

**EVALUATION OF KNOWLEDGE, ATTITUDES AND PRACTICES OF
DOPING AMONG ELITE MIDDLE AND LONG DISTANCE RUNNERS IN
KENYA**

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DECLARATION

This thesis is my original work and has not been presented for examination in any other University.

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DEDICATION

To my late mother Mary Sitienei, who never lived long to read this work. She was my academic icon, the source of my inspiration and the person behind my every success in life. She passed away on the 6th of March 2013, when I was at the height of data collection.

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ABBREVIATIONS AND ACRONYMS

AAS	Anabolic Androgenic Steroids
AAF	Adverse Analytic Finding
ACE	Angiotensin Converting Enzyme
ADO	Anti-Doping Organization
ADRV	Anti-Doping Rule Violations
AIDS	Anti Immune Deficiency Syndrome
AK	Athletics Kenya
ANOVA	Analysis of Variance
CNS	Central Nervous System
DEA	Drug Enforcement Administration
DCO	Doping Control Officer
EPO	Erythropoietin
ENT	Ear Nose & Throat
ESPN	Entertainment and Sports Programming Network
FIFA	Federation of International Football Associations
GP	General Practitioner
hGH	Human Growth Hormone
IAAF	International Association of Athletics Federation
IOC	International Olympic Committee
KADA	Kenya Anti-Doping Agency
LH	Luteinizing Hormone
NACADA	National Agency for Campaign against Drug Abuse
NADO	National Anti-Doping Organizations
NCAA	National College Athletics Association

NOCK	National Olympic Committee of Kenya
NSAID	Non-Steroidal Anti Inflammatory Drug
OTC	Over The Counter drugs
PEAS	Performance Enhancement Attitude Scale
PEDs	Performance Enhancing Substances
PFC	Perfluro Chemicals.
rhGH	recombinant Human Growth Hormone.
RADO	Regional Anti-Doping Organization
TUE	Therapeutic Use Exception
SMS	Short Message Service
UK	United Kingdom
UNESCO	United Nations Educational Scientific and Cultural Organization
USA	United States of America
WADA	World Ant- Doping Agency

OPERATIONAL DEFINITIONS OF TERMS

Doping:

Use of artificial substances or methods to enhance sports performance.

Knowledge:

Refers to Kenyan elite athletes' awareness with regard to doping issues. This include doping substances, methods, testing procedures, athlete's rights and responsibilities, therapeutic exception rule, health and career effects of doping.

Attitude:

Refers to the feelings and opinions of Kenyan elite athletes towards doping regulations, testing procedures and actual practice of doping.

Practice of Doping:

Refers to the occurrence of one or more of the eight anti-doping rule violations stipulated in the WADA code as indicated in appendix six (WADA, 2011) among Kenyan elite athletes.

Elite Athletes:

Used to refer to Kenyan athletes who have competed at national and international levels.

Evaluation:

Is the systematic assessment of athletes' knowledge, attitude and practice of doping in order to establish the degree to which they are aware about doping regulations, their feelings and opinions about doping and the extent to which they practice doping.

Therapeutic Use Exemption (TUE):

Permission granted to an athlete by an Anti-Doping Organization to use, for therapeutic purposes, a substance or method included in the Prohibited List.

Performance Enhancing Drugs (PEDs):

Drug substances used by athletes in order to improve their abilities and thus enhance performance, and which has been banned by WADA.

Nutritional Supplements:

Substances or products, normally in form of tablets, capsules, powder or liquid, rich in specific food nutrients, commonly consumed to supplement diet in order to improve athletic performance or aid in recovery from injury.

Traditional Herbal Medicine:

Substances, usually in form of plant roots, leaf, bark or stem, derived from herbs, used for treatment of ailments. They are naturally produced by crashing, boiling or burning the plant substances and constitute the traditional form of medicine.

Natural Substances:

Organic compounds produced from natural sources such as plants, animals or soils, and can be used both as medicine or food supplements. They are normally consumed in their natural form without chemical processing.

Prohibited/Banned Substances:

Refers to all substances that have been classified by WADA as performance enhancing substances, and which have been banned under the WADA code.

Middle and Long distance runners

Athletes competing in events ranging from 800m to 10 000m, cross-country and marathon races.

ABSTRACT

The purpose of this study was to assess the knowledge, attitude and practice of doping among elite middle and long distance runners in Kenya. The main objectives were to establish the athletes' level of awareness with regard to doping information disseminated by World Anti-Doping Agency (WADA), to determine their attitude towards doping and to establish the occurrence of anti-doping rule violations among the athletes. The study also investigated the most common sources of doping information used by the athletes and the association between gender, age, experience and doping knowledge. The target population was Kenyan elite middle and long distance runners. A stratified sample of 432 male and female athletes in middle and long distance running was selected from the population of Kenyan elite athletes. A total of 327 athletes successfully completed the questionnaires. The study was a cross sectional survey based on self-reported questionnaires. Data generated was analyzed using SPSS computer software version 17.0. Overall mean score on knowledge of doping by Kenyan athletes was established to be 46.4%, with male scoring slightly higher than females (47.7% and 44.7%) respectively. Assessment of attitude revealed that majority (82.3%) of Kenyan athletes had a negative attitude towards doping with varying degrees. Only 17.7% indicated a positive attitude. On assessment of prevalence of doping among Kenyan athletes, majority of the athletes (96%) denied having ever used Performance Enhancing Drugs (PEDs), only 4% admitted having used it. But asked whether they knew anyone using it, 38% admitted it while 62% did not. Twenty one point four (21.4%) of the athletes also admitted using herbal and nutritional supplements of which 54% indicated medium to low knowledge of the supplements. The most common source of doping information used by Kenya athletes was established to be Athletics Kenya (30.6%), followed by IAAF (19.4%). The most preferred website was AK, at 41.3%, followed by WADA at 12.3%. In conclusion, Kenyan runners have slightly below average knowledge on doping issues and a strong negative attitude towards the practice. Actual practice of doping is low. Pearson chi square indicated a significant association between age and knowledge of doping (χ^2 value 31.6, $p = .002$). Pearson correlation indicated a weak correlation between gender and knowledge (Pearson correlation = .008 and $p = .147$) while experience did not have a significant association with knowledge ($\chi^2 = 8.03$, $p = .531$). There is need to enhance doping education to improve on knowledge of doping issues and to establish proper structures and policies of doping control in order to comprehensively curb the problem of doping.

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CHAPTER ONE

INTRODUCTION

1.0 Background to the Study

Kenya is popularly known for its excellence in middle and long distance races. Kenya's sterling performance in marathon, cross country, middle and long distance racing has put her in the limelight of the world. This phenomenological success in athletics can be traced back to 1964 when she won her first Olympic medal through Wilson Kiprugut (Bale& Sang, 1996). In 1968, Kenya won its first gold medal and by 1972, it made remarkable mark in athletics after winning the men's 4x400m relay. Kenya displayed another remarkable performance in the 1988 Seoul Olympics when she won four gold medals. The feat was repeated in the 2008 Beijing Olympics where she won 6 gold, 4 silver and four bronze medals, all in middle and long distance racing (IAAF, 2011).

Kenyan athletes have not only excelled in track athletics but also in cross country and marathon, both at senior and junior levels (IAAF, 2011). In 2010, Kenya dominated the IAAF World Cross Country Championship taking all the individual and team titles. Kenyan women have not been left behind in sports excellence. They took the top three positions in marathon and 10,000m during the 2011 World Championship series. At regional level, Kenya has swooped nearly all medals on offer in three distinct series of the African Cross Country Championship, the 2011, 2012 and 2014 series (IAAF, 2014). Though Kenya's performance was not remarkable in the 2013 London Olympics, David Rudisha smashed a long time record in 800m, while Ezekiel Kemboi

put a sterling finish in the 3000m steeple chase. Kenya was able to recover its glory in the 2013 World Athletics Championship with five gold medals to take home.

Several scholars have sought to establish the reasons behind Kenya's phenomenological success in middle and long distance racing (Scotts & Pitsilladis (2007), Onywera (2009), Elbe, Madsen & Midtgard 2010) and Hamilton (2000). Among the factors that have been explored are diet and lifestyle, genetic predisposition, environmental influence and motivational factors. Scotts and Pitsiladis (2007) conducted a study to ascertain the assumptions that Kenya's dominance in middle and long distance running could be a result of genetic makeup. However, findings of the research did not indicate any unique genetic makeup that could be attributed to excellence in running. Another study conducted by Onywera (2009) sought to establish the role of geographical location and environmental influence on sports performance. The study highlighted the significance of environmental and social factors as contributing to success of Kenyan runners in athletics.

The role of motivational factors as a possible reason for Kenyan success in athletics has been investigated in two studies. A study conducted by Elbe et al., (2010) established that Kenyan runners are motivated by extrinsic reasons compared to their Danish counterparts who were included in the study. This opinion is supported by the findings of a study by Onywera, Scott, Boit & Pitsiladis (2006) which demonstrated that majority of Kenyan runners were motivated by economic reasons. Another recent study, also conducted by Onywera (2009) sought to establish the foundations of Kenya's running dominance, particularly the role of diet and lifestyle, talent identification and injury management. The study established that Kenyan athletes have benefited more

from use of basic equipment and amenities that are available within their environment than use of technology.

All the above studies have explored possible reasons for Kenyan success in athletics but none has explored the possibility of use of performance enhancing drugs. Several gaps have been identified by observers and journalist among them with regard to implementation of World Anti-Doping Agency (WADA) regulations. Among the gaps is the fact that a number of Kenyan athletes have tested positive for medicinal drugs that are prohibited or have been consumed above the levels allowed by WADA. Examples include Cosmas Ndeti and William Tanui who tested positive for ephedrine and claimed to have taken it over the counter as cold remedy (Manners, 1997). This raises queries on their levels of knowledge of what is allowed or not allowed, and about their knowledge of Therapeutic Use Exception Rule.

A second gap that has been evident in the implementation of doping regulations in Kenya is the occurrence of an incident where a Kenyan athlete refused to provide samples for test, a situation that portrays ignorance of international testing procedures. The case of John Ngugi who was banned for four years after refusing to provide sample is an example (Luhtala, 2002). The ban was later reduced after an appeal. This raises queries on athletes' awareness about doping procedures.

Studies conducted on Kenyan athletes have also raised similar concerns on Kenyan athletes awareness of what is prohibited by the World Anti-Doping Agency (Kimiye & Simiyu, 2009, Otieno & Offula, 2009). The studies reveal wide use of recreational drugs, herbal medicine and dietary supplements by Kenyan sportsmen and women on

one hand, but on the other hand, there is little evidence of athletes' awareness of the risk associated with use of these substances with regard to doping control regulations. A study conducted by Kimiywe *et al* (2009), revealed that Kenyan rugby players have limited knowledge of use dietary supplements though they rampantly used it.

Another study conducted by Onywera *et al.*, (2006), which investigated diet and lifestyle of Kenyan runners revealed that Kenya runners still value traditional food types and medicine. Here again, there is no evidence of the athletes' awareness of the risk of using traditional diet and medicine with regard to doping. A study conducted by Otieno and Ofulla (2009) on recreational drug use in western Kenya indicated rampant abuse of alcohol (57.9%), tobacco (34.7%) and cannabis (18.3%) and khat (23.1%) by its subjects. The study further revealed that the users had very scanty knowledge of effects of the drugs. Research has shown that a number of supplements available in many countries contain banned substances such as stimulants, hormones and pro-hormones. Two studies (Schanzer, 2002 & Geyer, 2004) have confirmed these claims.

The World Anti-Doping Agency (WADA) uses its website as a main tool of disseminating information to athletes and other stakeholders. Recent studies have portrayed internet access in Kenya as being generally very low (Ochara, 2008, Kamau & Ouma, 2008, Gituma *et al.*, 2009). This casts doubts as to whether Kenyan athletes have adequate access to information disseminated by WADA. It is not clear whether there is disparity in knowledge of doping between male and female athletes both at junior and senior categories since no study has been conducted on the same. The current study investigated the extent to which the problem affects Kenyan elite athletes, by

finding out if Kenyan athletes access information disseminated via websites, sports organizations and sports officials.

1.1 Statement of the Problem

A number of Kenyan athletes have tested positive for either medicinal or recreational drugs prohibited by WADA during competitions (IAAF, 2011). Examples include; Susan chepkemei and Lydia Cheromei who tested positive for medicinal drugs, David Munyasa and Komen who tested positive for recreational drugs. In all the cited incidences, the athletes did not apply for the Therapeutic Use Exemption (TUE) and neither did they make appeals after the cases were determined. Such cases of doping portray Kenyan athletes as being largely ignorant of banned substances, doping test procedures and their rights and responsibilities. No studies have been done to establish the athlete's level of awareness of doping regulations stipulated by WADA. The current study aimed to establish this crucial information that can be used in the improvement of doping education programs in the country.

Recently (2013) the IAAF banned three top Kenyan athletes for doping; Wilson Erupe Loyanae, a two time winner of Seol marathon, Nixon Kiplagat and Moses Kurgat, both renowned Kenyan distance runners (AK, 2013). Furthermore the recent statistics released by WADA and published by AK (2013) on the list of athletes serving a ban for doping indicated a drastic rise of Kenyan athletes in the list, from 4 in 2010/2011 to 17 in 2012/2013 representing an increase by 425%. Regrettably most of the cases tested positive for PEDs rather than medicinal or recreational drugs as witnessed in the past. There has also been wide allegations of doping by Kenyan athletes by both print and

electronic media and even among the athletes' themselves. Two Kenyan athletes, Moses Kiptanui and Mathew Kisorio have openly confessed that doping is rife in Kenya (BBC Interview, 15th February 2013) This has raised concern by WADA who has issued stern warning to Kenya Government to address the issue.

While many studies have been conducted on possible factors that could be responsible for Kenya's running dominance in middle and long distance races (Scotts & Pitsilladis (2007), Onywera (2009), Elbe, Madsen & Midtgard 2010 and Hamilton, 2000), none of the studies has explored possible use of performance enhancing substances. This is what the current study aimed to establish.

