurs when the athlete jumps and accidentally lands on a team member's or opponent's foot resulting in an ankle sprain. These common injuries can be prevented if volleyball players are able to jump and land safely.

Another common injury is the blunt force injury, which is the result of impact of the volleyball along the forearms of the athlete. This injury often occurs at the beginning of the sports season with relatively low occurrence after the season has progressed. The athlete may feel discomfort at the sensitivity of the forearm area being repeatedly struck by the volleyball and may experience bruises in this area. Long sleeves can prevent this injury at least until the athlete is able to build up resistance to the impact in this area. The blunt force injury category also includes injuries associated with collisions with other players, the net or the ball in some other area than the forearms. These injuries should be treated on a case-by-case basis.

The last most common injury is the injury induced from repetitive motions such as serving or spiking the ball. If the athlete is not conscious of their impact motion, they can bring on a repetitive motion injury that can require a brace, physical therapy or, in severe cases, surgery (Bisseling, Hof, Bredeweg, Zwerver & Mulder, 2007). Several strategies can help prevent volleyball injuries - from wearing appropriate safety

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equipment to careful inspection of the court. These injuries can be prevented by the athlete learning the appropriate impact motion from their physical education coach/teacher. Volleyball is a sport which has been on the rise in the Ga South district of the Greater Accra Region. The researcher who is a physical education instructor in the district has observed the increase in participation in volleyball over the past five years. Also, having observed the volleyball players play from the inter house level to the District level, the researcher realized that the injury levels were getting higher even in schools that are seen to be doing very well in all sporting disciplines. This actually inspired the researcher to delve and probe further into risk management in the teaching of volleyball in the Ga South District.

1.2 Statement of the Problem

The International Volleyball Federation requests that volleyball players should wear protective gadgets during the cause of play. The Ga south district sports do not adhere to the directives exposing the players to injuries. It has been reported that 78% of the boys and girls who play volleyball sustain injuries. This was based on the reported cases at the various schools infirmaries. Among some of these injuries that the players sustained are various cuts, hand injuries ankle sprain and back injuries. However some of these injuries could have been prevented if the schools had provided the players with these protective gears. In the teaching of volleyball, teachers often take things for granted. In some cases, students are not aware of safety issues in volley ball. Worst of all, some students have never had a feel of volleyball protective gears such as knee pads, ankle brace etc. However, managing injuries is crucial to the teaching and learning of volleyball. Therefore, the researcher tried to find out the factors affecting risk management in the teaching and learning of volleyball.

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1.3 Purpose of the Study

Due to the growing emphasis on safety in sport, the purpose of this research was to explore and determine to what extent physical education teachers conduct their affairs in a professional manner by utilizing specific risk reduction strategies in the teaching and learning of volleyball to prevent or reduce injuries and also to promote safety.

1.4 Research Questions

The following research questions have been formulated to guide the study.

1. What is the level of student awareness of risk management in the teaching and learning of volleyball activities is?
2. What factors affect risk management in volleyball activities in the Ga South district?
3. What types of common injuries are there in volleyball?
4. What measures can be put in place to prevent volleyball injuries?

1.5 Significance of the Study

This work would add to the existing body of knowledge on risk management in volleyball in Ghana. The findings will be made available to coaches and teachers of Physical Education and Sports to appropriately manage the teaching and learning of volleyball for their athletes and students under their care. It will also assist government and institutions to develop sound volleyball programmes that pay attention to players risk management that will drastically reduce the spate of injuries related to volleyball among volleyball players and athletes in general in the society. Finally, this work will

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serve as a reference material for students who want to carry out further research in this area.

1.6 Delimitation of the Study

This research work is delimited to senior high schools in the Ga South district of the Greater Accra Region of Ghana. This study is further delimited to volleyball players at this level.

1.7 Limitation of the Study

The basic limitations of this study were time and resource constraints. A study of this nature should have covered the whole of the ten (10) regions of Ghana but because of time constraints, the researcher was not able to do it. He was thus compelled to focus on the Ga South District in the Greater Accra Region.

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1.8 Operational Definition of Terms

Blunt trauma: This refers to physical trauma to a body part, either by impact, injury or Physical attack

Dislocation: It is a separation of two bones where they meet at a joint.

Injuries: They are damages to a biological organism caused by physical harm.

Sprain: It is the tearing of ligaments and tissues around a joint. It is usually caused by upper extension of the joint or by exposing the joint to severe pressure.

Strains: The over-stretching of the muscles or the tearing of muscle fibers which usually occurs when performing strenuous activities.

Volleyball Player: A person who takes part in volleyball matches.

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CHAPTER TWO

LITERATURE REVIEW

This chapter contains the summary of the writings of recognized authorities and of previous research done on the problem under investigation. The review is organized under the following subheadings:

1. Theoretical framework

2. Injuries in volleyball

3. Factors that affect risk management in volleyball

4. Prevention of volleyball injuries

2.1 Theoretical Frame Work

The notion of 'risk' is central to the definition of 'risk management'. The Risk Management Standard describes 'risk' as the possibility of something occurring that can have a detrimental impact on objectives of an organization Standards Australia, 2004. Risks may also occur as the consequences of a negligent act or non-compliance of an organization with laws, regulations and standards in the industry, such as injuries to exercise participants, legal liability claims and distorted reputation of an organization. Even though all human actions involve a certain amount and degree of risk and it would almost be impossible to eliminate all risks. They can be minimized by the way people perceive and handle these risks. The perception of risk is subjective and can depend on various factors such as experience, cultural perspective, knowledge and skills. For example, a person may accept the risk of driving a car but may choose not to fly in aircraft because of the perceived risk, when fatality statistics indicate the risk

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associated with air travel is much lower than that for driving a car (Standards Australia, 2004c, p.3). Therefore, those with best possible information, knowledge and experience of past events will usually be better prepared to manage risks. In the past, managers used to deal with risks as they faced them, or solely relied on intuition and common sense to either prevent problems resulting from risks or reacting in an attempt to recover. Today, no longer is risk management a safety procedure conducted by common sense, experience and intuition, but an organized plan based on fundamental legal concepts, through which a business attempts to control and encounter the risks it faces (Williams et al., 2006).

It is possible to find a variety of definitions for risk management in the literature. The Risk Management Standard defines risk management as the culture, processes and structures that are directed towards the effective management of potential opportunities to improve performance and taking action to avoid or reduce the chances of something going wrong and its adverse effects (Standards Australia, 2004a, p.4). Even though this approach to managing risks may relate to every aspect of an organization, personal injury and prospective liabilities are considered to be primary issues in risk management of sport and recreation organizations due to the risky nature of sport and physical activity (Sharp, Moorman and Claussen, 2010). Correspondingly, Spengler, Connaughton and Pittman (2006, p. 2) describe risk management as "reducing or eliminating the risk of injury and death and potential subsequent liability that comes about through involvement with sport and recreation programs and services". As Sharp, Moorman and Claussen (2010) denote, the safety and well-being of all customers should be one of the core values of an organisation and risk management is a crucial asset for an organisation in carrying out that objective. In support of this assertion, the American College of Sports Medicine defines risk management in a health/fitness facility as "the practices, procedures and systems by which the club reduces its risk of

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having an employee, member, or user experience an event that could result in harm (injury or death) to the individual (employee, member, or user) and perhaps later to the business entity itself" (Tharrett, McInnis and Peterson, 2007).

In this regard, a good risk management plan of a health/fitness facility would cover practices that range from those that are preventive in nature (i.e. pre-activity screening, proper maintenance of fitness equipment, record keeping of facility inspections, and analysis of why accidents occur) to those practices that are considered a reaction or a recovery and response system to unexpected events (i.e. emergency response systems).

2.2 Injuries in Volleyball

What constitutes an injury is not as easy as it may seem at first glance, and there have been many different approaches to injury definition in the past. A consensus statement was issued in 2006 in the sport of football (soccer) stating that the broadest definition of injury would be any event occurring as a result of participation in sport (Fuller et al., 2006). Injury was then further classified into medical attention injuries; those that required assessment or treatment by a medical practitioner. A further sub-division was time-loss injuries; those causing a player to miss one or more practices or games or sessions. The important point in any research regarding injury surveil-lance is that one must know in advance exactly what will be counted, and this must be consistent across all people and all groups recording injury. This is important to ensure consistency both within a given period of surveillance and over time between different periods of surveillance.

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Volleyball involves repetitive overhead motions, such as spiking and blocking, as such players are prone to overuse injuries of the shoulder. In addition, volleyball players are particularly susceptible to finger injuries. Injuries are, regrettably, an unavoidable hazard of sports participation. Although volleyball and beach volleyball are by most estimates relatively safe sports particularly in comparison to other sports such as football epidemiologic research has revealed that volleyball players are at risk for certain types of injuries (FIVB Medical Commission, 2013). The Medical Commission of the international volleyball federation further stated that serious injuries, which interfere with the athlete's ability to participate, have obvious immediate consequences (time lost from training and competition) and may have long-term implications as well (chronic disability and functional limitation). Coaches and trainers should therefore have an understanding of the most common volleyball-related injuries in order to appreciate the potential impact injuries may have on the both on the athlete and the team. One of the first considerations in discussing the injuries for which volleyball players are at risk is to define what constitutes an injury. One accepted definition used in research is that an injury is any condition for which an athlete seeks medical attention. Injuries so defined may in turn be further subdivided into conditions that result in time lost from either competition or training and those that do not limit playing time. The length of time loss (typically reported in days or weeks) therefore provides a measure of injury severity that can be used to compare different types of injury. For example, in their 2004 study chronicling the injuries that occurred during one volleyball season in the Dutch professional league, Verhagen et al (2004) determined that shoulder injuries resulted in an average time lost from training or competition of 6.5 weeks – by far the longest mean absence from participation compared to other injury sites documented in their study.

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Injuries are also commonly categorized by and compared based upon the body part affected (e.g. shoulder, knee, ankle, lower back). One additional useful classification criterion is whether the athlete was injured as the result of acute tissue overload or whether the injury resulted from chronic overuse. Acute injuries, such as ligament sprains and muscle strains, occur when the limits of tissue dispensability and integrity are suddenly overwhelmed. The athlete is usually able to recall an exact mechanism of injury to correspond to the sudden onset of pain and functional limitation. In contrast, overuse injuries (e.g. tendinopathies) often occur insidiously. As a result the injured athlete often cannot recall a specific traumatic incident or a definite mechanism of the injury. A hybrid of these two injury mechanisms occurs when tissue that has been weakened from overuse suddenly fails in response to an acute load. The athlete will identify the moment of "injury", but may not appreciate the impact of the chronic tissue overload that predisposed him (or her) to ultimately develop outright tissue failure. Theses numerous studies on injury patterns in volleyball. Unfortunately, differences in the definition of injury and in calculation of incidence rates make it difficult (if not impossible) to directly compare these studies. Nevertheless, it is generally accepted that the most commonly occurring injuries are acute ankle sprains, followed by overuse conditions of the knee (patellar tendinopathy) and shoulder (multidirectional instability, impingement) and the lower back (nonspecific mechanical low back pain).

