UNIVERSITY OF CAPE COAST

EFFECT OF TWELVE WEEK SKILL RELATED FITNESS INTERVENTION ON SHOOTING ACCURACY AMONG HIGH SCHOOL BASKETBALL PLAYERS IN THE CAPE COAST METROPOLIS, GHANA

ALEXANDER KWEKU ESHUN

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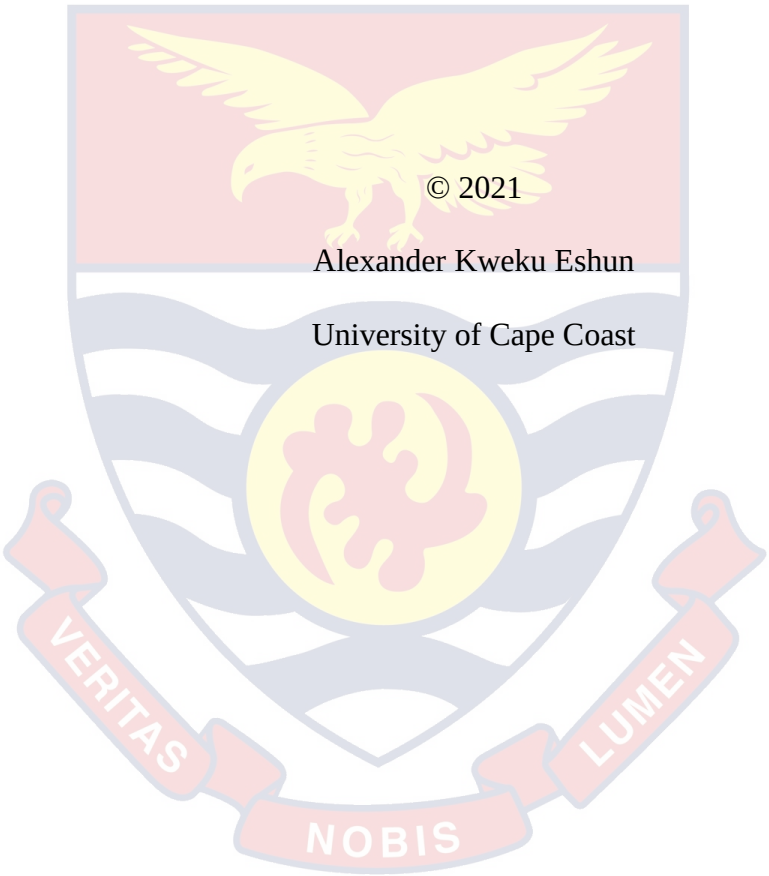

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BY

ALEXANDER KWEKU ESHUN

Thesis submitted to the Department of Health, Physical Education and Recreation, Faculty of Science and Technology Education, University of Cape Coast in partial fulfillment of the requirements for award of Master of Philosophy Degree in Physical Education

JULY 2021

DECLARATION

Candidate's Declaration

I hereby declare that the thesis is the result of my own original work and that no part of it has been presented for another degree in the University or elsewhere.

Candidate's Signature: ……..……. Date:……

Name: ……..

Supervisors' Declaration

We hereby declare that the preparation and presentation of this work were supervised in accordance with guidelines on supervision of Thesis laid down by the University of Cape Coast.

Main Supervisor's Signature: ……..… Date: ……

Name: ……..

Co-Supervisor's Signature: ……..…… Date: ……

Name: ……...

ABSTRACT

The main purpose of this work was to investigate the effect of skill related fitness on shooting accuracy among high school basketball players in the Cape Coast Metropolis of Ghana. Forty (40) basketball players (comprising 20 boys and 20 girls) were selected using simple random sampling and classified into experimental and control groups. Tests were conducted for skill related fitness as well as shooting accuracy. The experimental group was taken through drills to improve on their skill related fitness while the control group did not but had routine training. Data was collected and analyzed using dependent, independent Sample t-tests and Pearson's correlation. Results showed that there were statistically significant differences between the experimental and control groups with the experimental group doing better in all four shooting tests than the control group. For static free throw, $t(19) = 12.35$, $P < 0.001$(experimental group, M = 6.85, SD = 0.89; control group, M = 4.40, SD = 0.89; dynamic free throw $t(19) = 19.26$, $P < .001$, (experimental group, M = 6.65, SD = 0.64; control group M = 3.90, SD = 0.64) static two points, $t(19) = 11.05$, $P < .001$(experimental group M = 6.53, SD = 1.21; control group M = 3.35. SD = 1.21) and dynamic two points, $t(19) = 7.31$, $P < .001$,(experimental group, M = 8.28, SD = 1.68, control group M = 5.45, SD = 1.68). Skill related fitness is therefore considered as very important for better shooting performance among High School Basketball Players in the Metropolis therefore there should be a plan to improve on it as the season progresses so that in consequence shooting accuracy is also improved.

KEYWORDS

High School Basketball Players

Shooting

Shooting Accuracy

Skill Related Fitness

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DEDICATION

To Emilia, Alexina, Emilander, and Princess.

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LIST OF ACRONYMS

AFABA	African Federation of Amateur Basketball Association
BMI	Body Mass Index
CCM	Cape Coast Metropolis
FIBA	Federation of International Basketball Association
GBA	Ghana Basketball Association
NBA	National Basketball Association
NCAA	National Collegiate Athletics Association
RAST	Running-Based Anaerobic Sprint Test
YMCA	Young Men's Christian Association

CHAPTER ONE

INTRODUCTION

Shooting accuracy of High School Basketball Players in the Cape Coast Metropolis is not good compared to the standards of players within same age category. With the different kinds of shots that are used in attempting to gain points during the game players create lots of shooting opportunities but few ends up entering the rim to be counted as shots. This has resulted in individual schools within the metropolis and the selected sides that represent the metropolis most often do not end up getting the ultimate prize after participating in competitions. When this issue is addressed more schools within the metropolis will represent the region at higher competitions and also the selected teams for zones and the metropolis will do very well if not getting the ultimate from competitions. There are a number research that have described the relationship between skill related fitness and shooting accuracy among professional basketball players and also some that deals with the effect of jump shot skill on shooting accuracy.

Background to the Study

The game basketball is among the group of sports being classified as being physically very demanding because it requires that players move frequently repeating sets of highly intensive actions (sprints, turning, jumps) in addition to few jogs and walks which form basically periods of recovery and are very short (Abdelkrim, Fazaaa, & Ati, 2006). This includes both aerobic (the use of oxygen in the performance of an exercise) and anaerobic (where oxygen

is not needed in performing an activity) energy driven processes (Narazaki, Berg & Stergiou, 2008). In effect, in order to be a successful basketball player, the individual must be prepared physically in such a way that their levels of agility, power and many other skill related fitness is very high (Apostolidis, Nassis, Bolatoglou & Geladas, 2004). Movement abilities such as sprints, jumps and traits of flexibility as well as throwing ability make up physical variables that are deemed as very crucial in playing basketball and contribute to the best performance of any team. According to Sibila, (1997), successful performance in basketball needs some level of power of legs and arms, sprint speed and an overall kinesthetic that enhances ball control.

Eculj and Supej (2006) reported that, the main skill that determines successful playing of basketball is shooting accuracy. The game of basketball attracts massive patronage in the United States of America and other European countries because so many baskets are made within the period of play making the game enjoyable. In this regard enthusiasm is created and in the end more people especially the youth are involved in the game. This phenomenon is different in our part of the world. For instance in the 2018/2019 inter school games championship it was a common practice to watch a thirty (30) minutes basketball game that only records a total of (11) eleven goals that is six (6) for one team and (5) for the other.

The reason is that there is poor shooting accuracy so there are many attempts at shooting but few end up being successful for it to be counted. In effect we can say that accuracy of shots is one of the most useful abilities as far as playing basketball is concerned (Erčulj & Supej, 2006; Pojskić, Šeparović,

& Užičanin 2011). In this regard the issue of what could predict better shooting accuracy especially with youth basketball is worth asking.

This research work aims at finding out the effect of skill related fitness on shooting accuracy of high school basketball players in the Cape Coast Metropolis (CCM). Physical fitness in general is what enables players to deal with their physical needs of the game which in turn allows for the effective use of some level of technicalities during play (Babu & Reddy, 2009). Playing basketball is one of the very competitive games players engage in so it needs high level of fitness qualities from the individuals who play.

Some of the main physical qualities are power, agility, endurance, speed and some others that have to do with coordination (Sudha, 2015). Basketball demands a high level variety of movements, and those who play should undoubtedly be having a great deal of physical fitness to be able to control the game (Ramesh, 2015). Basketball players should possess the basic qualities of physical fitness components like speed, speed endurance, agility, explosive power, flexibility, coordination. With these basic qualities the players can improve their performance level during the game. With this as well as the player's physical qualities like height and arm length, leg length is also pivotal in deciding the efficiency of the basketball player (Karthi, 2009).

Basketball performance mainly depends on physical variables of speed, strength, agility, flexibility, power, endurance, balance and coordination (Debnath, 2001). Basketball techniques like dribble, pass, layup shots, rebounds and faking or feinting are considered as highly skillful techniques and must be developed for a successful game. However, these skills must be complemented with physical as well as physiological aspects such as those mentioned above.

All of these skills stated above and skill related fitness are complementary to each other (Kamble, Daulatabad & Baji, 2012).

Shooting is a phenomenon that is applicable in many games and sports. It is defined as throwing or propelling a basketball with the aim of making it enter the rim (basket) to attract a point depending on where it is thrown from. There are different ways by which shots can be made during play in basketball and these are free throws where there is an award of one point for the player's team. There is also the layup shot, set shot, hook shot and also the jump shot, which depending on where the shot is taken from the team is awarded two or three points. The act of putting the ball in the basket is considered the most important part of the game of basketball (Pojskic et al., 1998). In addition to the skill of shooting, the players must be confident in themselves in order to shoot well. The combination of the mental and mechanical aspects of shooting basically results in the shooting success. The number of successful shots out of the total shots attempted by a player within a game or a particular time frame of play is known as shooting accuracy of that particular player.

Fitness is said to be the ability for one to undergo all activities imposed on the body in a particular day with little or no fatigue and still have energy in store for leisure activities. Gallahue and Ozmun (2002) in their book "Conditioning for Sports Performance" enumerated key principles of training for fitness. They stated that for every kind of fitness training to achieve its intended purpose there are principles which we must work with in order to get the desired results. These are:

1. Specificity: The kinds of training we engage in must be specific to the sports in order the get the desired benefits. For example, basketball

players run but not as much as soccer players. Cyclists and swimmers will have to build their aerobic capacity but not in the same levels and concise manner.

2. Overload: Meaning having enough intensity that takes your body out of the zone that it is comfortable with and demanding more than it has been used to over time.
3. Intensity: The exercise regime that brings about different physiological changes to the body. If you want to measure this principle of exercise during work out the best way to do it is to use heart rate.
4. Progression: As the body gets use to rigorous training schedule the level of intensity will get comfortable and no longer cause sufficient overload. For performers and non-performers to improve on their fitness the intensity of a particular training schedule the duration must be increased at regular intervals.
5. Recovery: The player finds it is easy to do too much but tries to progress quickly. The body only adapt well to training when the resting period is adequate. This means that there must be enough of the recovery time. When the body becomes fatigued the individual must keep the training light or stop completely. Casorla, (1983) stated that the level of intensity of recovery is important for performance because it has a direct relationship to the energy used within the period between bouts of training. There have been different ideal recovery period reported for some specific sports such as basketball and cycling.

Physical fitness can be characterized as a group of components that people have in connection to the execution of physical movement and this has

a bearing with individual's make-up and how they maintain adequacy of nutrition (Gallahue & Ozmun, 2002).

Physical fitness as an attribute has usually been always linked contextualizing it with physical work. Physical fitness is in two main categories namely health related and skill related. Skill related fitness also called game related or motor fitness, is that area of physical fitness that deals directly with performance. Skill related fitness is most commonly thought of as one's recent performance level which has the influence of factors such as speed, agility, balance, coordination and power (Gallahue & Ozmun, 2002).

The generality and specificity of motor fitness have been talked about and researched for years with the most of the research evidence on its specificity. It is also said to be the fitness component that enhance the performance of players in a particular sport. High school basketball players in the context of the study are players of both sexes between the ages of 15 and 18 years who are in high schools playing basketball for their school teams.

As a teacher of physical education in one of the senior high schools in the Cape Coast Metropolis my job description makes me an automatic coach of one or more games that the Senior High Schools play every year. The researcher has been coaching his school's basketball team for quite some time. This offered him the opportunity to enter into many competitions with the team from the Zonal, Regional and National levels. This also gave him the ideas about how many schools play basketball and the various issues that are associated with the game of basketball including player indiscipline, issues of fitness of players, inadequate time for training, lack of technical knowledge of some of the coaches just to mention but a few. One of the issues about the game that the researcher

first detected with the team was the poor conversion rate of their shots especially when it come to free throws which is considered as a very important shots in basketball game.

Kozar (1994) reports that 20% of all points accumulated in a game come from free throw shots. The free throw is considered easier than of all shots for a basketball player the reason being that the player is alone 4.6m from the rim with nobody to interfere with the execution of the shot. Considering the above statements, it was a worrying trend to find out that from some few years past the best free throw shooter of the researcher's team had an average of 50% success rate when teams that do well in basketball were compared using the record within the past few years. These are Aggrey Memorial Zion Senior High School and Mfantsiman Girls Senior High School which are schools in the central region and at the national level Yaa Asentewaa Girls Senior High School, Akosombo International School and in recent times Accra Wesley Girls High School and Ahantaman Senior High School.

It is interesting to note that the best shooting rate the researcher came across was from a particular girl from Aggrey Memorial Zion Senior High School and the rate was 60%. This shooting rate is not good enough for a basketball player at this level. Kelbick, (2015) stipulated that, a good free throw shooter should be able to shoot over 80%. With those in high school (between 15 and 18 years) they should be able to shoot over 70% to qualify to be placed in the category of good shooters. With the boys' schools, Mfantsipim School, Adisadel College, St. Augustine's College do so well in basketball in the Central Region and when it comes to the national level the researcher can make reference to Pope Johns Senior High School, Opoku Ware Senior High School,

Keta Senior High School and Ghana Secondary Technical School. Interestingly most of the boys have an average accuracy of between 40% and 50% with very few of them recording a 60% success rate. Two girls' schools perform well as far as basketball is concerned in the Central Region and the nation at large (with reference to their performance in competitions in the past five years) so these schools were considered as some key players were picked and their shooting accuracy recorded in a game between them. That is presented on the table below;

Table 1: Wesley Girls High School

Player	No of free shot attempts	No scored	Accuracy
1	10	4	40%
2	10	5	50%
3	12	5	41.6%

Table 2: Aggrey Memorial Zion Senior High School

Player	No of free shot attempts	No scored	Accuracy
1	10	5	50%
2	10	6	60%
3	10	4	40%

For instance, during the 2017/2018 inter school basketball competition in the final match between Mfantsipim School and St. Augustine's College the researcher randomly selected three boys from each school and as they got the opportunity to execute a free throw in the cause of the game the following data was collected.

Table 3: Mfantsipim School

Player	No of free shots attempts	No scored	Accuracy
1 1	15	8	53.3%
2 2	15	5	33.3%
3 3	12	6	50%

Table 4: St Augustine's College

Player	No of free shots attempts	No. Scored	Accuracy
1	14	5	35.7%
2	16	8	50%
3	10	4	40%

Looking at the trend above the researcher realized the need for improvement in the shooting accuracy since successful shooting is to a large extent a contributor to gaining more points, through which most games are won. Babu and Reddy (2009) argued that physical fitness and for that matter skill related fitness improves sports performance. For this reason the researcher finds it imperative to find out the effect of skill related fitness on shooting accuracy among high school basketball players so as to be informed on what measures to take to improve on their shooting accuracy. This will consequently result in more points gained and as a result enhancing the chances of winning tournaments.

The poor shooting accuracy could not be attributed to shooting techniques because most of the boys and girls were seen to be exhibiting high technical ability such as good transfer of weight from the legs through to the fingers when shooting as well as good release angle, height of release and good skill such as good elbow alignment to the rim and correct hold of the ball. That is to say the general shooting process of these players was good. There are different means through which players attempt a shot. One of them is free throw as discussed above. It must be stated nonetheless that there was a particular kind of shot that players were seen to be doing well as far as conversion rate is concerned which is the layup shot.

Statement of the Problem

This research work aims at finding the effect of a skill related fitness intervention on shooting accuracy among high school basketball players in the Cape Coast Metropolis. Shooting accuracy of the players is not good enough as presented in the background. This has resulted in individual schools within the metropolis and the selected sides that represent the metropolis most often ends up not getting the ultimate prize after participating in competitions. A good free throw shooter should be able to shoot over 80% (Kelbick, 2015). With those in high school they should be able to shoot over 70% to qualify to be placed in the category of good shooters. He further stated that anyone between 15 and 18 years of age (high school age) who shoots below 70% cannot be classified as a good free throw shooter. It has been widely published that skill related fitness improves sports performance. The aspects that make up game related fitness which are agility, reaction time, balance, power, coordination and speed are considered necessary for playing basketball (Kozar, Vaughn, Whitefield, Lord

& Dye, 1994). All the various components of skill related fitness contributes a great deal in improving sports specific aspects of an individual thereby resulting in improved performance. Considering the situation presented in the background of this research there should be a way to improve shooting accuracy in the high school basketball players of the metropolis. There are quite a number of related studies on fitness in general as well as skill related fitness and shooting accuracy in particular but the participants were mostly professional basketball players based in the European countries. The researcher also noticed that none of these studies examined all the components of skill related fitness and its effects on shooting accuracy of any category of basketball players.

For instance, Hum-Kinet (2012) discussed strength of the player's muscles, anaerobic endurance, agility, ability to sprint and jump power and their relationship with performance in Professional Basketball Players and found out that these fitness variables have a strong positive relationship with performance of professional basketball players. Similarly, Posjkic et al., (2014) from the University of Tuzla, Bosnia and Herzegovina did a study on examining the relationship of physical fitness among professional Bosnian basketball players and shooting accuracy in one season. This study also reported a strong positive relationship between the variable of study. There was an analysis play recordings of about 500 college basketball tournaments and noticed that more than (20%) of points all obtained by most of the teams were from the free throws line (35%) of points gained at the closing five minutes were from free throws, and also about two thirds of points gained by the teams that won the various games in closing five minute were from the free throw line. There have been some studies conducted concerning this topic but most of them were done with

elite players and also the variables of study, geographical location as well as the population for this particular study is different. From the above narrative it is evident that little has been found out about the effect of skill related fitness on the shooting accuracy among senior high school basketball players in the Cape Coast metropolis.

Purpose of the Study

The purpose of the research work was to investigate the effect of skill related fitness variables; agility, balance, coordination, speed, power and reaction time on shooting accuracy among high school basketball players of the CCM after taking them through twelve weeks of training to improve on their skill related fitness.

Research Questions

1. What is the Difference in Skill Related Fitness Levels between Experimental Group and Control Group among High School Basketball Players in the CCM before and after the Intervention?
2. What is the Difference in Basketball Shooting Accuracy Levels between the Experimental and Control Group among High School Basketball Players in the CCM before and after the Intervention?
3. What is the relationship between Skill Related Fitness and Shooting Accuracy among High School Basketball Players of the CCM?

Hypotheses

1. There will be a significant difference in the Shooting Accuracy of the Experimental Group of High School Basketball Players in the CCM from Pre-test to Week Three, Week Six, Week Nine and Week Twelve of Intervention.

2. There will be a Significant Difference in the Shooting Accuracy of the Experimental Group of Boys and Girls of High School Basketball Players in the CCM after Twelve Weeks of Training to Improve on their Skill Related Fitness.

Significance of the Study

This research work aims at providing an avenue for Physical Education teachers and coaches in the area of basketball within the CCM to be informed on what to do as far as skill related fitness is concerned in relation with the shooting accuracy of their players. The findings of the study will enable the coaches to design appropriate skill related fitness training programmes to improve on the shooting accuracy of their basketball players.

Delimitation

This research work is delimited to:

1. Basketball players of the same age as those in the high school but not enrolled for the high school system and attending school.
2. Basketball players who are in a high schools located outside the Cape Coast Metropolis.
3. Experimental design using two group pretest-posttest design.

Limitations

Results of this research cannot not be generalized to schools which are out of the metropolis even though probability sampling (simple random sampling) was used to select participants for the study.

Definition of Terms

High School Basketball Players:

Basketball players who are between the ages of fifteen (15) and eighteen (18) years and are enrolled in the mainstream high school.

Physical Fitness:

An individual's ability to perform his daily tasks and routine physical activities efficiently and effectively without fatigue and still has energy in store for leisure or recreation.

Skill Related Fitness:

This includes training that enables one to attain some appreciable amount of speed, agility, balance, coordination, power and reaction time. When an athlete possesses these variables it helps in the improvement of performance of their particular field of sport or physical activity.

Shooting:

In basketball it is an attempt by a player to throw the ball through the shooting ring (rim) with the view of being awarded a point depending on which part of the court the attempt was made.

Shooting Accuracy

The success rate of a player's attempts made in putting the basketball in the shooting ring considering the number of shots made during a particular game or a certain period of play.