Studies have established that use of Performance enhancing substances have adverse negative effect on athletes health even long after one has stopped using them (Takala, Ruokommen & Webster, 1993, Christian, 2001, Laurent *et al.*, 2004). Increased practice of doping among Kenyan athletes therefore, jeopardizes their health now and in future. Furthermore it is likely to spoil the integrity of the sport in the country, which for a long time has been the source of national pride. Individual athletes who dope also risk cutting their careers short, which is a source of livelihood for their families and development income for the nation. Doping is therefore an emerging problem which must be tackled at root level, before it gets out of hand hence this study.

1.2 Purpose of the Study

The purpose of this study was to evaluate the knowledge, attitude and practice of doping among Kenyan elite middle and long distance runners.

1.3 Objectives of the Study

1. To evaluate the knowledge of doping among Kenyan elite runners.
2. To assess the attitude of Kenyan elite runners towards doping.
3. To establish possible practice of doping among Kenyan elite runners.
4. To assess athletes' knowledge and use of herbal and nutritional supplements.
5. To establish the common sources of doping information used by Kenya elite runners.
6. To identify the factors that influence doping practice among Kenyan elite runners
7. To determine if there is an association between age, gender, and experience of athletes and their knowledge of doping.

1.4 Research Questions

- a) What is the level of knowledge of doping among Kenyan elite runners?
- b) What is the attitude of Kenyan elite runners towards doping?
- c) To what extent do Kenya elite middle and long distance runners practice doping?
- d) What is the level of knowledge and use of herbal and nutritional supplements among elite runners?
- e) What are the common sources of doping information used by Kenyan elite runners?
- f) What factors influence the practice of doping among the athletes?
- g) Is there an association between age, gender, experience and the knowledge of doping among athletes?

1.5 Research Hypotheses

H₀₁ There is no significant association between gender of athletes and their knowledge of doping

H₀₂ There is no significant association between age of athletes and their knowledge of doping

H₀₃ There is no significant association between athletes' length of experience and their knowledge of doping.

1.6 Significance of the Study

This research provides information that might be used as a basis for improving doping education in the country and thus addresses the problem at its roots. With the improved educational programs, athletes will be able to make informed decisions when faced with issues regarding doping, thus may be in a position to safeguard their health and careers which are a major source of income for their families and an economic resource to Kenya as a nation. This will also safeguard the integrity of sport in Kenya. The research identified reasons that have led to no-compliance of WADA regulations by some Kenyan elite runners. The recommendations may be useful in addressing the gaps that have existed with regard to the implementation of these regulations.

The research will expand the body of knowledge in the area of doping, particularly in Kenyan region, which may reflect the situation at similar developing countries. Furthermore the findings of the research can guide in sports policy development and amendments of legal framework regarding regulation of sports. Information obtained

from the research can be used by Athletics Kenya, IAAF and WADA in addressing doping issues affecting the country.

1.7 Delimitation and Limitations of the Study

Recruitment of the participants was limited to elite runners who compete both nationally and internationally. Both male and female athletes of senior and junior categories were considered for the study. Range of athletic events was from middle to long distance track races. Cross country and marathon athletes were also included in the study. Sprints and field events were excluded from the study.

The research survey was restricted to Kenyan elite athletes. This did not necessarily represent majority of the young upcoming athletes who enter the international scene every year. Furthermore, it may not have represented the situation with regard to other sporting events like team sports. The self-reported nature of the survey may have limited the reliability of the data. This is more especially when it comes to finding out the possibility of practice of doping by athletes. Due to the illegal nature of the subject matter, athletes who may have doped and were never discovered are unlikely to have reported about their practices.

1.9 Assumptions of the Study

The study assumed that doping is practiced by some elite Kenyan runners. It also assumed that Kenyan athletes had low knowledge of doping which could vary with gender, age and experience of the athletes. The study was carried out with the assumption that all participants were cooperative and honest in their responses. The

researcher recruited the participants on voluntary basis and further explained the purpose of the research. Issues of confidentiality were also discussed. It was assumed that this created confidence among participants and therefore enhanced honesty in their responses. It was also assumed that all athletes had some level of literacy and would understand and fill the questionnaire.

1.10 Conceptual Framework

The study was guided by a model derived from the Drug Compliance in Sport model, developed by Donovan, Egger & Kapernickl (2002). This conceptual framework sought to facilitate compliance to regulations pertaining use of performance enhancing drugs. The framework was derived from three scientific theories, the social cognition, threat/fear appraisal, and instrumental/normative theories. The model was modified to include two other significant variables which the researcher intended to assess, the influence of demographic information and access to disseminated information on doping.

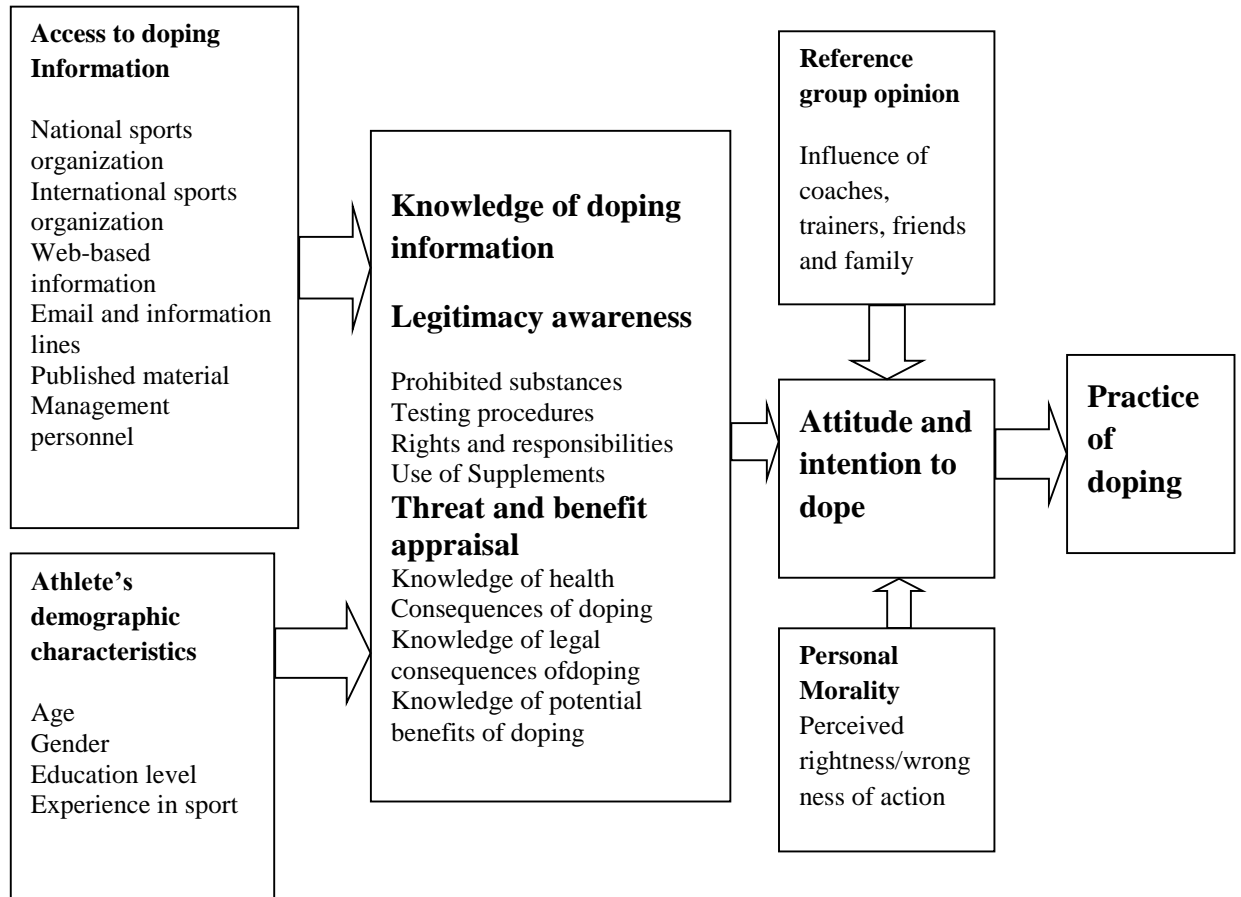
The model comprises of six components that are likely to influence attitudes and intentions towards dope, namely; knowledge of legitimacy of doping, threat appraisal, benefit appraisal, personal morality, demographic characteristics and reference group. The model predicts that likelihood of doping is lowest when fear of effects is high, knowledge of benefit is mediocre, personal morality is opposed to doping, knowledge of legitimacy is high, and the reference group disapprove the use of drug. The model is stratified into four major levels that guided the procedure in conducting the research and analyzing the results. At the first level, the researcher assessed the sources of

doping information used by Kenyan elite athletes and their usefulness to them. Through questionnaires, the research established the most commonly used methods as well as those preferred by the athletes.

At the second level as per the model, the research evaluated the level of knowledge possessed by Kenyan elite runners with regard to various aspects of doping. The researcher also assessed possible association between levels of knowledge and athletes demographic characteristics such as age, gender, and level of experience in sport.

At its third level, the researcher examined the attitude of Kenyan elite athletes towards doping. The study further examined the effect of two other variables on athletes' attitude towards doping; the influence of reference group (coaches, family, friends and colleagues) and athletes personal morality (perceived rightness or wrongness of the action). At its final level the research established the level of practice among Kenyan elite runners to establish if this was related to their levels of knowledge.

Conceptual Framework



(Derived from *Drug Compliance in Sport Model* by Donovan et al., 2002)

Figure 1. 1: Conceptual Framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of Doping

The term doping is generally used to refer to the use of certain substances or scientific techniques that could unnaturally improve the physical or mental health conditions of a contestant before and during the competition thus enhancing his or her sports performance (Murray, 2011). These substances and techniques are normally prohibited as they are considered as unfair means of winning against those who exhibit their natural potential in sports performance. (WADA, 2011) WADA defines doping as the occurrence of one or more of the eight anti-doping rule violations stipulated in the WADA code (2011).

2.2 History and Development of Doping

Doping can be said to be as old as sport. In early history, warriors are known to have eaten animal brains, hearts and livers in order that they would become more intelligent, and stronger (Murray, 2011). In West Africa for example, men consumed a herb called cola nitida which was believed to improve performance (Higgins, 2006). In China, army men eat Ma Huang as a means of stimulation. Around 5BC to 3BC in Greece, athletes were put on special diets such as dried figs, wine, wet cheese, meat and mushrooms to enhance performance in sport (Murray, 2012). In America, sportsmen in Peru and Mexico regions consumed cola leaves to boost endurance during competitions (Hoberman, 1992)

By 1920, doping had become quite evident in many sporting events that restrictions became essential (Wadler, 2011). Beside this, there were reported fatal cases of doping. The first recorded fatal case was in 1886, an English cyclist who died of an overdose of what was known as trimethyl (Wadler, 2011). Since then, fatal cases continue to increase in number. In 1960, a Danish cyclist Knud Jensen and an English cyclist Tommy Simpson died of some form of drug that was meant to improve their performance (Maraniss, 2008).

Since the 1960s, advancement in science and technology has brought many new drugs into the market, ideally with the intention of treating ailments and improving the health conditions of patients (Wadler, 2011). Unfortunately athletes, in their efforts to gain athletic advantage over colleagues have abused the drugs. For instance, anabolic steroids were first developed in 1930s with an intention to treat starvation victims by promoting nitrogen balance, and to treat testosterone deficiency (Schanzer, 2004). Athletes immediately took it up as a means of enhancing their hormone levels for better performance (Peters, 2002).

2.3 Commonly Abused Substances and Methods

2.3.1 Anabolic Steroids

These fall under the S1 category of WADA prohibited substance list. Anabolic steroids are chemically manufactured drugs. They can be said to be the man-made version of testosterone, the male sex hormone (Schanzer, 2004). This class of doping substance also includes all steroids that possess anabolic properties, meaning that they cause an extensive increase in muscular mass (WADA, 2011).

Few Kenyans have been found guilty of using anabolic steroids (WADA, 2011). Examples include Ambrose Bitok who failed a drug test in Linz in August 2003 after testing positive for substance norandrosterone and Elizabeth Muthoka who was selected to compete for Kenya in the 2008 Summer Olympics. She did not compete after she tested positive for the substance nandrolone and was given two-year ban. Another athlete, Joseph Cheromei, who was selected to compete for Kenya in the 2000 Summer Olympics, was suspended after testing positive for nandrolone.

The above incidences are evidences of abuse of anabolic steroids among Kenyan athletes, and thus the need to investigate the extent to which the drug may be used and how much athletes are aware about their effects on health as well as the potential of the drugs to jeopardize their careers.

2.3.2 Peptides Hormones

This are categorized as S2 of the WADA prohibited list of drugs. They include the use of peptide hormones as well as other growth factors and related substances (Laurent R, Martial S. AND Margin P (2001). Examples include erythropoietin (EPO), chorionic, hormone (CH) Luteinizing Hormone (LH), Insulin, Corticotrophins and Human Growth Hormone (HGH). The most commonly abused forms are EPO and HGH.

EPO involves the administration of synthetic erythropoietin. Synthetic EPO was developed as an anti-anemic drug to treat patients with cancer, AIDS, or chronic renal failure (Guadard, 2003). It behaves the same way as naturally occurring EPO. Athletes administer it by injection for a continuous period prior the competition. Its effects are

similar to those attained in training in high altitude where hypoxia is common. Human Growth Hormone (HGH) is a naturally occurring peptide hormone secreted in the pituitary gland. The hormone in the body is rather heterogeneous. Although the hormone may be produced by the body naturally, a recombinant HGH (rhGH) has been developed through genetic engineering and successfully used in patients with HGH deficiency. (Takala J., Ruokonen E and Webster N, 1993). The use of HGH in sport is not only based on its anabolic properties but also on its effects on carbohydrate and fat metabolism (Saugy *et al.*, 2006). Athletes and body builders claim HGH can increase lean body cell mass (muscles) and decrease fat mass.