2.2.1 Ankle Sprains

Ankle sprains are clearly the most common volleyball-related injury, accounting for just over half of the acute injuries recorded prospectively by Bahr et al (2003) and Verhagen et al (2004). Ankle sprains occur most frequently at the net when

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one player lands on another player's foot, inverting the ankle and stretching (or tearing) the ligaments on the lateral (outer) aspect of the ankle. Ankle injuries are the most common injury to volleyball players and responsible for the most lost playing time. Ankle sprains should be immobilized for as short as time as possible to allow for quicker rehabilitation. Every ankle sprain needs an 8-week course of daily rehabilitation exercise to decrease the risk of re-injury. Usually injuries can be treated no operatively with bracing and physical therapy or home rehabilitation exercises. Occasionally, though, ankle sprains can be associated with subtle fractures or cartilage injuries. Continued pain after several weeks should prompt further evaluation, including X-rays and/or MRIs.

Return to play is usually allowed once players have no pain and are able to support their body weight while standing on the toes. Surgery is reserved for those with recurrent ankle sprains that have not responded to conservative measures or those with specific associated fractures. Athletes who have suffered an ankle sprain in the past are more likely to suffer a subsequent injury. If the injured player has difficulty accepting weight onto the involved ankle, or if bearing weight results in severe pain, she or he should not continue playing and should seek prompt medical attention.

The goal of initial treatment for ankle sprains (and for acute injuries in general) is to limit internal bleeding and swelling, and to provide an environment conducive to tissue healing. The acronym PRICE is easy to recall and nicely summarizes the early steps in caring for an acute ankle sprain (FIVB Medical Commission, 2013). PRICE stands for: Protection, Rest, Ice Compression and Elevation.

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Protection

Protect the ankle from further immediate injury. Depending on the severity of the sprain, a period of immobilization and restricted weight bearing may be necessary. As the athlete's condition improves, he or she may resume progressively more advanced activity patterns. However, use of an external support (brace, or taping) is generally recommended for the first six months following injury.

Rest: As mentioned, a period of restricted activity promotes early tissue healing. Weight - bearing may resume as symptoms subside, and activity may progress accordingly.

Ice: Application of ice (or other cryotherapy modality) provides analgesia and helps to minimize swelling. Although there is no consensus on treatment parameters, cold treatment is often applied for 20 minutes at a time (followed by 20 minutes without ice). Three such on/off cycles of cryotherapy may be administered in succession several times per day over the first 24 –48 hours following the injury.

Compression: Temporary compression immediately following the injury limits swelling in the injured ankle, which in turn facilitates restoration of normal range of motion.

Elevation: Elevating the injured ankle also helps to minimize swelling immediately following the injury.

PRICE treatment should be initiated as quickly as possible following the injury. Acute injuries should also be promptly evaluated by a trained medical professional in order to carefully assess the extent and severity of injury, arrange for diagnostic testing as needed in order to arrive at an accurate understanding of the nature and extent of the injury, and formulate a definitive treatment plan. The athlete should be monitored

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carefully, and examined periodically to confirm that healing is progressing as expected. In addition to range of motion and strengthening exercises, the comprehensive treatment of ankle sprains should include instruction in a program of neuromuscular (proprioceptive) re-education. This involves having the athlete balance on the involved limb, limiting corrective motion to the involved joint to the extent possible. As the athlete improves, these balancing exercises should be made progressively more challenging (both in terms of duration, and in terms of adding unstable surfaces or other challenges to the maintenance of balance). Return to play decisions following an ankle sprain (or indeed any injury) should be guided by functional recovery rather than mere absence of pain. In their 2004 study, Verhagen et al (2004) documented that ankle injuries resulted in a mean of 4.5 weeks of time lost from training or competition.

Since ankle injuries are so common among volleyball players and result in considerable time loss, it makes sense to try to prevent them. Primary prevention entails practicing proper footwork at the net, integrating proprioceptive exercises into the athlete's regular conditioning program, and consistent use of external ankle braces. Only recently has there been any evidence for a significant prophylactic effect from the use of semi-rigid external ankle orthoses among volleyball players. Despite some concern voiced by coaches and athletes alike, there is no evidence in the literature to suggest that the use of ankle orthoses increases the risk of knee injuries. Another means of reducing the risk of ankle sprains would be to modify the existing centre line rule, which allows for a portion of the foot to cross onto the opponents court without a violation. While such rule changes have been discussed, it seems unlikely that any substantive modification of the centre line rule would be possible without significantly altering the dynamic aspects of the sport as it is currently played.

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2.2.2 Overuse Injuries –Patellar Tendinopathy

Anterior knee pain represents the second most common diagnosed injury among volleyball players. The most common causes of anterior knee pain among volleyball players are patellar femoral syndrome, and patellar tendinopathy (also known as "jumper's knee"). Both of these diagnoses represent overuse conditions. Fortunately, volleyball players appear to be at relatively low risk for acute knee problems, such as injury to the anterior cruciate ligament. Nevertheless, overuse conditions such as patellar tendinopathy can extract a very high cost in terms of loss of time, and may lead to chronic debilitating symptoms that adversely affect the athlete's quality of life. Unlike acute injuries, which have a distinct mechanism and time of onset, overuse injuries are insidious in nature. Athletes with overuse injuries generally cannot recall a specific moment when their injury occurred, but report instead a history of activity related discomfort that has become progressively more severe over time. Many athletes attempt to "play through" or compensate for the initial symptoms of overuse pathology, and only after the pain becomes limiting or the performance deficit intolerable will the athlete take time off from training or competition. Consequently, treatment of overuse injuries is often challenging. The first priority is to alter or minimize the load on the injured area. This is generally accomplished through activity modification. Reducing the load on the injured area allows the affected tissues an opportunity to recover and begin healing. However, in order to adequately treat an overuse injury, it is important to examine the athlete's risk factors for injury. Risk factors for injury (which can be defined as those qualities which increase the likelihood that an athlete will develop a certain type of injury), may be categorized as either "intrinsic" or "extrinsic" to the athlete, and as either "modifiable" or "Unmodifiable". Risk factors for jumper's knee include the volume of jumping and jump training which the athlete must endure (extrinsic, modifiable), the biomechanics of the knee during the spike approach and

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upon landing from the jump (intrinsic, modifiable), and the composition of the surface on which the athlete trains and competes (extrinsic, modifiable). Documented that hard, unforgiving surfaces increase one's risk of developing jumper's knee. Not surprisingly, therefore, jumper's knee is less common among beach volleyball players than it is among indoor volleyball athletes. The amount of knee valgus stress on the lead (usually non- dominant) knee during the spike approach jump is a risk factor for developing patellar tendinopathy, as is the degree of knee flexion achieved during landing from the spike jump. Interestingly, those athletes who had the greatest jumping ability were found to be at the greatest risk for developing patellar tendinopathy. There are undoubtedly other genetic susceptibility factors involved in the pathogenesis of jumper's knee, since not all athletes who undergo comparable jump training programs will develop symptomatic jumper's knee. Practical prevention strategies for jumper's knee include strengthening and conditioning the muscles of thigh, hip, and buttocks so that they can effectively absorb the shock of landing from jump after jump. Analysis of technique is also important, as bending too deeply at the knees when landing from a jump, or excessively toeing in during the loading and take off phases of the jump can predispose the athlete to jumper's knee.

Perhaps the most effective preventive intervention is simply reducing the load on the knee extensor mechanism by limiting the volume of jumping required during training sessions. Even with an appreciation of some of the modifiable risk factors for anterior knee pain, effective treatment of jumper's knee often remains elusive, further underscoring the importance of prevention. Some athletes benefit from the use of an infra-patellar strap, which is thought to redistribute the traction force on the patellar tendon during activation of the quadriceps, thereby reducing the risk (or minimizing the symptoms) often dinopathy. Eccentric quadriceps training may be of some benefit as a pre-season conditioning exercise, but this type of exercise has not been shown to be

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effective in treating symptomatic patellar tendinopathy during the competitive season. Advances in our understanding of the underlying cellular and tissue pathophysiology have led to new methods to treat this condition, which at its worst can be potentially career-threatening. Among these treatments is sclerosis of neovessels under ultrasound guidance, which has been shown to be of some clinical benefit. Other less proven methods of treatment include injections with platelet rich plasma. Although thought to deliver concentrated growth factors and cellular mediators involved in tissue healing direct to the site of tissue injury, there is little scientific proof of the effectiveness this technique. Severe cases of patellar tendinopathy may require surgical intervention.

2.2.3 Overuse Injuries –Shoulder Problems

The shoulder is the third most commonly injured body part overall. Injuries to the shoulder most often occur as the result of chronic overuse. Acute shoulder trauma (such as an anterior shoulder dislocation) does occur, but it often occurs in the context of underlying overuse-related pathology. Spiking is perhaps the most dramatic skill in volleyball. It has been estimated that an elite volleyball player, practicing and competing 16 to 20 hours per week, may perform as many as 40,000 spikes in one season (FIVB Medical Commission, 2013). The volume of overhead loading inherent in that much activity places enormous demands on the glenohumeral joint specifically and the shoulder girdle in general. The shoulder is an extremely mobile joint that permits the volleyball athlete to swing high for a spike or reach out for a block. Athletic shoulder function is dependent upon the precise action of the rotator cuff and the muscles that stabilize the scapula (shoulder blade). These muscles must be well conditioned and work in a coordinated manner to ensure pain-free shoulder function. Unfortunately, through repetition and the sheer volume of training, the muscles and

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tendons of the shoulder girdle may become overloaded and fatigued. This may result in "wear and tear" damage to the shoulder, which over time may culminate in a time - loss injury. Regrettably, treatment of overuse conditions of the shoulder girdle (such as rotator cuff tendinopathy) is often incompletely successful. Accepted principles of non-operative treatment include load reduction (limiting the number of spikes or serves performed) and correction of any underlying imbalances of strength or flexibility through appropriate training programs. Some conditions, such as shoulder instability due to injury to the glenoidlabrum, may require surgery if conservative management does not restore the athlete to an acceptable level of function.