Organization of the Study

The study is in five chapters, chapter one dealing with the introduction, the background to the study, statement of the problem, purpose of the study, research question, and significance of the study. The literature review of this

study is presented in chapter two where the researcher looked at the views of authors and presentations in connection to skill related fitness and shooting accuracy of basketball players. Chapter three centered on the research methods which comprises; research design, population, study area, sampling procedures as well as data collection instruments. It also describes data collection procedures and data processing and analysis. The findings and discussions are presented in chapter four while chapter five is about the summary of findings, conclusions and some recommendations made for future considerations.

CHAPTER TWO

LITERATURE REVIEW

The purpose of the research work was to investigate the effect of skill related fitness on shooting accuracy among high school basketball players of the CCM after taking them through twelve weeks of training to improve on their skill related fitness. This chapter covers the review of literature related to the study. Literature reviewed was on physical fitness, health and skill related fitness and many others including the game of basketball with special emphasis on shooting. The literature review was conducted under the following main themes:

1. Organization of School Sports in Central Region
2. Concept of Physical Activity
3. Physical Fitness and Basketball
4. Health Related Fitness
5. Skill Related Fitness
6. Drills that Improves Skill Related Fitness
7. Fitness Testing
8. The Game of Basketball
9. Shooting in Basketball
10. Relationship between Skill Related Fitness and Basketball Shooting Accuracy
11. Theoretical Framework
12. Conceptual Framework

13. Summary of the literature review

Organization of Schools Sports in Central Region

The Central Region has six zones but until recent times it were five. The zoning is done using proximity as the main criteria and also for competitions to be competitive enough some schools were zoned at the same area. These zones compete in games during the first term and in the second term they get together at one venue to compete for laurels in athletics events. Selection is then made for players and athletes to represent the zone. The regional Physical Education unit then chooses a date for the various zones to meet at a center dedicated to the various games and compete with each other for players to be selected to represent the region.

In the case of athletics an individual athlete qualifies for specific event from their zonal level and so competes with all other athletes from the other zones on the said events. Schools which have many athletes qualifying for the number of events at a particular meeting and getting the better positions for the final events end up winners of a particular meet. The period for all these competitions spans from October to March each year. Basketball is organized differently from the other games because of a national competition that always climaxes the year. Zonal winners and runners up meet to determine the overall winner. Winners from the various regions and previous year's winners in both boys and girls categories meet in Accra during the January holidays to play in the Sprite Basketball tournament which serves as a climax of the year's basketball games season.

Concept of Physical Activity

Physical activity is movement of part or whole of the body as a result of the actions of skeletal muscles which results in an increase in energy use to more than what the body uses when at rest (Arnheim & Prentice, 2002). This definition gives room for a considerable amount of space in the classification and categorization by weight related activities, non-weight related activities, those linked with occupation, those undertaken for leisure purposes, continuous, non-continuous, organized and not organized. Physical activity is also categorized by the type of activity (type), number of times the activity is done (frequency), time used for the activity (duration), and how long an individual does the activity (intensity)

There is no doubt that the kind of activity; volume, how it is composed, and the time of food intake before the activity can affect physical activity and performance of exercise dramatically (Wrutniak, Epstein, Doin, Jones, & Kondilis, 2006). When physical exercise or physical work moves up to more than an hour a day, the question of adequate energy and nutrients intake becomes worth asking. All kinds of physical activities can be performed at various intensities, and this ranges from light (low), moderate, and vigorous (high) intensity activity. Ones understanding of the differences that exist among these intensity levels are as important as the performance of the activity itself.

Light intensity activities require the lowest amount of exertion of energy when compared other exercises. The meaning of light intensity activity is an activity that is put in the classification of less than three metabolic equivalents. One metabolic equivalent is the amount of oxygen expended while sitting or resting, (Franklin, Brinks, Berra, Larvie, Gordon & Sparks, 2017). An activity

considered as two metabolic equivalents will be equal to two times the amount of oxygen consumed during sitting (which is one metabolic equivalent) walking leisurely (i.e. in a shop, around the office) sitting by a computer, laying your bed. Metabolic equivalents are a helpful and standardized strategy for depicting the right amounts of physical exercises within a prescribed context, (Franklin et al., 2017). A few illustrations of light physical exercises include making the bed, chores at the kitchen, and washing clothes.

Moderate intensity activities are also classified as those activities that range between three metabolic equivalents and six metabolic equivalents. These activities require more oxygen to be carried out than light intensity activities. These activities have been put in the category of moderate intensity physical activities and they include sweeping, brisk walking, dancing to jazz music, using the vacuum cleaner, washing louvers, shooting a basketball free throw.

Lastly vigorous intensity activities are classified as having greater or equal to six metabolic equivalents, (Franklin et al., 2017). People require good amount of oxygen utilization to be able to cause movement of many forms. A few cases of oxygen usage for physical exercises include running, swimming using the shovel, playing soccer, skipping rope, carrying bricks and many more.

The volume of energy needed to complete a task is measured in either kilojoules or kilocalories. The kilojoule is mostly accepted because its direct link with the measure of energy that is expended but sometimes the kilocalories which is the unit of measure of heat is used.

The expression of the rate (kcal per unit time) the volume of energy used by a person at a particular event is a continuum and ranges from low to high. The whole amount of calories expended in relation to physical activity is a

determinant of the quantum of muscle mass which produces movements resulting in the intensity, time, and how frequent the muscles contract.

Everybody performs few low to high level physical activity in order to live; be that as it may, the amount and type is for the most part an individual choice and changes from individual to individual as well as for a given individual over time. Physical activity which one undertakes monthly, at certain season, or all yearly round may also be investigated so as to establish the sustainability of physical activity that an individual will engage in for longer periods.

Categories of Physical Activity

Physical activity can be grouped in various ways though the approach which is most commonly used is the segmented one. This is on the basis of what we identify as part of daily life through which the activity occurs. The simple form of categorization presents physical activity as the activity that happens while one is sleeping, doing work as well as spending time for leisure. There is a formula that can be used to make specific the amount of calories at each grouping to the full energy used due to physical exertion. Kilocalories that the body uses at sleep in addition to the kilocalories that one needs to be able to engage in occupation in addition to kilocalories that you need for leisure makes up the kilocalories of total daily physical activity. (Ziviani, Poulsen, & Hansonic, 2009). The total calories contributed by each category to the total energy use due to participating in a kind of activity are always above the base metabolic rate as such energy usage during sleep is always less compared to all others.

Leisure time activities can be further broken down into groupings like sports, conditioning training, house chores (for example, house work, clearing grass, and repairs) as well as many other activities (Ziviani et al., 2009).

Physical activity is a complex phenomenon but can be subdivided into others which are related but not necessarily of those mentioned in the earlier discussion. For example, physical activities can be divided into light, moderate, or heavy intensity. We can also choose to put them as ones that are done willfully or compulsorily and those that are done throughout the week and at weekends. All of these are acceptable ways of breaking down physical activity. The only condition is that the sub groupings are mutually exclusive and that they all add up to the total calories expended due to the engagement in a kind of physical activity. There are undeniably countless ways by which the categorization of daily physical activity can be done. Each framework must permit estimation of how calories add up to and used and also of the calories exhausted in the different subcategories. Each one of them may relate to a specific sub grouping at a particular time. The differences add up to the total caloric use (that's proportionate commitment from a few categories) and an uneven accumulation of total use (that's, major commitment from a category). In this way, people and groups can be identified by the need for a particular category. To the degree that each of the categories has distinctive determinants and distinctive impacts on health, this differentiation both can be utilized for the sake of epidemiology purposes and implications in terms of public health promotion and intervention strategies that are employed to assist individuals (Wrutniak et al., 2006). Discussions as well as comparisons of research on

physical activity will be improved when data in the studies are discussed using specific categories that are identifiable with those stated above.

Physical Fitness

Basketball is a type of game which is performed with high intensity and demands of high physical contact. High speed movements, constant jumps and turns are used in offense, defense and various kinds of changes that occur in the game. Basketball needs the individuals who engage in it to be physically fit in nature as well as technically and tactically sound for optimal performance (Hoffman, 1996). In a broader sense physical fitness is determined by the individual's ability for maximal work, motor development and sport performance (Astrand & Rodahl, 1986). During competition however, the physical fitness of a player can be a critical determinant of how successful the individual will be. A greater amount of speed, power, explosiveness and agility are needed for basketball players to excel (Boone & Bourgois, 2013). Some of the movements that are regularly performed by players at distinctive positions such as blocking, shooting and bouncing back, vertical hops and sprint work outs are fundamentals for all components of basketball game (Adelkerim et al., 2007). One of the factors affecting performance in basketball is jump power because of its usefulness during shooting.

Physical fitness is also said to be a group of attributes of people or what they attain which in relationship to the capacity to perform physical activity. Physical activity is in relation to the movements that an individual undergoes but physical wellness may be a set of qualities that individuals have or ought to accomplish. Being physically fit means that an individual is able to carry out his daily routine with the needed vigour and alertness, without undue fatigue and

with available energy to enjoy leisure time as well as being able to deal with emergencies. Even though the definition may be contextually sound, some aspects of physical fitness cannot be measured but a group of quantifiable aspects do contribute to it. The two most frequently mentioned components one in related to health and the other related to skills which concern more to athletic ability. Effective legs offer assistance in accomplishing great bounce when the player has to bounce back in attack and defense. Arm power gives great force during fast breaks and shots. Speed and agility are exceptionally imperative qualities to run quicker and alter movements during the course of the game of basketball.

Arnheim and Prentice (2002) reported that flexibility plays a key part in the performance of movements that are coordinated and provides an avenue for the developing other major aspects such as power, speed, agility and many others. Excess weight has proven to be disadvantageous for a player to be quick and to move the body during the game (Tanwar, 2013). Fitness though important at all levels of the game is seen to be even more crucial for advanced players. It is also very useful for beginners who must increase their efficiency through a good fitness range. Fitness enhances the player's ability to solve the physical demands of the game and also allows him to efficiently use his technically acquired skills and techniques during play (Babu & Reddy, 2009).

Basketball is very competitive and so it needs greater levels of physical qualities. The most important of these physical qualities are explosive strength, endurance, agility, speed, some other qualities concerned with coordination, (Sudha, 2015). Basketball is one of the games that require a high degree of motion and for that matter a player should have physical fitness to have some

level of control over the game (Ramesh, 2015). A great volume of performance depends on a number of identifiable basic factors. These are muscular strength, explosive power, cardio respiratory endurance, speed, reaction time, flexibility, and balance. The aforementioned are fitness factors which play a crucial role in the determination of individual's sport performance.

Different sports require different levels of fitness to be very successful. The motor fitness is understood better by analyzing the components like speed, endurance, flexibility, agility, coordination, and balance. The components of physical fitness such as speed, strength, flexibility, endurance, agility and coordination are the main factors that influence performance of an athlete in every type of sport and physical activity.

A sportsman who has good physical capabilities will always do better in his kind of sport (Sidhu, 2012). Excellent delivery in sports at all levels is the result of fitness. Although several factors have been seen to significantly contribute to the successful performance, physical fitness activities plays a key role. A player with high physical fitness starts a game and performs excellently from the beginning till the game is over still maintaining the same level of performance as he started the game with, (Devaraju, 2016).

Basketball techniques such as dribbling, passing, lay up shots rebounding and faking are considered as highly skillful acts. But these abilities ought to be upgraded with physical and physiological determinants such as anthropological characteristics, composition of the body and control of leg muscles, oxygen consuming capacity, flexibility and agility. All of these technical as well as tactical skills and fitness parameters are dependent on one another (Thani, 1997). Physical fitness is very necessary for the achievement of

success in sports. Without a high level of physical fitness and person will not be able to go through the stretch and strain imposed on the body by different games and sports. For teams to be successful in competitions and to be able to attain a high level of sports performance optimal physical fitness is a must, (Praveen, 2015).

Health Related Fitness

Health related fitness includes exercise and activities that one undertakes to progress your physical wellbeing so that an individual remains healthy.

Cardio Respiratory Endurance

Cardio respiratory endurance is classified as the well-functioning of the heart, lungs, and circulatory system. Cardio respiratory fitness is also explained as the ability of the body to sustain prolonged activities that have a direct bearing on circulatory system. Activities like running, walking, riding the bicycle and swimming are functional activities that sustain the body over duration of time and enhances ones cardio respiratory fitness.

Muscular endurance

Muscular endurance is the capacity to perform repeated action utilizing strong exertion and repetitive drills on a particular group of muscles within a time period.

Muscular strength

This is what is called the maximal force. The force muscle(s) can generate within a time limit of a specific movement to overcome specific load.

Body Composition

This is in connection with the proportion of fat tissues or body fat that an individual carries on the body as one grows from one stage to the other. High rate of body fat have is connected to metabolic infection, low energy, and overall emotional health issues.

Flexibility

This is defined as the range of motion about a specific joint. Flexibility is dependent on many variables such as age, gender, body composition and some general behavioral habits. Inadequate flexibility leads to loss of power and consequently results in injuries.

Physical activity ranges from low to moderate and high so is the level of individual's physical fitness depending on the volume he or she engage in within a period of time. Nonetheless the five health related fitness variable may vary even with the same person, for instance a person may be strong but may not have a high levels when it comes to flexibility. These five health related variables are more important to the health of the individual than they are to how an individual can perform a certain athletic ability to a certain level.

Skill Related Fitness

Skill related fitness in simple terms is when an individual is able to do well in daily life activities as well as a particular sport. Skill related fitness components are made up of the following; agility, balance, coordination, power, and reaction time and speed. Athletes who are very skilled basically do well in all six areas which results in improved performance in their chosen sports.

Agility

This is the capacity to change direction rapidly while the body is moving. Example is changing directions through turnovers within the game of basketball.

Balance

This is being able to keep an upright body form while standing still or moving. For example, during the execution of free shots a high level of balance is required for desired results. There are two kinds of balance namely static and dynamic balance.

Static balance is being in equilibrium about a fixed position or a fixed point.

Dynamic balance is the ability of the body to maintain equilibrium while it is in motion.

Coordination

The ability of the individual to use all senses as well as the body parts or to use two or more body parts at the same time in the performance of a specific activity. In dribbling a basketball the player uses hands, eyes and the body altogether and this makes a successful dribbler.

Power

The ability to use one maximum effort to overcome a volume of load within a shortest period of time as possible. Example is a basketball player who runs out from defense for a fast break speeding to advance the player having the ball.

Reaction Time

The ability to generally react or respond quickly to stimuli, in this case most often from external source. The ability of a center to quickly receive a pass

and initiate an attack after a basket has been made against his team or after a missed shot.

Speed

The ability to perform movements or cover a given distance in a shortest period of time. The duration maybe compared with a standard time or a time someone has used to perform same activity. Numerous sports use speed to take advantage of opponents. A basketball player is making a fast break to perform a layup or a player running back to cover a zone in defense.

Drills that Improve Skill Related Fitness

The following are drills that improve skill related fitness;

Agility

Basketball is a game that incorporates different planes of movement at a time and speedy changes of direction. Basketball agility prepares an individual to maneuver, progresses from unstable movement and permits a player to alter course quicker and more appropriate to the kind of movement that is to be executed. The following drills will make one basketball player better than the other when correct procedures are followed. Most basketball coaches overlook the significance of having great agility but concentrate on some other things about the player that may not necessarily be the needs of that player.

For this reason this very important characteristic is ignored. To be quick persistently on the court having these drills is exceptionally imperative. In the course of the game you have to read your opponent and react or respond quickly. In basketball, the player must be able to quickly alter the direction of their movement at many points in the course of the game. This must be done while maintaining same speed and balance during the game. A player who has a great

speed performs well on the defense, turnovers and within quick break circumstances. Making the whole team go through agility exercises together as well as planning agility schedule for specific individuals of the team will greatly enhance their performance on the court.

Improved agility improves balance which is very important when basketball players are practicing the dunk. Stability goes with improvement of power derived from strength training with coordination. The following are some activities that improve agility of basketball players.

Name of Activity/Drill: The super shuttle

Equipment needed: Chalk and Tape measure

Procedure to follow:

The player stands with the back facing the court.

Marks A to D are made on the court.

Players who play defense shuffle back to the right corner of the basket which is point A.

Run to the point B but with minimal change in direction.

Keeps the side towards the starting point and move to it with the defensive positioning.

Jump to the net and make contact with your hands.

Repeat the activity with the side of point C and D.

This activity is repeated in sets of 6 or 8 with 1 minute rest period.

2. Name of Activity/Drill: Weave in and Out

Equipment needed: Cones and Measuring tape.

Procedure to follow:

Make straight line with 4 cones with the gap of 3meters.

Put a cone in between two markers each but in the same manner of 3meters to the left.

The player sprints to the first cone then to the second alternating leg.

This is repeated 6 to 8 times take about two minutes rest and restart.

3. Name of Activity/Drill: Box Drill

Equipment needed: Cones, Chalk and Measuring tape

Procedure to follow:

Make a starting point with a cone 6×6 meters on the court.

Four cones are placed at the edges of the court.

The coach calls out a specific cone randomly and the player sprints towards that cone.

Go to the starting point and do the activity for the next cone.

You must finish this within one and a half minutes.

4. Name of Activity/Drill: Shuttle with Pass

Equipment needed: Cones, Chalk and Measuring tape.

Procedure to follow:

Start from the left side of the end line, run forward to point A.

Take a pass and return the pass and sprint back to the point B to take a pass.

Continue this activity as you reach till point D at this point after receiving the pass the player keeps the ball take two steps and start dribbling the end line.

5. Name of Activity/Drill: The Figure 8 Drill

Equipment needed: Cones, Chalk, Stopwatch and Measuring tape.

Procedure to follow:

Place 2 cones with a distance of 5 meters interval.

Starting from the behind the first cone dribble around it.

Then move diagonal to the second cone.

Then right when you face the second cone.

Move again diagonally to the start cone.

Keep low to improve stability and to bounce the ball out of cones.

Take rest for about 2 minute and repeat in sets of 8 keeping the rest periods interval between the sets.

6. Name of Activity/Drill: High Knee Drill

Equipment needed: Ladder and Stopwatch.

Procedure to follow:

Place one foot in the space of a ladder and move across it.

The focus should be on the knees and put them past your hips.

After sets of 6 take a break for one and a half minutes before continuing the activity.

7. Name of Activity/Drill: Right Legged Thrust

Equipment needed: Ladder and Stopwatch.

Procedure to follow:

Put the right leg between the ladder spaces.

Put the next left leg outside while maintaining balance.

Move as fast as possible through the ladder in the manner stated above.

Finish four sets repeating same length in each set.

Balance

There is literature evidence which suggests that a greater balance that experienced athletes have is as a result of constant training schedules that for a

period of time affects motor responses (Balter, Stokroos, Akkermans & Kingma, 2004). Some researchers also argue that improved balance is the result of training experiences which in the long run influences an individual's capacity to deal with relevant proprioceptive and visual cues (Ashton-Miller Wojtys, Huston & Fry-Welch, 2001). Balance which is also referred to as postural control can be explained as the ability to maintain a support with minimal movement, while maintaining a stable position while you perform a task (Winter, Patla & Frank, 1990). This is determined by a myriad of factors some of which are sensory information, joint range of motion and strength of the individual (Grigg, 1994; Palmieri, Ingersoll, Stone & Krauseet, 2003), and it is the reason for correctly executing complex movements in sports and prevention of injuries that may result in such movements.

It has been widely published that injuries especially at the knee and ankle are common in present day sports men mostly seen in sports such as volleyball, soccer and basketball which involves lots of cutting and jumping (Griffin, 2000). Non-contact movements, such as lands after a jump, mostly lead to joint and ligament injuries, that are as a result of inadequate strength at that part of the stability impairment as well as balance (Wikstrom Powers, Tillman, 2004). Literature evidence shows that a greater balance in athletes who are experienced come through constant training which affects motor behaviour (Balter et al., 2004); some also say that greater balance is due to practice experiences affecting an individual's capability to attend to useful visual cues (Ashton-Miller et al., 2001).

By improving balance, players improve their sports performance and skills. The ideal balance program must take into consideration the two kinds of

balance in sports both static and dynamic balance. Static balance is training where the player stands at one place and uses solid surfaces. Dynamic balance training is mostly done by the adding of stimulus underfoot that is unstable such as the wobble board. Athletes who are training for balance for the first time should practice at least twice each week and the activities from the simplest to the most difficult. If a task is purposely for work on one leg the other leg to go through same training to balance the muscle that are involved in the performance if the activity. Continue until there is fatigue because that means those particular muscles have been fully worked on. Make a physical note of your head and neck position when balance is best.

Balance Training

To test balance, let the player move forward a few taking steps.

As he extends one leg forward, they have to feel how the center of the body goes over that leg to stabilize the whole body.

Let the player develop an awareness of the body naturally sways. This happens for all movement whether static or dynamic.

Sway is generated by the nervous system when the body feels series of unconscious impulses that enables the muscles to keep an upright posture with less effort.

To test sway let the players stand with close eyes closed and feet in a walking stance.

Check the movement of their bodies side to side and also the inconsistency in the circular patterns of movement.

Let the players stand on one foot and identify the first part their body that is adjusted to balance. There is often an awareness of ankle movements which is the difference between advance and intermediate athletes.

Following are some dynamic balance exercises and drills.

1. Name of Activity/Drill: Ball and Wall Pushups.

Equipment needed: Medicine ball and Stopwatch

Procedure to follow:

Let the player stand a little more than arm's length from a wall.