Looking at the Kenyan scenario, there has been evidence of presence and use of EPO in the country. Raymond Kiptanui after being caught with the drug in London admitted having bought the drug in Kenya after being recommended to him by teammates (Manners, 1997).

2.3.3 Blood Doping

This falls under the category of prohibited methods in the WADA prohibited list. According to Venables (2008), blood doping refers to the process of oxygen enhancement, where an individual's hemoglobin concentration is artificially increased above normally occurring levels in order to improve the athlete's endurance. Gaudard (2003) describes blood doping as the use of artificial oxygen carriers. While hemoglobin is the natural oxygen carrier in the body, artificial carriers are manufactured substances designed to aid in the transport of oxygen throughout the body. Scientific research has led to the isolation of hemoglobin from erythrocytes which can then be

infused directly into humans. This has led to the generation of different forms of modified hemoglobin solutions.

Blood transfusion is another form of doping classified under prohibited methods. It refers to the transfer of blood into a person's vein (Vernables, 2008). A number of studies have indicated that blood transfusion can increase an individual's hemoglobin concentration above normal levels (Guardadet *al.*, 2003, Ross *et al*, 2007, Promer *et al* 2010 and Vernales, 2008). According to Guardadet *al.*, (2003) the increase in hemoglobin levels correlates to an increase in maximum oxygen uptake because the extra hemoglobin can transport extra oxygen. This heightens the athletes' endurance thereby improving performance.

2.3.4 Gene Doping

Gene doping refers to the manipulation of genetic elements to improve muscle performance. (Mc Phenon, 1997, Barton, 1998). It involves the application of gene therapy techniques in genetic enhancement of human performance. Gene transfer into muscles is known to counteract age related muscle atrophy (Barton, 1998). This is similar to the effects of training in muscle hypertrophy, thus there is a potential that increased expression of certain genes in skeletal muscles may increase muscle strength in athletes.

A recent study conducted by Wells (2008) examined the effects of gene therapy on performance. The study concluded that genetic manipulation produced very impressive results in animal models but it has only shown significant beneficial effects in a limited number of human trials.

2.3.5 Stimulants

Stimulants belong to group A of the IOC list of prohibited classes of drugs in competitive sport. The term stimulant is used to refer to a cluster of compounds whose effect is to influence the central nervous system. Such influence is meant to cause a reduced tiredness, increased attention and disposition for competition as well as aggressiveness. Such substances include amphetamine, cocaine, metamphentermine, benzphetamine among others.

Few Kenyan athletes have tested positive for ephedrine and pseudoephedrine, Ndeti, Kiptanui and Komen (WADA, 2009). They claimed to have bought the drugs over the counter for medicinal purpose for cold relief. This casts doubts as to whether these athletes were aware of prohibited substances outline in the WADA list. The three did not seek Therapeutic Use Exemption, and neither did they appeal for leniency considering that they were taking it for medicinal purposes. This also portrays them as being ignorant of doping procedures.

2.3.6 Beta -2 Agonists

This is a group of substances that may be used for medicinal purposes but have the potential to enhance performance in sport. Therefore its use is regulated. Sulbutamol, for example, is allowed up to a maximum of 1600 micrograms over 24 hours which is in accordance with manufacturer's recommendations. The presence of sulbutamol in urine in excess of 1000ng/mg is presumed not to be intended for therapeutic use therefore prohibited (WADA, 2011). Many Kenyan athletes have tested positive for therapeutic drugs taken in excess of what is allowed by WADA. This casts doubts on

their level of awareness of what is allowed and what is not. This research was intended to establish this level of awareness and to recommend possible remedy where required.

2.4.0 Kenya's Running Dominance Explored

For decades, Kenyan runners have been known to excel in middle and long distance running. Several scholars have sought to unravel the mystery behind this running excellence. Several factors have been considered for studies to establish possible factors that may be influencing the performance of the athletes. Among them are historical explanations, role of genetics, effect of lifestyle and environment, motivational and environmental factors.

2.4.1 Historical and Physiological Explanation

Bale and Sang (1996) explored the role of political history in the establishment of Kenya's running culture. In their study, they assessed the effect of western sport as a form of social control during the colonial period. The study highlighted how sport and particularly athletics has over time developed to become a source of pride and identity.

Scott and Pitsiladis (2007) studied the role of genetic makeup as a possible explanation of Kenya's dominance in middle and long distance running. However, the study did not find any unique genetic makeup among Kenyan athletes that could be attributed to their athletic excellence. These findings concur with those of another study on the same subject by Onywera *et al.*, (2005), which concluded that ACE gene variation was not an explanatory factor for Kenya's success in distance running.

Contrary to the above findings, a recent study by Scott *et al.*, (2009) attributed success to Mitochondrial Haplogroup distribution. The study established that international

athletes had excess of LO haplo groups and lower frequencies of L3, contrary to national athletes who displayed excess of M haplo groups.

2.4.2 Effect of Diet and Lifestyle.

Two studies investigated the role diet and lifestyle in athletics in contributing to athletic success among Kenyan athletes (Onywera, 2009 & Kimiywe, 2009). The first study conducted by Onywera (2009) sought to establish the foundations of Kenya's running dominance, particularly the role of diet, injury management and talent identification. The study concluded that most athletes are still largely ignorant of actual nutritional supplements. The study also established that athlete's lifestyle and adaptation to environmental circumstances played a role in athletics success. He noted that athletes benefit more from basic equipment and amenities that were presented by the environment rather than scientific technology.

The findings of this study are in line with those of the second study on Rugby players by Kimiywe and Simiyu (2009). This study concludes that nutritional supplements and traditional food are still largely used by players. However their knowledge of these dietary supplements was established to be ranging from low to moderate.

Two other studies (Fudge *et al.*, 2006, and Fudge *et al.*, 2008) on diet explored the effect of hydration and energy balance on athlete's performance. The first study (Fudge *et al.*, 2006) aimed to establish energy balance of 9 athletes during intense training. The study established that on average the athletes were in negative energy balance with the diet being high in carbohydrates (67.3%), having adequate protein (15.3%) and fat (17.3%). The authors concluded the negative balance would mean less body mass that would enhance performance by reducing cost of energy expenditure.

A second study by Fudge *et al.*, (2008) among Kenyan endurance runners assessed the hydration of the athletes during intense training. The study established that Kenyan athletes stay hydrated with ad libitum fluid intake during training. These findings are in line with those of the previous study (Fudge *et al.*, 2006) that established a similar pattern and volume of fluid intake.

2.4.3 Motivational Factors

Hamilton, (2000) explored among other factors the role of social and psychological factors as contributing to the success of Kenyan in athletics. He attributed Kenya's success to negative external factors (poor economic situation) as compared to their European counterparts, who enjoyed stable external factors, therefore, lacked the strive for excellence in athletics. A similar notion is portrayed in a study by Baker and Horton (2007), which discussed the potential effects of athletes personal or group perception of their potentials. The study established that athletes who perceive themselves as having physiological advantage over their opponents tend to perform better. On the other hand, athletes who perceive themselves as having inferior potential tend to not to perform well. However, the study did not establish if this is a factor contributing to Kenya's dominance in running.

Another study by Entine (2000) explored the role of Kenyan athletes' self-conception and the stereotype associated with them, which identifies them as middle and long distance runners. According to the study, this ideology is said to perpetuate a culture of running dominance among athletes. It instills a sense of self-belief in the said athletes which translates to determination and actual performance.

Elbe *et al.*, (2010) conducted a cross cultural comparison of factors that motivate Kenya's runners as compared to their Danish counterparts. Findings indicated that both groups were more extrinsically motivated but to a larger degree by the Kenyan athletes than the Danish group. This also agrees with the findings of the study by Onywera (2006) which indicated that majority of Kenya's athletes; both nationally and internationally are motivated by economic reason.

2.4.4 Emergence of Professional Athletes

The poor economic conditions in Kenya, especially in remote areas where most athletes come from, coupled with the lack of employment opportunities in the country have encouraged many Kenyans to take on sports to improve their economic status. The past decade has witnessed emergence of professionalism in athletics both nationally and internationally. A number of Kenyan athletes are observed by Kenya Prisons, Kenya Police, Telecom Kenya, private universities among other institutions specifically to represent these organizations and institutions during athletics championships.

The athletes are recruited with the understanding and obligation that they have to perform excellently to maintain their contracts. However, there is little information as to how these athletes cope with the demands of their other job or study requirements amidst rigorous training to maintain top performance in athletics. It is also not established whether such pressure is likely to push them into use of performance enhancing drugs.

2.4.7 Effect of Athlete's Migration to Other Nations

The low returns that Kenya athletes get when they compete locally has pushed many of them to look for greener pastures elsewhere. They get 'hooked up' by training agents who connect them to educational institution or even national clubs overseas. A number of articles have been considered to explore the effect of athletes' migration on their performance, and the likelihood of these athletes using performance enhancing drugs.

Darby (2001) elaborates on the migration of Kenyan athletes to oil rich countries like Qatar and Bahrain, as well as developed countries like USA and UK. The study further examines the reason for their migration which emerged to be improving living standard and the presence of opportunities in these countries.

Simms and Rendell (2004) noted that the migration of Kenyan athletes to compete for other nations has turned into a global trade, and Kenyan athletes have shifted allegiance from their home country to wealthy states which have become their new homes. Lukalo (2005), in his paper, termed the migration as 'evolution or devolution of athletes, athletics and sports policy', citing especially how athletes have changed, not just their citizenship but also their names and identities.

Darby (2001) in his paper, termed the practice as 'The New Scramble for Africa', elaborating on how Kenya athletes have been enticed into American colleges with scholarships which they have to sustain by explicating excellent performance in athletics. Chepyator (2003) attempted to establish the experience of these scholar runners in USA. The study established that though majority of them were satisfied with their academic achievements, a good percentage expressed concern over the pressure

placed on them to maintain their university scholarships. However, it is not established whether this pressure does influence their attitude and behavior towards doping.

2.5.0 Drug Use in Kenya

2.5.1 Use of Recreational Drugs

Several studies have been conducted to establish levels of drug use in Kenya, types of drugs and possible reasons for their consumption. Otieno *et al.*, (2009) conducted a cross sectional survey to determine the factors associated with drug use and abuse among secondary school students in Kisumu region. The study sought to establish particularly the effect of age, gender, and peer-influence on drug use. Findings indicated that the most common reason for drug use was enjoyment (47.3%), followed by experimentation (38.2%), then influence from friends (18.7%). The most commonly abused drugs were alcohol (57.9%), tobacco (34.7%), cannabis (18.3%) and khat (23.1%).

Balmer *et al.*, (1997) explored use of drugs by youth as a possible way of coping with frustrations that result from inability to meet set goals. The authors concluded that socio-economic changes in developing countries have led to intensified dilemmas among youth, which consequently has resulted in the use of drugs. Two other studies illustrated the same precedence. Mugisha Arinaitwe & Hagambe (2003), and Otieno *et al.*, (2009) both indicated low socio economic status, adolescent age 16-18, prevalence in boys and being out of school as contributing factors to drug use. The authors recommended that these factors be considered when developing health education programs for secondary schools.

A popular recreational drug used in Kenya is miraa, popularly known as khat. A number of studies have explored the use of miraa among certain communities in Kenya (Carrier, 2003, Warfa, 2007, Aden, 2006 & Dhaifalah *et al.*, 2004). Though the substance is mainly grown in Meru and Embu regions, it is consumed in many parts of the country including Somalia, Tigania and Igembe. It has also penetrated Kenya's major towns of Mombasa, Nairobi and Nakuru. According to two studies (Carrier, 2003 & Warfa, 2007), the substance enjoys a cultural significance by a number of Kenyan communities. Apart from its economic significance, it is viewed as a centre of focus for social gathering, a symbol of identity and an avenue of solving disputes and bringing families together.

Aden, Dimba & Ndolo (2006) studied the socio economic effects of khat chewing in Eastern Kenya. The study established that the use of the substance was rampant in the region, with up to 88% of the respondents admitting that they had family members who use it. The study also reported that there was overall lack of knowledge of negative effects of khat by its users. The users were also known to spend three quarters of their budget on the substance. This concurs with the findings of Dhaifa *et al.*, (2004) which concluded that miraa caused diversion of valuable household income that could have been used for home improvement.

2.5.2 Use of Traditional and Herbal Medicines

Several studies were considered in this section in order to establish Kenya's position with regard to use of herbal medicine and nutritional supplements. Findings from majority of the studies indicated that herbal medicine was significant in traditional societies and still plays a role in some communities today. However, there was a general

concern by most researchers that information on the herbal medicine is still scanty and usually passed orally therefore may pose a risk of consuming illegal substances by the athletes.

The safety and efficacy of drugs was explored by Orwa *et al.*, (2007). It was noted in this study that the safety and efficacy of herbs was only available for a few plants. Koros *et al.*, (2008) conducted a study to establish indigenous medicine plant utilization, management and extinction threat in Samburu West, Kenya. Findings of the study indicated use of 56 medicinal plant species which are used to treat different diseases including; digestive disorders, respiratory problems, malaria and skin diseases. A similar study conducted in Central Province Njoroge *et al.*, (2006) sought to establish traditional remedy for Ear, Nose and Throat infections. Findings of the study indicated the use of 67 species of herbs derived from 36 plant families. These were commonly used for treatment of wounds, body aches, stomach upsets and burns.

A study of herbal medicine use among the Maasai of Sekenani, Rift Valley (Bussman, 2006) revealed that up to 150 plant species were used. Thirty nine species were particularly used as medicine for ailments while the remaining was consumed with food and generally believed to boost health of individuals and guard against disease. A second study of plant use among the Maasai (Kiringe, 2006) established that 73% of the respondents preferred to use traditional herbs to modern medicine. The study was carried out among the Kuku group of Southern Kajiado District.