As with jumper's knee, comprehensive treatment of volleyball-related shoulder problems requires that specific risk factors for injury be identified and addressed. Our understanding of the risk factors for volleyball-related shoulder problems is unfortunately quite limited. Kugler et al (1996) described the adaptive changes in scapular positioning they observed in elite volleyball players, but there has been little volleyball-specific follow-up to this insightful paper. In their recent study, Reeser et al found that spiking volume (extrinsic, modifiable) and scapular dyskinesia (intrinsic, modifiable) were associated with an increased incidence of shoulder problems. Shoulder pain was also associated with core instability (intrinsic, modifiable), reflecting the importance of the kinetic chain in generating power for the spiking motion. Wang and Cochrane, along with other researchers, have documented the ratio of eccentric shoulder external rotational strength to concentric shoulder internal rotational strength among volleyball players. Their work, collectively, suggests that a reduced ratio represents a risk factor for injury. Wang and Cochrane (2001) also documented that those with a longer training history had a higher incidence of shoulder problems. Lastly, there have been numerous reports in the literature describing the supra scapular mono neuropathy that is common in volleyball players, but the risk factors for the onset of

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this condition remain a matter of debate. Similarly, treatment for this condition is somewhat controversial, since it frequently is essentially painless and causes little or no performance deficit.

Prevention of shoulder pathology among volleyball players has been poorly studied. It is not known whether intervening in any of the aforementioned areas, such as instituting a program of flexibility training to address the deficit of glenohumeral internal rotation commonly observed in the dominant shoulder, will minimize or eliminate the volleyball athlete's risk of developing shoulder pain. Nevertheless, it is probably advisable to incorporate posterior capsular stretching into the shoulder girdle strengthening and scapular stabilization program followed by elite volleyball athletes. Most conditioning programs also include a program of core stabilization exercise designed to promote correct posture and facilitate the generation and efficient transfer of power throughout the kinetic chain.

2.2.4 Low Back Pain

Volleyball players, along with the rest of the general population, frequently complain of lower back pain. More often than not, the pain will resolve spontaneously within several weeks, and as such probably does not indicate serious pathology.

However, mechanical back pain is much less common among young players and those individuals 20 years of age or younger who have persistent back pain that limits them from participating in activities (such as volleyball) should be evaluated by a sports medicine physician. There are many different causes for back pain, and as a result the exact cause of an individual's lower back pain often cannot be precisely identified. That said, if a young athlete's low back pain is made worse by lumbar extension (bending

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backwards), then a stress fracture of the lumbar spine ("spondylolysis") should be ruled out. If the athlete has suffered an acute strain of the muscles of the low back, then the pain will typically be self -limiting and should improve rapidly over a few days. Pain related to an inter-vertebral disc injury or spinal nerve impingement may be disabling, and should be treated aggressively. Anti-inflammatory medicines such as ibuprofen can help to control symptoms in the short term. Volleyball training (especially jumping and strength training) should be curtailed until the athlete is feeling better. Because of the different types of injury that may give rise to low back pain, it is difficult to give general recommendations for exercises that would be therapeutic in all situations. For this reason, an appropriate exercise prescription should be developed in consultation with a trainer, physical therapist, or sports medicine physician. Prevention of lower back problems includes minimizing torsional stress on the spine, particularly while loaded, as well as minimizing extremes of or repetitive flexion and/or extension- particularly in the young athlete. Proper weight-training technique is an important aspect of a comprehensive injury prevention program, as is an integrated program of core stabilization.

2.3 Factors Affecting Risk Management in Volleyball

A review of literature related to various factors affecting risk management of indoor campus recreation was undertaken. As a result of the literature search, a variety of information including, but not limited to, the following topics was uncovered: risk management policies, guidelines, plans, forms, insurance, responsibilities of directors to prevent risks, health pre-screening procedures, Cardiopulmonary Resuscitation and first aid certifications, automatic external defibrillator training, methods of communication, security, and employee matters related to the facility.

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In a study by Young and Ross (2000), it was pointed out those efforts to reduce liability through risk management plans will continue to be complex and will create challenges for recreational sport administrators. A basic responsibility of the facility manager is to make sure the facility is reasonably safe for its intended use (Fried, 1999; Mulrooney, Styles, & Green, 2002). Fried (1999) addressed the standard of "reasonably safe" and indicated that through proper inspection, it should be made sure that facilities and equipment are reasonably safe. The development and implementation of emergency response systems was also stated as an effective means of providing the highest reasonable level of safety for users (Tharrett et al., 2007c).

Upper administrators, according to Mulrooney et al. (2002), are aware of the impact that risk management programs have on liability reduction. Findings by Mulrooney et al. showed National Intramural-Recreational Sports Association (NIRSA) department heads have risk management plans in place. Styles and Mulrooney (2005) concluded that having comprehensive risk management procedures is a course of action protecting the facility from liability. In addition, Fried (1999) recommended the formation of an event safety committee to plan, establish, implement, and evaluate risk management policies as a way to help ensure safety of the facility.

2.4 Prevention of Volleyball Injuries

Over the last 20 years, the ability of sports medicine professionals to diagnose and treat athletic injuries has improved dramatically. Athletes are now capable of returning from serious injuries faster than ever before due to aggressive treatment and rehabilitation programs. The greatest remaining challenge in the field of sports medicine is to design and implement programs that will reliably prevent injuries from occurring in the first place (FIVB Medical Commission, 2013). Although injuries

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cannot be entirely avoided, our present understanding of the basic risk factors associated with the most common volleyball-related injuries can help coaches and athletes prepare themselves and their teams for a successful season with minimal risk of injury. Several general strategies that can be adopted in an effort to reduce an athlete's risk of volleyball-related injury are presented below. Although certainly not exhaustive, the principles briefly outlined form the foundation of a sound volleyball injury prevention program.

1. Follow a sport-specific program of strength training and conditioning: Volleyball is primarily an anaerobic sport. Nevertheless, volleyball players should maintain good cardiovascular fitness, as it will enhance their ability to recover between points and after matches. Elite volleyball players also train to become strong and powerful, not only for the performance advantage offered but because well-conditioned muscles are better able to endure the demands of sport participation, and are less likely to become injured. In addition, fitness allows the athlete to maintain optimal form and technique throughout a match, thereby minimizing the risk of fatigue-related injuries. Warm-up prior to and proper cool-down following a competition readies the athlete for the demands of the event and facilitates subsequent recovery.

2. Avoid overtraining: Adequate rest is almost as important to an athlete's development and performance as proper training. Athletes who train too hard may not give their bodies' sufficient time to recover, resulting in an increased risk of overuse injuries. Each athlete has a unique tolerance for training and individual needs for rest and recovery, making it difficult for a coach to take a "cook book" approach to training for all members of the team. Athletes who persistently train without sufficient rest are at risk for developing a syndrome of mental and physical fatigue commonly referred to as "burnout". Elite athletes train for volleyball throughout the year, but vary the intensity

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and composition of their workouts so that they achieve and maintain peak fitness during the competition season. There is evidence that this practice, known as periodization, further reduces an athlete's risk of injury.

3. Pay attention to and practice proper technique: As we have seen, most ankle sprains occur when an athlete lands on a teammate's or opponent's foot while making a play at the net. Practicing good blocking footwork and controlled spike jump approaches and landings can minimize the likelihood of contact-related injuries about the centre line. It is also important to attend to technique, since subtle alterations in performance and technique often provide the earliest clues that an athlete is developing (and attempting to compensate for) overuse related dysfunction.

4. Train (and maintain) core stability: To function properly, joints (and in fact the body as a whole) must be mechanically stable. Stability is conferred through both passive and active mechanisms: the musculoskeletal anatomy provides the joint with an underlying passive structural stability, which is augmented through dynamic (active) neuromuscular control. Such control can be learned, and indeed is an essential component of the athlete's ability to adapt to the demands of and excel in their chosen sport. When actively engaged in sports, athletes are rarely static -their position in space is constantly changing as they react to the competitive situation. In volleyball, although the legs initiate most of the activity, the culmination of a given movement often involves the upper limbs reaching overhead. Thus, even though the upper body may perform the skill, the energy to perform those skills is generated by the lower limbs and by the trunk. The smooth and efficient transfer of energy from lower limb to upper limb is dependent on an integrated response from the intervening segments of the "kinetic chain" -particularly the pelvis and the thorax columnar spine.

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Together the pelvis and the thorax columnar spine form the foundation of what has become known as the athletic "core." Research has demonstrated that a stable, well-conditioned core plays a critical role in coordinating the body's movements and in minimizing the athlete's risk of both upper and lower limb injuries, as well as low back pain. The core may therefore be thought of as a functional integration of the associated anatomical structures of the pelvis and thorax columnar spine, including the hip flexors, hip extensors, hip abductors and adductors, abdominals, par vertebral musculature, and the diaphragm. Developing and maintaining the athlete's dynamic core strength and stability will reduce his or her global risk of injury by facilitating proper coordination and energy transfer along the kinetic chain

5. Properly rehabilitate injuries: Research has shown that a body part, once injured, is more likely to be injured again upon returning to play. To prevent acute injuries from becoming chronic recurrent injuries, it is imperative that the injured athlete receive careful evaluation from a sports medicine provider, so that an accurate diagnosis can be made and a comprehensive treatment program started. Typically the athlete will be allowed to return to competition once they can perform sport-specific skills- such as jumping and spiking -without pain. However, a truly thorough program will rehabilitate the athlete "beyond the absence of symptoms". This philosophy requires that the athlete’s trainer, therapist, or team physician identify and address any structural and/or functional factors that contributed to (or resulted from) the injury. For example, an athlete with a stress fracture of the lower back may develop inflexibility of the hamstrings and subconsciously alter his or her spiking form so as to minimize stress on the lower back. Unless these factors are identified and corrected during the rehabilitation process, the athlete may subsequently develop shoulder pain as a consequence of the altered mechanics.

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6. Maintain proper nutrition and hydration: Consuming a balanced diet with adequate caloric intake ensures that the athlete will have sufficient energy stores to allow full participation throughout the season. Dietary protein intake provides the building blocks to repair injured tissues, while fats and carbohydrates serve as fuel for the athlete's fire. Sufficient fluid intake (preferably water or -during competition -a sports drink) prevents dehydration and minimizes the risk of developing heat illness. Coaches should be particularly attentive for recurrent injury among female athletes, as this may indicate the presence of the "female athlete triad" - a condition characterized by disordered eating (typically anorexia), which in turn leads to irregular or even absent menstrual cycles (amenorrhea), and eventually to loss of bone mass (osteoporosis).

7. Avoid early sport and position specialization: Volleyball is a sport that can be enjoyed by the young and old alike. However, engaging young athletes in overly structured, competitive programs may increase their risk of injury. The American Academy of Pediatrics Committee on Sports Medicine and Fitness has discouraged "specialization in a single sport before adolescence", and it seems reasonable to conclude that the volume of training in developing athletes should be limited in order to reduce the risk of developing overuse injuries

2.4.1 Supervision of the Volleyball Facility

The duty to properly supervise an activity or a group of individuals, according to Fried (1999), is extended whenever a person puts his or her well-being into another's hands. It is also important that those employed at the facility must have an appropriate level of professional education, work experience, and/or certifications aligning with their responsibilities (Tharrett, McInnis, & Peterson, 2007b). Recreational directors at multimillion-dollar facilities recognized the importance of establishing a plan of

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supervision that embraces routines for safety inspection (Styles & Mulrooney, 2005). Risk can also be decreased by maintaining the facility and staying up to date and informing participants of the safety and risk management standards associated with participation (McGregor & MacDonald, 2000).