Put a ball in the middle of the players and the wall

Let them put their hands on the ball a bit wider than shoulder width.

Let the player keep an upright posture and move the chest toward the ball then back.

Perform this activity using your desired number of sets

The player must be given rest for some time before repeating the activity.

2. Name of Activity/Drill: Wheelbarrows.

Equipment needed: Stopwatch

Procedure to follow:

With the player in a prone falling position

Hold the feet and let them move up and down and walk for a short distance while guiding their lower body.

Let them rest for 30s

3. Name of Activity/Drill: Hand stand against a wall.

Equipment needed: Stopwatch

Procedure to follow:

The player practices cartwheels for some time.

Then let the player stand about 5 meters from a wall.

Let the players take a few bounds to the wall.

Put their hands on the floor and let them move their feet to the wall.

4. Name of Activity/Drill: Crunches on the exercise ball.

Equipment needed: Stopwatch

Procedure to follow:

Let the player lie on their back while supporting the head with hands, with feet on the ground.

Let the player raise and lower their upper body and reduce and increase, the distance between the rib cage and front hip bones.

5. Name of Activity/Drill: Balance on all fours.

Equipment needed: Stopwatch

Procedure to follow:

Let the player balances on all four limbs on a ball.

When they are ready let them move up onto their knees and hold for at this point for 10s.

6. Name of Activity/Drill: Stability ball Push ups

Equipment needed: Stopwatch

Procedure to follow

Let the player get in a prone falling position on a ball with their legs on the ball and hands on the floor.

The hands should be wide open to support the upper body while the head is in line with the spine.

Let the player raise one leg from the ball for 10s.

Let the player change and use the other leg

Coordination

Coordination enables an individual to go through complex movements quick, smooth, and in confidence.

1. Name of Activity/Drill: Balloon Tossing

Equipment needed: Balloons

Procedure to follow:

Stand with partner while playing with the balloon back and forth with each other catching and bumping it.

The players use all body parts.

Change directions whiles playing to introduce challenge.

Change the speed so that it is unpredictable

Try starting position facing different directions.

Stand closer together for some time and move further apart.

2. Name of Activity/Drill: Juggling

Equipment needed: Balls and Stopwatch

Procedure to follow:

Juggling is one of the ways to develop timing.

Slow circles with just two balls are preferred for a start

Find pace and coordinate both hands

Add another ball this will enhance your speed up as a challenge.

Restart the activity anytime one of the balls drops.

3. Name of Activity/Drill: Small Ball Tossing

Equipment needed: Tennis balls and Stopwatch

Procedure to follow;

A small ball is introduced to allow for faster speeds.

You can change the momentum while you play.

Change the angles and throwing patterns as well.

3. T Name of Activity/Drill: Target Practice with Balloons.

Equipment needed: Balloons

Procedure to follow:

This involves complex but a very natural skill of throwing, sighting and aiming that toss.

Start with a close distance and later move further away.

Use different angles instead of directly facing it.

Turn quickly aiming for the target.

4. Name of Activity/Drill: Dribbling a small ball.

Equipment needed: Tennis balls

Procedure to follow:

Practice the right speed and maintain the right angles requires to successfully executing this task.

As much as possible dribble with one hand

Switch back and forth between both hands to perfect the skill.

Reaction time

The time between a stimulus and the initiation of a response by the individual to that stimulus. The main factor inhibiting a response time is the number of stimuli need to succeed. The motive of reaction speed activities is to increase the reaction time of the athlete. The cue for the reaction to be executed can be visual, voice or sound. The cue should go with your event or sport. The following are examples:

1. Name of Activity/Drill: Command Voice or sound

Equipment needed: Stopwatch, Measuring tape and a Whistle

Procedure to follow:

Starting position; Lying on the ground supine or prone.

Action; to get up and sprint 20 to 30m

The point can be the coach who moves from one point to the other so that the athlete can move to the place where the coach is at a command.

3. Activity/Drill: Running while controlling the ball.

Equipment needed: Whistle and Chalk.

Procedure to follow;

Command, move to the left, right, to the back or move forward

To sprint after hearing of the command, whilst controlling the ball, and after that return to while running.

The activity is rehearsed 3 or 4 times bringing the competitor back to the beginning point to pass the ball to the next competitor.

Use the inactive position also that is standing, sitting or lying down

Action To sprint and capture the ball some time recently its moment bounce

For sprinters to practice their reaction speed to the gun the following exercises can be used:

Whistle is blown or hand clapped at the back of the athlete

The right knee is lifted up to the thigh region; the lower leg is upright and vertical to the ground with a flexed foot.

The arms are in a ready position to sprint.

It is expected that the right foot is set within the rear block of the beginning pieces on a sprint star.

Power (Upper and Lower Body)

The following exercise routines will improve the total body power and performance of the basketball player. These exercises are great because they can be done by the players themselves at any time. Power is important on the court so it's very important to develop it before the games start.

1. Name of Activity/Drill: Push Ups

Equipment needed: Stopwatch

Procedure to follow:

In a prone fallen position with both of your hands extended.

Go down halfway unto the floor.

Quickly move from the floor and balance yourself on your basketball and hold for a one second.

Toss your body and absorb the shock as you land on the floor.

Continue the sets with some desired period of rest

2. Name of Activity/Drill: Medicine Ball Wall Throws

Equipment needed: Medicine balls and Stopwatch

Procedure to follow:

This improves coordination as well.

Face a wall with a medicine ball at chest height.

Quickly move the medicine ball at a target on the wall.

Let hands out in front ready to receive the ball off the wall.

Take the ball and throw it back at the wall

Use number of repetitions or a time frame

3. Name of Activity/Drill: Medicine Ball Rotational Throws

Equipment needed: Medicine balls and Stopwatch

Procedure to follow;

This is a power exercise which also improves coordination and the player's ability to change direction.

Stand with the feet shoulder width separated with a side facing the wall.

Hold the medicine ball with arms only slightly bent on the side of the hip away from the wall.

Swing ball over to your hip and forcefully throw the ball underarm to the wall.

Get ready to take back the ball back.

Catch ball and make sure that the activity is repeated.

4. Name of Activity/Drill: Medicine Ball Squat Throws

Equipment needed: Medicine balls and Stopwatch

Procedure to follow:

This is one of the many explosion exercises which as well teach the basketball player how to transfer the energy generated from the ground and taken through the hands as they do most of the time while playing.

Squat throws are very important routines that must be part of every training schedule because it develops both the upper and lower body power.

Stand with your feet shoulder width apart while you are holding a medicine ball and the chest area.

Quickly in a squat position down to parallel

Forcefully jump up and fire the medicine ball above your head.

Allow the medicine ball to drop to the floor

Repeat the activity for specific number of times desired.

Speed

For a player to get more speed he has to improve power in the upper legs and lower legs. Plyometric activities help to develop power in the muscles which results in increased speed. The plyometric activities listed below will improve greatly a basketball player's speed.

1. Name of Activity/Drill: Jumping box

Equipment needed: Boxes, Stopwatch and Whistle

Procedure to follow;

This is very effective leg exercise that increases vertical jump of basketball players. It is also a very common exercise which will increase the gluteus muscles and the quadriceps that are basically the muscles which assist in jumping.

Put the box in front and stand behind it.

Make sure you are able to start and land in a position similar to the start.

Start from a squat position with feet faces forward and shoulder width apart.

The lower body should also be bent slightly forward.

Flex the lower body.

Swing your arms in a forward and use the legs to propel your body onto the box.

Ensure you slowly absorbing the pressure with the legs.

Get down from the box and repeat the process.

Increase the height of the box to increase the difficulty of the exercise.

2. Name of Activity/Drill: Dot Drill

Equipment needed: Chalk, Mat and Measuring tape.

Procedure to follow;

This exercise increases the speed of the foot.

The strength of the muscles of the lower leg is increased in the process.

Mark five dots on the floor or place a dot mat in front of you.

Spread the dots such that two dots are at either end of the mat and one at the center.

Beginning from the front of the tangle, position your feet on the two corner dots.

Bring your feet together towards the center speck by jumping off the ground.

Continue hoping towards the conclusion of the tangle by isolating your feet to arrive on the two corner dots.

Repeat these developments in switch order.

Repeat the process for up to 10 counts to finish the first sequence of the exercise.

The second arrangement of the exercise you have got to begin from the other conclusion of the tangle and moving forward instead of the switch course.

Repeat the second sequence for another 10 counts.

The third sequence involves hoping on each dot using one leg.

The starting position is the right front corner dot.

Utilizing one leg, bounce to the center dab, to the distant right corner dab, to the distant cleared out corner dab, back to the center dab, jump

to the distant cleared out corner dab and after that wrap up with the primary right corner speck.

Repeat 10 counts for the third sequence.

3. Name of Activity/Drill: Lateral Lunges

Equipment needed: Dumbbells, Bar bells and a Stopwatch

Procedure to follow;

This is a simple but very effective activity which improves the quadriceps, hamstrings, and hips in a way that is required to have the ability to move speedily sideways as it improves tremendously the players lower body power.

Select two dumbbells or get a barbell and thrust toward one leg.

Push yourself back to the beginning stance quickly.

Ensure that your shin is opposite to the ground to offload stretch from the knee.

You can do 3 to 4 sets of 8 to 12 repetitions

Fitness Testing

Fitness testing is how we obtain information about the general fitness components of an athlete. Testing can be done in a number of environments depending on the needs of the results. There are a variety of tests that can be done in or out of the laboratory which also provides very important information to the coach and players.

Reasons for Fitness Testing

1. To find out the qualities and shortcomings of an athlete so that training programs to be planned to make strides for the player to improve.
2. For evaluation of a training program to see if it is making a difference the athlete in accomplishing their objectives or something else.

3. To measure fitness levels of players returning from injury or from the off season.
4. To help in setting goals for the team and individuals of team during the season.
5. To determine general health status of individuals of a particular population.
6. Used for talent identification in the various fields of sport.
7. Fitness testing also aids in motivation of certain individuals

Principles of Fitness Testing

Fitness tests must be accurate and serve the purpose for which it is designed. In this regard some principles must be applied as proposed by Gallahue and Ozmun (2002).

Specificity: The test should access a person's fitness for the particular kind of sport in question. For instance, there is no need using a running endurance test cycling endurance.

Validity: Fitness tests must also assess the aspect of fitness that they are supposed to assess. If you want to measure flexibility of the hamstrings will your sit and reach test do just that or there are other factors involved.

Objectivity: A test that is considered objective produces the same results for the same individuals, regardless of the one who administers the test and at what time the test was conducted.

Reliability: A test produces the same results when repeated on individuals of same characteristics. An assessment meant for skin fold will give the same result, when a particular area is tested after a short period of time.

Factors Which May Affect Fitness Tests

Fitness tests may be affected by a large number of factors which are can be both internal and external. These factors may cause a change in the outcome of the test depending on the extent to which the individual feels the effect that these factors present. When performing a particular test which may be repeated it is very important that the tester ensures that these factors have limited effect as much as possible on the individuals taking. For this reason testing conditions must be very close to being same as what happened with the previous tests.

Time of the day the test is taken.

Weather conditions of the day.

Environmental conditions of the area taking the test.

A different assessor who may conduct the test.

Accuracy of measurements with regards to instruments and assessors.

Test protocol must be followed as exactly as the first time of taking the test.

Time interval between meals and time of testing.

The emotions of the player taking the test.

Hydration status of the athlete at the time of taking the test.

Player's health status, simple condition like cold can affect the performance of a player during test.

Medication the player may be taking can also affect the performance during a test.

Fitness tests can be developed to test every aspect of fitness but the tester must ensure that testing principles are strictly adhered to. Below are examples of some fitness tests which can be conveniently used within every environment

to test a particular fitness variable depending on what the tester want to assess and for which purpose.

1. Agility

Illinois Agility Test (Test selected for this research)

T-Test

505 Agility Test

20 Yard Shuttle

3-Cone Drill

Shuttle Run test

40 Yard Shuttle Run

SEMO Agility run

Zig Zag Test

Figure of 8 Agility Run Test

Hexagon test

2. Balance

Flamingo Balance (Test selected for this research)

Stork Stand Test

Standing Balance Test

Stick Lengthwise Beam Walk Test

Balance Beam Test

Balance Board Test

3. Coordination

Alternate Hand Wall Toss (Test selected for this research)

Stick Flip Test

Wall Toss Test

Block Transfer

Plate Tapping

Light Board Test

4. Power

Seated Medicine Ball Throw (Test selected for this research)

Medicine Ball Throw

Powerball Throw Overhead (kneeling)

Medicine Ball Throw Standing

Power Ball Throw Overhead

Basketball Throw (seated)

Basketball Throw (kneeling)

Bench Press Max Power

5. Reaction Time:

Ruler Drop Test (Test selected for this research)

Click reaction time

Tap reaction time

Reaction Time Ruler Test

Reaction Stick Timers

Reaction Timer Gadgets

Groningen Reaction Time Test

6. Speed

20 meter dash

30 meter dash

40 meter dash (Test selected for this research)

60 meter dash

The Game of Basketball

Basketball is a sport in that constitutes five players from two teams. They play with the main aim of shooting a ball roughly 9.4 inches (24 cm) in distance across) through the band (18 inches (46 cm) in distance across mounted 10 feet (3.048 m) tall to a backboard at each end of the court) whereas preventing the opponent from shooting. Each basket from the free throw line is worth one point; field basket is worth two points and a basket made from outside the three point line is worth three points. Basketball is one of the complex technical team games so performances between players differ in regions. (Angyan, Teczely, & Zalay, 2003)

The game begun with eighteen men in a Youthful Men's Christian Affiliation (YMCA) exercise room in Springfield, Massachusetts, USA has developed into an amusement that more than three hundred million individuals play around the world. The man who made this dream come to reality was Dr. James Naismith. He first intended to convert outdoor games such as soccer and lacrosse into indoor games. But it was difficult to do so for the aforementioned games because of their nature.

Ghana officially became member of the Federation of International Basketball Association in 1962. Ghana was placed within Zone three of FIBA AFRICA. Ghana first participated competitively in the 6th African Women Championship held in Dakar, Senegal from the 25th December 1976 to 3rd January 1977. The second time Ghana competed in Africa was in the following year 1978 when Ghana hosted the 7th African Women Championship between 31st December and 2nd January 1978 which Ghana placed 3rd. three nations participated in the tournament namely Senegal, Somalia, and Ghana. Senegal

retained their title as champions once again. Ghana's men's national team competed in annual bilateral games with neighboring country Ivory Coast in the 1970's. In the case of senior high school basketball in Ghana, zonal championships are held where all schools that are in the zone are put into groups to play. Teams which will qualify from their zones then compete with teams from the other zones at the super zonal competition. From there schools which will emerge winners for both boys and girls categories are then chosen to participate in the Sprite Basketball tournament which serves as a climax of the year's games season. The period for all these competitions starts from October and ends in January each year.

Shooting in Basketball

Shooting is arguably most important skill in the game of basketball even though the processes that lead to shooting are equally important. There are some basic rules to be considered during shooting:

Eyes on target

For a basketball player to improve his shooting accuracy, one has to locate the target (rim) as soon as possible for that matter the player must keep the eyes on the target and not keep eyes following the flight of the ball because keeping the target focus is very crucial.

1. **Stance for balance**

Feet are placed shoulder width apart so that the player has a good balance. The feet must be in slightly staggered stance so that the player is comfortable for the shot. The shooting foot is placed slightly ahead of the non-shooting foot. The shooting foot must be pointed in the direction of the basket but not necessarily directly in line with it. A stance with slightly open legs is

usually preferred but the player has the right to use a closed stance if that is more comfortable. With an open stance, the feet point towards one side of the basket. Once a comfortable stance is assumed the feet are lined up in the exact same way for every shot. Whatever stance the shooter chooses he must consistently use that. The knees must always flexed or bend the knees during the execution of every shot.

2. **Shot pocket**

When the player catches the ball he must move it quickly into the shot pocket. Line up everything so that the ball and the shooting eye are in a straight line with the basket. Grasp the ball well and get ready to shoot. The ball must be placed in the shooting position the same way every time the player is in the shooting position.

3. **Grip or hold**

Place the ball between the middle and index fingers on the fingertip pads. At this position the player is able to monitor to apply the back spin. There must also be space between the ball and the central part of the palm. Spread the fingers enough so that you comfortably balance the ball in only one hand. The ball is placed on the finger tips precisely on the pads with the other hand is just supporting the shooting arm.

4. **Balance hand**

The non-shooting hand must be placed on the side of the ball. This hand should not add any force or spin to the shot and should not move on execution and must always move off the ball before the shooting hand.

5. **Delivery**

The balls motion must start directly upwards from the shot pocket. The player should position the elbow comfortably under the ball whiles the ball is in front of the shooter and must not be behind the head of the shooter. The legs, trunk, and arm power must all be coordinated in delivering the shot. The elbow and wrist must be extended so that they are in a straight line to the rim. The shooting arm must be extended in a straight line to the rim. The ball should be propelled in such a way that the ball comes off the shooting hand with perfect backspin.

6. **Up forced and landing (Jump Shot)**

The ball is released on the way up, just before take-off. The legs are used to generate up-force. The player should land in the same place that they took off; this is a way of telling that the player has a good balance on the shot.

7. **Follow through**

The wrists is be relaxed, with fingers pointing at the target. Always complete executing this skill with high body. The player must see the fingers squaring up of the back board and be in the follow through position until the shot is completed (the ball hits the rim)

The set shot

1. **Preparing for the shot**

The body must be well balanced with the weight concentrated on the balls of the feet with the eyes fixed on the rim. Finger pads are spread on the ball with elbow under the ball and the knees open.

2. **Executing the shot**

There is an extension of the legs to allow for upward lift. Shooting arm below the ball, wrist flexed so that it is 90° between forearm and wrist. The ball is raised vertically through the line of sight while the arm is extended to full elbow lock and with a wrist snap. Release the ball just before reaching full extension of the leg.

3. **Completing the shot**

There should be a follow through position where the hand is held with the fingers directed at the rim until the shot is completed (ball hitting the rim). The body is raised up onto the balls of the feet and balance is held until the ball hits the rim. The ball must be propelled such that it travels with a back spin.

The lay-up shot

1. **Preparing for the shot**

While dribbling the ball with control the player must keep the eyes on the rim. The ball is kept in both hands in the in the process of moving towards the basket. Once the dribbling ceases the foot will be moved towards the basket with right-left-jump for a right hand lay-up and left right jump for the left hand lay-up.

2. **Executing the shot**

The movement towards the rim is near to the side of the basket to create an appropriate angle. The left knee is flexed to apply vertical force. The right leg should be at 90° and driving up at waist height. There is the extension of the elbow so that the shooting arm allows for one-hand release, flexed wrist and extended fingers to release the ball at a perfect height. The elbow at the point of release is on or above eye level.

3. **Completing the shot**

The ball must make contact with the top corners of the small square on the backboard. Landing after the shot is balanced with knee flexion to absorb the impact of the ground on the body.

Catch and Shoot Jump shot

1. **Preparing for the shot**

Square up shoulders to the rim and flex knees target with all hands up for visibility to the passer. Take a step into the pass and the catch is made with two hands raised over the head.

2. **Executing the shot**

The ball is caught in the air with a jump with both hands raised above the head as an ideal position. The shooting arm is put below the ball, with flexed wrist to assume a proper angle between the forearm and wrist. The ball is raised vertically with leg extension to assist in power which will result in a good vertical jump from the ground. There is a full extension of the arm leading to full lock of the elbow and finally a snap of the wrist upon release of the ball.

3. **Completing the shot**

After leaving the ground the shooter must land on the same spot on the balls of the feet. Follow through position is very crucial and must be held with the fingers directed at the rim until the ball hits the basket. Follow through position of arm is held until the ball hits the rim and the ball must travels with back spin.

One Dribble Jump shot

1. **Preparing for the shot**

The player's stance is in the triple threat position. The ball is ripped by sweeping it across the front to the opposite side then the dribble is made before the shot is executed.

2. **Executing the shot**

There is the extension of the legs to provide power so as to execute the vertical jump. The elbow is held at 90° pointing at the rim and the shooting arm under the ball. The arm is extended upwards and the ball released just before the shooter reaches maximum height of jump.

3. **Completing the shot**

Getting off the ground and landing are on the same spot on the balls of the feet. Follow through position is held with fingers directed at the rim until the ball hits the basket. The ball must be propelled such that it travels with back spin.

Some Shooting Drills for the Game of Basketball

1. **Shooting basics**

Set-up: Players in pairs and spread out about ten feet from each other. Basketball is given to one of the players.

Drill: Players practise their shooting technique by imagining a basket over their partner. When the partner catches the ball performs same action. This is repeated for 10 to 20 times. During the practise the coach must walk up and down the giving coaching points out to players to improve their shots. There is a variation where a set of players take a number of shots with focus on balance,

then another set focusing on for example keeping elbow in and many other techniques that comes with shooting.

2. V- cut Pass and Shoot

Set-up: Two lines are formed and the first player in each of the lines does not have a basketball in the hand.

Drill: Start with the first player in each line making a "V-Cut" at the baseline and comes back out to about 6 meters away from the basket and calls for the ball by showing all fingers palms open facing the team mate player number 2. Player number 2 then passes the ball to player number 1 after which player number 1 shoots and collects his own rebound. Player number 1 then goes to the back of the line giving his ball to number 4. Since player number 2 gave his ball to player number 1, he now makes a V- cut to the baseline and the activity is repeated for desired number of times while the coach moves round correcting errors that come with the process.