A final article on use of herbal medicine is a study by Otieno *et al.*, (2007) which explored the utilization of herbal medicine in management of diarrhea in urban centers in Kenya. Results indicated that 97.4% of participants sought this mode of treatment

for diarrhea conditions. The main reasons for choosing it were given as ‘because of its effectiveness’ and due to the low cost of accessing it’.

The above studies have indicated a wide use of herbal medicine among different sectors of people in Kenya today. Though the studies do not point towards use of herbs by individual athletes, the samples were drawn from societies in which the athletes exist. It is, therefore, possible that the practice may affect Kenya athletes as well. This raises concern over risk of taking prohibited substances that may be contained in the herbal medicine by athletes.

2.5.3 Use of Natural Substances to Enhance Performance

Some traditional African communities have history of use of natural substances to enhance physical performance. In West Africa for example, men eat a herb called cola nitida which was believed to enhance performance (Murray, 2012). In central Africa states, warriors eat animal brain, heart and livers in order to become swifter, stronger and more intelligent. Similar history has been noted elsewhere in the world. In Peru and Mexico, long distance runners eat cola leafs which were believed to enhance endurance during competitions. Two studies (Demeo, 2007 & Hoberman, 1992) have indicated use of natural substances such as coca leafs, opium, kola nuts and theobromine in Western countries.

In Kenya, there have been limited studies on use of natural substances to enhance sports performance. However, investigations done on effects of naturally occurring plants such as miraa, that are consumed for recreational or health purposes have revealed that it contains performance enhancing substances that are banned by WADA

(www.ephedra.nu). Motram (2011) established that ephedrine occurs naturally as 'genus ephedra', and cathine is derived from plant 'khat', which is popular in Kenya.

A recent incident of a Kenyan boxer who tested positive for cathine after allegedly chewing miraa is a good example of the potential effects of consuming natural substances (Carrier, 2008). Most natural substances consumed by Kenyans are directly sourced from plant leaves or roots which are either boiled or crushed and consumed directly. No scientific investigations are done on the substances prior consumption and neither are the doses regulated. This shows the magnitude of risk involved with use of natural substances with regard to doping control practices.

2.5.4 Use of Nutritional Supplements

A number of studies have indicated that a number of supplements available in various countries contain banned substances (Schanzers, 2002, Geyer, 2004). Two studies (Kimiye, 2009 & Ama, 2003) were considered in this review to establish the extent of use of nutritional supplements by Kenyan sports men and women and their degree of knowledge of the substances. Kimiye *et al.*, (2009) conducted a study among Kenya rugby players to establish their knowledge and use of nutritional supplements. Findings indicated that rugby players had moderate knowledge of dietary supplements with varying degrees for particular substances. Consumption of supplements ranged from low to moderate. Hypothesis testing confirmed significant difference between variables (age, academic qualification and club affiliation). Majority of participants (52.5%) indicated a positive attitude towards use of supplements.

Results of the above study were similar to those of a study conducted in Cameroon among football players (Ama *et al.*, 2003). Like in Kenya, knowledge of supplements

ranged from low to moderate. In both studies the sportsmen believed the use of supplements was necessary to boost performance. Another study (Kiawi, 2008) on knowledge, attitude and practice of doping among sportsmen and women in Cameroon concurs with the above findings, concluding that sportsmen and women of the country were not sufficiently educated on negative effects and criminal offences associated with use of supplements and drugs.

Tscholl *et al.*, (2010) assessed the use of nutritional supplements among top level track and field athletes. The study was conducted among international athletes during 12 IAAF championships. Results indicated there were 6,523 nutritional supplements and medications reported. The most frequently used were; non-steroidal anti-inflammatory drugs, analgesics and respiratory drugs. Creatine and amino acids were used more by power sports and sprinters while nutritional supplements were used more by middle and long distance runners than other groups.

2.5.5 Use of Performance Enhancing Drugs (PEDs) in Kenya

Kenya's outstanding performance in the middle and long distance races has led to several speculations and suspicions of drug use by its athletes. John Manners in his article 'Kenyan World Record Cycles and Drugs' (Manners, 1997) analyzed Kenya's growing success in athletics in the light of drug allegations. According to Manners there were several factors that contributed to Kenya's growing success other than drugs. First was the IAAF's initiative of subsidizing the participation of poor countries in world cross country championships. The Athletics Kenya then named KAA took it seriously and established training camps with more rigorous training that boosted Kenya's performance.

The greatest push of Kenya's athletes to greater heights of success came with the appointment of Professor Mike Boit as the commissioner of sports in the year 1990 (Manners, 1997). Prof Boit, a 1972 Olympic medalist and a PhD from Oregon played a significant role in eliminating restrictions on athletes' travel and access to agents. Up to then the athletes' movement and earnings were closely monitored by KAA. The new freedom of athletes' movement led to spiral opportunities, greater incentives and ferocious training that eventually led to the breaking of more world records and a string of gold medals for Kenya.

Despite all the reasons outlined above for Kenya's outstanding performances the speculations about drug use cannot be overlooked. There have been incidences of Kenyan athletes testing positive for drug use and consequently facing the ban from participation for several years (IAAF, 2011). Examples include Cosmas Ndeti who tested positive for ephedrine after he finished second in the 1988 World Cross Country Championships in New Zealand. He claimed to have taken the drug over the counter ignorantly as a cold remedy, but it made no differences as he had to be banned for three months and had his medal stripped. William Tanui also tested positive for ephedrine in 1993 after buying it over the counter as a cold remedy (IAAF, 2011). Komen tested positive for Caffeine in 1997 spring, a condition that was attributed to a physiological anomaly that apparently causes his urine to register high doses of caffeine after taking a can of Coke.

Another case is that of John Ngugi, he was slapped with a four year suspension in 1993(which was later reduced after an appeal) for refusing a drug test (Manners, 1997). Ngugi's case reflects a different form of ignorance, a misunderstanding that arouse from

miscommunication between him and the IAAF official. He turned up unannounced in his door step and asked him to pee in a bottle. Ngugi who had not been informed of such procedures refused.

The above cited incidences portray Kenyan athletes as being largely ignorant of doping drugs, procedures and methods, an issue which this research aims to shade more light on. Most of the drugs that Kenyan athletes have tested positive are mainly medicinal drugs that have been consumed beyond WADA's acceptable levels.

Nevertheless Kenyan athletes cannot be said to be completely ignorant of doping drugs and practices. Claims have been made by some skeptics that there are no drugs or provisions for doping practices in Kenya thus the reason why Kenyan athletes have not been exposed to the practice of doping (Manners, 1997). However this has been challenged by the fact that Kenyan elite athletes have now based themselves in Europe for much of each year hence equally exposed to doping practices as any other athletes elsewhere in the world (ESPN, 2011). Furthermore Kenyan based clubs are run by some of the most recognized sports medicine specialist (Hamilton, 2000). This is evident that some Kenya athletes have access to some of the most sophisticated pharmacology services. However there has been no evidence of abuse of such personnel or facilities.

While most sports analyst still view Kenyan sportsmen as being clean and their involvement as in doping as being purely out of ignorance (Manners,1997) there has been few incidences of self-confessing athletes who claimed to have taken the drugs knowingly and purposefully. Raymond Tanui a Kenyan athlete who was caught in the UK with EPO in his possession admitted he bought the EPO from Kenya after his training mates recommended it to him (ESPN, 2011). This makes it obvious that some

form of doping takes place in Kenya and a number of Kenyans are aware about it. The question is to what are they aware of the implications of doping especially with regard to international regulations regarding doping.

Recent reports from WADA (2013) indicate a rising trend in the number of doping cases among Kenyan athletes. The rise in numbers has been so sudden in the recent past (from 2 in the 2011/2012 season to 17 in the 2012/2013 season). This has caused speculation among the doping control organs, particularly WADA and IAAF. There is also a recent case in which a Kenyan athlete, who tested positive, confessed that the practice is rife in Kenya and nearly everybody does it (BBC News, 2013). This is an indication that there could be presence and use of banned substances within the country. As a result of the rising cases of doping, and the media allegations that doping is rife in Kenya, WADA and other stakeholders have put pressure on Kenyan government to unearth the problem and address it.

2.6.0 Empirical Studies on Knowledge, Attitude and Practice of Doping

2.6.1 Studies on Knowledge of Doping by Athletes

Many studies have been carried out in the world to establish the level of knowledge and general awareness of doping substances, methods and procedures among athletes in different sports. The studies focus on specific areas such as knowledge of banned substances, drug testing methods and procedures and rights and duties of athletes with regard to doping control regulations.

A study conducted by Albrechet *al.*, (1992) described general awareness of drug testing procedures among college athletes. The study was conducted in USA among college

athletes. The focus of the study was to examine the extent to which college athletes are informed of drug testing procedures employed by their institutions. The sample comprised 2282 athletes from a range of sports, including football, tennis and swimming. Results indicated that 36% of the athletes enrolled in the institutions where testing procedures were in effect were ignorant of testing taking place. Of all of them, 70% were unable to identify the testing protocol while a small percentage was aware they were susceptible to testing.

This study provides an insight into how athletes can be largely ignorant of testing procedures. However, given the location of the study (USA) and the target population (college athletes), the results may not reflect a possible situation among Kenyan elite athletes. The context of United States may not be similar to Kenya context and furthermore the situation among college athletes may be different from elite athletes.

Anshel *et al.*, (1997) conducted a study on elite athlete's knowledge and attitude. The study was conducted in Australia among elite male and female athletes to establish their attitude and practice of doping. Focus was on the relationship between knowledge of Anabolic Steroids and attitude towards their use among the track and field athletes. Results revealed that greater knowledge about steroid use and its effects on health was not significantly related to their attitudes about using steroids. Males had higher mean knowledge scores than females at all levels of education except college and university levels. The author commented that existing educational programme may have limited value in terms of creating appropriate attitude to reduce steroid use.

A similar study was conducted by Scarpino *et al.*, (1990), among Italian elite athletes. The key themes were knowledge, attitude and use of illegal substances in sport. Results indicated that 10% of athletes stated that amphetamines and AS were being used frequently at national or international level. Overall, 30% of athletes, coaches and managers thought athletic performance could be enhanced by doping. Athletes' most frequently cited reasons for using doping agents were to win in competition (63%), improve training performance (9%), reduce pain (6%) and at the request of a coach (6%). Majority of the athletes believed that they had been put under external pressure to use drugs or doping practices. Three-quarters of athletes indicated that access to illegal substances was not difficult. A greater number of subjects indicated that doping was potentially harmful than stated, but it was efficacious in improving performance.

2.6.2 Studies on Attitude of Athletes towards Doping

Many sports organizations endeavor to obtain a reliable view of the spread of doping in their sport (Petroczi, 2009). Establishing prevalence of doping among the athletes could be one way of determining the spread of doping in a sport. However owing to the sensitivity of the matter and the legal implication on their careers, many athletes are reluctant to report about the actual situation (Petroczi & Aidman, 2008). In the absence of objective information about actual prevalence of doping, focus is now shifting on doping attitude which is used as proxy to doping behavior (Donavan *et al.*, 2002).

A number of doping behavior models have been forwarded that relate doping attitude to doping behavior (Donavan *et al.*, 2002, Dodge & Jaccard, 2008 and Lucidi *et al.*, 2008). The models assert that the greater the leniency towards doping by athletes, the

more likely they are to dope. It further recommends that interventions aimed at minimizing doping can be introduced during the attitude development stage.

A number of studies have been conducted on athletes' attitude towards doping regulations, substances and testing procedures. The studies have been done across many states and among athletes from variety of sports. These studies revealed varied attitudes and perception of doping by elite athletes. A recent study conducted by Paretti et al., (2004,) on attitude of elite athletes indicated a varied perception by different athletes. The study was carried out in France among 458 elite athletes. A cross sectional survey was used to collect data. The study revealed over 90% of the athletes believed doping was dishonest, unhealthy and/or hazardous. Three clusters of subjects were identified, those that considered doping as both dangerous and useless, those that considered doping as dangerous but efficient way of enhancing performance and those that considered dangerous but necessary adjunct to sporting achievement. The authors concluded that athletes who practice doping do so in pursuit of legitimate goals using illegitimate means but justify their behavior with legitimate rationale.

A second study on attitude was carried out by Alaranta *et al.*, (2006). It was conducted in Finland among elite athletes receiving financial support from National Finish Olympic Committee. The focus of the study was on attitudes of these athletes towards doping practices and performance. Questionnaires were used to collect data and responses were compared in terms of speed and power sports, endurance sports, skilled based sports and team sports. From the results of the study, none of the athletes admitted doping. Overall 90% believed performance could be improved with use of banned substances. Over 90% also believed that it is possible to attain highest level of performance without doping. Thirty two percent of speed and power sport reported they

knew of another athlete who use banned substances while only 7% of the skilled athletes shared the view. Seven percent of the athletes stated they would use currently banned substances if they were allowed. Three percent believed doping agents could be used completely or nearly without adverse effect.

The above two studies summarizes a number of opinions put forward by athletes which may be comparable with opinions that may exist among Kenyan elite athletes. Combs and Ryan (1990) conducted a study on athlete's attitude towards doping testing procedures. The study was conducted among college athletes in United States and the focus was on the impact of mandatory drug testing programme on morale and wellbeing of college athletes. A 75-item questionnaire was used on 57 athletes. Majority of the respondents (71%) reported that taking part in the testing was not a big deal, was interesting and educative. On side effects, 47% reported that the process was embarrassing, 36% reported it was humiliating and 26% reported it was upsetting. Forty seven percent indicated that testing caused non-using athletes to worry about being falsely identified as users and 38% indicated it adversely affected their morale. The attitudes described in this study largely constitute the areas that this research will cover as far as doping in Kenya is concerned. However the results may not be directly comparable as it was conducted among college athletes who may not be elite.