2.4.2 Responsibilities of Heads of School

Principals are responsible for the development and implementation of a student supervision plan for school sport and other physical activity programs. This would include weekly sport, integrated sport, zone and higher representative sport competitions, fixtures and carnivals, outdoor recreation activities, as well as any other school-sponsored occasion. The plan should clearly indicate the supervision arrangements and responsibilities at the various physical activity locations and venues and include where appropriate supervision of student travel to and from these venues and locations.

Principals should assess a number of factors in determining the level and type of supervision which needs to be provided during a particular activity. Aspects which should be considered in this assessment are:nature and location of the activity (prior inspection of the location may be required to identify potential dangers)number of students involved age and maturity of student'squalifications and experience of the adult supervisors travel to and from the venuefor sport activities, specific focus programs (eg. aquatic activities) and physical activities conducted outside the school grounds, the school must inform parents or caregivers about the location, costs, mode of travel and supervision arrangements, activities to be undertaken and dismissal times, where it is appropriate, before permission is obtained.

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CHAPTER THREE

METHODOLOGY

This chapter discusses the methods and procedures used in collecting data for the study. These include the following:

1. Research design
2. Population
3. Sample and sampling procedure
4. Instruments
5. Validity
6. Reliability
7. Administration of instruments
8. Procedure for data analysis

3.1 Research Design

The study adopted the descriptive survey method. This design was adopted because it involves data collection from a fraction of the population (the sample) to generalize the findings to the population.

Fraenkel and Wallen (2000) perceive the descriptive survey as a research design that attempts to describe existing situations without actually analysing existing relationship among variables. Descriptive survey is used to obtain information concerning the current status of a phenomenon. The purpose of this method is to describe what exists with respect to situational variables. It is less expensive and time consuming than pure quantitative experiments. It collects a large amount of data for detailed studying .As it is used to describe and not make any subjective conclusions, it

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is easier to start the research with it, and it can identify further areas of study. Purposive sampling was also adapted for the study this method was used for sample students who were learning volleyball at the time the study was taken place.

3.2 Population

Population mostly comprises the entire aggregation of elements in which the researcher is interested. Identification of the population for the study is an important one as it is impossible to carry out research in vacuum. It is, therefore, necessary to know the target population in order to decide on what sample size would be feasible for the research. The population for the study consisted of all students in senior high schools in the Ga South District of the Greater Accra Region of Ghana namely Accra High Senior School, Christian Methodist Senior High School, Dansoman Senior High School, Ebenezer Senior High School, Wesley Grammar Senior High School, Accra Academy Senior High School, Odorgonno Senior High School, Kaneshie Senior High Technical School, Kinbu Senior High Technical School, and NgleshieAmanfro Senior High School.

3.3 Sample and Sampling Technique

Sample is usually the subset of the entire population of interest to the researcher. In research, it is usually not feasible to involve all the entire population and therefore the need to select some of them. The sample should have identical characteristics with the rest of the population (Avoke 2005). The sample is made up of senior high school volleyball players within the catchment area of the Ga South District of the Greater Accra Region of Ghana numbering about 100 selected from 10 senior high schools. The

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population was made up of 50 males and 50 females. Simple random sampling was used to select the 10 students from the population from each of the 10 schools.

The researcher also used the purposive sampling technique to avoid gender bias. From each school selected for the study, the researcher used the technique first in grouping the students according to gender i.e boys only in one group and girls only in the second group. It was after this that the simple random simply technique was used to select the sample size. In using the simple random technique the researchers. The YES or NO technique was used to select the respondent randomly where sheet of papers with YES or NO written on them and put into a bag and vigously mixed. Male students were made to draw papers from the bag and those who picked yes were selected. The same process was followed to select the females.

3.4 Instrumentation

The instrumentation depicts tools used in the collection of data. This study used a questionnaire to elicit the relevant data from the students. A questionnaire (Appendix B) was used to collect information from the students to assess the level of risk management in volleyball activities in their schools. The questionnaire had twenty-nine questions. The first four questions were to collect personal information of the respondents and 25 items to collect information on respondents' knowledge about risk management practices in volleyball activities in the Ga South District. Each item was followed by a four-point Likert type options ranging from 1=strongly agree, 2=Agree, 3=Disagree to 4=strongly disagree.

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3.5 Validity

Validity refers to the appropriateness, meaningfulness, and usefulness of the specific inferences made from test scores (Crowl, Kaminsky and Podell 1997). Validation is necessary for the collection of evidence to support inference making. Therefore, two types of validity were identified and addressed in this study. These included face validity and content validity of the instruments. Face validity refers to the likelihood that a question will be misunderstood or misinterpreted by the subjects. Validation is necessary for collection of evidence to support inference making. My supervisor in the Department of Health, Physical Education Recreation & Sports was shown the questionnaires and some of the question items were modified on some of the items.

3.6 Reliability

Reliability concerns the degree to which an experiment, test or any measuring procedure yields the same results on repeated trials (Pattaon, 2007). To determine the reliability of this instrument, internal consistency estimate of reliability procedure was used. In testing for the reliability of the instruments, a pilot study on 10 volleyball players were sampled from Winneba Senior High School in the Effutu Municipality in the Central Region of Ghana which was not part of the study area. The pilot test sample was made up of 5 boys and 5 girls. Reliability is the extent to which a test or procedure produces similar result under constant conditions on all occasions (Bell, 2004). The pilot testing approach was used to establish the reliability Chronbach co-efficient of r =0.81 for the instrument.

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3.7 Administration of Instruments

The researcher first secured an introductory letter from the Department of Health, Physical Education, Recreation & Sports of the University of Education, Winneba to enable him gain access to the respondents. Copies of this letter were given to the various heads of the schools involved to officially introduce the researcher. Upon approval, the respondents were educated on the rationale of the study and the need for honesty was emphasized. Students were also told by the researcher that their identities and answers would be kept anonymous and under no circumstance would it be revealed. The questionnaire was then administered to the students and the researcher was on hand to clarify concerns raised by the students with regard to answering the questionnaire. The students were given enough time to answer the questions.

3.8 Procedure for Data Analysis

According to Ary, Jacobs and Razaviehn (1990), data analysis is the ordering and breaking down of data into constituent parts and forming statistical calculations with the raw data to provide answers to the research questions which guided the research. The researcher, after administration of the tests and collection of results, prepared a data file using statistical computer application software called the Statistical Package for Social Sciences (SPSS) by assigning identity numbers to cases and preparing variable lists and names. A Pearson correlation analysis was conducted to determine the correlation between injuries and safety and risk management in volleyball activities.

The completed questionnaires were gathered, coded and arranged to facilitate easy identification. The Statistical Package for Social Sciences (SPSS) was used in the

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analysis. The data was analyzed using descriptive statistics. Descriptive statistics including frequencies and percentages were compared and discussed in order to address the research questions posed. Also, tables and graphs were used to present the distribution of respondents. Quantitative interpretations were adopted and backed by the literature to make the interpretation authentic. In this regard, tables and charts were used to support the analyses to make it clearer for better comprehension.

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CHAPTER FOUR

RESULTS, FINDINGS AND DISCUSSIONS

The purpose of this research was to explore factors affecting risk management in the teaching and learning of volleyball in Senior High Schools in the Ga South District of the Greater Accra Region.This chapter is divided into three sections. The first section presents the demographic characteristics of the participants. The second section presents general information concerning the volleyball players in the SHS's in the Ga South District and the third section presents the findings based on the research questions for the study.

4.1 Demographic Characteristics of Sample

The study sample was made up of 100 volleyball players (50 males and 50 females) that were selected from 10 senior high schools in the Ga South District of the Greater Accra Region of Ghana. The figure below showed that, for the study sample, 50% (n=50) were males and 50% (n=50) were females.

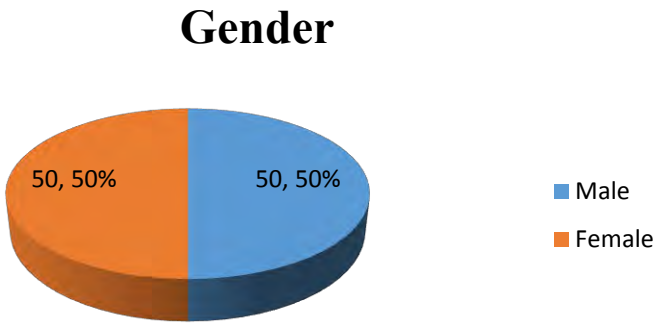

Figure 1: Gender of Participants.

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Table 1: Age Distribution of Participants

Age (Years)	Frequency	Percentage (%)
15	8	8
16	53	53
17	39	39
Total	**100**	**100**

Table 1 indicates the age distribution of the sample as presented in the study. The dominant age group was 16 years 53%, (n=53). This is a true reflection of the students' ages as the average age for SHS students is between 16 and 18 years. This was followed by 17years 39%, (n=39) and followed by age 15 years 8%, (n=8).

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General Information

Table 2: Volleyball Playing Level of Participants

Level	Frequency	Percentage (%)
Inter house	47	47
Inter school	39	39
District level	14	14
TOTAL	**100**	**100**

Table 2 indicates the volleyball playing level of the sampled participants from the 10 SHS schools in the Ga South District. Fourteen percent 14% have played volleyball at the district level, 47% have played in inter house level and 39% stated that they have played in inter- school volleyball competition.

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Table 3: Participants' Years of Experience in Playing Volleyball

Years	Frequency	Percentage (%)
1	15	15
2	40	40
3	37	37
4	8	8
5	0	0
Total	**100**	**100**

Table 3 indicates the participants' years of experience in playing volleyball. Forty percent 40% of the students sampled stated that they had been involved in playing volleyball for 2 years, 37% stated that they had been involved in playing volleyball for 4 years, 15% stated that they had been involved in volleyball activities for 1 year and 8% stated that they had been involved in playing volleyball for 4 years. No student stated that they had experience in playing volleyball for more than five years.

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Table 4: Introductory level to playing volleyball

Level	Frequency	Percentage (%)
Primary School	16	16
Junior High School	63	63
Senior High School	21	21
TOTAL	**100**	**100**

Table 4 indicates the level of introduction to playing volley by students sampled from the 10 SHS in the Ga South District. Majority of the students 63% (n=63) stated that they were first introduced to playing of volleyball at the JHS level. Twenty-one percent 21%, (n=21) also stated that they were first introduced to playing of volleyball at the SHS level and 16% stated that they were introduced to it at the primary school level. This implies that majority 79% (n=79) of the volleyball players had developed their volleyball nuances from previous levels before getting to SHS.

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Data Presentation for Research Questions

Research Question1: What is the level of student awareness of risk management in the teaching and learning of volleyball activities?