3. Bombs away

Set-up: Three lines are formed with players about 8 to 13 feet away from the basket.

Drill: Players take shots from the spots, go after their own rebound, and pass it to the next player and line. They go to the end of the line. Play for a period of time. Introduce competition where players keep track of how many shots they got in during the period of practise.

4. Pass and cut

Set-up: Two lines facing the basket. One line will pass and cut to the basket. The other line will pass and rebound.

Drill: Shooter passes the ball to teammate and cuts towards basket for return pass. Player does a lay-up the other line which passed the ball will follow and collect the rebound.

5. Two-line lay up:

Set-up: Two lines facing the rim. One line is the layup line and the other line is the rebounder's line. First two players in the layup line have a basketball.

Drill: First player in line with a ball dribbles the ball to shoot a lay-up. Shooter joins rebounding line. Rebounder joins shooting line.

6. Lay-up relay:

Set-up: Two lines of players are formed.

First player in each line has a basketball.

Drill: First player dribbles to the rim and makes a layup and collects his own rebound. He then dribbles back their line and passes ball to next player in the cue. The activity repeated till desired outcome are realised.

7. Circle lay-up:

Set-up: Odd number of players' line up for a lay-up drill. Every other player has a basketball.

Drill: Player number 1 runs to the basket to execute a lay-up. Player number 2 follows number 1 but without a basketball. When number 1 makes the layup he allows player number 2 to collect the rebound. Player number 1 does not have a basketball now and number 1 tries to run behind player number 7 who does have a ball. And next time through, player number1 collects the rebound from number 7. Number 3 and number 4 continue the drill as player number 1 and number 2 has done.

Relationship between Physical Fitness and Shooting Accuracy in Basketball

In examining the relationship among physical fitness of professional Bosnian basketball players and shooting accuracy, Pojskic, Separovic, Myratavic and Uzicanin (2014) from the University of Tuzla, Bosnia and Herzegovina found a positive relationship between basketball shooting skill tests, particularly dynamic ones and competitive shooting accuracy. There was no relationship between physical fitness and competitive shooting accuracy in the homogenous group of basketball border players. However, the researchers found out that shooting skill tests particularly the dynamic ones were better determinants of shooting accuracy during the season compared to the physical fitness. The dynamic tests also showed some relationship with the competitive accuracy of parameters though relatively small.

The major importance of the dynamic tests is their application in evaluating shooting accuracy of homogenous groups of basketball players when skill related fitness parameters cannot determine their competitive shooting accuracy. In principle, the results are very useful as they can help basketball strength and conditioning coaches create better training programmes to focus on overall explosive power development of their players. Also, the findings suggests the use of the shooting tests as an basic portion of quality and conditioning programs to assist players develop their shooting accuracy. This will empower players to be able to deal with their particular weakness so as to be more precise during competition.

Okazaki (2006) conducted a study that analyzed the speed and accuracy relationship in basketball shooting. He analyzed speed and accuracy

relationship in basketball shooting and provided avenues in the understanding of this ability. This analysis also provided the opportunity to understand better the relationship between speed and accuracy in complex movement tasks such as playing the game of basketball. The sample for the study was fifteen (15) basketball players from male adult category.

The findings indicated that when shooting speed is increased movement precision declines. Moreover, the results showed that the basketball shot executed with more prominent speed of discharge was exceptionally precise. It is believed that this trade off in speed accuracy was not confirmed in basketball shot in agreement with other factors that impact the execution of this capacity such as the angle of release and height of release. Even though the increased speed results in greater variability and as a result decrease shooting accuracy, participants appeared to have the ability to manipulate the angle and height of release to allow for a good performance.

Release speed on the other hand was not seen to be the determining factor for an accuracy of the basketball shots. So basketball players were seen to be manipulating other variables such as the angle of release and height of release to compensate for speed.

Lehnert, Hulka, Maly, Fohler, and Zuhalka, (2013) studied the effects of six (6) week polymeric training programme of explosive strength and agility among professional basketball players. Their findings showed that explosive strength of the lower limbs and agility are important aspect of a game performance in basketball. Wang (2004) conducted a study on free throw accuracy where members shot a number of free throws in low pressure and high pressure conditions. The low pressure conditions that were used included

monetary rewards, a non-distracting gathering of people, and a video recorder to record each shot the participants took. The researcher found out that high pressure conditions cause an overall decline in free throw shooting performance of basketball players.

Kozar (1994) collected data from two separate college basketball seasons and calculated free throw percentages by players in those games for both home and away. He compared them to practice free throw percentages of these players. The findings are that, players had higher practice rates since they had higher number of free throw endeavors in progression compared to amusement circumstances where players shoot as it were one or two at a time. This higher number of endeavors in progression permits the player to urge the rhythm. Game situations don't permit players to urge into this kind of rhythm. He also observed that free throw shooting for home games were higher than that of the away games. This can obviously be attributed to the fact that it is the players own court where the players train for that matter getting very used to the basket.

Kozar, Vaughn, Whitefield, Lord, and Dye (1994) analyzed play by play records of nearly five hundred college basketball season games and found that over 20% of baskets in each game was scored from free throws and out of this 35% of baskets were scored in the last five minutes were free throws, and also more than two thirds of baskets made by the winning teams in the final minutes of every game were free throws. They also found out that winning teams gained a higher percentage of their scores from free throws than losing teams. Dunn and Wozniak (1988) tried the social facilitation theory by expressing that the nearness of others would increase the execution level of those who are great at

an assignment but will diminish the execution level of those who are not too good at that same task. Participants of this study shot free throws amid two different circumstances, one while they were alone and the other while they created an amusement setting. They concluded that all subjects made a lower rate of free throws within the amusement settings.

The most related work was the relationship between physical fitness and shooting accuracy of professional basketball players by Pojskic, Separovic, Myratavic, and Uzicanin (1998) these researchers found a positive relationship between basketball shooting tests particularly dynamic ones and competitive shooting accuracy. No variable for the evaluation of physical fitness contributed to the execution of free throw shooting. High school basketball players have sometimes become professional basketball players after experiencing serious basketballs playing at the high school level. In view of this the researcher sees that it will be good to undertake a study using high school basketball players.

Theoretical Framework of the Study

Fister and Fister (2019) Theory of Sports Training

The processes involved in sports training comprise of four stages, planning, realization, control, and assessment. Within the planning stage, coaches endorse a training stack that must be overcome by the competitor. At the realization, the reaction of the competitor on the stack speaks to physical stretch. This could be measured (specifically or by implication) by a few physical measures of which heart rate is the most essential. Based on performance analysis, the sessions realized are assessed regularly at the conclusion of the training cycle. This assessment informs the coach if there should be any adjustments at the end of the training process. There are two main

adjustments that can be made in sports training. These are physical adjustment which is concerned with the athlete's body and the training arrangement adjustments made by coaches which are in relation to the training process. The physical adjustment is based on the Common Adjustment Disorder (CAS) theory of Syle. Agreeing to this theory, the athlete's body reacts to training in three stages. The shock stage, the resistance stage and the exhaustion or fatigue stage.

The shock is the response of the athlete to the sports training plan. Within the resistance stage, the athlete's body recuperates from the physical exertions experienced during training sessions and adjusts to more demands of the sports training plan. The last stage happens when the player or athlete does not have adequate time to adjust. Fatigue and weariness can develop when physical training is followed by an insufficient time of rest. A coach can build up at a few training schedules for an athlete to shape them when they are falling behind. Related components such as unacceptable natural conditions are the reason some changes in the training regime may be effected. The training technique must in any case stay unchanged though the coach can change the plan by altering some aspect of the training sessions.

Phases of Sports Training

Overseeing the training schedule is one most important role of a sports trainer. This process comprises of four stages. In spite of the fact that all four stages are more important, coaches have until as of late have concentrated on only the first two stages.

Planning

Arranging the sports training sessions is one of the essential assignments of sports coaches. In endorsing the correct work out units within the training cycle, these arrangement is what permits athletes to attain their objectives. The objective of sports training is to progress athletes and players through work outs that will make them reach their peak just in time for the competition. The objective is set for a much longer period of time or cycle (the complete season) on the specific preparing technique embraced. In this way, all work out units contributes to accomplishing the objective set for the season.

Realization

The realization of the training plan is the day by day duty of the sports coach. The most vital assignments of the coach in this stage incorporate planning. Preparation of equipment is critical in numerous sports disciplines such as ball (cones, balls, stopwatches and many others) tumbling (vaulting horse, bars, adjust bar, still rings, etc.), cycling (review of the cycle) at the starting of preparation, the coach assesses the physical and mental condition of the competitor at the warm-up stage. In case the competitor does not feel well, the plan of the sports training session must be reduced or cancelled so that the specific competitor stops training at all. The realization stage is dependent basically on the plan and the athlete's particular type of discipline.

Control

Within the realization stage, the sport coach records information about the exercises performed, orders these as wanted and puts them on the list of finished work outs. This list incorporates as it were the foremost information recorded by the coach about the training programme. By comparing the training

plan to the list of completed work outs the coach can alter the plan for future training.

Evaluation

Athlete performance during the preparation stage is eventually assessed genuinely during competitions. At this time, all the efforts made by the competitors are either compensated or not, dependent on how well this was executed. During the competition, competitors accomplish various tasks the leading observable results. In this way, all difficulties experienced during the preparations are overlooked. In fact, assessing the victory of the sports training procedure is the final assignment to be performed by the sports coach. There are two ways of preparing assessment; these are evaluating a single completed training stack also called short term execution examination and assessment of the whole training cycle known as long-term performance analysis.

Conceptual Framework

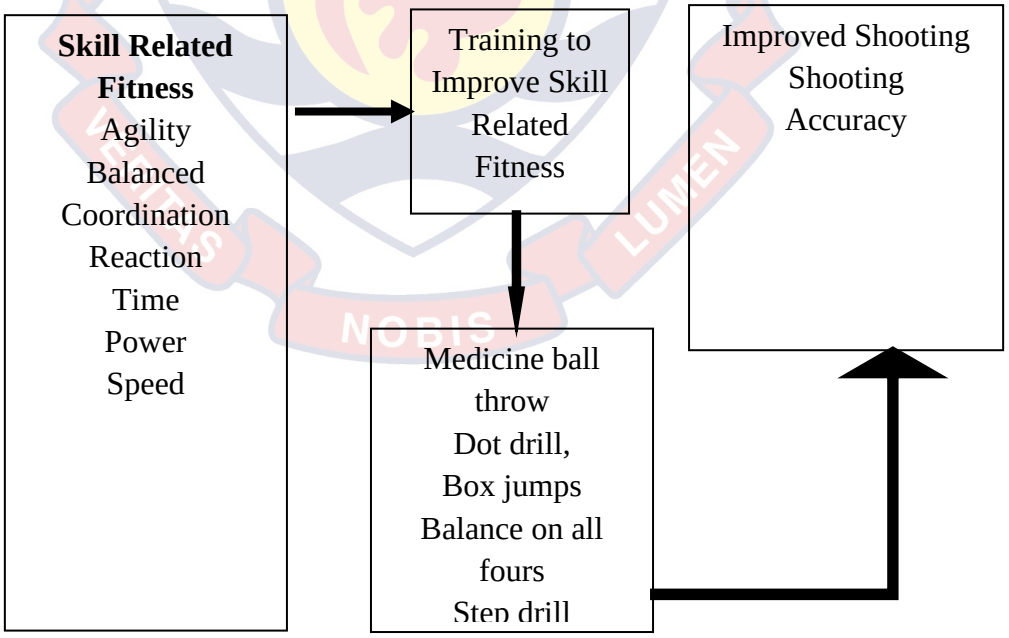

Figure 1: Conceptual Frame Work.

Chapter Summary

For a summary of literature review of this research work, there was a description of the school sports system in central region which is basically same as other regions of this country though there are minor differences in some aspects of the organizations. Physical activity was discussed in detail putting out all its categories. Also physical fitness with its two main categories health related and skill related was dealt with as far as their details are concerned. The researcher later discussed drills that improve skill related fitness. Here various drills which improve agility, balance, coordination, power, reaction time and speed was described and ways through which these drills can be performed to bring out the needed improvement in the game of basketball.

Fitness testing, a key issue about fitness was also discussed making mention of reasons for fitness testing, principles of fitness testing, factors which may affect fitness testing, various tests that can be used to for skill related fitness described in detail showing the ones that were used for this particular research. There was also a presentation on the game basketball in general and shooting in basketball to be specific and previous studies that presented the relationship between skill related fitness and shooting accuracy in basketball. Theory of sports training the theoretical framework of this research was presented as well as the conceptual framework.

CHAPTER THREE

RESEARCH METHODS

The purpose of this research work was to investigate the effect of skill related fitness on shooting accuracy among basketball players in Senior High School in the CCM. This chapter dealt with the following; research design, study area, population, sampling and sampling procedure, data collection instruments, data collection procedure and finally data processing and analysis.

Research Design

The study is an experimental research, pretest posttest control group design. Experimental research is an approach to research, where one or more free factors are controlled and connected to one or more subordinate factors to measure their impact on the dependent variable. In this case skill related fitness variables were applied to shooting accuracy to measure its effect of on shooting accuracy. The effect of the independent variables on the dependent variables is observed over a period of time to enable the researcher draw conclusions regarding the relationship between these two variables, (Pedhazur & Schmelkin, 1991).

The pretest-posttest Control Group Design was selected for the study because participants were randomly put in two groups and the experimental group taken through an intervention. After close observation both groups were post-tested at different intervals to find out the extent of change in each of the groups. Conclusions were then drawn based on the changes in the variable of study during the period of intervention.

Study Area

This research work was carried out using basketball players in all the Senior High Schools within the CCM of the Central Region of Ghana.

The Cape Coast Metropolitan Assembly is bounded on the south by the Gulf of Guinea, west by the Komenda, Edina, Eguafo, Abrem Metropolitan, east by the Abura, Asebu, Kwamankese area and north by the Twifu Hemang Lower Denkyira. The City covers an area of 122 square kilometers and is the smallest city within the nation. The capital, Cape Coast is additionally the capital of the Central Region.

The Cape Coast Metropolis is one of the seventeen (17) districts of the Central Region of southern Ghana. The capital is Cape Coast, which is additionally the capital of the Central Region. There are quite a good number of basic schools in the metropolis with some settlements having as many as three different institutions. In respect to the senior high schools which is the focus of this research there are thirteen of them. (Ghana Districts Guide, 2018). The total number of students enrolled in these schools' number twenty-three thousand nine hundred and ninety (23,990) comprising of thirteen thousand nine hundred and five (13,905) boys and ten thousand and eighty-five (10,085) girls. (Regional Education Directorate, 2018/2019 Academic year.) The total numbers of basketball players are estimated at three hundred and twenty (320) also comprising of one hundred and eighty (180) boys and one hundred and forty (140) girls. (Heads of P. E. Departments)

Most of the boys in the schools have an average age of seventeen (17) years while the girls have an average age is sixteen (16) years. In the various basketball team players of the schools these ages have also been identified as

being their average ages. Some of these boys and girls who represent their schools for basketball have been playing basketball from their primary school days while some others started at Junior High School and for some they learnt it while in the Senior High School. The playing experience of these boys and girls in playing basketball ranges from two (2) to eight (8) years. . The total number of schools which are located in the metropolis is eleven. This comprises of six mixed schools and five single sex schools. With the five single sex schools two of them are made up of only girls whiles the other three made of only boys.

Population

The study was focused on basketball players in the senior high schools of the Cape Coast Metropolis. In the Cape Coast Metropolis some high schools are single sex (male only or female only) while others are mixed (both male and female students on the same school compound). There are eleven (11) schools located in the metropolis. These consist of five (5) mixed schools, two (2) girl's schools and four (4) boy's schools (one of the mixed schools did not have a girls basketball team so was placed in this category). It is estimated that in the single sex schools we have a total of twenty (20) players playing regularly for the school team out of which twelve are selected to represent the school for competitions.

The mixed schools also have same number of twenty (20) players for each of the sexes. This makes a total of about three hundred and twenty (320) players to be involved in the study. Out of the target population of three hundred (320) students comprising one hundred and eighty boys (180) and one hundred and forty (140) girls the researcher selected two (2) boys and girls from the mixed schools and for the single sex schools two boys or girls in each case.

Ogah (2013) stated that we have to consider whether the research design is a true experiment (control group, pre-test post-test design) or a non-experiment (a cross sectional survey) in order to settle on the sample size because the former can use smaller sample sizes whiles the later requires lager sample sizes.

Since there is supposed to be equal number of boys and girls as sample some schools were picked where more than two boys or two girls were sampled for the study. In effect the sample size for girls is twenty (20) participants and that of boys is also twenty (20) participants. (The source of information with respect to numbers was obtained from the Heads of the listed schools and the Department of Physical Education for each of the schools)

Sampling Procedure

A day was set aside to select the sample for each school where players were invited to their school's basketball court for this activity. A numbering system of one to twenty was written on sheets of paper and put in an opaque bowl which was shaken well to ensure that the numbers are well mixed up. This bowl was put on a table for the players to pick a number each. Players who picked numbers two (2) and eight (8) were selected for schools that the researcher needed two students. In the case where the researcher needed four students those who picked numbers two (2) and eight (8) and twelve (12) and eighteen (18) were selected. Because the boys teams were nine and the girls teams were seven the researcher needed more than two players from certain teams to make up equal number of boys and girls for the study hence the need to select more than two participants from certain teams.

Table 5: Student Enrolment in Cape Coast Metropolis

School	Basketball Players (Accessible population)		Sample	
	Boys	Girls	Boys	Girls
Academy of Christ the King School	20	20	2	2
Cape Coast Tech. Institute	20		2	
Efutu Senior High Technical School	20	20	3	2
Ghana National College	20	20	3	4
Holy Child School		20		2
Mfantsipim School	20		3	
Oguaa senior High Tech. School	20	20	2	3
St. Augustine's College	20			
University Practice Senior High School.	20	20	2	3
Wesley Girls High School		20		4
Adisadel College	20		3	
Total	180	140	20	20

Data Collection Instruments

The skill related fitness levels of the players were tested using the following standardized skill related fitness tests:

1. The Illinois agility test (measuring agility)

2. The flamingo test (measuring balance)

3. The 40m dash (measuring speed)

4. The Ruler test (measuring reaction time)

5 The alternate hand wall toss (measuring coordination)

6. The standing broad jump and seated medicine ball (measuring power)

For each of the following tests, the participants were given three trials and the average of the three was used for analysis. All these are Eurofit test batteries with high reliability coefficients (Roozen, 2008). Meanwhile for this research, agility had a high reliability across trials with a test retest reliability coefficient of .89, the test retest reliability of the flamingo test was .82 and that of the ruler test was .79 on the other hand the reliability coefficient of the alternate hand wall toss test was reported as .87 while that of the standing broad jump was .89, also the test retest reliability of seated medicine ball toss was .85 and 40m dash reported a test retest reliability of .90

The foremost commonly utilized test to assess the basketball shooting ability is the AAPHERD ball test (Strand & Wilson, 1993), which is planned for middle and high school students, but not for competitive situations. The problem under investigation was identified during competitive situations and its application after intervention as well. The actual fact is that a key figure for effective basketball playing is shooting even though there are other important aspects of play. (Erčulj and Supej, 2006) The researcher used basketball shooting tests that are more suitable for competitors (Pojskić et al., 2011; Uzicanin et al., 2014), and to relate them with players' skill related fitness. These tests have been planned to depict more reasonable circumstances, since they require a player to put in acts that are exhibited during play.

These are;

1. The Static Free Throw

2. Dynamic Free Throw
3. Static Two Points
4. Dynamic Two Points

The validity and reliability of these basketball shooting instruments are assured since they have been used at different places over a period of time. Nonetheless the instrument was pre-tested because of slight modifications made on it. All four shooting tests has a high reliability .92. The total number of successful shots out of ten attempts in each of the categories was recorded and used for analysis.

Data Collection Procedures

The selected sample was invited to Adisadel College Basketball court where all the tests as well as the training were conducted. In the first place skill related fitness and shooting accuracy tests were conducted for all the participants and recorded. The researcher made sure that a particular test is completed for all the participants in a particular day. The sample was then broken down into two groups, the experimental and the control groups respectively using the simple random sampling. Numbers 1and 2 were written on pieces of paper and folded; these numbers were dropped for the participants to pick one each. All those who picked the number 1 constituted the experimental group while those who picked 2 formed the control group. Before each test participants went through fifteen minute of warm up which included general warm up, specific warm up as well as stretching. After the pretest the control group was taken through a normal training schedule at a separate venue where they do not see the training routine that the experimental group goes through. The experimental group was taken through the drills three times in a

week with the aim of improving their skill related fitness. The researcher selected drills that overlap (which is those that had the tendency of improving more than one fitness component at a time). Some of the drills which the researcher took the participants are Ladder drill, Step drill, Dot drill, Jump rope, Box jump, Target throwing, Ball tossing, Wheel barrow, Medicine ball rotational throws just to mention but a few. At the end of the third, sixth, ninth and the twelfth week the control group joined the experimental group for the tests to be conducted.