Finally, a study conducted by Mc Ardle (1999) on elite athletes' perception of the use and regulations of performance enhancing drugs indicated a number of opinions. The study was carried out in the United Kingdom among 12 elite athletes. Participants' knowledge of and attitudes towards drug testing were explored in reference to the case

of Diane Modahl, a British athlete who was banned and subsequently cleared of doping. Results indicated general poor knowledge of effects of anabolic steroids and other performance enhancing drugs. Moreover, respondents did not have faith on testing procedure, all based on the case of Dianne Modahl. A number were concerned about testing positive for substances such as caffeine or codeine which can be found over the counter.

2.6.3 Studies on Prevalence of Doping Among Athletes

This constitutes the third objective of the research, to establish possible practice of doping among Kenyan elite athletes. A number of studies have been reviewed on this subject. A major study was conducted in USA by Wroble et al., (2002) on prevalence, knowledge and attitude of anabolic steroids among pre-adolescent athletes. The survey was conducted in 34 states in USA and funded by National Youth Sports Research and Development Centre. A 2- item questionnaire was used to assess their knowledge of effects of steroids and prevalence of the same. From the results, less than 1% of the respondents reported current use of anabolic steroids with higher percentage in males than females. Reasons for use included to improve performance, personal appearance and peer pressure. Sixty six percent indicated it would improve their performance. Ninety percent indicated they did not need to use steroids to be successful in sport. Most common source of information was indicated as books and magazines.

Levent Ozdemir *et al.*, (2005) conducted a survey research on doping in Sivasi state in Turkey. The aim of the study was to determine the rate of doping and performance enhancing drug use in Sivasi, Turkey, and to analyze the main reasons for their use. A cross sectional study based on a self-reported questionnaire was carried out. The

subjects filled questionnaires describing population in terms of demographics, sports practice, doping in sports, and other substance abuse. Number of respondents was 883 of which 433 were athletes 450 were healthy non-athletes. Mean age of volunteers was 21 years. Male and female ratios were 78.2% to 21.8% respectively.

From the findings the research concluded that doping and drug use was high among athletes (74.5%) than non-athletes (18%). On the type of substance used anabolic steroids was highest at 60.5%, creatine 14%, Na Bicarbonate 11.3% and erythropoietin 5.4%. From the study also it emerged that the main reasons for use ranged from bettering the body condition (47.9%) to solve weight gaining or loosing (11.3%). The study established that the potential side effects of doping and drug use are not satisfactorily familiar to most users thus recommended education of athletes on the matter to be a top priority.

Another study conducted by Chester, Reilly & Motram (2003) explored the use of 'Over the Counter' Drugs by athletes. The study was conducted in UK among elite and non-elite athletes. Focus was on use of over the counter drugs especially those that are used for treatment of respiratory tract infections that contain banned substances. Results showed that only 3% of athletes stated they used over the counter drugs to enhance performance and less than half of them believed they were effective. Twenty three percent (23%) of the athletes believed that over the counter drugs should be banned. Elite athletes were more likely to have knowledge of over the counter banned substances than non-elite athletes.

The study provides an insight of what could be the situation in Kenya as a number of Kenyan athletes have tested positive for over the counter drugs in excess of permitted levels purportedly for medicinal reasons. However, it is not certain that the results would be similar as the study location (United Kingdom) is far more developed than Kenya.

Though the above studies may provide an insight into the attitude and practice of doping among elite athletes, the context of the study may limit the generalization of the results to similar countries. Most studies were conducted in developed states (USA, UK, Australia, Italy, Turkey, Finland and France) which may not be comparable to Kenya in terms of athletes' exposure, doping education programs and accessibility to quality training facilities. Besides, some studies were conducted among college athletes and non-athletes. This may not reflect the situation with elite athletes. The current study aimed to establish Kenya elite runners' knowledge, attitude and practice of doping.

2.7 Factors that influence doping

The development of effective anti-doping prevention requires a better understanding of underlying factors that make athletes vulnerable to doping (Petroczi, 2009). Past researches have used the epidemiological approach which requires athletes to declare or admit a behavior that would jeopardize their careers (Petroczi & Aidman, 2008). This limits the reliability of the findings. Increased knowledge of factors that lead to doping are among WADA's top priorities as evidenced in the call for proposals on the subject in the 2009 scientific researches (WADA, 2009).

Laure (1997) in his paper of review of studies on motives behind doping summarized the factors into two major categories; (i) physiological aspects such as strength, endurance, recovery from injury and faster outcomes of training and (ii) psychosociological factors such as pressure to win, expectations of significant others, fame and money rewards. A number of researchers (Ansel, 1991; Williamson, 1993; Laure & Reinsberger, 1995 and Laure, Lecerf and Bingsinger; 2004) seemed to point on two main factors, desire to achieve better performance and monetary rewards that comes with winning.

Other factors cited in the studies included; external pressure to win at all cost (Scarpino et al., and ASADA, 1997), paranoia about chemically enhanced competitions (Fountain, 1987, Yesalis, Herrick & Buckley, 1988, ASADA, 1989, 1990, 1997), and speeded recovery from injury (ASAD, 1989 and Ansel, 1991). According to the studies, external pressure mainly resulted from the demands of the coach for excellent performance. Yesalis et al., (1988) further pointed out that athletes use performance enhancing drugs and methods as a means of coping with the physical demands of training and competitions.

Improving appearance was among reasons cited in two studies (Williamson, 1993 and Melia et al., 1996). Silvester (1973) reported one other factor that is not mentioned in any other study; using PEDs to cope with the cruel race against records that have been set by predecessors that seem out of reach.

Many of the studies mentioned above were conducted in developed states (Australia, UK, USA and France). Considering that the social and economic background and environmental influence may be different from that of developing countries like Kenya,

the inferences made from the studies may be not be transferable. In other words the factors that influence doping in Kenya and other developing states may be different from those stated in the studies. It is therefore important to conduct a survey on the subject in Kenya which was one of the objectives of the study.

2.8.0 Doping Control Practices in Kenya

This section examines existing legal and institutional framework for doping control in Kenya. An examination of Kenya law reveals Kenya does not directly incriminate the use of PEDs (Wekesa, 2011). However, sections of the sports bill and sports policy provides for framework for actions against doping. Although the Sports Policy framework does not directly outline procedures of regulating doping, sections of it touch on drugs in sports. (National Sports Policy, 2002). The sections concerns protection of health of individuals by guarding against harmful substances. This section can be improved to provide guidelines on use of drugs in sport.

The ratification of the 2005 UNESCO Convention on 17th of August 2009 (Wekesa, 2011) meant that under the new constitution, the convention stipulations become part of Kenya law. It provides legal framework for regulating doping in Kenya. This implies Kenyan government must oversee the implementation of these regulations among sports organs in the country.

The National Olympic Committee of Kenya (NOCK) plays a role in doping control. The committee is affiliated to the IOC and by law, expected to abide by its rules and regulations. IOC, therefore, provides the guidelines with regard to implementation of doping regulations. The Kenya Anti-Doping Agency operates under the umbrella of NOCK. This restricts its mandate and operation to members of NOCK.

Athletics Kenya which is affiliated to IAAF and WADA is by law expected to adopt the anti-doping regulations from these International bodies (WADA 2011). There is evidence of actions having been taken by AK against athletes who have been found to dope. The case of Florence Muthoka is an example. The 800m runner had qualified to participate in the 2008 Olympics but was removed from the list after she tested positive for anabolic steroids in July 2008. AK in liaison with IAAF constituted a committee to give the athlete a hearing. After the hearing, AK suspended the athlete for two years and communicated the same to IAAF as per the rules (IAAF, 2011).

There is also evidence that though AK has structures of handling doping cases, it seems to lack adequate educational programs on banned substances and athletes' rights and responsibilities. The case of Susan Chepkemei is an example. Susan tested positive for sulbutamol, a drug which was used to treat her for a chest infection at the hospital. She was suspended for two years and she did not appeal. In this case Susan should have avoided suspension by seeking Therapeutic Use Exemption (TUE) or even launched an appeal of the case if she had adequate knowledge of doping regulations (IAAF, 2011).

With limited sports academies in Kenya, sports talents are tapped from youngsters participating in secondary, college and university sports. These institutional sports are run by national bodies which include Kenya Primary Schools Sports Association (KPSSA), Kenya Secondary School Sports Association (KSSSA), Kenya Teachers Colleges Sports Association (KTCSA), and Kenya Universities Sports Association (KUSA).

In a study on doping regulations (Wekesa, 2011), findings revealed that there were no institutional frameworks for doping control among institutional sports associations.

Such bodies rely on specific national sports federations for guidance. Their efforts to implement doping regulations may further be hampered by lack of sufficient finances allocated to sports.

Though Kenya has no specific anti-doping laws, there are several pieces of legislations that touch on regulations of doping drugs and methods. The Pharmacy and Poisons Act which regulates the training, licensing and registration of pharmacists and the handling and distribution of drugs touches on a wide range of prohibited substances. However, it makes no reference to doping control. The act does not make it a requirement for a pharmacist to know the prohibited substances in doping and neither does it prohibit them from dispensing them to athletes for whatsoever reason. It also does not provide for labeling of prohibited substances on the products. This makes it easier for pharmacist to dispense or even administer doping substances without fear of the law.

The Medical and Dentist Practitioners Act provides for training and registration of medical practitioners and dentists. This act also does not control administration of doping substances and methods. This implies a doctor can comfortably aid an athlete to dope without fear of losing licenses or any penalties so long as it is with the athletes' consent.

The Narcotic and Psychotropic Substances Act deals with some drugs which appear in the WADA prohibited list such as cathine, heroine, and opium, but does not make reference to doping. It also prohibits the possession and trafficking of these substances without making specific reference to doping.

2.9.0 Summary of the Literature Review

Generally, past studies have revealed a rising trend in the practice of doping in sports across different regions of the world and in a variety of sporting activities. The main reasons for the practice as it emerged from the findings of majority of the studies was the availability of new effective drugs and methods that can beat the test, the growing professionalism in sport and the influence of social and political environment. A few studies indicated that dopers had previous experience with one or more of similar drugs like alcohol and bhang. Studies on college athletes revealed strong influence of social environment and pre-exposure to other forms of drugs prior to joining college or playing sport. Few studies indicated lack of sufficient knowledge as a cause for doping. Most studies confirmed a negative attitude of athletes towards. The studies also confirmed a low prevalence of doping among different groups considered for review. A survey of doping prevalence in Kenya revealed occurrence of a number of cases both at national and international levels. The survey further revealed scanty doping control structures among sports organization, mainly relying on guidelines from international federation. However no studies were found on doping attitude and knowledge among Kenyan athletes.

The findings of the researches are more grounded and relevant to the locations of the study and may not in many aspects reflect on the situation in Kenya. This study is therefore, is an effort to establish similar information on the practice of doping in Kenya. It is an effort to join the rest of the world in the fight against doping by providing vital information that can be used as basis of developing anti-doping programme.

A recent report presented to WADA (Backhouse et al., 2007) on review of literature on doping knowledge, attitude and practice concluded that methodologies used to examine

athletes and their support networks were weak. Majority of the tools were either not reported or insufficiently reported. In some of them the scales were not subjected to psychometric testing. This undermines the validity and reliability of inferences that were made from some of the studies. The current study employed tools that were subjected to both validity and reliability test.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

This research used the survey design to investigate the problem. This design was found suitable for the study because of its versatility, efficiency and ability to be generalized as recommended by Weiss et al., (2001). It is versatile in the sense that it enquires diverse variables within the same research tool, efficient because many variables can be measured without increasing cost and relatively within a short time. According to Weiss et al., (2001) it is the best means of developing a representative picture of the attitudes and characteristics of people, which was part of the objectives of this research.

However, for a survey to be successful, two types of errors must be minimized: poor measurement of cases that are surveyed (errors of observation) and omission of cases (errors of non-observation) (Groves, 1989). To overcome these errors, appropriate sampling technique and procedures were used to identify sample. The instrument was subjected to validity and reliability test to minimize errors in measurement of samples.

3.2 Measurement of Variables

To measure the knowledge of doping by the Kenyan athletes, a 16- item questionnaire was used to test different aspects of doping which included; knowledge of prohibited substances, doping procedures, athletes' rights and responsibilities and risk of using nutritional supplements. The questions were derived from WADA athletes' online resources (WADA, 2012). Each section marked independently out of 100% to establish score per section. Scores were then graded ranging from Excellent ≥ 80 , 60-79 = Good,

40-59 = Average, ≤ 39 as poor. The total score for all the sections combined was also computed and an overall mean score then calculated.

The research employed the Performance Enhancement Attitude Scale (PEAS) developed by Petroczi (2002) to measure the attitude of Kenyan elite runners towards doping. The PEAS is a un-dimensional instrument first developed by Petroczi in the year 2000 (Petroczi 2000), and used in several studies to establish its reliability (Doping Behaviourial Model, Petroczi 2002, Social Desirebilty Effect, Petroczi & Nepusz, 2006, Comparing Implicit and Explicit Attitudes, Petroczi, Aidman and Nepusz, 2008). The attitude statements are judged by a 6 point likert type scale with points anchored from strongly disagree(1), disagree(2), slightly disagree(3), slightly agree(4), agree(5) and strongly agree(6). No neutral score was offered and all items scored in same direction, in favor of doping. The frequency and percentage of each item on the scale was computed for each statement given in the tool. This was used to establish athlete's opinion with regard to each statement. An overall mean for each item on the scale was then computed. This was used to determine the attitude of the athletes towards doping.

Practice of doping was measured in terms of occurrence of any of the eight anti-doping rule violations stipulated by WADA (WADA, 2009) which included: use or attempted use of PEDs, failing without justification to provide sample, failing to declare whereabouts during competitions, possession and trafficking of PEDs and encouraging, aiding or abetting others to dope. Frequencies and percentages were used to indicate the magnitude of the occurrence of each offense. Frequencies and percentages were also used to determine the sources commonly used for doping information and the magnitude of use of nutritional supplements.