This question sought to find out students' level of awareness of safety risk management strategies in volleyball activities in their schools. Their answers to 8 questions relating to safety and risk management were collated, analyzed and the mean score for their responses was calculated. The mean score was also used to interpret the results of the analysis. Scales of 4 for *Strongly Agree*, 3 *for Agree*, 2 for *Disagree* and 1 for *Strongly Disagree* were used in the analysis. The average mean for the total questions was also calculated and presented in figure 2. In accessing the level of students' awareness, if the average mean of responses was less than 3 it meant that the students had low levels of risk management strategies and practices and if the total score was greater than 3, it pointed to the fact that students had a high level of safety and risk management strategies and practices in their schools.

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Figure 2: Factors Affect Risk Management in the Volleyball.

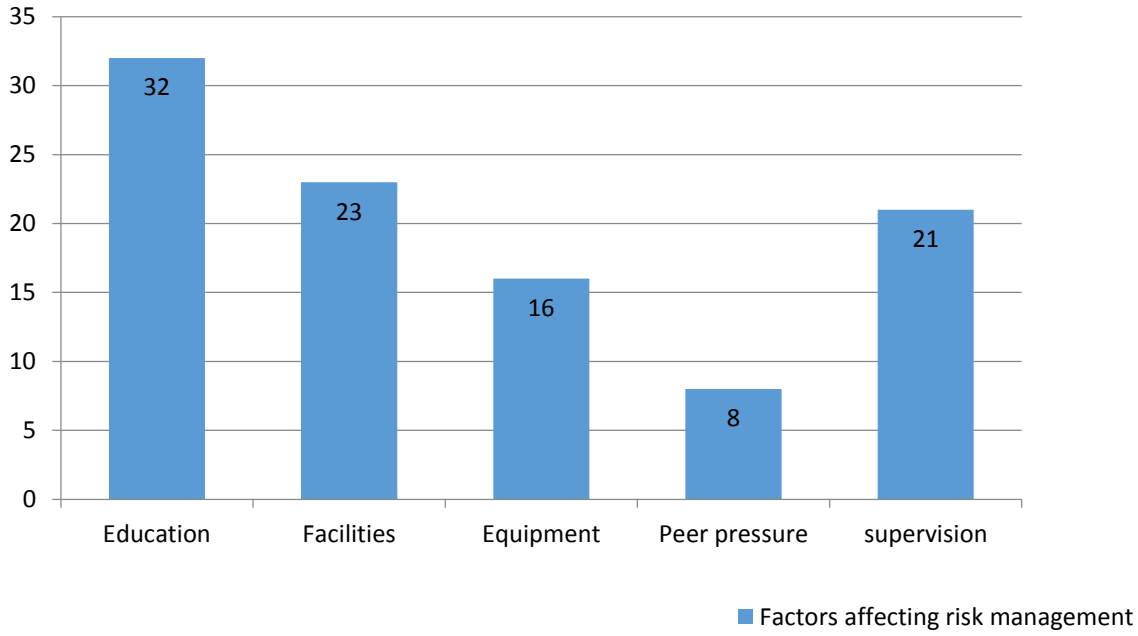

Figure 2 indicates the breakdown of the factors affecting risk management in volleyball activities as presented by the sample. The major factor was education 32%, followed by facilities 23%. Supervision of volleyball activities had 21%. The used of equipment 16% and peer pressure was 8% respectively.

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Figure 3: Types of Injuries Experienced by Volleyball Players in the Ga South District.

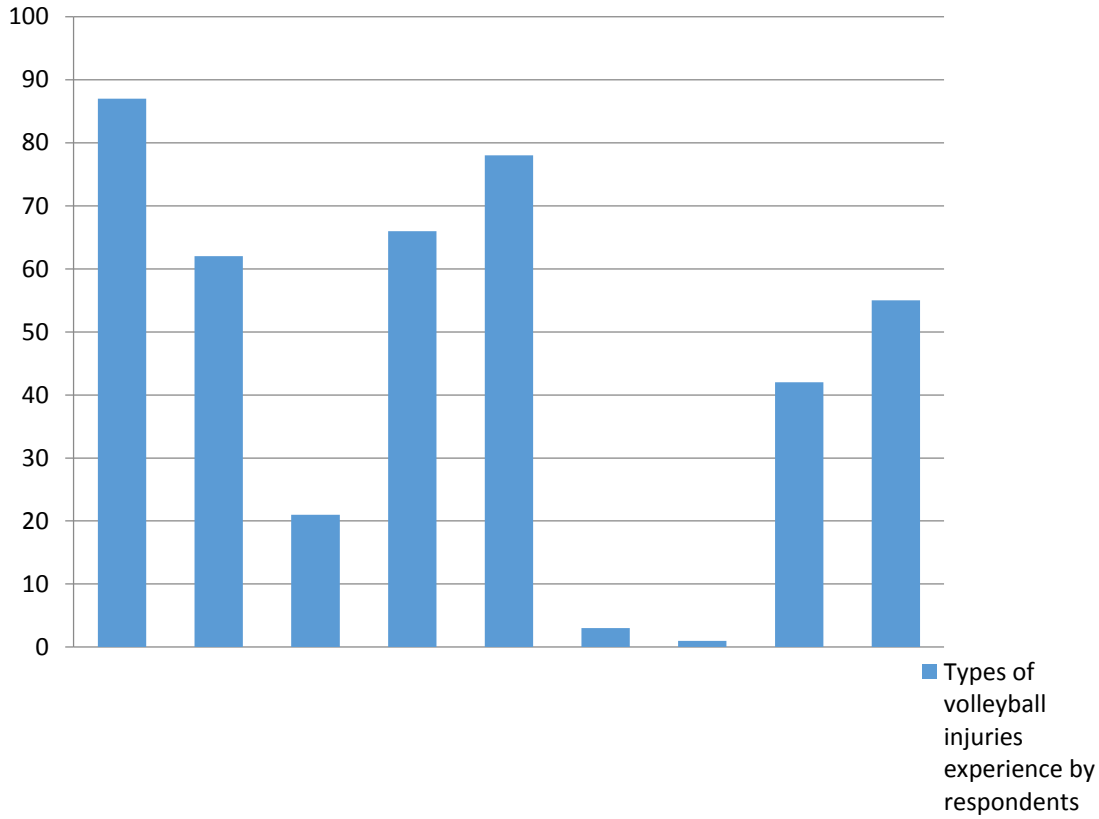

Figure 3 presents the results of the multi response frequency analysis of the respondents' responses to the types of injuries experienced in volleyball activities. The frequency of the responses to each of the items was tallied and used. From the results, it is clear that majority of the injuries experienced by the athletes were mainly ankle sprains, back pains, shoulder injuries, finger injuries, knee injuries and stress injuries. These injuries can be classified as minor injuries. However, major injuries such as fractures and concussions had only a few instances of being mentioned as injuries experienced by the volleyball players.

The question was to explore the relationship, if any, between student's injuries in volleyball and their knowledge of risk management awareness. A correlation was,

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performed on their responses to ascertain whether they had experienced injuries in volleyball and their responses to their awareness of safety and risk management strategies.

Table 5: Correlation between Injuries and Risk Management in Volleyball Activities

		Injuries	**Safety**	**Risk Management**
Injuries	Pearson Correlation		1	
	Sig. (2-tailed)			
	N			
Risk Management	Pearson Correlation	**.324**	.64*	1
	Sig. (2-tailed)	**.000**	.023	

* Correlation is significant at the 0.05 level (2-tailed).

A Pearson's Product Moment correlation analysis was conducted to examine whether there is a relationship between injuries and safety and risk management. The results revealed a significant and positive relationship ($r = 1$, $N = 100$, $p = .02$). The correlation was strong in strength. Higher levels of injury were associated with lower levels of safety (see Table 5). There was also a significant and positive relationship ($r = .1$, $N=100$, $p = .015$). The correlation was strong in strength, which means higher levels of injuries were also associated with lower levels in risk management awareness.

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Research Question 4: What measures should be put in place to prevent volleyball injuries?

The purpose of this research question was to elicit from respondents what measures they felt should be put in place or taken to promote safety and risk management in volleyball activities in their various schools. An open-ended question was used to gather responses from students. The responses were coded into themes and analyzed on a theme basis. The results are presented below.

Students made the following comments when asked about their impressions about measures that should be taken to promote safety and risk management in volleyball among senior high school students in the Ga South District:

One student stated that:

"There is the need for us to use proper strength training techniques for the lower back, shoulders, and legs. I was watching a documentary on the internet and they were showing volleyball players how to conduct such training as it would help them in the sport."

Another student also commented that:

"We need to use protective gear such as an external ankle support, an ankle brace or taping to prevent the ankle from rolling over and causing serious injury. There are also other kinds of equipment such as finger braces etc that can be worn by us the athletes but unfortunately these are not provided for us by the school."

Other comments by students were:

"We do not warm up most of the time before we start playing volleyball. All we do is to get onto the field and play. Warm up muscles with stretching and light aerobic

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exercises. The same applies after we finish playing volleyball. We should be sure to properly cool down after practice or playing."

"There is also the need for us to use proper equipment for the sport. Sometimes, during practice. We use footballs instead of volleyballs. This causes a lot of pain and discomfort."

"There is the need for us students to be educated on types of injuries, injury prevention and injury management. There is also the need for us to be taught about safety during volleyball activities. This will go a long way to help us prevent some of these injuries."

4.2 Discussion of Results

Findings on Research Question1

The findings for research question one revealed that the volleyball players sampled on the average had low levels of risk management practices and procedures in volleyball. This could be attributed to lack of knowledge on some risk management practices, poor facilities and equipment, lack of safety gear, provision for athletes and a host of other related issues.

In this regard, a good risk management plan of a health/fitness facility would cover practices that range from those that are preventive in nature (i.e. pre-activity screening, proper maintenance of fitness equipment, record keeping of facility inspections, and analysis of why accidents occur) to those practices that are considered a reaction or a recovery and response system to unexpected events (i.e. emergency response systems). This would go a long way to raise the safety and risk management awareness levels of athletes.

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Findings on Research Question 2

The data analysis for research question 2 revealed that the factors affecting the risk management in volleyball activities was education, use of requisite protective equipment, use of appropriate facilities and finally, proper supervision.

A review of literature related to various factors affecting risk management found out that a variety of information including, but not limited to the following topics was uncovered: risk management policies, guidelines, plans, forms, insurance, responsibilities of directors to prevent risks, health pre-screening procedures, and first aid certifications, automatic external defibrillator training, methods of communication, security, and employee matters were factors affecting risk management adoption in sports, especially volleyball.