Skill Related Fitness Tests

There are quite a number of test protocols for the various components of skill related fitness and all of them are suitable depending on the group of people being tested and some other factors. For instance, with agility one can talk of the shuttle run test, zig zag test, hexagon test, and the 505 agility test just to mention a few but for the purpose of this research the Illinois agility test was used. With regards to balance we can decide to measure the static or dynamic balance and this can be done with the balance beam test, the flamingo balance test or the stork test. Static balance was measured and the test used was the flamingo test.

Speed can be tested with the 35m dash, the 40m dash or even 60m dash. For this research work 40m dash was used to assess the speed of the players. Quite a number of tests can be used to measure reaction time and the ruler test was selected for this work. Talking about coordination the researcher employed the alternate hand wall toss and test for power, though we can use the vertical jump test, standing broad jump or pushups depending on the part of the body we want to test. Seated medicine ball was used to test for upper body power

while standing broad jump used to test power of the lower body. The tests used for the purpose of this research work are described in detail below;

Testing for agility using the Illinois Agility Test

The Illinois Agility Test (Getchell, 1979) is a commonly used test of agility in sports, and as such there are well-established norms available. The purpose for this is to test running agility using various turns and movements.

Test objective: The objective of this test is to find the players agility level.

Things needed:

The assessor will require the following to undertake the test,

Flat surface area

Cones

Stopwatches

Assistants

Procedure:

The athlete will run the route in the diagram below.

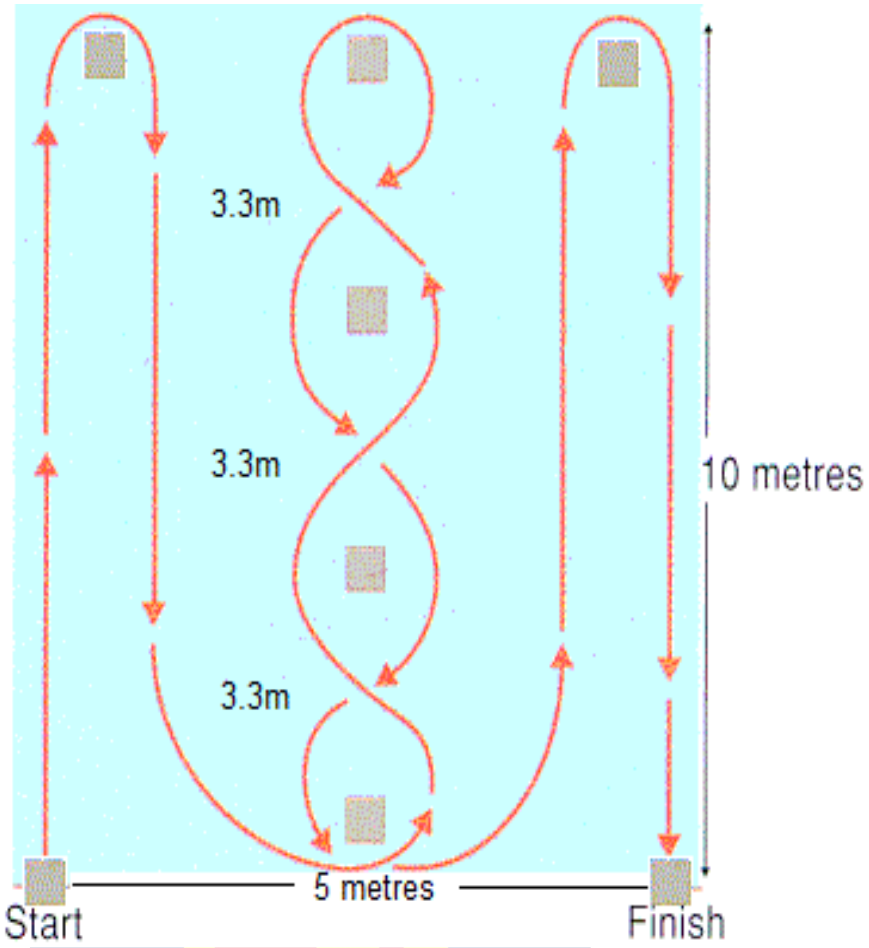

Figure 2: The Illinois agility run test.

The athlete does a warms up and stretches for 15minutes

The assistant sets up the route as in the diagram

The athlete stands ready at the "Start" cone

The assistant says "GO" and the presses the stopwatch.

The athlete starts running as fast as possible following the red line route as shown in the diagram to the finish

When the player completes the course the assistant stops the watch and writes the time used to complete.

The researcher compares his time with that of the assistant to be sure of right timing of the athlete

Each participant went through three tests and the average was used for analysis.

Testing for Balance using the Flamingo Balance Test

The Flamingo Balance Test is total body balance test which forms part of the Eurofit Testing Battery. It is single leg balance test that assesses the strength of the leg, pelvic, and trunk muscle as well as dynamic balance.

Test objective: The purpose is to ability to balance successfully on a single leg.

Things needed:

To undertake this test the assessor needs the following,

Stopwatches,

Metal beam approximately 50cm long, 5cm by 3cm width (this should be stabilized with supports at both ends and the surface must not be slippery)

Assistants

Procedure:

The player warms up and stretches for 10minutes

The player will stand on the beam (without shoes)

Keep balance while holding the instructors hand and balancing on the suitable leg and free leg is flexed at the knee and the foot of this leg held closed to the thigh.

Start the watch as the instructor lets go. Stop the watch each time the player loses balance (either by falling off the beam or letting go of the foot being held) start all over again with the timing until they lose balance.

The number of falls in 60s of balancing is counted.

Three tests were conducted for each of the participants and the average of the three used for analysis.

Testing for coordination using the Alternate Hand Wall Toss Test

The Alternate-Hand Wall-Toss Test is a test of hand-eye coordination, where the participant throw a ball against a wall from one wall in an underarm action, and attempt to catch it with the opposite hand.

Test objective: To measure hand-eye coordination (how a player can combine the senses in performing a physical activity)

Things needed:

To execute this test the assessor will need the following;

Tennis balls

Smooth and solid wall

Marking tape

Stopwatches

Assistants

Procedure:

This procedure was followed

A mark was made two (2) meters from the wall.

The participant stands facing the wall.

The ball is thrown from one hand against the wall and caught with the other hand.

The ball is thrown back with the hand that was used to catch it and thrown back with same hand.

The test continued for 30s and the total number of tosses was recorded.

If the ball fell in the process the counting is restarted without the stop of the watch.

The time constraints factor introduces working under pressure.

The table below lists general ratings for the wall toss test.

There are various varieties that can be done to the methods of this test based on the results, shape and weight of the ball, the distance from the wall, the number to be attempted and duration can all be changed.

Testing for Power using the Standing Broad Jump

The Standing long jump, also called the Broad Jump is a common test of explosive leg power. Though it an easy assessment to administer is the ideal way of testing for explosive power in the legs of athletes especially activities that require taking off and landing.

Test objective: To measure power in the lower body

Things needed: To do this test you will need the following

Chalk

Cones

Measuring tape

Assistants

Procedure:

A line was drawn on the floor where participant will stand.

The tester ensures that each participant stands with the middle of the foot right on the marked line.

Measurements were made on the line from where the participants will stand to where they landed after takeoff.

The participants take the tests in turns taking off on both feet from the line and where they landed is measured.

Measurement is taken from the foot closest to the take off line.

Each participant took three trials and the average calculated for analysis

Testing for power using the seated medicine ball toss

The seated medicine ball throw test is used to test an athlete's upper limb power. By keeping the back in contact with the wall the power of the upper body (in particular the arms and chest) is tested.

Test objective: To assess the upper body strength of participants

Things needed: The assessor will need the following to undertake this test

Cones

Measuring tape

Chalk

Assistants

Procedure:

The player sits on a line which is drawn on the floor.

The player moves the ball to the chest region and to throws it horizontally as far as possible.

The player is not permitted to move the body backwards in the process of throw and so a chair was placed behind the player.

The performance was measured from the beginning line to the spot where the ball drops.

They performed three trials, with the average result calculated and used for analysis.

Girls used a four kilogram (4kg) while boys used six kilogram (6kg) medicine ball for the test.

Testing for Reaction time using the Ruler Test

Ruler dropping test or simply the ruler test can be the easiest way of measuring reaction time but it is a very effective way of testing for reaction time

which can be referred to as reaction speed. The test requires very minimal few items and can be conducted with a small available space.

Test objective: The property of gravitational force is used to decide how long it takes an individual to reply to the dropping of an object by measuring how distant the object falls from the time it was released until being caught.

Things needed: to undertake the test we need the following

30cm Ruler

A Desk.

Assistants

Procedure:

The testee sits near the edge of a desk

The elbow is rested on the desk so that the wrist extended over the side

The tester with ruler in the air between the subjects thumb and index finger but not touching and not too wide apart

The zero mark should be aligned with the participants thumb and index fingers.

The participant indicates when they are set to go.

Without the attention of the testee the ruler is released and made to drop and the testee must catch it as fast as possible as they see it being released.

The distance the ruler dropped to is recorded on the ruler.

Three trials are taken and the average score recorded for analysis.

Testing for speed using the 40m Dash

The 40m Dash is part of the rating system for speed in many games and sports and is a reliable indicator of speed. It can also be used to test for agility and quickness in some sporting activities.

Test objective: To determine how fast a player can complete a 40 meter distance.

Things needed: to carry out this test you will need the following resources

6 Cones

2 Stopwatches

Assistants

Procedure:

The player gets ready in a 5m acceleration zone from where the player gets ready to take the test.

One assistant stands at the start line whiles the other stands at the finish line.

The player is observed while he moves towards the start line the moment he gets there the stopwatch is started (by both assistants and stopped same) to synchronize with his acceleration

The players performed three 40-meter sprints on the school field.

Participants did the tests in turns such that by the time it gets to one's turn for the second and third trial there would have been some time lapse to allow as rest period.

The average score of the three tests was used for analysis.

The timing devices started when the assistant says go, and stopped when the player crosses the finish line.

Basketball Shooting Accuracy Tests

This study utilized the following tests to measure basketball shooting accuracy.

The Static (Stationary) Free Throw Shooting Test

After the warm up depicted within the testing methods, each player performs ten consecutive free shots.

Ten basketballs were placed for the participants within the free throw area to be picked one at a time and shot. (as shown in figure 2)

The total number of successful shots was used for analysis.

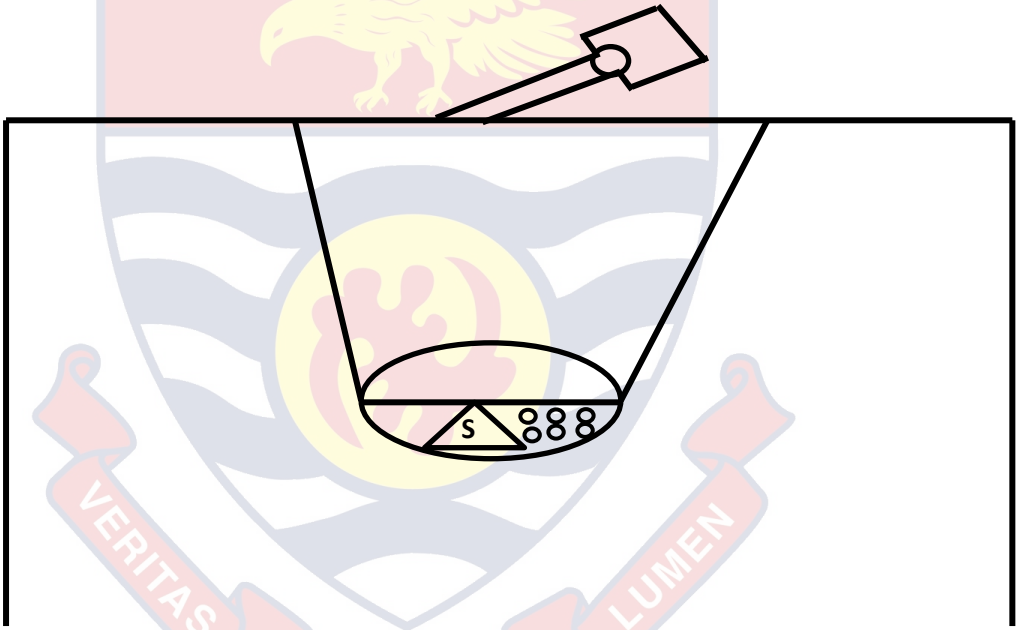

Figure 3: Static free throw test. S= Shooter (player taking the test).

2. The Dynamic Free Throw Shooting Test

Each player performed ten free throws jogging five meters between the series and receiving a pass from another player.

Each player started the test with a jog from the free throw line, made a turn around a cone 5m from the free throw line and back to receive a pass to take a shot. (as shown in figure 2)

Two players passed the balls to the player taking the test one from each side of the court.

The players performed ten free throws with a 1-minute recovery after every five shots. The total number of successful shot out of the ten was used for analysis.

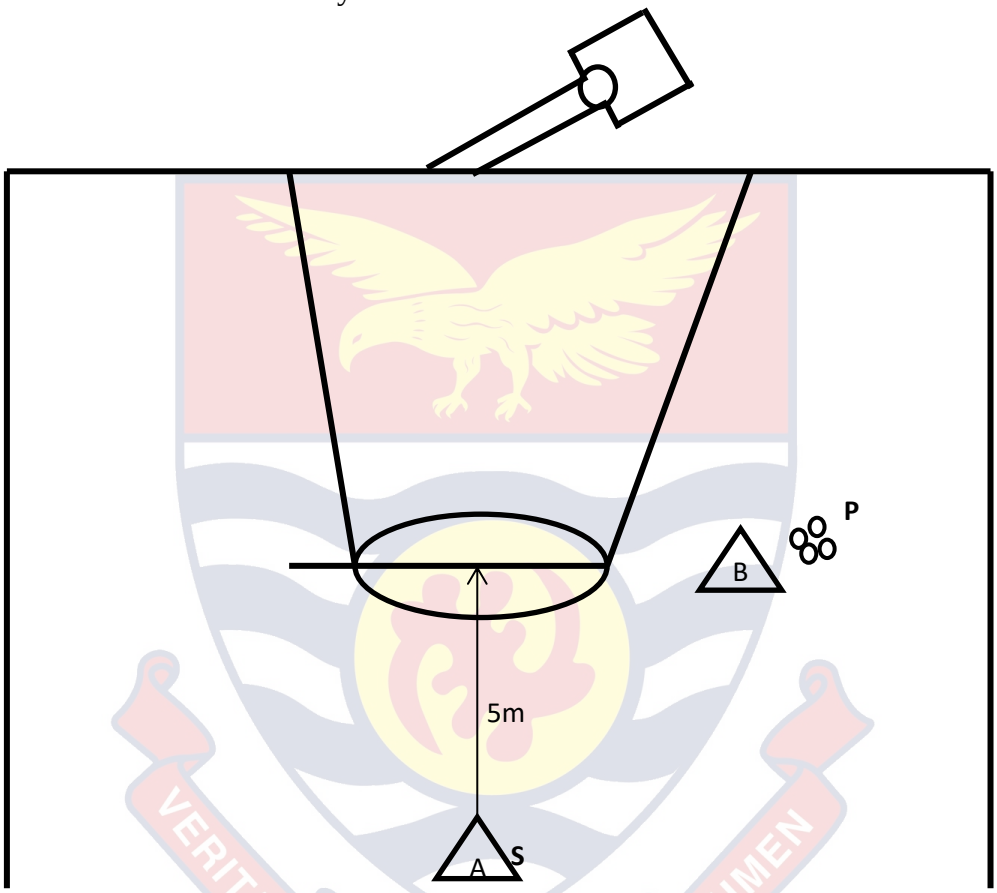

Figure 4: The dynamic free throw shooting test.

P = passer (player assisting the shooter in taking the test)

S = shooter (player taking the test)

3. The Static (Stationary) Two-point Shooting Test

Each player performed five jump shots from two different positions making ten shots in total (Figure 4)

The player's beginning point was on the right side of the rim. Shooting position was set at a separate of five meters from the vertical side of the rims middle on the ground. Five basketballs are placed beside the testee to pick and attempt a shot.

There was no time limit for the shots. The testee walks to the other wing, where the basketballs were moved to continue the shooting test.

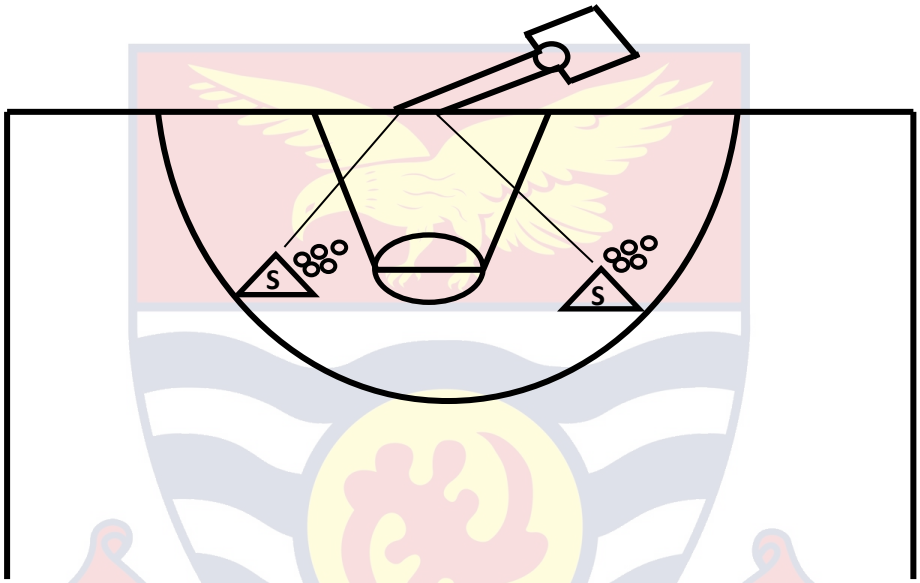

Figure 5: The stationary two-point shooting test.

S = shooter (player taking the test)

3. The Dynamic Two-point Shooting Test

The player shot five basketballs from each side of the hoop.

The player's starting position was seven meters diagonally from below the hoop (Figure 5).

A passer below the hoop gives the ball to the testees from where he bounces the ball while he runs to the hoop and attempts a shot.

The total number of successful shots out of the ten attempts was used for analysis.

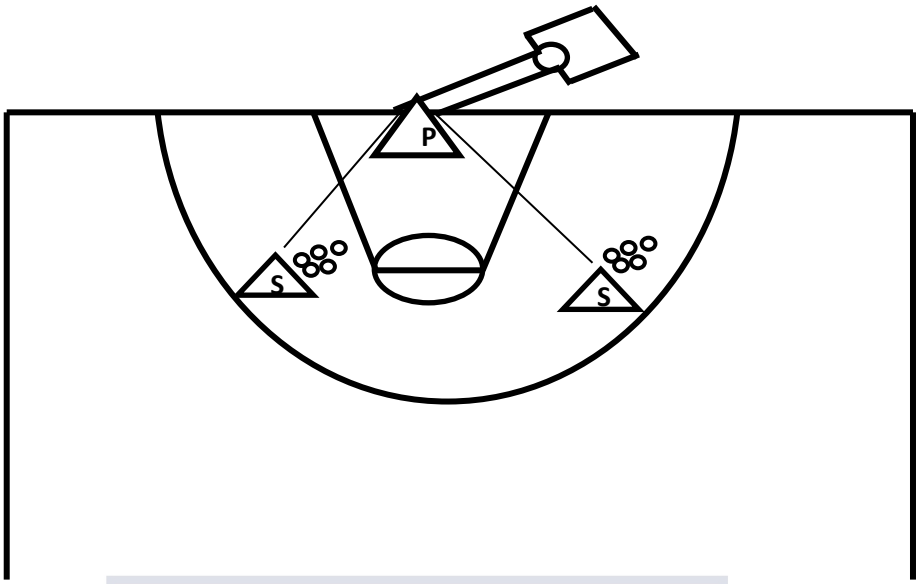

Figure 6: The dynamic two-point shooting test. P = passer, S = shooter.

After the initial tests for all the basketball players to obtain the level of their skill related fitness and shooting accuracy accordingly the experimental group was subjected to activities to improve on their skill related fitness while the control group taken through a routine training in passing and dribbling.

Intervention

The experimental group was taken through the drills three times in a week with the aim of improving their skill related fitness. The researcher selected drills that overlaps, which are those that had the tendency of improving more than one fitness component at a time. Some of the drills which the researcher took the participants through are Ladder drill, Step drill, Dot drill, Jump rope, Box jump, Target throwing, Ball tossing, Wheel barrow, Medicine ball rotational throws just to mention a few. At the end of the third, sixth, ninth and the twelfth week the control group joined the experimental group for the tests to be conducted.

The training was conducted three times in a week, Tuesdays, Thursdays and Fridays. The period for training was two hours each day which included

time when teams formed with the experimental and control group engage in a game. The routine followed included:

Warm up and stretching	15mins
Drills on related activity for the day	15mins
Workout	30mins
Water breaks	5mins
Workout continues	30mins
Game situation	15mins
Cool down	10mins

Ethical Considerations

After the introductory letter was sought from the Department of Health, Physical Education and Recreation, University of Cape Coast necessary document were added to the UCCIRB where clearance was given for the research work to be carried out.