3.3 Location of the study

The research was carried out in various parts of Kenya. The areas identified for the study included, Ngong training camp, Nanyuki training camp, Eldoret, Iten, and Kapsabet training camps. These are areas with high concentration of elite athletes. This has been attributed to good training environment characterized by hilly terrains and areas of high altitude. Consequently this has led to establishment of numerous training camps, thus the concentration of athletes in these areas.

3.4 Target Population

The research particularly targeted 1996 elite athletes in Kenya currently registered with Athletics Kenya (2011). Scope of events ranged from 800 to 10,000 meters track races, cross country and marathon. This was because Kenya athletes predominantly undertake middle and long distances races as opposed to other athletic events.

3.5 Sample Size and Sampling Technique

According to Athletics Kenya records (AK website, updated August 2011) there were 1996 elite athletes who compete both at national and international levels in middle and long distance races. Sample size was determined using Israel (2009) sampling table (appendix seven). The table was derived from a formula developed by Yamane (1967) which sets the confidence level at 95%, p value at 0.5 and levels of precisions at $\pm 5\%$, $\pm 7\%$ and $\pm 10\%$. The formula is illustrated below;

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size, N is the population size, and e is the level of precision. The formula was applied to the study as illustrated below;

$$n = \frac{1996}{1 + 1996(0.05)^2} = 333$$

The sample was further increased by 30% to take care of non-responses as recommended by Israel (2000). This brought the sample size to 432. The actual sample size became 327, which was within the prescribed limit of $333 \pm 5\%$ (Israel, 2009). Stratified sampling procedure (Krejcie & Morgan, 1970) was used to determine actual composition of the sample in terms of gender and age. Using the method, the percentage of the particular variable (age and gender) in the original population was used to determine the percentage in the sample. According to Krejcie & Morgan (1970), the stratified sampling procedure ensures that different groups of population get equal chances of being sampled.

3.7 Research Instruments

The questionnaire was used as the main tool of data collection. This was because of its ability to be used with large number of population and to enquire into different variables. Bloomquist (1985) suggests that questionnaires offer considerable advantage in its administration since one person can administer a questionnaire to a number of subjects at a time. Gay (1985) maintains that questionnaires give respondents freedom to express their views and opinions and to make suggestions. He further asserts that the ability of the questionnaires to be administered anonymously help produce more candid answers than is possible with interviews.

The questionnaires were divided into six different sections to cover different aspects of the research objectives. The first section of the questionnaire gathered demographic information about the subjects and their perception of their knowledge of doping. The second section enquired in to the sources of information commonly used by Kenyan athletes to access doping information. Among the areas assessed are: websites, sports associations, athletes' officials and the WADA resources. The third section assessed the prevalence of doping in terms of occurrence of any of the anti-doping rule violations outlined by WADA. The fourth section was on athletes knowledge of doping substances, doping procedures, rights and responsibilities and use of supplements. One item assessed factors that influence doping while the last section was a likert scale that assessed attitude.

3.8 The Pilot study

A pilot study was conducted among 20 subjects to check appropriateness of the questionnaire in testing the intended variables. The pilot was conducted during the 2012 Nairobi Cross country trials held at Tele Posta Sports grounds off Ngong road. The event was chosen because it brings together athletes of both genders and in both junior and senior categories. This meant that the desired categories were represented in the pilot group.

The responses of the pilot study were closely scrutinized to check if the subjects were able to correctly interpret the questions. Other aspects of the instrument such as appropriateness of the length of the questionnaire and clarity of words used were also checked. Appropriate amendments were made in the questionnaire. Words found to

be ambiguous, confusing or irrelevant were removed to minimize misinterpretation of the questions.

3.9 Validity and Reliability of Research Instrument

A questionnaire's validity is determined by how well it measures the concept that it is intended to measure. It refers to the degree to which the study itself accurately reflects or assesses the specific concept that the research is attempting to measure (Campel & Stanley, 1996). Mugenda (1999) defines it as the accuracy and meaningfulness of the inferences which are based on the research results, in other words, the degree to which the results obtained actually represent the phenomenon under study. The instrument was subjected to rigorous process of validation. The instrument was first discussed with supervisors who scrutinized it for appropriateness in addressing key variables in the research as suggested by Konthari (2009). Then it was tested through the pilot study to check for clarity of questions and appropriateness in addressing research objectives.

Gay (1992) defines reliability as a measure of the degree to which the research instrument yields consistent results or data after repeated trials. The test-retest technique was used to check reliability. Cooper and Schinder (2000) indicate that the test-retest technique enables a study to compare a research instrument over time. The test-retest involves administration of same questionnaire twice to same set of subjects at certain intervals. To test reliability, the questionnaire was administered to twenty subjects twice with an interval of three weeks. The three weeks period was appropriate since too short a period would allow the subjects to recall the questions and alter the responses, while, on the other hand, too long a period would mean other variables such

as sensitization on the subject, may intervene and alter the responses (Cooper & Schinder 2000).

The results of the test-retest were accurately recorded and critically analyzed to assess consistency of responses in each set of questionnaires. Cronbach's alpha was used on the likert scale used to measure attitude ($\alpha = 0.8$). Spearman rank correlation was used for the rest of the items to determine the extent to which content of the questionnaire were consistent in producing same responses for the two sets of test. The results ($\alpha = .7$) which was within acceptable limits.

3.10 Data Collection Procedure

Once the research was approved the researcher visited the selected training camp and through the organizers, approached athletes and took them through the research statement, explaining the purpose and scope of the research. Once the athletes had understood and agreed to take part in the research, they were asked to sign the consent form. Athletes were also approached directly during open athletic trails and taken through the same procedure. The participants were then given the research questionnaire and asked to fill and return it to researcher. The questionnaires were collected directly from the participants and through mail.

3.11 Data Analysis and Presentation

The questionnaires were first edited and scrutinized for errors and omissions. Data was then coded and accurately entered into a computer program (SPSS version 17.0). The data were then analyzed using the program. Initial data analysis was conducted using descriptive statistics methods. This included calculations of mean, standard deviations,

percentages and frequencies. Cross tabulation was used to compare knowledge scores per gender, age groups and different lengths of experience.

Association measures were then used to determine possible association between variables. Pearson chi square was used to determine possible association between gender and knowledge scores. The method was found appropriate because it can be used with categorical data (nominal and ordinal) which was the case with the variables at hand. The method is also believed to be powerful, versatile and objective (Campel & Stanley, 1996). Pearson chi square was also used to determine possible association between athletes' length of experience and their knowledge scores.

One way ANOVA was used to compare knowledge mean scores of different age groups. The technique was found suitable because it allows one to compare three or more levels of one factor. The technique assumes normality, independence and equality of variance (Cooper & Schinder 2000).

3.12 Logistical and Ethical Considerations

Permission to carry out the research was sought from Kenyatta University Ethics Committee as well as the participants themselves. The nature and purpose of the research was explained to the participants prior to seeking of consent. This enabled the participants to make informed decisions on whether to participate or not. Consent forms were provided for signing prior data collection. Privacy and confidentiality was assured.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Demographic Information of Participants

Out of 432 questionnaires distributed to elite athletes who compete both at national and international levels, 327 were successfully completed and returned by respondents. This falls within the acceptable limit ($333 \pm 5\%$) as per sample size table (Israel, 2009). On gender representation, 190 (58.2%) males and 137 (41.8%) females participated in the survey. The research sample, therefore, met gender balance. Athletes were asked to indicate their age. The data was clustered into 5 categories as indicated in table 4.1. Majority (77.3%) of the respondents were under 25 years. Only 3 athletes were over 36 years. 21.7% were between 26 and 35 years.

Table 4. 1: Distribution by Age

Age	Frequency	Percent (%)
<20	125	38.2 %
21-25	128	39.1%
26-30	58	17.(%
31-35	13	4.0%
>36 Years	3	.9%
Total	327	100.0(%)

This study also established that majority (62.6%) of the interviewed elite athletes have five to nine years experiences in national and international competitions, while 17.4%

have got ten to fourteen years. 17.7% are recent athletes with up to four years' experience while only 2.1% of those interviewed are older athletes with an experience of over 15 years. (Table 4.2).

Table 4. 2: Athletic Experience

Athlete Experience	Frequency	Percent
≥ 15 years	7	2.1%
10 – 14 years	57	17.4%
5-9 years	205	62.6%
≤ 4 years	58	17.7%
TOTAL	327	100%

Table 4.3 displays the athletic discipline of the participants surveyed. Within the range of middle to long distances races, the research sought to establish particular races which the respondents participated

Table 4. 3: Participation per Event.

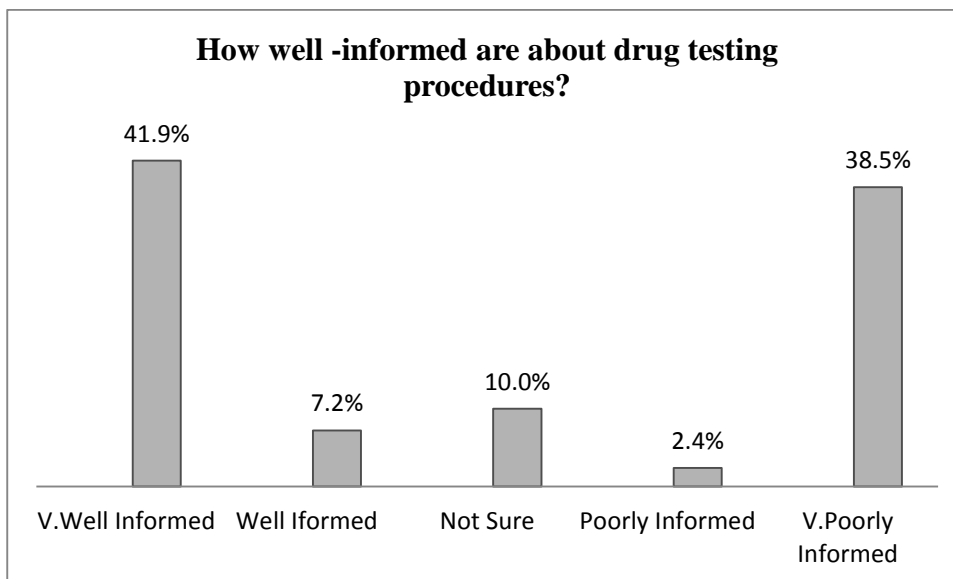
Event	Frequency	%
Cross country/marathon	128	39.1%
Track events long races >800M	190	58.1%
Track & Field events(throws)	1	0.3%
Track & Field events(jumps)	7	2.1%
Race walking	1	0.3%
Total	327	100%

Majority of the athletes competed in long distance track events >800M (58.1%). The next highest group competed in cross country/ marathon (39.1%) and a total of 9 % competed in both track and field. Only 1% competed in walking race.

4.2.1 Personal Rating of Knowledge of Drug Testing Procedures

The research sought to establish athletes' personal rating of their knowledge of doping particularly on testing procedures and procedures that follow when results turn positive. Forty one percent (41.90%) of the athletes felt that they were very well-informed of drug testing procedures, 7.20% as well-informed, 10% not sure, 2.40% poorly-informed and 38.50% as being very poorly- informed (see Figure 4.1)

Figure 4. 1: Perceived knowledge of doping procedures

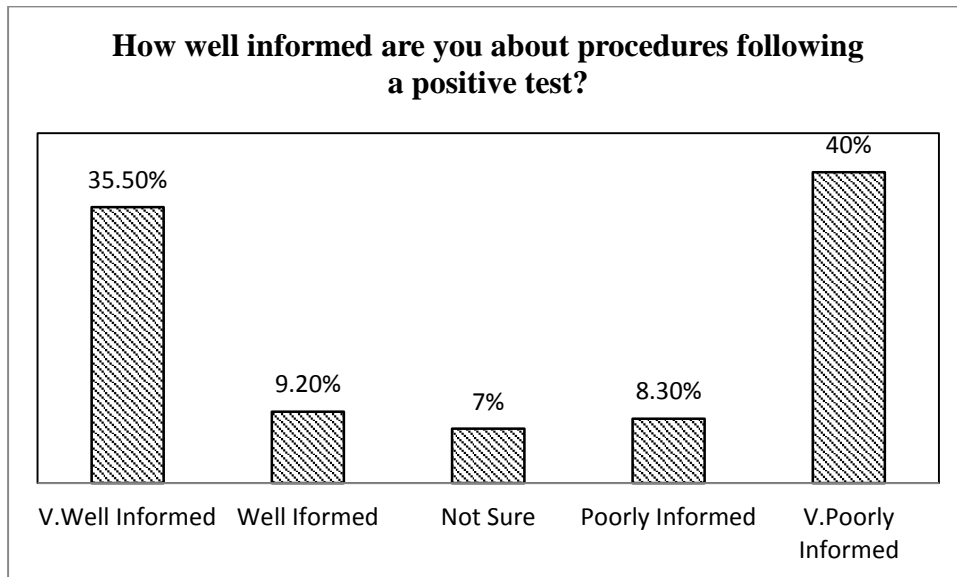


4.2.2 Personal rating of Knowledge of Procedures following a Positive test

On the issue of whether they knew the procedure that follows when laboratory reports positive test, 35.5% reported that they were very well-informed, 9.2% as well-informed, 7% were not sure, 8.3% as poorly-informed and 40% as very poorly-informed. The

findings indicate lack of adequate knowledge on doping procedures by more than half of the participants (see figure 4.2)

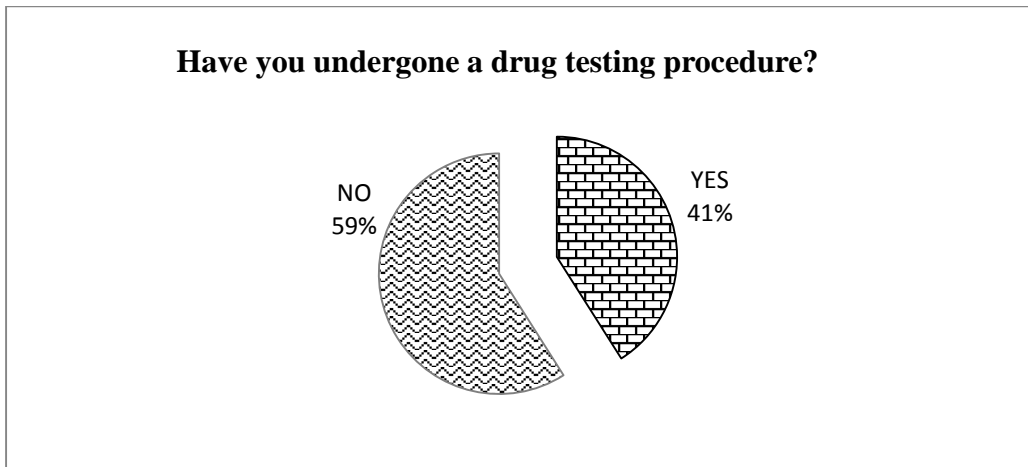
Figure 4. 2: Perceived knowledge of procedures following a positive test



4.2.3 Athletes' Exposure to In and Out of Competition Test

With regard to drug testing experience, a question was posted to establish the number of athletes who have undergone drug testing. Fifty nine percent (59%) reported that they have never been tested, while 41% indicated having been tested at one time or another (Figure 4.3). Of the 158 athletes who have undergone testing, 65 athletes (21%) reported having been tested 1-3 times and 58 (18%) 4 to ten times.