In a study by Young and Ross (2000), it was pointed out that efforts to reduce liability through risk management plans will continue to be complex and will create challenges for sport administrators. A basic responsibility of the physical education instructor or coach is to make sure the facility is reasonably safe for its intended use (Fried, 1999; Mulrooney, Styles, & Green, 2002). Fried (1999) addressed the standard of "reasonably safe" and indicated that, through proper inspection, it should be made sure that facilities and equipment are reasonably safe. The development and implementation of emergency response systems was also stated as an effective means of providing the highest reasonable level of safety for users (Tharrett et al., 2007c).

Upper administrators, according to Mulrooney et al. (2002), are aware of the impact that risk management programs have on safety and liability reduction. Findings by Mulrooney et al. showed National Intramural-Recreational Sports Association (NIRSA) department heads have risk management plans in place. Styles and Mulrooney (2005) concluded that having comprehensive risk management procedures is a course

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of action protecting the facility from liability. In addition, Fried (1999) recommended the formation of an event safety committee to plan, establish, implement, and evaluate risk management policies as a way to help ensure safety of the facility.

Findings on Research Questions 3

The data analysis for research question 3 revealed that the resultant injuries experienced from volleyball activities of respondents were ankle sprains, back pain, fractures, shoulder injuries, finger injuries, knee injuries, concussions and stress injuries. Volleyball involves repetitive overhead motions such as spiking and blocking. As such, players are prone to overuse injuries of the shoulder. In addition, volleyball players are particularly susceptible to finger injuries. Injuries are, regrettably, an unavoidable hazard of sports participation. Sports scientists suggest that injury rates could be reduced by 25% if athletes took appropriate preventive action. Although volleyball and beach volleyball are by most estimates relatively safe sports – particularly in comparison to other sports such as football (soccer) - epidemiologic research has revealed that volleyball players are at risk for certain types of injuries (FIVB Medical Commission, 2013). The FIVB Medical Commission further states that serious injuries which interfere with the players ability to participate have obvious immediate consequences (time lost from training and competition) and may have long-term implications as well (chronic disability and functional limitation). Coaches and trainers should, therefore, have an understanding of the most common volleyball-related injuries in order to appreciate the potential impact injuries may have on both the athlete and the team. One of the first considerations in discussing the injuries for which volleyball players are at risk is to define what constitutes an injury. One accepted definition used in research is that an injury is any condition for which an athlete seeks

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medical attention. Injuries so defined may in turn be further subdivided into conditions that result in "time lost" from either competition or training and those that do not limit playing time. The length of time loss (typically reported in days or weeks), therefore, provides a measure of injury severity that can be used to compare different types of injury. For example, in their 2004 study chronicling the injuries that occurred during one volleyball season in the Dutch professional league, Verhagen et al (2004) determined that shoulder injuries resulted in an average time lost from training or competition of 6.5 weeks – by far the longest mean absence from participation compared to other injury sites documented in their study.

Injuries are also commonly categorized by and compared based upon the body part affected (e.g. shoulder, knee, ankle, lower back). One additional useful classification criterion is whether the athlete was injured as a result of acute tissue overload or whether the injury resulted from chronic overuse. Acute injuries such as ligament sprains and muscle strains occur when the limits of tissue distensibility and integrity are suddenly overwhelmed. The athlete is usually able to recall an exact mechanism of injury to correspond to the sudden onset of pain and functional limitation. In contrast, overuse injuries (e.g. tendinopathies) often occur insidiously. As a result, the injured athlete often cannot recall a specific traumatic incident or a definite mechanism of injury. A hybrid of these two injury mechanisms occurs when a tissue that has been weakened from overuse suddenly fails in response to an acute load. The athlete will identify the moment of "injury" but may not appreciate the impact of the chronic tissue overload that predisposed him (or her) to ultimately develop outright tissue failure. Numerous studies reporting on injury patterns in volleyball have been published.

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Unfortunately, differences in the definition of injury and in calculation of incidence rates make it difficult (if not impossible) to directly compare these studies. Nevertheless, it is generally accepted that the most commonly occurring injuries are acute ankle sprains, followed by overuse conditions of the knee (patellar tendinopathy) and shoulder (multidirectional instability, impingement) and the lower back (nonspecific mechanical low back pain).

Acute Injuries

Ankle sprains are clearly the most common volleyball-related injury accounting for just over half of the acute injuries recorded prospectively by Bahr et al (2003) and Verhagen et al (2004). Ankle sprains occur most frequently at the net when one player lands on another player's foot, inverting the ankle and stretching (or tearing) the ligaments on the lateral (outer) aspect of the ankle. Athletes who have suffered an ankle sprain in the past are more likely to suffer a subsequent injury. If the injured player has difficulty accepting weight onto the involved ankle, or if bearing weight results in severe pain, he or she should not continue playing and should seek prompt medical attention. The goal of initial treatment for ankle sprains (and for acute injuries in general) is to limit internal bleeding and swelling, and to provide an environment conducive to tissue healing. The acronym PRICE is easy to recall and nicely summarizes the early steps in caring for an acute ankle sprain (FIVB Medical Commission, 2013). PRICE stands for:

Protection: Protect the ankle from further immediate injury. Depending on the severity of the sprain, a period of immobilization and restricted weight bearing may be necessary. As the athlete's condition improves, he or she may resume progressively

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more advanced activity patterns. However, use of an external support (brace, or taping) is generally recommended for the first six months following injury.

Rest: As mentioned, a period of restricted activity promotes early tissue healing. Weight - bearing may resume as symptoms subside, and activity may progress accordingly.

Ice: Application of ice (or other cryotherapy modality) provides analgesia and helps to minimize swelling. Although there is no consensus on treatment parameters, cold treatment is often applied for 20 minutes at a time (followed by 20 minutes without ice). Three such on/off cycles of cryotherapy may be administered in succession several times per day over the first 24 –48 hours following the injury.

Compression: Temporary compression immediately following the injury limits swelling in the injured ankle which in turn facilitates restoration of normal range of motion.

Elevation: Elevating the injured ankle also helps to minimize swelling immediately following the injury.

PRICE treatment should be initiated as quickly as possible following the injury.

Acute injuries should also be promptly evaluated by a trained medical professional in order to carefully assess the extent and severity of injury, arrange for diagnostic testing as needed in order to arrive at an accurate understanding of the nature and extent of the injury, and formulate a definitive treatment plan. The athlete should be monitored carefully, and examined periodically to confirm that healing is progressing as expected. In addition to range of motion and strengthening exercises, the comprehensive treatment of ankle sprains should include instruction in a program of neuromuscular (proprioceptive) re-education. This involves having the athlete balance on the involved

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limb, limiting corrective motion to the involved joint to the extent possible. As the athlete improves, these balancing exercises should be made progressively more challenging (both in terms of duration, and in terms of adding unstable surfaces or other challenges to the maintenance of balance). Return to play decisions following an ankle sprain (or indeed any injury) should be guided by functional recovery rather than mere absence of pain. In their 2004 study, Verhagen et al (2004) documented that ankle injuries resulted in a mean of 4.5 weeks of time lost from training or competition.

Since ankle injuries are so common among volleyball players and result in considerable time loss, it makes sense to try to prevent them. Primary prevention entails practicing proper footwork at the net, integrating proprioceptive exercises into the athlete's regular conditioning program, and consistent use of external ankle braces. Only recently has there been any evidence for a significant prophylactic effect from the use of semi-rigid external ankle orthoses among volleyball players. Despite some concern voiced by coaches and athletes alike, there is no evidence in the literature to suggest that the use of ankle orthoses increases the risk of knee injuries. Another means of reducing the risk of ankle sprains would be to modify the existing centre line rule which allows for a portion of the foot to penetrate onto the opponent's court without a violation. While such rule changes have been discussed, it seems unlikely that any substantive modification of the centre line rule would be possible without significantly altering the dynamic aspects of the sport as it is currently played.

Legal Protections against Liability, including Contracts

Releases, waivers, assumption of risk, informed consent, and insurance, in some capacity, have all served as deterrents to liability. As indicated by Fried (1999),

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indemnity clauses can be constructed in contracts in such a way that even administrators can protect themselves from anything other parties will agree to accept.

Regarding the basic understanding of risk management forms, McFarland (2006) points out that, because the average American adult reads at the eighth-grade level, they are no match for the vocabulary included in most risk management forms.

Woody (1998) advises participants to complete a waiver, release, and assumption of risk form before participation. Fried (1999) points out that a release is a contract freeing someone from future liability, usually after a settlement, whereas a waiver is a contract waiving a person's right to sue if injured and is signed before undertaking an activity. Voluntary assumption of risk is a protection against liability and is risk inherent to a particular activity assumed by participants when they choose to participate (McGregor & MacDonald, 2000). "Generally, the defence of assumption of risk can be used when a plaintiff (professional or amateur) voluntarily engages in an athletic or recreational activity involving open and obvious risks" (Drago, 2002, p. 583).

Traditionally, parents do not have the right to sign away the rights of their children for future negligence claims arising out of recreational injuries (Kozlowski, 2007). Commercial enterprises that attract children should take reasonable precautions to protect their safety. Permitting liability waivers might remove a significant incentive for operators of commercial enterprises to provide a reasonably safe environment (Kozlowski).

Informed consent forms declare risks that are part of an activity but are not necessarily inherent to the activity which allows participants to make an informed decision as to whether they want to assume the risks declared on the informed consent (McGregor & MacDonald, 2000). Medical releases are signed by medical doctors and

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provide evidence of a person assuming the risks of participating, despite their condition (Fried, 1999). Having insurance is also a means used to protect administrators and the facility from liability (Styles & Mulrooney, 2005). McGregor and MacDonald (2000) concur that the coverage of medical expenses through sport accidents is a key area of insurance related to recreation.

Negligence

McGregor and MacDonald (2000) discuss the "average person" and "reasonable person" measure when attempting to portray an understanding of how the laws of negligence can be applied to individuals involved in the supervision of recreational sports and athletic activities. Recreational sport and fitness facility administrators, as well as professionals, must have a basic understanding of and remain up to date in their particular areas. Voluntary assumption of risk is also pointed out by McGregor and MacDonald as a common way to escape negligence

Physical Examinations/Health Screening.

Efforts to promote physical activity to the "beginner fitness" population have heightened the need for careful safety policies such as pre-screening which identifies users who pose an increased risk of experiencing exercise-related cardiovascular incidents Tharrett, McInnis, & Peterson, (2007). The need for employers to provide training for staff members responsible for administering first aid and cardiopulmonary resuscitation was pointed out by Connaughton, DeMichele, Horodyski, and Dannecker (2002).

The necessary implementation of blood-borne pathogen procedures will eliminate virtually any risk of infection to staff and participants in the sport and

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recreation area (McGregor & MacDonald, 2000). McGregor and MacDonald also outlined key areas related to the procedures of dealing with blood-borne pathogens. Training, according to Connaughton, DeMichele, et al. (2002), should be provided to staff that have jobs dealing with bodily fluids or blood-borne pathogens such as handling bloody towels, razors, or other types of potentially infectious waste.