Because the research involved the use of human subjects, protection of participant's rights were strictly adhered to. This included privacy, dignity, the right to anonymity, protection from hazard or damage and participants had the right to discontinue the practice at any point they intent to. Participants had total understanding of the forms of training they were going to engage in and while it started and along the line any issues raised by the participants were duly addressed. Data collection instruments that were used did not have any portion that the students put their names and this was purposefully done to ensure anonymity and confidentiality. There was also confidentiality during the data collection process. The consent of the various students, headmasters and headmistresses of the institutions as well as the heads of physical education

departments were sought before the study started. Participants were briefed on what they will gain from the study, protection from any injuries as well as compensation for them after the study.

Data Processing and Analysis

The data collected with regards to the skill related fitness components and shooting accuracy was entered and analyzed using SPSS Version 20.0. Analysis was done to compare the skill related fitness and shooting accuracy tests of the experimental and control groups. Dependent sample t-test was used to find out the Difference in the Skill Related Fitness as well as the Shooting Accuracy Levels of Players before and after the Intervention. Pearson's correlation was used to test whether there will be a Relationship between Skill Related Fitness and Shooting Accuracy of High School Basketball Players of the CCM.

Independent sample t-test was used to test whether there was Significant Difference in the Shooting Accuracy of the Experimental Group of Boys and Girls of High School Basketball Players in the CCM from Pretest to Week three, Week six, Week nine and Week twelve of Intervention and also whether there was a Significant Difference in the Shooting Accuracy of Experimental Group of Boys and Girls in the CCM after twelve weeks of training to improve their skill related fitness.

Chapter Summary

The researcher did an experimental research, pre-test post-test design. Experimental research, an approach to research where one or more variables are controlled and connected to a few subordinate factors to test the degree of effect of the independent variable on the dependent variable.

The effect of the independent variables on the dependent variables is usually observed and recorded over some time, to aid researchers make a sound conclusion regarding the association between these two variables (Pedhazur, & Schmelkin, 1991).

The study was focused on basketball players in the senior high schools within the Cape Coast Metropolis. In the Cape Coast Metropolitan assembly some high schools are single sex and (male only or female only) others are mixed (both male and female on same school compound). There are eleven senior high schools located in the metropolis and it was estimated that in the single sex schools we have a total of 20 (twenty) players playing regularly for the school team. In this research work the sample size was wide enough in order to be able to detect all the characteristics about the sample that will result in some kind of relationship. Simple random sampling was therefore used to select the sample for the study.

In the first place the players skill related fitness levels were tested using the various instruments that are originally designed to test the extent to which one possess a certain fitness quality. Some of the already existing tools are the 40m dash test for speed, standing broad jump for testing strength in the legs and seated medicine ball test for testing upper body strength. The rest are the Illinois agility test just to mention a few. With regards to the shooting accuracy tests the researcher adapted tools for the measurement. Tools which were adapted for testing the shooting accuracy of players are the dynamic free throw test, static free throw test and the dynamic, the static two points test, dynamic two-point test. The various teams were visited at their training grounds with the permission

of their heads of institution as well as the head of the Physical Education Department and the needed sample selected.

The selected sample met at one of the school's where they were tested for skill related fitness and shooting accuracy. The data collected with regards to the fitness components and shooting accuracy was entered on the SPSS. Analysis was for the various research questions that were asked earlier in the research. The researcher believes that the design employed for the study, an experimental design has presented better facts about the variables of study.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents and discusses findings of the research. The main objective of this study was to investigate the effects of skill related fitness on shooting accuracy among senior high school basketball players in the CCM. The researcher employed an experimental pre-test post-test design for the study. A total of forty basketball players, twenty (20) boys and twenty (20) girls at the senior high school level were used as the participants. The researcher used simple random sampling to select the participants and later divided each of the sexes into two groups thus the experimental and control groups respectively. The researcher used existing instruments; Illinois Agility test, Flamingo test, Alternate Hand Wall Toss test, Ruler test, Standing Broad jump, Seated Medicine ball and 40m Dash to test the skill related fitness of the participants and also modified the test protocol used by Uzicanin et al, (2014) for the shooting accuracy tests.

Research questions 1 and 2 were analyzed using the dependent sample t-test. Research question 3 was analyzed using Pearson correlation while hypothesis 1 and 2 were tested using the independent sample t test.

Demographic Characteristics of Respondents

The demographic characteristics of the respondents who took part in the study are presented below. Specifically, the results of the respondents are presented according to their gender, age, weight and height. Table 8 present the results of the demographic characteristics of boys and table 9 for girls.

Table 8 presents the descriptive statistics of boys used in the study. A total of twenty boys with a mean age of 17.15years and standard deviation of .74.The mean weight of boys is 73.20kg and standard deviation of 8.764. Also, the average height of boys is 1.79m and a standard deviation of .08. The minimum age for the group was 16 years while the maximum was 19 years. For weight the minimum was 53kg and maximum 88kg while for height has a minimum of 1.7 meters and a maximum of 1.9 meters. The estimation is that about 80% of the participants have regular playing time in their various school basketball teams.

Table 6: Descriptive Statistics of Boys

	Range	Minimum	Maximum	Mean	Std. Deviation
Age	3.00	16.00	19.00	17.15	0.745
Weight	35.00	53.00	88.00	73.20	8.76
Height	0 .20	1.70	1.90	1.79	0.075

N = 20

Source: Field Survey (2020)

The descriptive statistics of girls is presented in Table 9. A total of twenty girls with a mean age of 17.15 and standard deviation 1.18 were used in the study. The mean weight of girls 69.5 and standard deviation of 9.81 and height with a mean of 1.65 and standard deviation .68

The minimum age for the group was 15 years while the maximum was 20years. For weight the minimum was 60kg and maximum 105kg while for height we have a minimum of 1.6 meters and a maximum of 1.8 meters. It estimated that about eighty five percent (85%) of the participants for this group have regular playing time in their various school basketball teams.

Table 7: Descriptive Statistics of Girls

	Range	Minimum	Maximum	Mean	Std. Dev.
Age	5.00	15.00	20.00	17.15	1.18
Weight	45.0	60.00	105.00	69.50	9.81
Height	.20	1.60	1.80	1.64	0.07

N = 20

Source: Field Survey (2020)

Research Question 1: What is the Difference in Skill Related Fitness Levels between Experimental Group and Control Group among High School Basketball players in the CCM before and after the intervention?

The purpose of this research question was to determine if there is any significant difference in skill related fitness among High School Basketball players in the CCM before and after the intervention. In achieving this objective, a paired t-sample test was conducted to compare the scores of the experimental and control group at pretest and week twelve of the various aspects of skill related fitness. Table 10 presents the descriptive statistics for skill related fitness test variables for the experimental and control groups. The study employed six variables for skill related fitness. These variables are agility, balance, coordination, power, reaction time and speed. The study tested for both upper and lower body power due their usefulness in shooting. Power in the upper body was tested with seated medicine ball while power in the lower body was tested with the standing broad jump.

From the results, it is observed that for agility, the experimental group had a pre-test mean (M) = 19.00 while the control group had a pre-test mean (M) = 20.54. After the intervention the experimental group had a mean (M) = 17.75 while the control group had a mean (M) = 20.24.

In relation to balance, before the intervention, the experimental group had a mean (M) = 4.03 while the control group had a mean (M) = 4.88. The experimental group had a mean (M) = 3.32 while the control group had a mean (M) = 4.33 after the twelve week intervention. For coordination, the experimental group had a mean (M) = 20.55 while the control group also had a mean of (M) = 18.44. However, the experimental group had a mean (M) = 21.46 while the control group had a mean (M) = 18.02 after the intervention. The others were upper body power with a mean (M) = 2.40 for the experimental group and (M) = 2.21 for the control group. After the intervention, the seated medicine ball toss recorded a mean (M) = 2.87 for the experimental group and (M) = 2.20 for the control group. For the test for lower body power, the experimental group had a mean of (M) = 3.67 with a control group mean (M) = 3.46. After the intervention, the experimental group had a mean (M) = 4.02 with a control group mean (M) = 3.43 for the test for standing broad jump.

With regards to the reaction time, the experimental group had a mean (M) = 8.87) while the control group had (M) = 9.53 before the intervention. However, the mean for the experimental group and control group is (M) = 6.36 and (M) = 8.70 respectively after the intervention. Finally, the pre-test result for speed in the experimental group was (M) = 7.59 while the control group had a mean of (M) = 8.05 and after the week twelve of intervention, the mean for the experimental group was (M) = 7.18 while the control group had a mean of (M) = 8.13.

Table 8: Paired Sample Statistics for skill related fitness tests

	Control Group		Experimental Group	
Skill Related Fitness Test Variables	Mean Pretest	Mean Posttest	Mean Pretest	Mean Posttest
Agility	20.54	20.54	19.00	17.75
Balance	4.88	4.33	4.03	3.32
Coordination	18.44	18.02	20.55	21.46
Lower Body Power	3.06	3.43	3.67	4.02
Upper Body Power	2.21	2.20	2.40	2.87
Reaction time	9.53	8.70	8.87	6.36
Speed	8.05	9.03	7.59	7.18

Source: Field survey (2020)

Table 11 shows the paired sample t test for skill related fitness tests. The skill related fitness tests showed a statistical significant difference between the experimental and control group. With respect to agility there was a significant difference between the experimental and control group t(19) = -2.54, *P* =.002 (experimental group mean (M) = 19.00, SD = 4.39; control group mean (M) = 20.54, SD = 4.39) there was a statistical significant difference between the experimental and control group in respect of coordination t(19) = 2.56, *P* = .001 (experimental group mean (M) = 20.55, SD = 6.02; control group mean (M) = 18.44, SD = 6.02) the analysis also showed a statistically significant difference between the experimental and control group for lower body power t(19) = 4.38, *P* = <.001, (experimental group mean (M) = 3.67, SD = 0.59; control group mean (M) = 3.06, SD = 0.59) there was a statistical significant difference between the experimental and control group for upper body power t(19) = 10.68,

P = <.001, (experimental group mean (M) = 2.87, SD = 0.28; control group mean (M) = 2.20) Reaction time also saw a statistical significant difference between the experimental and control group t(19) = -3.11, *P* = .005, (experimental group mean (M) = 8.87, SD = 3.36; control group mean (M) = 9.53, SD = 3.36) Statistically significant difference was also recorded for speed between the experimental and control group t(19) = -1.02, *P* = <.001, (experimental group had a mean (M) = 7.18, SD = 0.91; control group mean (M) = 8.05, SD = 0.91) Meanwhile there was no statistical significant difference between the experimental and control group with balance t (19) = -1.45. *P* = .164, (experimental group mean (M) = 4.03, SD = 3.11; control group mean (M) = 4.88, SD = 3.11)

Table 9: Paired Sample Test for Skill Related Fitness Tests

Skill Related Fitness Test Variables	Mean	Std. Deviation	t- Statistic	Sig.
Agility	-2.490	4.3944	-2.535	0.002
Balance	-1.00	3.11158	-1.449	0 .164
Coordination	3.451	6.02677	2.561	<0.001
Standing broad jump	0.586	0.59936	4.376	<0 .001
Seated medicine ball	0.665	0.27835	10.684	<0.001
Reaction time	-2.337	3.36497	-3.107	0 .005
Speed	-44.32	0.91111	-1.020	< 0.001

Source: Field Survey (2020)

The finding indicates a statistically significant difference for all the skill related fitness test variables with the exception of balance. This implies that there is significant difference in skill related fitness of the experimental and

control group of High School Basketball players in the CCM. Overall finding shows that there is no significant difference in skill related fitness of the experimental and control group of High School Basketball players in the CCM before intervention but after the intervention there is a significant difference between the two groups.

This finding concurs with the findings of Kozar et al., (1994) who asserted that components of skill related fitness are necessary for playing of the game basketball. The result also follows the findings of Yilmaz (2014) who maintained that speed, agility, endurance, and coordination are essential for skillful performance. There are many instances where speed becomes of essence to a player in the course of the game of basketball. Fast breaks are ways through which most two points are scored in the game of basketball and at this point in time speed is the most important factor. During same periods as stated above defending players must be fast enough to take up their zones for marking to make it difficult for the opponent to make a successful basket. A player needs a high level of agility and coordination to be able to dribble and continue possessing the ball so as to be able to advance with it.

Research Question 2: What is the Difference in Basketball Shooting Accuracy Levels between the Experimental Group and the Control Group among High School Basketball Players in the CCM before and after the Intervention?

The purpose of this research question was to determine if there is any significant difference in the shooting accuracy among High School Basketball players in the CCM before and after the intervention. In achieving this objective, a paired t-sample test was conducted to compare the scores of the experimental and control groups at pretest and week twelve of the four shooting accuracy tests that were employed for the study.

From the group statistics result presented in Table 12, shooting accuracy before the intervention for the control and experimental group can be described with respect to the mean. In this study, four kinds of tests were used for the shooting accuracy for both experimental and control groups. These are static free throw, dynamic free throw, static two points and dynamic two points. From the result, the average value of static free throw before the intervention for experimental group is (M) = 3.60 while the control group had a mean value of (M) = 2.60. However, after the intervention, the experimental group had a mean value of (M) = 6.85 for static free throw whiles the control group had a mean of (M) = 4.40 With respect to dynamic free throw the experimental group had a pre-test mean of (M) = 3.35 while the control group pre-test mean was (M) = 2.35 but after the week twelve of intervention, the experimental group had a post-test mean of (M) = 6.65 while the control group had a post-mean of (M) = 3.90 for dynamic free throw.

With regards to static two points, the experimental group had a pre-test mean of (M) = 1.70 while the control group had a pre-test mean (M) = 2.40. Nonetheless, after the intervention, the experimental group had a mean of (M) = 6.53 while the control group had a mean (M) = 3.55 for static two points. Finally, for dynamic two points, the experimental group had a pre-test mean (M) = 5.30 while the control group had a pre-test mean (M) = 6.0. However, after the intervention, the experimental group had a mean (M) = 8.20 while the control group had a mean (M) = 5.40 for dynamic two points.

Table 10: Paired Sample Statistics for shooting accuracy tests

Shooting Accuracy (Test Variable)	Control Group		Experimental Group	
	Mean-Pretest	Mean-Posttest	Mean-Pretest	Mean-Posttest
Static Free Throw	2.60	4.40	3.60	6.85
Dynamic Free Throw	2.35	3.90	3.35	6.65
Static Two Points	1.70	3.55	2.40	6.53
Dynamic Two Points	6.00	5.45	5.30	8.20

Source: Field survey (2020)

Further analyses were performed to investigate whether there were any statistical significant difference between the control and experimental group on the variables under consideration. Table13 show these results. Results showed a significant difference between the experimental and control group in their shooting accuracy. For the shooting accuracy tests there were significant differences between the experimental and control group in all the four kinds of shooting accuracy tests used. When the researcher assessed static free throw there was statistically significant different between the experimental and control group $t(19) = 12.35$, $P < 0.001$. (experimental group mean (M) = 6.85, (SD) = 0.89; control group mean (M) = 4.40, SD = 0.89) There was also a statistical significant difference between the experimental and control group for dynamic free throw $t(19) = 19.26$, $P < .001$, (experimental group had a mean (M) = 6.65, SD = 0.64; control group with mean (M) = 3.90, SD = 0.64) and for static two point there was a statistical significant difference between the experimental and control group, $t(19) = 11.05$, $P < .001$. (experimental group mean (M) = 6.53, SD = 1.21; control group mean (M) 3.55, SD 1.21) Lastly for dynamic two

points also showed statistical significantly difference between the two group t(19) = 7.31, *P* <.001, (experimental group mean (M) = 8.28, SD = 1.68; control mean (M) = 5.45, SD = 1.68)

Table 11: Paired Samples Test for Shooting Accuracy

Paired Shooting Accuracy Test Variables	Mean	Std. Dev.	t Statistics	Sig.
Static Free Throw	2.450	0.887	12.352	<0.001
Dynamic Free Throw	2.750	0.638	19.256	<0.001
Static Two Points	3.000	1.213	11.052	<0.001
Dynamic Two Points	2.750	1.682	7.312	<0.001

Source: Field survey (2020)

From the results presented above, there was no significant differences in shooting accuracy of the experimental and control group of High School Basketball players in the CCM before intervention but after the intervention with post- test recording the highest means for all the four tests used for the shooting accuracy for experimental group there was a significant difference between the experimental and control group after twelve weeks of intervention to improve on their skill related fitness.

Research Question 3: What is the Relationship between Skill Related Fitness and Shooting Accuracy among High School Basketball Players of the CCM?

This research question aimed to find out whether there is a relationship between skill related fitness and shooting accuracy of high school basketball players of the CCM. Pearson correlation analysis was conducted and the result is presented in Table 14. Results showed a positive relationship between agility and dynamic two points, balance also related positively with static two points, coordination, lower and upper body power also related positively with all the four shooting tests. Reaction time related positively with dynamic free throw,

static two points and dynamic two points while speed related positively with static free throw. Meanwhile there was a negative relationship between agility and dynamic free throw, static two points and dynamic two points. Balance had a negative relationship with dynamic two points and reaction time also had a negative relationship with static free throw as well as speed related negatively with dynamic free throw, static two points and dynamic two points.

From the findings coordination had a strong relationship with dynamic free throw as well as speed which also had a strong relationship with dynamic two points. There was a moderate relationship between agility and dynamic free throw and with dynamic two points and also between coordination and static two points and dynamic two points as well as lower body power and dynamic two points. Seated medicine ball had a moderate relationship with static two points and dynamic two points and finally reaction time also had a moderate relationship with dynamic free throw. On the other hand there was a weak relationship between agility and static free throw and static two points, balance and all the four shooting tests. Lower body power also had a weak relationship with static free throw and dynamic free throw while upper body power also had a weak relationship with dynamic free throw. Reaction time had a weak relationship with dynamic two points and finally speed also had a weak relationship with dynamic free throw and static two points. Meanwhile it is reported from the findings that there was a very weak relationship between coordination, standing broad jump and reaction time and speed and static free throw.

These presentations show the details. Agility positively related to dynamic free throw; r(38) = 0.130, *P* = 0.583. Also, there was a positive

correlation between balance and static free throw; r(38) = 0.177, *P* = 0.456 dynamic free throw; r(38) = 0.201, *P* = 0.396 and static two points; r(38) = 0.026, *P* = 0.913. Moreover, coordination related positively to all the four shooting accuracy variables. With static free throw r(38) = 0.033, *P* = 0.891, dynamic free throw; r(38) = 0.453, *P* = 0.045, static two points; r(38) = 0.365, *P* = 0.113, and for dynamic two points; r(38) = 0.302, *P* = 0.196. From the result, lower body power (measured by standing broad jump) and upper body power (measured with seated medicine ball) positively related to all the four shooting tests. The following for lower body power, static free throw; r(38) = 0.144, *P* = 0.544, dynamic free throw; r(38) = 0.282, *P* = 0.229, static two points; r(38) = 0.048, *P* = 0.841, and dynamic two points; r(38) =0 .353, *P* = 0.127 and for upper body power its relationship is as follows. Static free throw; r(38) = 0.052, *P* = 0.892, dynamic free throw; r(38) = 0.177, *P* = 0.455, static two points; r(38) = .358, *P* = .121 and dynamic two points; r(38) = 0.347, *P* = 0.104. Reaction time had a positive relationship with dynamic free throw r(38) = 0.347, *P* = 0.134. Static two points; r(38) = 0.213, *P* = 0.368, and dynamic two points; r(38) = 0.209, *P* = 0.376. Finally it can be noted from table 17 that speed related positively with static free throw; r(38) = 0.032, P = 0.892. Meanwhile agility negatively related to static free throw; r(38) = - .092, *P* =.701 static two points; r(38) = -0.196, *P* = 0.409, and dynamic two points; r(38) = -0.438, *P* = 0.054, balance had a negative relationship to dynamic two points; r(38) = -0.156, *P* = 0.510. Reaction time with static free throw; r(38) = - 0.045, *P* = 0.849. And lastly speed had a negative relationship with dynamic free throw; r(38) = -0.239, *P* = 0.892, static two points; r(38) = -0.222, *P* = 0.340 and dynamic two points; r(38) = -0.529, *P* = 0.017. The overall results therefore show a weak positive

relationship between skill related fitness and shooting accuracy of high school basketball players of the CCM.

The findings showed how skills related fitness variables relate to shooting accuracy variables. It can be observed that agility negatively related to static free throw, static two points and dynamic two points but positively related to dynamic free throw. This implies that a player who has a high level of agility will have better shooting accuracy as far as dynamic two points is concerned but is not likely to do better with static free throw, static two points and dynamic free throw. Also, since there is a positive relationship between balance and static free throw, dynamic free throw and static two points a player who has a good balance will do better in the aforementioned but not with dynamic two points. Therefore, as players increase their ability to keep good posture during basketball game and especially when performing the shots their shooting accuracy in terms of static free throw, dynamic free throw and static two points increase.

Moreover, because coordination positively related to all the four shooting accuracy variables, a player's ability to put their senses in tune with their body parts will make him or her better shooter than the one who will fall short in coordinating one or more body parts to the other. A high level of power is needed for basketball players. From the findings it was evident that power positively related to static free throw, dynamic free throw, static two points and dynamic two points thus all the four shooting tests.