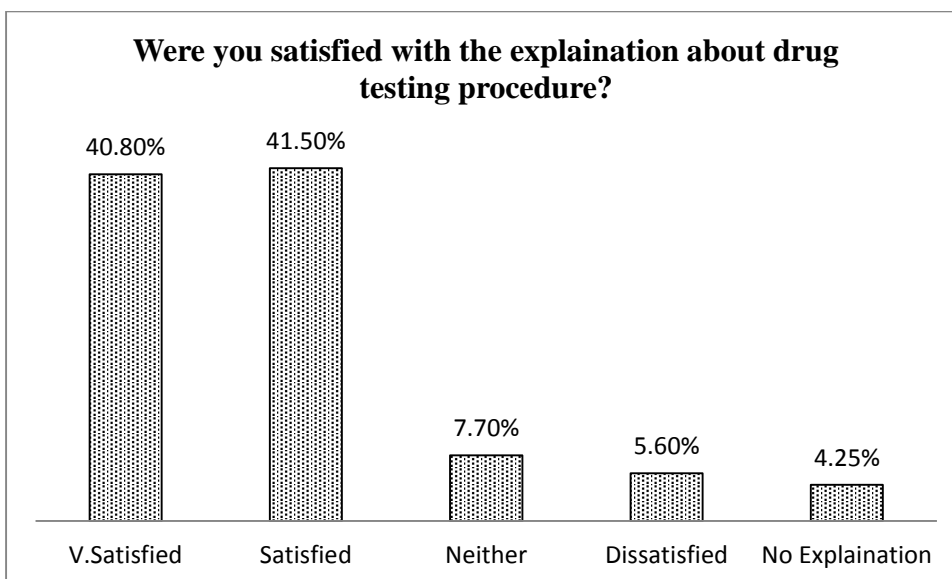
Figure 4. 3: Exposure to testing procedures



4.2.4 Athletes' perception about the fairness of Drug testing procedures

Figure 4.4 illustrates the satisfaction of athletes with the explanation they received about testing procedures. Forty point eight (40.80%) indicated that they were very satisfied, 41.50% as being satisfied, 7.70% as being neither satisfied nor dissatisfied. A total of 5.60% were dissatisfied while 4.25% either do not remember or have never received information.

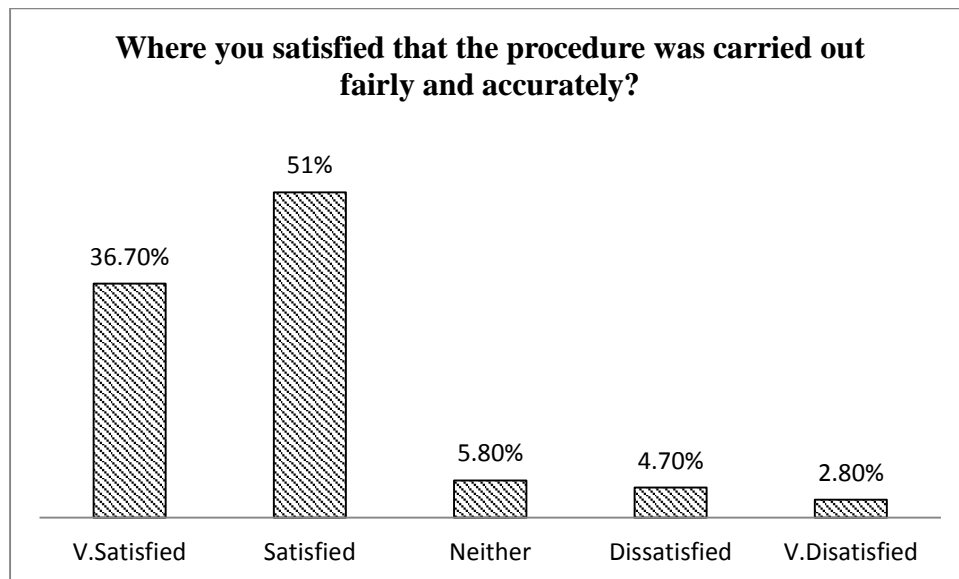
Figure 4. 4: Satisfaction with explanation of testing procedure



4.2.5 Fairness of Testing Procedures

On the issue of whether they were satisfied that the test was carried out fairly and accurately, 36.7% reported they were very satisfied, 51% as satisfied 5.8% as being neither satisfied nor dissatisfied and a further 4.7% as being dissatisfied while 2.8% indicated being very dissatisfied. (Figure 4.5)

Figure 4. 5: Fairness of Testing Procedures



4.3.0 Common Sources of Doping Information used by Kenya Runners

The second set of questions assessed the common sources of information commonly used by Kenyan athletes. Among the areas that were assessed were websites, sports associations, emails, information lines, advice cards, athletes' coaches, doctors and managers.

4.3.1 Sports associations and other organizations

According to the respondents the most common source of doping information among sports associations is AK (30.6%) followed by IAAF at 19.4%. The study also

established that a substantial number (20.4%) of athletes have never received information on drug-free sport while 9.2% indicated that they have received information on drug free-sport but they are not certain about the source. 9.2% indicated WADA while 7%, NACADA. (Table 4.4). Thirteen athletes (3.9%) did not respond to the question.

Table 4. 4: Sports Association and other organizations as sources of information

Source of Information	Frequency	Percent
AK	96	30.6%
NACADA	22	7%
IAAF	61	19.4%
World Anti-Doping Agency	29	9.2%
Other	13	4.1%
Do not know the source(s)	29	9.2%
Never received information on doping	64	20.4%
	314	100%
Missing	13	3.9

4.3.2 Most Commonly used Websites

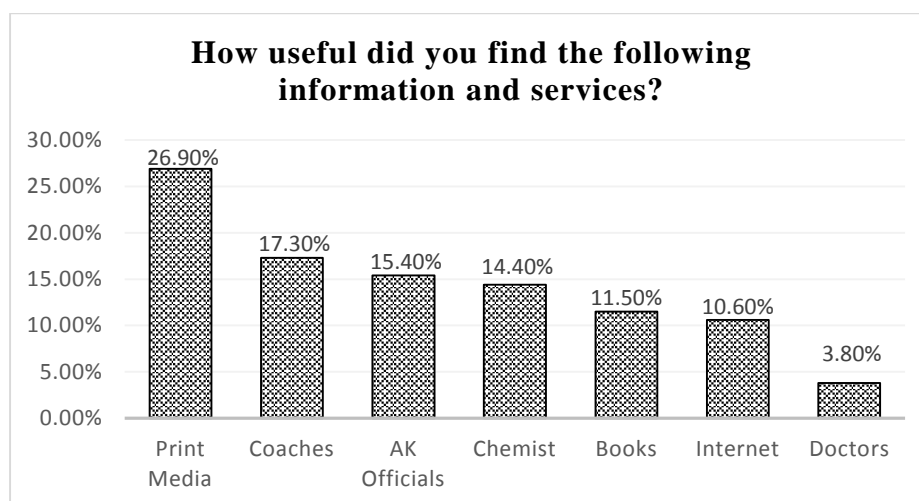
When elite athletes were further asked to name the most preferred website they are likely to use for up-to-date drug-free sport issues. Again, AK emerged the most preferred website (40.3%) followed by WADA (11.5%). Five point two (5.2%) indicated International Federation while 3.3%, other websites. A good percentage of the athletes (33.6%) indicated that they did not spent time on drug-free sport information (Table 4.5).

Table 4. 5: Most Preferred Website for doping information

	Frequency	Percent
AK	133	40.3%
International Federation Website	17	5.2
World Anti-Doping Agency Website	38	11.5
Other Websites	11	3.3
Not spent time on drug free sport information	111	33.6

4.3.3 Other Resources and Services that Provide Anti-Doping Information

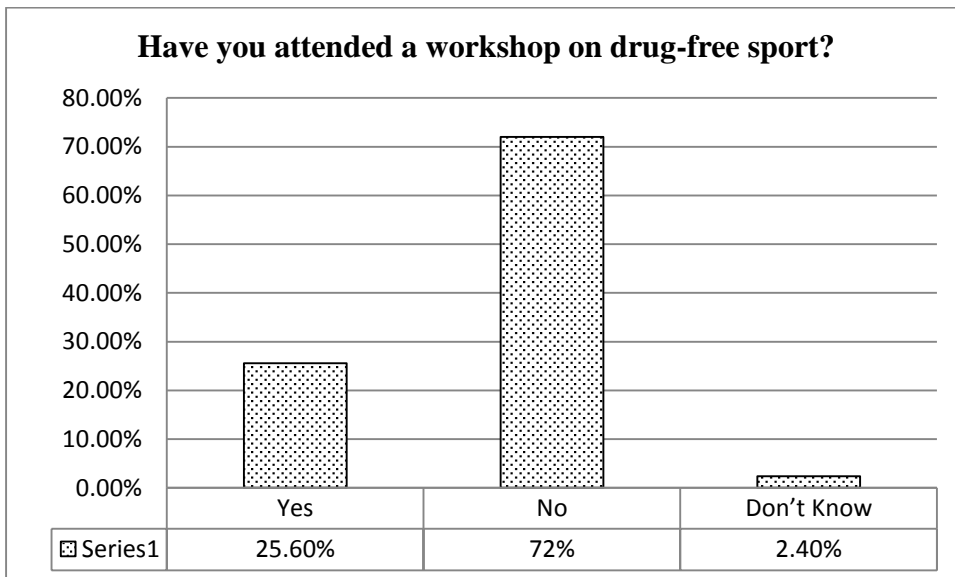
The researcher was also interested in finding out other sources of anti-doping information apart from those that had been anticipated above. When respondents were asked to name other sources of anti-doping dissemination materials, print media came first with up to 26.9% of respondents indicating it. This was followed by coaches at 17.3%, AK officials at 15.4% and chemists at 14.4%. Books were mentioned by 11.5%, internet, 10.6% and the least were doctors at 3.8%. (Figure 4.6).

Figure 4. 6: Other resources and services

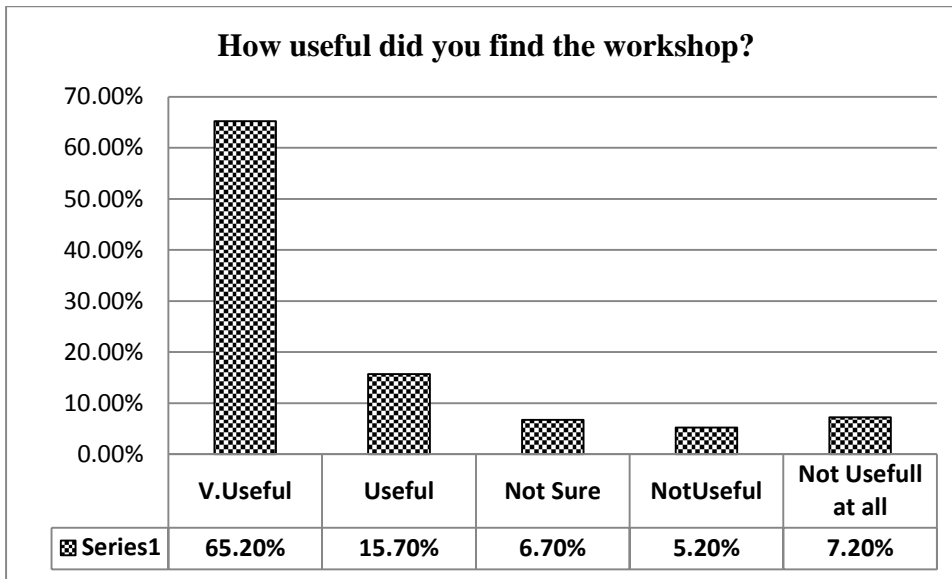
4.3.4 Attendants and Perceptions of Workshops on Drug-Free sport

The athletes were asked whether they have attended a workshop on drug free sport and how useful they found it. Twenty five point six (25.6 %) reported having attended a workshop and 72% as having not. Two point four (2.4%) did not know if they have attended a workshop on drug free sport. (see figure 4.7).