Communication Strategies and Surveillance Systems

Various forms of communication were found to be effective in helping to secure recreational facilities. During multiple events, two-way radios were the mode of communication most frequently used among staff (Veltri, Miller, & Scott, 2001). Readable signage used colour to communicate and was placed in conspicuous locations as a means for facilities to communicate with the users (Tharrett, McInnis, & Peterson, 2007d). In addition, a good risk management plan, according to Fried (1999), should designate one media communications person who is trained to speak to the media in a fact-oriented manner. In a study by Miller and Veltri (2003) in which public recreation facilities were examined, an entire section of a survey completed by facility administrators/ supervisors was devoted to closed-circuit television use. It was discovered by Miller and Veltri (2001) that illegal entry by others contributed, at the highest rate, to criminal activities in recreation centres.

Supervision of the Facility

The duty to properly supervise an activity or a group of individuals, according to Fried (1999), is extended whenever a person puts his or her well-being into another's hands. It is also important that those employed at the facility must have an appropriate

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level of professional education, work experience, and/or certifications aligning with their responsibilities (Tharrett, McInnis, & Peterson, 2007b). Recreational directors at multimillion-dollar facilities recognized the importance of establishing a plan of supervision that embraces routines for safety inspection (Styles &Mulrooney, 2005). Risk can also be decreased by maintaining the facility and staying up to date and informing participants of the safety and risk management standards associated with participation (McGregor & MacDonald, 2000).

It has been stated that great success comes from great collaboration. It seems reasonable to extrapolate on that theme and suggest that the modern international volleyball player may potentially benefit from the input of a myriad of professionals spanning the entire sports medicine spectrum, including bio mechanists, nutritionists, physiologists, physiotherapists, and physicians. Of course, one must include the coach (trainer) in that list since it is the coach who must decide how to best train the athlete and who ultimately implements the advice of the medical professionals regarding return to play following injury. In that regard, it should be acknowledged that, on occasions, the coach and the medical team might be at odds regarding their motivation. In the long run, however, it is the athlete's health and well-being that should serve as the principal motivation behind all recommendations offered by the sports medicine team in addition to serving as the deciding factor in all related decision-making.

Overuse Injuries –Patellar Tendinopathy

Anterior knee pain represents the second most common diagnosis among volleyball athletes. The most common causes of anterior knee pain among volleyball players are patella of moral syndrome, and patellar tendinopathy (also known as "jumper's knee"). Both of these diagnoses represent overuse conditions. Fortunately,

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volleyball players appear to be at relatively low risk for acute knee problems such as injury to the anterior cruciate ligament. Nevertheless, overuse conditions such as patellar tendinopathy can extract a very high cost in terms of loss of time, and may lead to chronic debilitating symptoms that adversely affect the athlete's quality of life.

Unlike acute injuries which have a distinct mechanism and time of onset, overuse injuries are insidious in nature. Athletes with overuse injuries generally cannot recall a specific moment when their injury occurred, but report instead a history of activity related discomfort that has become progressively more severe over time. Many athletes attempt to "play through" or compensate for the initial symptoms of overuse pathology, and only after the pain becomes limiting or the performance deficit becomes intolerable will the athlete take time off from training or competition. Consequently, treatment of overuse injuries is often challenging. The first priority is to alter or minimize the load on the injured area. This is generally accomplished through activity modification. Reducing the load on the injured area allows the affected tissues an opportunity to recover and begin healing. However, in order to adequately treat an overuse injury, it is important to examine the athlete's risk factors for injury.

Risk factors for injury (which can be defined as those qualities which increase the likelihood that an athlete will develop a certain type of injury) may be categorized as either "intrinsic" or "extrinsic" to the athlete, and as either "modifiable" or "unmodifiable". Risk factors for a jumper's knee include the volume of jumping and jump training which the athlete must endure (extrinsic, modifiable), the biomechanics of the knee during the spike approach and upon landing from the jump (intrinsic, modifiable), and the composition of the surface on which the athlete trains and competes (extrinsic, modifiable). Ferretti (1986) documented that hard, unforgiving surfaces increase one's risk of developing jumper's knee. Not surprisingly, therefore,

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jumper's knee is less common among beach volleyball players than it is among indoor volleyball athletes. The amount of knee valgus stress on the lead (usually non-dominant) knee during the spike approach jump is a risk factor for developing patellar tendinopathy as is the degree of knee flexion achieved during landing from the spike jump. Interestingly, those athletes who had the greatest jumping ability were found to be at the greatest risk for developing patellar tendinopathy. There are, undoubtedly, other genetic susceptibility factors involved in the pathogenesis of jumper's knee, since not all athletes who undergo comparable jump training programmes will develop symptomatic jumper's knee. Practical prevention strategies for jumper's knee include strengthening and conditioning the muscles of thigh, hip, and buttocks so that they can effectively absorb the shock of landing from jump after jump. Analysis of technique is also important as bending too deeply at the knees when landing from a jump or excessively "toeing in" during the loading and take off phases of the jump can predispose the athlete to jumper¹s knee.

Perhaps, the most effective preventive intervention is simply reducing the load on the knee extensor mechanism by limiting the volume of jumping required during training sessions. Even with an appreciation of some of the modifiable risk factors for anterior knee pain, effective treatment of jumper's knee often remains elusive, further underscoring the importance of prevention. Some athletes benefit from the use of an infra-patellar strap which is thought to redistribute the traction force on the patellar tendon during activation of the quadriceps, thereby reducing the risk (or minimizing the symptoms) of tendinopathy. Eccentric quadriceps training may be of some benefit as a pre-season conditioning exercise, but this type of exercise has not been shown to be effective in treating symptomatic patellar tendinopathy during the competitive season. Advances in our understanding of the underlying cellular and tissue pathophysiology have led to new methods to treat this condition which at its worst can be potentially

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career-threatening. Among these treatments is sclerosis of neo-vessels under ultrasound guidance which has been shown to be of some clinical benefit. Other less proven methods of treatment include injections with platelet rich plasma. Although thought to deliver concentrated growth factors and cellular mediators involved in tissue healing direct to the site of tissue injury, there is little scientific proof of the effectiveness of this technique. Severe cases of patellar tendinopathy may require surgical intervention.

Overuse Injuries –Shoulder Problems

The shoulder is the third most commonly injured body part overall. Injuries to the shoulder most often occur as the result of chronic overuse. Acute shoulder trauma (such as an anterior shoulder dislocation) does occur, but it often occurs in the context of underlying overuse-related pathology. Spiking is perhaps the most dramatic skill in volleyball. It has been estimated that an elite volleyball player, practicing and competing 16 to 20 hours per week, may perform as many as 40,000 spikes in one season (FIVB Medical Commission, 2013). The volume of overhead loading inherent in that much activity places enormous demands on the glenohumeral joint specifically and the shoulder girdle in general.

The shoulder is an extremely mobile joint that permits the volleyball athlete to swing high for a spike or reach out for a block. Athletic shoulder function is dependent upon the precise action of the rotator cuff and the muscles that stabilize the scapula (shoulder blade). These muscles must be well conditioned and work in a coordinated manner to ensure pain-free shoulder function. Unfortunately, through repetition and the sheer volume of training, the muscles and tendons of the shoulder girdle may become overloaded and fatigued. This in turn may result in “wear and tear” damage to the shoulder, which over time may culminate in a time - loss injury. Regrettably, treatment

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of overuse conditions of the shoulder girdle (such as rotator cuff tendinopathy) is often incompletely successful. Accepted principles of non-operative treatment include load reduction (limiting the number of spikes or serves performed) and correction of any underlying imbalances of strength or flexibility through appropriate training programs. Some conditions, such as shoulder instability due to injury to the glenoidlabrum, may require surgery if conservative management does not restore the athlete to an acceptable level of function.

As with jumper's knee, comprehensive treatment of volleyball-related shoulder problems requires that specific risk factors for injury be identified and addressed. Our understanding of the risk factors for volleyball-related shoulder problems is unfortunately quite limited. Kugler et al (1996) described the adaptive changes in scapular positioning they observed in elite volleyball players, but there has been little volleyball-specific follow-up to this insightful paper. In their recent study, Reeser et al (2006) found that spiking volume (extrinsic, modifiable) and scapular dyskinesis (intrinsic, modifiable) were associated with an increased incidence of shoulder problems. Shoulder pain was also associated with core instability (intrinsic, modifiable), reflecting the importance of the kinetic chain in generating power for the spiking motion. Wang and Cochrane, along with other researchers, have documented the ratio of eccentric shoulder external rotational strength to concentric shoulder internal rotational strength among volleyball players. Their work, collectively, suggests that a reduced ratio represents a risk factor for injury. Wang and Cochrane (2001) also documented that those with a longer training history had a higher incidence of shoulder problems.

Lastly, there have been numerous reports in the literature describing the supra-scapular mono-neuropathy that is common in volleyball players, but the risk factors for

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the onset of this condition remain a matter of debate. Similarly, treatment for this condition is somewhat controversial, since it frequently is essentially painless and causes little or no performance deficit. Prevention of shoulder pathology among volleyball players has been poorly studied. It is not known whether intervening in any of the aforementioned areas, such as instituting a programme of flexibility training to address the deficit of gleno-humeral internal rotation commonly observed in the dominant shoulder will minimize or eliminate the volleyball athlete's risk of developing shoulder pain. Nevertheless, it is probably advisable to incorporate posterior capsular stretching into the shoulder girdle strengthening and scapular stabilization programme followed by elite volleyball athletes. Most conditioning programme also include a programme of core stabilization exercise designed to promote correct posture and facilitate the generation and efficient transfer of power throughout the kinetic chain.

Low Back Pain

Volleyball players, along with the rest of the general population, frequently complain of lower back pain. More often than not, the pain will resolve spontaneously within several weeks, and as such probably does not indicate serious pathology.

However, mechanical back pain is much less common among young athletes and those individuals 20 years of age or younger who have persistent back pain that limits them from participating in activities (such as volleyball) should be evaluated by a sports medicine physician. There are many different causes for back pain, and as a result the exact cause of an individual's lower back pain often cannot be precisely identified. That said, if a young athlete's low back pain is made worse by lumbar extension (bending backwards), then a stress fracture of the lumbar spine "spondylolysis" should be ruled out. If the athlete has suffered an acute strain of the muscles of the low back, then the pain will typically be self -limiting and should improve rapidly over a few days. Pain

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related to an inter-vertebral disc injury or spinal nerve impingement may be disabling, and should be treated aggressively. Anti-inflammatory medicines such as ibuprofen can help to control symptoms in the short term. Volleyball training (especially jumping and strength training) should be curtailed until the athlete is feeling better. Because of the different types of injury that may give rise to low back pain, it is difficult to give general recommendations for exercises that would be therapeutic in all situations. For this reason, an appropriate exercise prescription should be developed in consultation with a trainer, physical therapist, or sports medicine physician. Prevention of lower back problems includes minimizing torsional stress on the spine, particularly while loaded, as well as minimizing extremes of or repetitive flexion and/or extension- particularly in the young athlete. Proper weight-training technique is an important aspect of a comprehensive injury prevention program, as is an integrated programme of core stabilization.