Table 12: Pearson Correlation Test

		Static Free Throw	Dynamic Free Throw	Static Two Points	Dynamic Two Points	Agility	Balance	Coordination	Upper Body Power	Lower Body Power	Reaction time	Speed
Static Free Throw	R	1										
	Sig											
	Covariance	0.450										
Dynamic Free Throw	R	0 .264										
	Sig	0.260	1									
	Covariance	0.155	0.766									
Static Two Points	R	0.411	0.261	1								
	Sig	0.072	0.266									
	Covariance	0.245	0.203	0.787								
Dynamic Two Points	R	465*	.347	454*	1							
	Sig	0.039	0.134	0.044								
	Covariance	.400	.389	.516	1.642							
Agility	R	-0.092	0.130	-0.196	-0.438	1						
	Sig	0.701	0.583	0.409	0.054							
	Covariance	-0.242	0.449	-0.683	-2.208	15.484						
Balance	R	0.177	0.201	0.026	-0.156	0.383	1					
	Sig	0.456	0.396	0.913	0.510	0.096						
	Covariance	0.249	0.370	0.049	-0.422	3.172	4.433					

Table 12: Continued

		Static Free Throw	Dynamic Free Throw	Static Two Points	Dynamic Two Points	Agility	Balance	Coordination	Lower Body Power	Upper Body Power	Reaction time	Speed
Coordination	Sig		0.891	0.045	0.113	0.196	0.030	0.272				
	Covariance		0.054	0.979	0.801	0.955	-4.709	-1.343	6.101			
Lower Body Power	R		0.144	0.282	0.048	0.353	-.235	-.364	-.111	1		
	Sig		0.544	0.229	0.841	0.127	0.319	0.115	0.640			
	Covariance		-.048	-.123	.021	.226	-.462	-.383	-.137	250		
Upper Body Power	R		0.052	0.177	0.358	0.374	-0.439	-0.182	0.322	216	1	
	Sig		0.829	0.455	0.121	0.104	0.053	0.443	0.166	36		
	Covariance		0.014	0.062	0.128	0.193	-0.695	-0.154	0.320	043		
Reaction	R		-0.045	0.347	0.213	.209	-0.273	-0.112	0.323	187	.575**	1
time	Sig		0.849	0.134	0.368	0.376	0.245	0.637	0.165	43	.008	
	Covariance		-0.065	0.649	0.403	0.573	-2.296	-.506	1.708	0.20	.494	4.577
Speed	R		.032	-.239	-.225	-.529*	.585	.465*	-.581**	0.308	.710**	-.421	1
	Sig		0.892	0.310	0.340	0.017	0.007	0.039	0 .007	0.187	0	0.065	
	Covariance		0.022	-0.212	-.202	-0.686	2.333	993	-1.455	-.156	-0.289	.912-	1.027

Source: Field survey (2020)

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

**. Correlation is significant at the 0.01 level (2-tailed).

This implies that a high level of power possessed by a player will improve the particular players shooting accuracy as asserted by Boone and Bourgois (2013). Thus coordination, lower and upper body power are an indispensable aspect of a player's fitness in the game of basketball.

Reaction time had a positive relationship with dynamic free throw, static two points and dynamic two points and so it can also be stated that for high school basketball players of the metropolis reaction time will also improve on their shooting if they are taken through drills to improve it even though it does not seem to have improved their shooting as far as static free throw was concerned. Therefore, as players develop proper ability to react or respond quickly to what they hear, see, or feel, their shooting accuracy increase especially dynamic free throw, static two points and dynamic two points. Finally, speed had a positive relationship with static free throw but inversely related to dynamic free throw, static two points and dynamic two points.

From the findings, it can be asserted that there is positive relationship between skills related fitness and shooting accuracy of high school basketball players of the CCM. This finding authenticates with the discoveries of Lehnert, et al,. (2013) and Harris, et al.,(1998) who found a positive relationship between basketball shooting tests particularly dynamic ones and competitive shooting accuracy. Because of those developments are regularly performed by players amid distinctive positions (blocking, shooting and bouncing back) maneuvers, vertical bounce and sprint work out are the fundamental for motor components of basketball (Adelkerim et al., 2007; McInnes 1995). One of the factors affecting performance

in basketball is jump power (Greene, 1998; Maji (1998) posited that strength is an essential aspect of physical conditioning and is a requirement in various sports disciplines for that matter not excluding basketball. The result, however contradicts the findings of Hum-Kinet (2012), Thorland (1987) who found no relationship between any measures of strength, single sprint performance and shooting accuracy in basketball.

Hypothesis 1: **There will be a Significant Difference in the Shooting Accuracy of the Experimental Group of High School Basketball Players in the CCM from Pre-test to Week Three, Week Six, Week Nine and Week Twelve of Intervention.**

To achieve this objective, paired sample t-test was conducted to determine whether there is significant differences in the skill related fitness and shooting accuracy of the experimental group of High School Basketball Players in the CCMA at Pre Test, Week Three, Week Six, Week nine and Week Twelve of intervention. The results are presented using descriptive analysis and the test of significant difference in the shooting accuracy of the experimental group of High School Basketball Players at Pre Test, Week Three, Week Six, Week nine and Week Twelve of intervention.

Results showed a statistically significant difference in the shooting accuracy of the players between pretest and week six t(19) = -4.56, P = < 0.001. (pretest mean (M) = 3.67, SD = 1.19; week six mean (M) = 5.06, SD = 1.13) There was also a statistically significant difference in the shooting accuracy between week pretest and week nine t(19) = -13.06., P = < 0.001 (Pretest mean (M) = 3.67, SD = 1.19; Week nine mean (M) = 6.67, SD = 0.77) and also between Pretest and Week twelve t(19) = 1.19, P = < 0.001, (Pretest mean (M) = 3.67, SD = 1.13; Week twelve

mean (M) = 7.06, SD = 0.68) Nonetheless there was no statistically significant difference in the shooting accuracy of the experimental group between Pretest and Week three t(19) = -0.844, *P* = 0.388**, (**pretest mean (M) = 3.67, SD = 1.19; week three mean (M) = 3.96, SD = 1.37)

Table 13: Pair t-test for shooting Accuracy

		Mean	Std. Dev.	T	df	Sig
Pair 1	Pre-Test	3.67	1.19	-0.884		0.388
	Week 3	3.96	1.37		19	
Pair 2	Pre-Test	3.67	1.19	.568		<0.001
	Week 6	5.06	1.13		19	
Pair 3	Pretest	3.67	1.19	.685		<0.001
	Week 9	6.67	0.77		19	
Pair 4	Pre-Test	3.67	1.19	-13.062		<0.001
	Week 12	7.06	0.68			

Source: Field survey (2020)

The finding reveals a significant difference in the shooting accuracy of the experimental group of High School Basketball Players from Pre Test to Week six, Week nine and Week twelve of intervention but no statistically significant difference in shooting accuracy from Pre Test to Week Three. For that matter the hypothesis that there will be a significant difference in the shooting accuracy of the experimental group of High School Basketball Players in the CCM from Pre-test to Week three, Week six, Week nine and Week twelve of intervention was not rejected.

The improvement in shooting accuracy after the week six of training is certainly due to the consistent effort devoted in the training. By implication, from

the sixth week the players had developed some level of speed, power, explosiveness and agility that are needed for Basketball players to improve shooting accuracy. This finding is consistent with the findings of Kozar, et al, (1994) who asserted that components of skill related fitness are necessary for playing of the game basketball so at a point where their skill related fitness has improved their shooting consistently improved. This implies that shooting accuracy has greatly improved during the twelve weeks of the intervention. It is obvious that shooting accuracy improved during the twelve weeks of the intervention because the players had acquired all the necessary fitness and skills required to improve their shooting accuracy.

After the twelve weeks of the intervention, the players were able to attain some appreciable amount of speed, agility, balance, coordination, power and reaction time. These when an athlete possess helps improve performance for their particular sport or activity. This finding is consistent with the findings of Boone and Bourgois (2013) who asserted that players who possess the necessary fitness variable will have improved performance during a basketball game. Hoffman (1996) asserted that basketball demands that a person is physically fit in nature as well as technically and tactically able for better performance. Physical fitness has been considered a pivotal part of the game and enables players to reach the high level performance in the game of basketball. Power in the legs helps a great deal to attain good jump during rebounds in offense and defense. Physical fitness, technical and tactical abilities are key things needed for best performance in the game of basketball. There should be a combination of all these three at a time since the

inadequacy of one of them may result in not being able to match at that aspect hence not being able to compete with that team.

Fitness is vital at all levels of but very important for progressed players. It is exceptionally valuable for beginners who need to develop their abilities during play through great fitness standards. Fitness permits players to deal with their physical needs of the game of basketball. It is an obvious fact to state that during competition the fitness of a player can be a decisive determinant of success, especially competitions that span a period of time. The fitness of a player is very important and skill related fitness which has also been referred to as game related fitness is the most important in this discussion.

The finding indicates an improvement in shooting accuracy from the Pre-test to week six, week nine and week twelve with the exception of week three because training adaptations had not taken full effect. This shows that there was a statistical difference in the shooting accuracy of the experimental group of High School Basketball Players in the CCM at Pretest to week six, week nine and week twelve of the intervention but not in week three. This result implies that shooting accuracy did not improve during the third week of the intervention. This was due to the fact that at week three the intervention may be too short to improve on the players shooting accuracy.

It is also possible that the one week rest given to the players after finishing the years' tournament was not enough for them to recover from the fatigue as most of them were seen not putting so much in the training that sought to improve their shooting accuracy at the initial stages of the training process. This is supported by

Olcay (2016) who posited that fatigue levels of physical exertion affects shooting accuracy of young basketball players because these shooting skills deteriorate. The game of basketball imposes both physical and mental demands on players and these demands become more intense as the game progresses. In games where both teams seem to have equal strength the metal demands are even worse. As young players they may not have gained the requisite experience to deal with this phenomenon the reason why most young players suffer a deterioration of their shooting and other skills as they are exposed to a certain level of fatigue and physical exertion.

Hypothesis 2: **There will be a Significant Difference in the Shooting Accuracy of the Experimental Group of Boys and Girls of High School Basketball Players in the CCM after Twelve Weeks of Training to Improve on their Skill Related Fitness.**

To achieve this objective, an independent samples t-test was employed since the number of distinct groups that were considered in the study was just two, boys and girls. The four kinds of test used for the shooting accuracy was employed. Table 16 presents the results of the descriptive statistics and independent t-test respectively.

The results of the independent sample test as presented in Table 15. From the result (Mean value) indicates that there is a difference between the experimental group of boys and girls of High School Basketball Players for all the four kinds of test used for the shooting accuracy. Clearly, the result shows that the degree of experimental boys in relation to all the four kinds of shooting accuracy test is higher than that of experimental girls. To verify whether these differences are statistically significant, an independent sample t test was conducted. The results are presented in Table 17. From the independent sample t- test the Levene's test for equality of

variances for all the four kinds of shooting accuracy test is insignificant since the significant value is greater than 0.05. As a result, the t test for equal variances assumed was used.

The results showed a statistical significant difference between the experimental group of boys and girls for static free throw t(19) = -.325, *P* = .004, (with boys mean (M) = 7.90, SD = 0.73; and girls mean (M) = 5.50, SD = 0.63) and dynamic free throw t(19) = -.325, *P* = .001. (boys mean (M) = 7.10, SD = 0.738; girls mean (M) = 6.20, SD = 0.788) and there was a statistical significant difference between the experimental group of boys and girls in dynamic two points t(19) = 3.53, *P* = .002 (boys mean (M) = 9.00, SD = 1.05; girls mean (M) = 7.40 SD = 0.966) However no statistical significant difference was also found between boys and girls in static two points t(19) = 1.28, *P* = .216 (boys mean (M) = 6.80, SD = 0.91; girls mean (M) = 6.30, SD = 0.82).

Table 14: Group Statistics for shooting Accuracy

	Sex	Mean	Std. Dev.
Static Free Throw	Girls	6.80	0.63
	Boys	6.90	0.74
Dynamic Free Throw	Girls	6.20	0.79
	Boys	7.10	0.74
Static Two Points	Girls	6.30	0.82
	Boys	6.80	0.92
Dynamic Two Points	Girls	7.40	0.97
	Boys	9.00	1.05

Source: Field survey (2020)

Table 15: Independent Sample T- test for shooting Accuracy

		Levine's Test for Equality of Variances		
		F	T	Sig (2 tailed)
Static Free Throw	Equal variances assumed	0.099	-0.325	0.749
	Equal variances not assumed		-0.325	0.749
Dynamic Free Throw	Equal variances assumed	0.258	-2.635	0.017
	Equal variances not assumed		-2.635	0.017
Static Two Points	Equal variances assumed	0.009	-1.282	0.216
	Equal variances not assumed		-1.282	0.216
Dynamic Two Points	Equal variances assumed	0.000	-3.539	0.002
	Equal variances not assumed		-3.539	0.002

Source: Field Survey (2020)

The findings clearly shows that there was a significant difference in the shooting accuracy of the experimental group of boys and girls for dynamic two but the rest the shooting tests used for the research; static free throw, dynamic free throw and static two points showed no statistical significant difference between the experimental group of boys and girls after twelve weeks of training. Because there was a significant difference in only one out of four shooting tests used for the research, the hypothesis that there will be a significant difference in the shooting accuracy of experimental group of boys and girls after twelve weeks of intervention was rejected.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the research work was to investigate the effect of skill related fitness variables; agility, balance, coordination, speed, power and reaction time on shooting accuracy among high school basketball players of the CCM after taking them through twelve weeks of training to improve on their skill related fitness.

Summary

Physical fitness has been considered an essential part of the aspects that enables players to get to the highest level of performance in basketball. Powerful legs offer assistance so much in accomplishing a good jump during rebounds in attack and defense. Arm strength gives more force in fast breaks and shooting. Speed and agility are imperative qualities that offer assistance for a player to run quicker and alter directions in a game which is required most regularly in a game of basketball. Balance assists in controlling the body during jump shots and while taking rebounds either attacking or defending. Skill related fitness is important at all levels of the game of basketball though very crucial when it comes to advanced players.

Physical fitness generally allows players to deal with the physical needs of the game as well as allowing for the efficient use of their technical abilities and techniques in the game. The game of basketball is considered highly competitive

so needs high level of fitness qualities. The major physical qualities are explosive strength, endurance, agility, speed and different coordinative capacities. Basketball also requires a high degree of movement, and the players ought to be physically fit to have control over the game, (Ramesh, 2015).

Many researchers have conducted studies on the factors which contribute to the success in the game of basketball. Among the discoveries are those who reported on specialized aptitudes as well as anthropometric and physical characteristics which influence basketball player's game. Since shooting is an essential ability in basketball, appropriate technique usage has continuously been the consideration of players and coaches.

The purpose of the research work was to investigate the effects of skill related fitness on shooting accuracy among high school basketball players of the CCM. In view of this the research work also studied the correlation between physical fitness parameters and shooting accuracy and also found out the difference in shooting accuracy between the experimental and control group.

Research evidence shows that about 20% of all points accumulated in a game come from a free throw shot (Kozar et al, 1994). The free throw shot is classified as the easiest shot for a basketball player because the player stands alone fifteen (15) feet away from the hoop with no interference. Considering the above statements, it was a worrying trend to find out that over the past three years the best free throw shooter of the researcher's team has had an average of 50% success rate. There was a comparison of data collected during a basketball season for some girls and boys schools in the Central Region.

The following research questions guided the researcher to conduct the study;

1. What is the Difference in Skill Related Fitness Levels between the Experimental Group and Control Group of High School Basketball Players in the Cape Coast Metropolis before and after the Intervention?
2. What is the Difference in Basketball Shooting Accuracy Levels between the Experimental Group and Control Group among High School Basketball players In the CCM before and after Intervention?
3. What is the Relationship between Skill Related Fitness and Shooting Accuracy among High School Basketball Players of the Cape Coast metropolis.

Hypothesis

1. There will be a Significant Difference in the Shooting Accuracy of the Experimental Group of High School Basketball Players in the Cape Coast Metropolis form Pre Test to Week three, Week six, Week nine and Week twelve of Intervention.
2. There will be a Significant Difference in the Shooting Accuracy of the Experimental Group of Boys and Girls of High School Basketball Players in the CCM after Twelve Weeks of Training to Improve on their Skill Related Fitness.

In respect of this literature review will be outlined under the following;

The school sports system

Physical Activity

Physical Fitness

Health related Fitness

Skill Related Fitness

Drills that improves skill related fitness

Fitness Testing

The game basketball

Shooting in Basketball

Relationship between Skill Related Fitness and Shooting Accuracy

Theoretical Framework

Conceptual Framework

Summary of the literature review

The study was focused on basketball players in the senior high schools of the Cape Coast Metropolis. In the Cape Coast Metropolitan assembly some high schools are single sex (male only or female only) while others are mixed (both male and female students on the same school compound). There are eleven (11) schools located in the metropolis. These consist of five (5) mixed schools, two (2) girl's schools and four (4) boy's schools (one of the mixed schools did not have a girls basketball team so was placed in this category). It is estimated that in the single sex schools we have a total of twenty (20) players playing regularly for the school team out of which twelve are selected to represent the school for competitions.

The mixed schools also have same number of twenty (20) players for each of the sexes. This makes a total of about three hundred and twenty (320) players to be involved in the study. Out of the target population of three hundred (320) students which will comprise of one hundred and eighty boys (180) and one

hundred and forty (140) girls the researcher selected two (2) boys and girls from the mixed schools and for the single sex schools two boys or girls in each case. Since there is supposed to be equal number of boys and girls as sample some schools were picked where more than two boys or two girls were sampled for the study. In effect the sample size for girls is twenty (20) while that of boys is also twenty (20) (The source of information with respect to numbers was obtained from the Heads of the listed schools and the Department of Physical Education for each of the schools)

A day was set aside to select the sample for each school where players were invited to their basketball court as they gather for their usual training schedule. A numbering system of one to twenty was written on sheets of paper and put in an opaque bowl which was shaken well to ensure that the numbers are well mixed up. This bowl was put on a table for the players to pick a number each. Players who picked numbers two (2) and eight (8) were selected for schools that the researcher needed two students. In the case where the researcher needed four students those who picked numbers two (2) and eight (8) and twelve (12) and eighteen (18) were selected.

In the first place, all the student's skill related fitness levels were tested on the first week of meeting using the various instruments that are originally designed to test the extent to which one possess a certain skill related fitness quality. The following tests were adopted for the skill related fitness test.

Agility – The Illinois Agility Test

Balance – The Flamingo Test

Speed – 40m Dash

Reaction time – Ruler Test

Coordination – Alternate Hand Wall Toss

Power – Standing Broad Jump and Seated Medicine Ball Test

For each of the following test the participants were given three trials and the average of the three was used for analysis.

The most commonly used test to evaluate basketball shooting is the AAPHERD basketball shooting test (Strand & Wilson, 1993) usually particularly used for middle school and high school students and not for competitors. In that regard due to the knowledge of the problem under investigation and the fact that it was identified under competitive situation and also the key factor for successful basketball playing is accurately shooting after high intensity movements with some level of fatigue impacts (Erčulj & Supej, 2006), the researcher used basketball shooting tests that are more fitting for competitors (Pojskić et al., 2011) and (Uzicanin et al., 2014) These tests have been planned to stimulate more realistic situations of the game since they require a player to put some amount of motion receive the ball and perform the shot. These are:

Static free throw test

The dynamic free throw test

Static two point test

Dynamic two point test

These instruments validity and reliability are assured since it's been used at different places over a period of time. The instrument was pre-tested. The total

number of successful shots out of ten attempts in each of the categories was recorded and used for analysis.

The sample was invited to Adisadel College Basketball court where all the tests as well as the training were conducted. In the first week of meeting participant's skill related fitness and shooting accuracy were tested and recorded. The researcher made sure that a particular test is completed for all the participants in a particular day. The sample was then broken down into two that is the experimental and the control groups respectively using the simple random sampling. Before each test participants went through fifteen minute of warm up which included general warm up, specific warm up as well as stretching. After the pretest the control group stopped coming to the venue while the experimental group continued coming and were taken through the drills three times in a week with the aim of improving their skill related fitness.

The researcher selected drills that overlaps, which are those that had the tendency of improving more than one fitness component at a time. This was to bring some level of efficiency in the training program. Some of the drills which the researcher took the participants are Ladder drill, Step drill, Dot drill, Jump rope, Box jump, Target throwing, Ball tossing, Wheel barrow, Medicine ball rotational throws just to mention a few. At the end of the third, sixth and the twelfth week the control group joined the fro the tests to be conducted but in each case after the tests they go back until the next time of testing. This is to make way for comparison so that later decisions will be taken in accordance with the data analysis findings.

The data collected with regards to the skill related fitness components and shooting accuracy was entered on the (SPSS Inc., Chicago, IL; Version 20.0). Analysis was done to compare the skill related fitness and shooting accuracy tests of the experimental and groups. Dependent sample t test was used to test whether there will be any significant difference in the skill related fitness levels and also shooting accuracy of players before and after the intervention. Pearson's correlation was used to find out the relationship between skill related fitness and shooting accuracy of high school basketball players of the CCMA. Independent sample t-test was used to test the hypothesis that there will be significant difference in the shooting accuracy of players from pretest three weeks, six weeks, nine weeks and twelve weeks of intervention and also the hypothesis that will be no significant difference in the shooting accuracy of the experimental groups of boys and girls of High School Basketball Players in the Cape Coast Metropolitan Assembly after twelve weeks of training to improve their skill related fitness.