Findings on Research Question 4

The findings of research question 4 revealed that the measures suggested by students to promote risk management in volleyball among SHS students in the Ga South District included education on risk management, use of proper and specialized equipment, and the adoption of proper training techniques.

Over the last 20 years, the ability of sports medicine professionals to diagnose and treat athletic injuries has improved dramatically. Athletes are now capable of returning from serious injuries faster than ever before due to aggressive treatment and rehabilitation programme. The greatest remaining challenge in the field of sports medicine is to design and implement programme that will reliably prevent injuries from occurring in

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the first place (FIVB Medical Commission, 2013). Although injuries cannot be entirely avoided, our present understanding of the basic risk factors associated with the most common volleyball-related injuries can help coaches and athletes prepare themselves and their teams for a successful season with minimal risk of injury. Several general strategies that can be adopted in an effort to reduce an athlete's risk of volleyball-related injury are presented below. Although certainly not exhaustive, the principles briefly outlined form the foundation of a sound volleyball injury prevention program.

1. Follow a Sport-Specific Program of Strength Training and Conditioning.

Volleyball is primarily an anaerobic sport. Nevertheless, volleyball players should maintain good cardiovascular fitness, as it will enhance their ability to recover between points and after matches. Elite volleyball players also train to become strong and powerful, not only for the performance advantage offered but because well-conditioned muscles are better able to endure the demands of sport participation, and are less likely to become injured. In addition, fitness allows the athlete to maintain optimal form and technique throughout a match, thereby minimizing the risk of fatigue-related injuries.

Warm-up prior to and proper cool-down following a competition readies the athlete for the demands of the event and facilitates subsequent recovery.

2. Avoid Overtraining

Adequate rest is almost as important to an athlete's development and performance as proper training. Athletes who train too hard may not give their bodies sufficient time to recover, resulting in an increased risk of overuse injuries. Each athlete has a unique tolerance for training and individual needs for rest and recovery, making it difficult for a coach to take a "cook book" approach to training for all members of the

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team. Athletes who persistently train without sufficient rest are at risk for developing a syndrome of mental and physical fatigue commonly referred to as "burnout". Elite athletes train for volleyball throughout the year, but vary the intensity and composition of their workouts so that they achieve and maintain peak fitness during the competition season. There is evidence that this practice, known as periodization, further reduces an athlete's risk of injury.

3. Pay Attention to and Practice Proper Technique

As we have seen, most ankle sprains occur when an athlete lands on a teammate's or opponent's foot while making a play at the net. Practicing good blocking footwork and controlled spike jump approaches and landings can minimize the likelihood of contact-related injuries about the center line. It is also important to attend to technique, since subtle alterations in performance and technique often provide the earliest clues that an athlete is developing (and attempting to compensate for) overuse related dysfunction.

4. Train (and maintain) Core Stability

To function properly, joints (and in fact the body as a whole) must be mechanically stable. Stability is conferred through both passive and active mechanisms: the musculoskeletal anatomy provides the joint with an underlying passive structural stability, which is augmented through dynamic (active) neuromuscular control. Such control can be learned, and indeed is an essential component of the athlete's ability to adapt to the demands of and excel in their chosen sport. When actively engaged in sports, athletes are rarely static -their position in space is constantly changing as they react to the competitive situation. In volleyball, although the legs initiate most of the activity, the culmination of a given movement often involves the upper limbs reaching

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overhead. Thus, even though the upper body may perform the skill, the energy to perform those skills is generated by the lower limbs and by the trunk. The smooth and efficient transfer of energy from lower limb to upper limb is dependent on an integrated response from the intervening segments of the "kinetic chain" -particularly the pelvis and the thorax columnar spine. Together the pelvis and the thorax columnar spine form the foundation of what is known as the athletic "core." Research has demonstrated that a stable, well-conditioned core plays a critical role in coordinating the body's movements and in minimizing the athlete's risk of both upper and lower limb injuries, as well as low back pain. The core may therefore be thought of as a functional integration of the associated anatomical structures of the pelvis and thorax columnar spine, including the hip flexors, hip extensors, hip abductors and adductors, abdominals, par vertebral musculature, and the diaphragm. Developing and maintaining the athlete's dynamic core strength and stability will reduce his or her global risk of injury by facilitating proper coordination and energy transfer along the kinetic chain.

5. Properly Rehabilitate Injuries

Research has shown that a body part, once injured, is more likely to be injured again upon returning to play. To prevent acute injuries from becoming chronic recurrent injuries, it is imperative that the injured athlete receive careful evaluation from a sports medicine provider, so that an accurate diagnosis can be made and a comprehensive treatment program started. Typically the athlete will be allowed to return to competition once they can perform sport-specific skills- such as jumping and spiking -without pain. However, a truly thorough program will rehabilitate the athlete "beyond the absence of symptoms". This philosophy requires that the athlete’s trainer, therapist, or team physician identify and address any structural and/or functional factors that contributed to (or resulted from) the injury. For example, an athlete with a stress fracture of the

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lower back may develop inflexibility of the hamstrings and subconsciously alter his or her spiking form so as to minimize stress on the lower back. Unless these factors are identified and corrected during the rehabilitation process, the athlete may subsequently develop shoulder pain as a consequence of the altered mechanics.

6. Maintain Proper Nutrition and Hydration

Consuming a balanced diet with adequate caloric intake ensures that the athlete will have sufficient energy stores to allow full participation throughout the season. Dietary protein intake provides the building blocks to repair injured tissues, while fats and carbohydrates serve as fuel for the athlete's fire. Sufficient fluid intake (preferably water or -during competition -a sports drink) prevents dehydration and minimizes the risk of developing heat illness. Coaches should be particularly attentive for recurrent injury among female athletes, as this may indicate the presence of the "female athlete triad" - a condition characterized by disordered eating (typically anorexia), which in turn leads to irregular or even absent menstrual cycles (amenorrhea), and eventually to loss of bone mass (osteoporosis).

7. Avoid Early Sport and Position Specialization

Volleyball is a sport that can be enjoyed by the young and old alike. However, engaging young athletes in overly structured, competitive programme may increase their risk of injury. The American Academy of Pediatrics Committee on Sports Medicine and Fitness has discouraged "specialization in a single sport before adolescence", and it seems reasonable to conclude that the volume of training in developing athletes should be limited in order to reduce the risk of developing overuse injuries. Unfortunately, no studies have been done to quantify what represents an appropriate training load for the young volleyball athlete. Athletes, coaches, and parents

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must therefore be particularly attentive to the early warning signs of overuse injury, including activity-related pain and deteriorating performance.

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CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this research was to explore factors affecting risk management in the teaching and learning of Volleyball in senior high schools in the Ga South District of the Greater Accra Region. This chapter summarizes the research findings and looks at the conclusions and recommendations made by the researcher.

5.1 Summary

The research was conducted using questionnaires to investigate factors affecting risk management in the teaching and learning of volleyball in senior high schools in the Ga South District of the Greater Accra Region. A sample size of 100 SHS volleyball players selected from 10 SHS in the Ga South District was used. The data analysis revealed that the athletes had a low level of risk management practices and procedures. The data analysis also revealed that the factors affecting the risk management in volleyball activities was education, use of requisite protective equipment, use of appropriate facilities and finally proper supervision. The data analysis also revealed that the resultant injuries experienced from volleyball activities of respondents were ankle sprains, back pain, fractures, shoulder injuries, finger injuries, knee injuries, concussions and stress injuries. The data analysis also revealed that higher levels of injury were associated with lower levels of risk management practices and procedures.

Finally the data analysis revealed that the measures suggested by students to promote risk management in volleyball among SHS students in the Ga South District included education on risk management, use of proper and specialized equipment, and the adoption of proper training techniques.

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5.2 Conclusion

The purpose of this research was to explore factors affecting risk management in the teaching and learning of Volleyball in senior high schools in the Ga South District of the Greater Accra Region. The descriptive statistical analysis revealed that the athletes had a low level of risk management practices and procedures. The data analysis also revealed that the factors affecting the risk management in a volleyball activity was education, use of requisite protective equipment, use of appropriate facilities and finally proper supervision. The data analysis also revealed that the resultant injuries experienced from volleyball activities of respondents were ankle sprains, back pain, fractures, shoulder injuries, finger injuries, knee injuries, concussions and stress injuries. The data analysis also revealed that higher levels of injury were associated with lower levels of risk management practices and procedures.

Finally the data analysis revealed that the measures suggested by students to promote risk management in volleyball among SHS students in the Ga South District included education on risk management, use of proper and specialized equipment, and the adoption of proper training techniques. This research work is a contribution to knowledge on the factors affecting risk management in volleyball. This study has documented a process of investigating risk management in volleyball. This is indeed necessary and consequently in Ghana where many volleyball players stands the risk of injuries during the course of playing volleyball. Finally, the researcher anticipates that this thesis has provided a useful framework and built a foundation for research across different approaches to exploring the factors affecting safety and risk management in volleyball.

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5.3 Implications

As the current studies has established, there is a strong negative relationship between injuries and risk management practices and procedures i.e. high levels of injuries in volleyball activities are associated with lower levels of risk management awareness in athletes. The findings of the current study also revealed that volleyball players sampled had low levels of risk management awareness. These findings will go a long way to improve the quality of volleyball players produced who can perform better once they are able to identify risks in the sport and also learn about ways of reducing, curbing and controlling these injuries. This will ensure that they give off their best in their various roles they play in athletics in the nation at large.

It is also believed that this study has provided an insight into the risk management awareness. However, there could be other factors that need to be identified or evaluated. Hence, it is the view of the researcher that further research needs to be carried out in the area and expanded to include other municipalities in other regions on the factors affecting safety and risk management in volleyball.

5.4 Recommendations

Based on the findings from the study, the researcher would like to make the following recommendations with the view that, when properly adhered to; they would improve upon the performance of SHS volleyball players as they would be aware of safety and risk management practices and procedures in volleyball:

- There is the need to create awareness of the benefits of teaching student athletes about risk management in volleyball.

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- There is the need for schools to provide proper facilities and safety gear for volleyball players to use and wear in order to prevent injuries.
- There is also the need to replicate this study in other schools and colleges in Ghana.
- In addition, workshops and seminars should be organized for teachers and P.E. instructors on how to provide support systems to provide risk management plans for their various schools and sports.

5.5 Suggestion(s) for Further Research

- It would be appropriate if this study is done in other regions of the country if possible to explore the factors affecting risk management in volleyball and come out with stronger conclusions.
- Future studies could also investigate the impact of risk management in other sports. Hence further research needs to be carried out in the area and expanded to include other municipalities in other regions.

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APPENDIX A