Findings

The finding from the analysis of research question 1 indicated a statistically significant difference for all the skill related fitness test variables with the exception of balance. This implies that there is significant difference in skill related fitness of the experimental and control group of High School Basketball players in the CCM. Overall finding shows that there is no significant difference in skill related fitness of the experimental and control group of High School Basketball players in the CCM before intervention but after the intervention there is a significant difference between the two groups.

Findings of research question 2 presented no significant differences in shooting accuracy of the experimental and control group of High School Basketball players in the CCM before intervention but after the intervention with post- test recording the highest means for all the four tests used for the shooting accuracy for experimental group there was a significant difference between the experimental and control group after twelve weeks of intervention to improve on their skill related fitness.

The findings of the correlation results of research question 3 showed that skills related fitness variables relate to shooting accuracy variables. It can be observed that agility negatively related to static free throw, static two points and dynamic two points but positively related to dynamic free throw. Also, there was a positive relationship between balance and static free throw, dynamic free throw and static two points. Coordination also positively related to all the four shooting accuracy variables. From the findings it was evident that power positively related to static free throw, dynamic free throw, static two points and dynamic two points in effect all the four shooting tests.

Reaction time had a positive relationship with dynamic free throw, static two points and dynamic two points. Finally, speed had a positive relationship with static free throw but inversely related to dynamic free throw, static two points and dynamic two points. Overall findings points to the fact that there is positive relationship between skills related fitness and shooting accuracy of high school basketball players of the CCM.

The findings of hypothesis 1 indicated an improvement in shooting accuracy from the Pre-test to week six, week nine and week twelve with the exception of week three. This shows that there was a statistical difference in the shooting accuracy of the experimental group of High School Basketball Players in the CCM at Pre-test to week six, week nine and week twelve of the intervention but not in week three. This result implies that shooting accuracy did not improve during the third week of the intervention.

For hypothesis 2 findings clearly shows that there is significant difference in the shooting accuracy of the experimental group of boys and girls for dynamic two points but the rest the shooting tests showed no significant difference between the experimental group of boys and girls after twelve weeks of training. For this reason the hypothesis that there will be no significant difference in the shooting accuracy of experimental group of boys and girls after twelve weeks of intervention was not rejected.

Conclusions

It can be concluded from the study that skill related fitness is one of the key factors which affects the shooting accuracy of basketball player of the CCM. From the data analysis there was a significant relationship between agility, balance, power, reaction time and speed with the skill performance of basketball. Based on the result and discussion it was evident that skill related fitness is a very important factor which affects the shooting accuracy of basketball. The findings of the present study show mainly positive correlations between independent variables and basketball shooting accuracy. The shooting ability of basketball player enhanced

by agility, balance, coordination, power reaction time and speed all of which had positive association with most of the shooting tests.

From the study the researcher can attribute the poor shooting accuracy of basketball boys and girls of the metropolis to lack of attention to their skill related fitness during preparation for competitions. And it is so because of inadequate time for preparing the teams. Critically looking at the calendar of activities there is always a limited time for preparation hence some of these very important things about team preparation is likely to be overlooked. In effect the problem of poor shooting accuracy of basketball players in the metropolis will be dealt with when coaches plan very well assessing and finding ways of improving on the skill related fitness of players.

Recommendations

1. Physical Education teachers as well as coaches must as much as possible test their basketball players skill related fitness and shooting accuracy and design activities to improve on them as the season progresses. Tests must be conducted in the course of the season to track improvement in performance of the players or otherwise and also to plan for the season.
2. Training to improve on skill related fitness of basketball players in the metropolis must take at least six weeks because it was from the sixth week that the researcher observed improvement in the various aspects.
3. Physical Education teachers and coaches must select activities or drills which overlaps (improves more than one fitness variable at a time) during training

sessions since this will help in making good use of the limited time available for team preparation.

Suggestions for Further Research

1. Relationship between skill related fitness and shooting accuracy among High School Basketball Players in Central Region, Ghana
2. Relationship Between Upper Body Strength And Shooting Accuracy Among High School Basketball Players in the Cape Coast Metropolis, Ghana

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APPENDICES

APPENDIX A

Permission letter to heads of schools

Wesley Girls High School
P. O. Box 61
Cape Coast

28th August 2019

THE HEAD OF SCHOOL
ADISADEL COLLEGE
CAPE COAST

Dear Sir/Madam,

PERMISSION TO ENGAGE SOME SELECTED STUDENTS OF YOUR SCHOOL FOR RESEARCH

I will be very grateful if you allow some selected basketball players to be engaged in a research work. The work is an intervention which seeks to address the poor shooting accuracy of basketball players of the schools in the Metropolis as identified by the researcher. Players who will been selected at random will go through training sessions three times a week for twelve weeks.

The training and all tests that will be carried out thereof will be done on the Adisadel College

School field and the basketball court. Thanks for your usual cooperation.

Yours faithfully

Cc ALL HEADS OF SCOOLS, CAPE COAST METRO

ALL HEADS OF DEPARTMENT (P.E.)

……

Alexander Eshun

(0206246742)

APPENDIX B

PERMISSION TO THE HEAD OF SCHOOL WHOSE FACILITY WAS USED FOR INTERVENTION

Wesley Girls High School

P. O. Box 61
Cape Coast
28th August 2019

THE HEADMASTER
ADISADEL COLLEGE
CAPE COAST
Dear Sir,

PERMISSION TO USE YOUR SCHOOL FIELD/BASKETBALL COURT FOR RESEARCH INTERVENTION ACTIVITIES

I will be very grateful if you allow me use your school field and the basketball court a research work. The work is an intervention which seeks to address the poor shooting accuracy of basketball players of the schools in the Metropolis as identified by the researcher. Players who will been selected at random will go through training sessions three times a week for twelve weeks.

I have selected your school for the training and all tests that will be carried out thereof due of its proximity to all the schools where participants have been drawn for the study

Thanks for your usual cooperation.

Yours faithfully

……

Alexander Kweku Eshun

(0206246742)

APPENDIX C

INTRODUCTORY LETTER

UNIVERSITY OF CAPE COAST
CAPE COAST, GHANA
COLLEGE OF EDUCATION STUDIES
FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION
Department of Health, Physical Education & Recreation

TELEPHONE: +233 -0206610931/0543021384/0268392819
TELEX: 2552, UCC, GH.
Email:hper@edu.gh

Cables & Telegrams:
UNIVERSITY, CAPE COAST

Ref. No. **ET/MPE/17/0001/3**

24th June, 2019.

The Chairman
Institutional Review Board
University of Cape Coast
Cape Coast

INTRODUCTORY LETTER: ALEXANDER KWEKU ESHUN (ET/MPE/17/0001)

The bearer of this letter is an MPhil (Physical Education) student of the above department. In partial fulfilment of the requirements for the programme, he is conducting a study on the topic **"Relationship Between Skill Related Fitness and Shooting Accuracy of Basketball Players of the Cape Coast Metropolis"** and would need ethical clearance from your outfit.

We would therefore be most grateful if assistance could be offered to him to carry out the research.

We count on your co-operation.

Thank you.

Dr. Daniel Apaak
HEAD

APPENDIX D

ETHICAL CLEARANCE

UNIVERSITY OF CAPE COAST
INSTITUTIONAL REVIEW BOARD SECRETARIAT
TEL: 0558093143 / 0508878309/ 0244207814
C/O Directorate of Research, Innovation and Consultancy
E-MAIL: irb@ucc.edu.gh
OUR REF: UCC/IRB/2B/220
YOUR REF:

7TH JULY, 2020

Mr. Alexander Kweku Eshun
Department of Health, Physical Education and Recreation
University of Cape Coast

Dear Mr Eshun,

RE: ETHICAL CLEARANCE ID (UCCIRB/CES/2019/28)

We write with reference to your letter dated 16th June, 2020 requesting for a change of you ethical clearance approved topic due some changes you have made in your thesis after Dat Collection. This is to inform you that the University of Cape Coast Institutional Review Boar (UCCIRB) has given approval to enable you change your topic from *Relationship between Skil Related Fitness and Shooting Accuracy of High School Basketball Players of the Cape Coas Metropolis* to **Influence between Skill Related Fitness and Shooting Accuracy of Hig School Basketball Players of the Cape Coast Metropolis.**

On the basis of that:

1. Your approval reference number remains **UCCIRB/CES/2019/28.**
2. Your research aim and/ or objectives remain the same as earlier approved.
3. Your study setting, sample and sampling procedure remain unchanged.
4. Any modification to the above by you nullifies your ethical approval.

The UCCIRB appreciate your effort and concern for improving and maintaining the rights of research participants.

Yours faithfully,

Samuel Asiedu Owusu, PhD
UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST

APPENDIX E

SHOOTING ACCURACY TEST (PRE TEST)

	SFTEXPT	DFTEXPT	STPEXPT	DTPEXPT	SFTCOPT	DFTCOPT	STPCPT	DTPCOPT
1	3	3	6	8	3	5	6	10
2	4	5	2	3	3	4	4	9
3	5	2	2	5	5	6	2	10
4	3	6	1	10	3	3	0	9
5	6	4	4	5	3	2	1	10
6	3	1	4	9	6	3	3	8
7	5	3	1	6	4	2	2	8
8	3	2	4	8	3	1	3	8
9	5	5	0	10	2	5	3	8
10	5	4	3	7	3	3	1	8
11	5	2	3	6	1	1	2	3
12	2	6	2	2	0	2	0	5
13	2	2	1	5	4	2	1	6
14	2	1	1	2	1	2	0	0
15	5	2	0	3	2	1	1	2
16	2	1	1	1	2	1	1	1
17	4	5	4	7	3	2	3	4
18	2	2	3	1	1	0	0	0
19	4	5	3	3	2	0	0	4
20	2	6	4	5	2	2	2	8

SHOOTING ACCURACY TEST (WEEK THREE)

	SFTEXPT	DFTEXPT	STPEXPT	DTPEXPT	SFTCOPT	DFTCOPT	STPCPT	DTPCOPT
1	4	3	3	6	4	4	4	4
2	3	5	5	9	4	4	4	7
3	5	5	2	10	5	5	2	10
4	4	5	4	9	3	3	2	7
5	6	5	4	7	5	5	1	10
6	3	3	4	8	3	3	3	10
7	5	4	3	5	3	4	3	6
8	4	2	4	10	4	1	3	8
9	5	4	3	9	3	5	3	10
10	4	3	3	6	7	5	2	7
11	4	3	3	4	2	2	2	3
12	3	4	3	4	2	0	2	3
13	2	3	1	3	1	1	0	2
14	4	2	1	5	2	1	1	2
15	1	1	1	2	2	2	1	2
16	4	3	0	4	4	4	2	5
17	3	2	2	2	1	2	0	1
18	5	5	5	7	3	1	1	3
19	2	2	2	1	5	5	3	5
20	3	5	5	5	3	2	2	6

SHOOTING ACCURACY TEST (WEEK SIX)

	SFTEXPT	DFTEXPT	STPEXPT	DTPEXPT	SFTCOPT	DFTCOPT	STPCPT	DTPCOPT
1	5	5	5	7	4	4	5	9
2	5	5	5	6	4	4	4	6
3	7	5	6	7	6	5	4	8
4	5	5	5	8	4	3	3	6
5	7	6	5	8	5	5	5	7
6	5	5	5	8	5	5	4	5
7	5	5	5	7	3	4	3	6
8	6	5	5	9	4	4	4	8
9	5	5	6	7	4	4	4	7
10	5	5	6	8	6	4	3	6
11	5	4	4	5	3	2	3	3
12	5	4	4	6	2	1	2	2
13	4	5	3	5	2	2	0	2
14	5	4	3	4	2	2	2	2
15	4	3	1	4	3	3	2	4
16	5	5	3	5	3	3	2	4
17	3	3	3	3	2	2	1	2
18	7	5	5	8	3	2	2	3
19	4	2	2	4	4	4	4	5
20	5	5	5	7	3	3	2	5

SHOOTING ACCURACY TEST (WEEK NINE)

	SFTEXPT	DFTEXPT	STPEXPT	DTPEXPT	SFTCOPT	DFTCOPT	STPCPT	DTPCOPT
1	7	6	7	9	4	5	5	8
2	7	6	6	7	4	4	4	6
3	8	7	8	8	5	5	2	8
4	7	7	7	10	4	3	3	6
5	7	7	7	9	5	5	5	7
6	7	8	6	9	6	4	4	6
7	6	8	5	7	3	3	3	6
8	6	7	7	8	4	4	5	8
9	6	8	7	9	6	4	4	7
10	7	7	8	10	5	3	3	6
11	7	6	7	7	4	4	5	3
12	5	7	7	8	5	3	2	3
13	7	6	6	8	4	3	3	3
14	7	7	6	7	5	4	4	5
15	7	6	5	8	3	3	3	5
16	6	7	7	6	4	3	2	4
17	6	5	6	7	4	3	3	5
18	5	6	7	9	4	2	2	4
19	7	6	5	8	5	4	4	6
20	8	6	7	7	5	4	4	5

SHOOTING ACCURACY TEST (WEEK TWELVE)

	SFTEXPT	DFTEXPT	STPEXPT	DTPEXPT	SFTCOPT	DFTCOPT	STPCPT	DTPCOPT
1	7	7	7	9	4	4	5	9
2	6	6	6	8	4	4	4	6
3	8	7	8	8	6	5	4	8
4	7	6	7	10	4	3	3	6
5	7	7	7	10	5	5	5	7
6	7	8	6	9	5	4	4	5
7	6	8	5	7	3	3	3	6
8	7	7	7	10	4	4	4	7
9	6	7	7	9	5	4	4	7
10	8	8	8	10	6	3	3	6
11	7	6	7	7	4	5	5	3
12	6	6	7	8	5	3	3	4
13	7	5	6	8	4	3	3	2
14	7	7	6	7	4	4	4	5
15	7	6	5	7	3	3	3	5
16	6	7	7	6	4	2	2	4
17	6	5	6	6	5	3	3	5
18	8	7	7	9	4	2	2	3
19	7	6	5	8	4	4	4	6
20	7	7	7	8	5	3	3	5

EXPERIMENTAL GROUP BOYS (WEEK TWELVE)

	SFTEXPBWK12	DFTEXPBWK12	STPEXPBWK12	DTPEXPBWK12
1	7	7	7	9
2	6	6	6	8
3	8	7	8	8
4	7	6	7	10
5	7	7	7	10
6	7	8	6	9
7	6	8	5	7
8	7	7	7	10
9	6	7	7	9
10	8	8	8	10

EXPERIMENTAL GROUP GIRLS (WEEK TWELVE)

	SFTEXPGWK12	DFTEXPGWK12	STPEXPGWK12	DTPEXPGWK12
1	7	6	7	7
2	6	6	7	8
3	7	5	6	8
4	7	7	6	7
5	7	6	5	7
6	6	7	7	6
7	8	7	7	9
8	7	6	5	8
9	7	6	5	8
10	7	7	7	8

APPENDIX F

SKILL RELATED FITNESS TEST INSTRUMENT

SKILL RELATED FITNESS TESTS PRE TEST

	AGI EXPPRE	BAL EXPPRE	COR EXPPRE	SBJ EXPPRE	SMB EXPPRE	REA EXPPRE	SPE EXPPRE
1	18.30	5.60	22.00	3.50	2.83	12.00	7.61
2	18.20	6.30	21.70	4.60	2.93	8.00	6.52
3	17.50	0.00	21.70	3.80	2.93	13.00	6.84
4	17.00	0.70	25.30	4.00	2.97	8.30	5.77
5	18.40	0.70	21.30	4.30	2.67	9.30	6.77
6	19.40	7.00	23.00	3.30	2.47	8.30	7.18
7	19.30	2.70	21.70	3.30	2.47	14.30	7.19
8	19.20	8.00	19.30	3.80	2.27	9.00	7.09
9	17.10	0.70	23.30	3.90	2.70	8.00	6.53
10	18.00	0.00	21.70	3.60	2.47	8.30	7.31
11	18.74	3.30	20.70	3.67	2.10	3.70	8.00
12	20.60	6.30	16.30	4.43	1.70	8.00	8.50
13	18.75	1.00	18.30	3.80	2.40	5.70	8.00
14	19.41	0.00	15.70	3.97	2.30	6.70	7.70
15	19.76	7.30	18.00	3.97	2.10	9.00	8.50
16	22.08	7.70	15.70	2.80	1.90	10.70	8.20
17	18.98	6.00	18.70	3.30	2.30	14.30	8.30
18	21.25	0.00	21.30	3.53	2.30	8.00	9.20
19	19.80	10.30	13.70	3.17	2.10	7.70	8.30
20	18.35	7.00	27.00	2.63	2.00	5.00	8.30

	AGI CONPRE	BAL CONPRE	COR CONPRE	SBJ CONPRE	SMB CONPRE	REA CONPRE	SPE CONPRE
1	17.80	3.30	21.70	3.53	2.57	8.70	6.20
2	19.20	0.30	24.00	3.32	1.80	8.00	6.83
3	18.00	3.70	21.70	4.23	2.93	10.70	6.64
4	25.50	1.00	25.70	3.40	3.00	11.70	6.92
5	17.60	2.70	23.00	3.80	2.53	10.70	6.89
6	18.60	5.70	22.30	3.20	2.43	17.00	7.14
7	18.00	0.70	21.30	3.30	2.38	9.70	6.53
8	18.70	0.00	18.70	3.10	2.30	11.30	7.30
9	18.70	2.30	21.30	3.70	2.68	13.00	6.84
10	18.70	5.70	21.30	3.80	2.40	9.00	6.28
11	21.30	7.30	14.00	4.03	2.20	7.70	8.60
12	20.86	1.00	14.70	3.57	2.00	9.00	8.80
13	20.50	6.30	15.30	2.90	2.20	4.70	9.00
14	19.70	7.30	14.70	2.90	2.20	6.70	10.00
15	29.66	5.00	14.70	3.27	1.50	11.00	12.00
16	21.34	10.70	14.00	2.90	1.90	9.70	9.20
17	22.77	8.30	13.70	3.80	1.70	7.70	8.50
18	19.84	7.30	13.00	3.73	2.10	9.00	9.30
19	22.10	14.30	23.30	3.07	1.70	10.00	9.60
20	21.81	4.70	10.30	3.67	1.70	5.30	8.40

	AGI EXPWK12	BAL EXPWK12	COR EXPWK12	SBJ EXPWK12	SMB EXPWK12	REA EXPWK12	SPE EXPWK12
1	17.34	4.61	22.67	3.83	3.73	8.67	6.74
2	17.53	3.33	24.33	4.87	3.07	5.00	5.71
3	18.23	5.33	21.00	3.73	3.67	9.33	6.47
4	17.72	0.67	24.00	4.50	3.33	8.00	5.43
5	17.80	0.67	20.33	4.80	3.23	6.67	6.46
6	18.43	2.00	24.33	3.60	2.73	6.00	6.43
7	18.80	3.00	25.00	3.67	2.90	10.00	6.59
8	18.51	5.67	21.00	3.63	2.70	8.67	6.70
9	17.15	2.00	22.70	4.40	3.40	6.33	5.73
10	17.40	0.33	23.33	3.97	2.80	8.00	6.88
11	18.10	2.33	22.00	3.90	2.47	5.00	7.37
12	19.80	3.57	21.00	4.70	2.47	5.33	8.27
13	18.50	0.67	24.00	4.30	2.70	5.61	7.53
14	19.30	4.00	21.67	3.97	2.60	5.00	7.50
15	19.35	4.00	20.67	3.40	2.50	5.33	8.13
16	19.17	5.00	22.00	3.67	2.70	5.67	8.63
17	18.80	0.67	20.00	3.63	2.73	9.33	7.75
18	19.77	6.67	22.33	4.27	2.47	4.00	8.20
19	19.25	5.00	21.33	4.47	2.60	7.67	8.74
20	18.07	7.00	21.67	3.03	2.50	5.67	8.40

	AGI CONWK12	BAL CONWK12	COR CONWK12	SBJ CONWK12	SMB CONWK12	REA CONWK12	SPE CONWK12
1	19.73	5.33	20.33	3.30	3.03	8.00	7.03
2	17.15	1.67	22.67	3.37	2.07	8.70	6.77
3	18.27	0.00	21.67	3.60	2.93	9.67	6.67
4	19.37	3.33	23.33	3.33	2.90	8.00	7.13
5	18.90	4.67	20.33	3.70	2.43	10.00	7.00
6	18.60	1.00	22.00	3.67	2.33	15.33	7.27
7	18.10	2.00	21.33	3.50	2.27	8.00	7.03
8	18.73	5.33	16.67	3.30	2.50	8.87	7.17
9	18.88	2.67	21.00	3.83	2.57	10.33	6.97
10	18.23	5.00	22.33	3.67	2.37	8.33	6.67
11	22.33	6.67	22.67	4.00	2.23	9.33	7.30
12	21.76	0.67	18.00	3.30	1.07	10.67	9.10
13	22.35	5.33	16.67	2.97	2.23	7.00	8.96
14	21.88	5.67	18.67	3.07	2.17	7.33	9.50
15	30.53	4.67	16.00	3.03	1.70	8.67	11.75
16	21.19	8.33	23.00	2.80	1.90	7.33	9.47
17	22.63	7.67	16.33	3.77	1.83	7.00	8.30
18	19.73	6.67	12.00	3.13	1.77	8.00	9.07
19	21.90	6.33	24.33	3.57	1.90	7.67	8.90
20	21.30	3.67	17.33	3.70	1.80	6.00	8.40