Figure 4. 7: Attendance of workshops



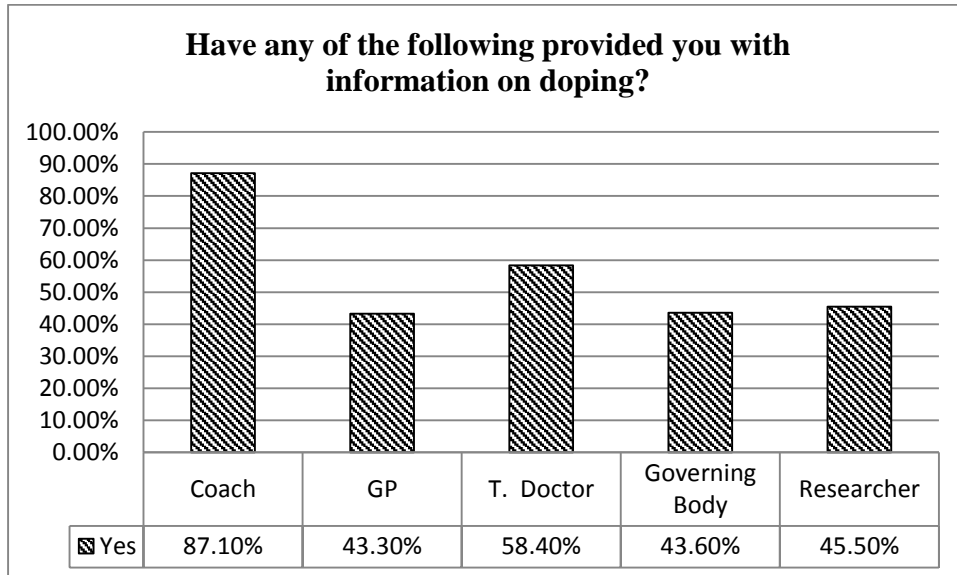
Of those who have attended, 65.2 % reported the workshop as being very useful, 15.7% as useful and 6.7% were not sure. A total of 22.3% did not find the workshops useful (Figure 4.8).

Figure 4. 8: Usefulness of the workshops

4.3.5 Athletes' Officials as Sources of Information on Drugs

A question was raised to establish if athletes' officials provide information on doping to the athletes. Majority (87.1%) indicated having received information from coaches while 5.9% as not. Another 2.7% were not sure. Asked about GP, 43.3% indicated having received information from GP, while 36% as having not, 3.9% were not sure and a further 12% indicated the question as being irrelevant. Fifty eight point four percent (58.4%) of the athletes confirmed having received information from team doctor while 52.1% as having not. Asked whether they have received information from an official from the governing body, 43.6% indicated yes, while 33.3% as no, 10% were not sure. On researchers as sources of information, 45.5% indicated 'yes', and 31.2% 'no'. 5.2% were not sure. In overall, coaches emerge the main sources of information (Figure 4.9).

Figure 4. 9: Athletes Officials as Sources of Information



4.4 Evaluation of Knowledge on Doping Among Kenyan Elite Runners

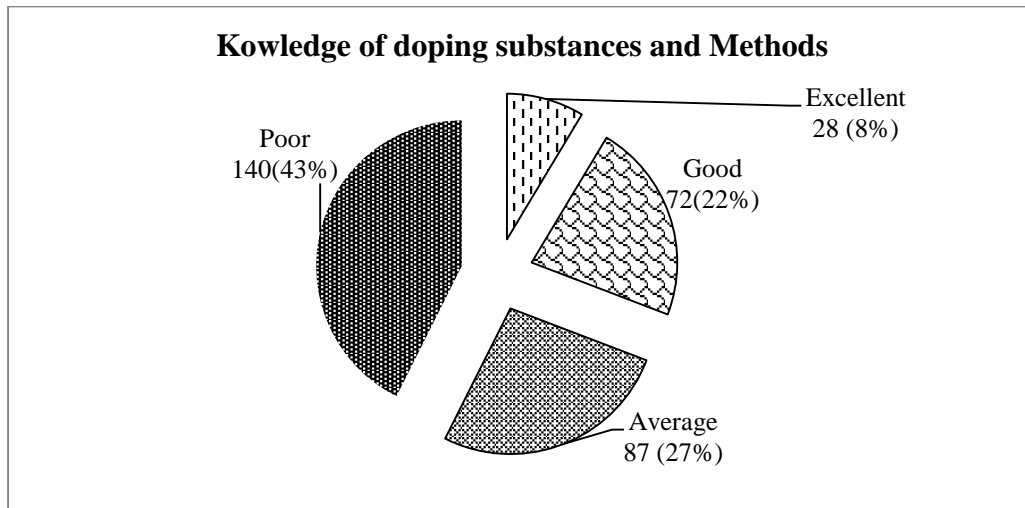
A total of 16 questions were raised to test athletes' actual knowledge of doping on four major areas; prohibited substances, testing procedures, athletes' rights and procedures and use of supplements. Scores were computed for each section and graded independently. A four point scale was then used to grade the scores per section and results presented in pie charts. The grading was done as follows: Excellent $\geq 80\%$, 60%-79% = Good, 40%-59% = Average, $\leq 39\%$ as poor.

4.4.1 Prohibited Substances and Methods

From the findings of the study it can be reported that a good percentage of elite athletes (43%) attained poor scores on knowledge of prohibited substances. About twenty seven percent of them (27%) had average knowledge while only 30 % scored good to excellent scores. (Figure 4.10). These findings indicate that a great majority of elite

sportsmen and women are ignorant about substances and methods that are classified as prohibited in sports.

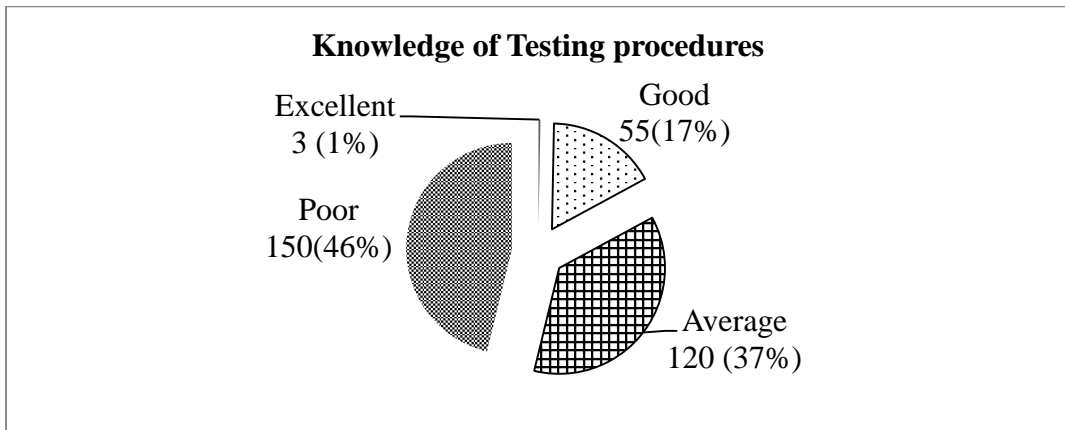
Figure 4. 10: Knowledge on Prohibited Substances and Methods



4.4.2 Testing Procedures

Results reveal that greater percentage (46%) of the elite athletes have poor knowledge on testing procedures (Figure 4.11). Only 56(18%) elite athletes had good to excellent scores on knowledge of testing procedures while 37% have average knowledge. These findings indicate a situation where many of the Kenyan elite athletes are ignorant of the testing procedures. This study provides an insight into Kenyan athletes' level of ignorance on testing procedures.

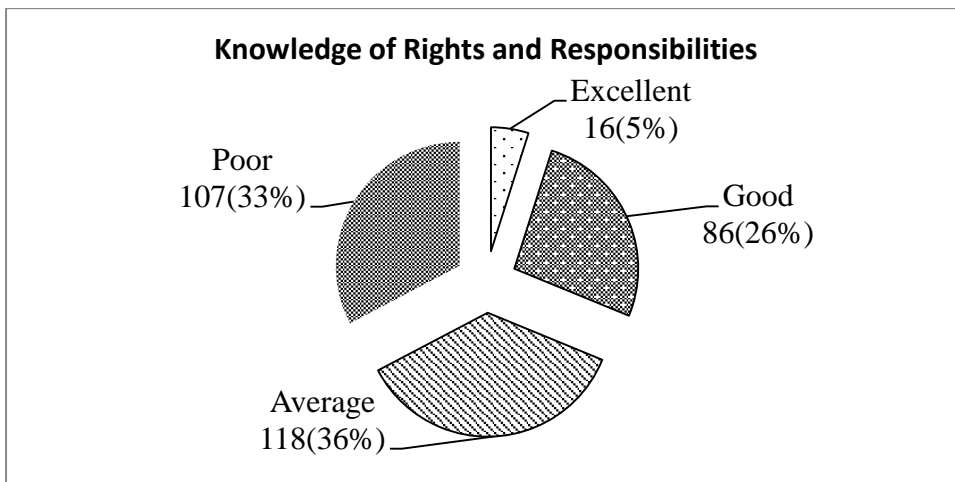
Figure 4. 11: Knowledge in testing procedures



4.4.3 Athlete Rights and Responsibilities

On athlete rights and responsibilities, the results indicate that athletes are generally aware of this issue. Figure 4.12 indicates that 107 (33%) have poor scores, 118(36%) have average scores, 86(26%) have good scores and 16(5%) have excellent scores on knowledge of doping. These results generally point to a population that is fairly well-informed.

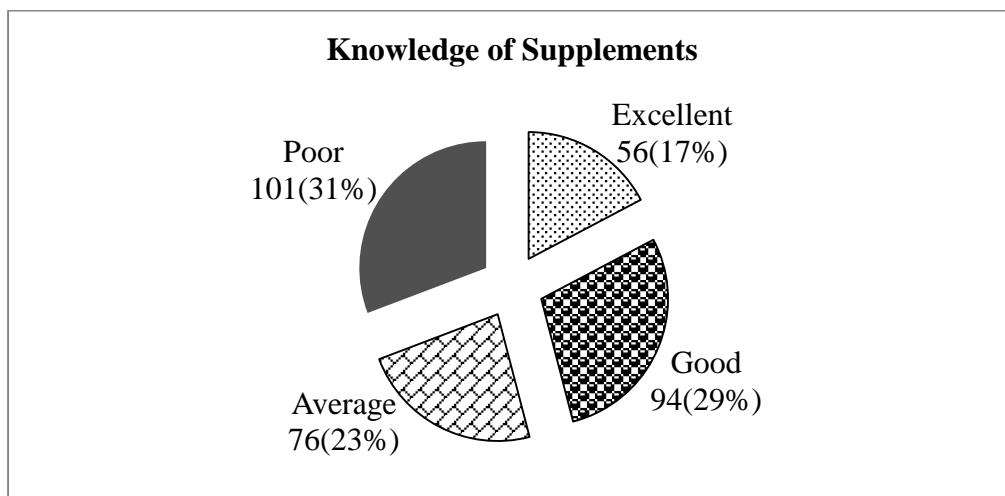
Figure 4. 12: Knowledge in athletes' rights and responsibilities



4.4.4 Knowledge of Supplements

Figure 4.13 indicates that athlete's knowledge concerning supplements is fairly good as 150 (46%) of the respondents had good to excellent scores on knowledge of supplements compared to only 101 (31%) who had poor scores. A further 23% had Average knowledge.

Figure 4.13: Knowledge in Supplements



4.5 Attitude of Kenyan Elite Runners towards Doping

A thirteen item attitude scale was used to assess elite middle and long distance athletes' attitude towards doping. The respondents were asked about doping, on a six-point likert scale, to indicate the extent to which they agreed or disagreed with statements concerning doping, their training in various events, how doping is perceived and reported by the public and their desire to achieve. The scale ranged from 1 –strongly disagree, 2-disagree, 3-slightly disagree, 4-slightly agree, 5-agree, 6- strongly agree. Frequencies and percentages of responses for each item on the scale were computed for

every statement given. A mean was then computed for each item on the scale based on responses to the item for the thirteen statements (Table 4.6)

Table 4. 6: Athletes attitude towards doping

State ment	Strongly disagree		Disagree		Slightly disagree		Slightly agree		Agree		Strongly agree		N
	F	%	F	%	F	%	F	%	F	%	F	%	
1	178	60.9	53	18.2	2	.7	20	7	18	6	21	7.1	292
2	175	60.1	79	26.9	9	3	3	1.1	16	5.5	10	3.3	292
3	155	53.2	69	23.7	12	4.1	12	4.1	23	7.8	21	7.1	292
4	159	54.1	64	22.1	13	4.5	9	3	23	7.8	24	8.3	292
5	145	49.6	77	26.3	15	5.3	18	6	23	7.8	14	4.9	292
6	138	47.4	60	20.7	23	7.9	20	6.8	29	9.8	22	7.5	292
7	165	56.4	72	24.8	5	1.7	10	3.4	25	8.6	15	5.3	292
8	136	46.8	83	28.4	22	7.5	28	8.6	15	5.3	11	3.7	292
9	178	61	64	22	11	3.9	11	3.9	15	5	13	4.4	292
10	152	52.1	67	23	17	5.7	20	6.8	26	8.9	10	3.4	292
11	156	53.4	69	23.7	9	3	15	5.3	25	8.4	18	6	292
12	145	49.8	84	28.7	9	3	20	6.8	27	9.1	7	2.3	292
13	147	50.4	72	24.6	30	10.4	17	5.8	16	5.4	10	3.5	292
Mean		53.5		24.1		4.7		5.3		7.3		5.1	

(Refer to appendix II for the 13 statements).

From the findings, majority of the athletes (53.5 %) strongly disagree with statements that support the practice of doping. Twenty four (24.1%) disagreed with the statements while a further 4.7% slightly disagreed. Only 17.7% slightly agreed, agreed or strongly agreed with the statements. Those who disagreed with the statements at varying

degrees totals up to 82.3%, while those who agreed are only 17.7%. This indicates a strong negative attitude by majority of the athletes.

Looking at responses to individual statements, when asked whether doping is necessary to be competitive, 61.2% strongly disagreed, 18.2% disagreed, and 0.7% slightly disagreed while only 20.1% strongly agreed, agreed or slightly agreed to the statement. On the issue of whether doping was cheating or not only 9.9% agreed that it was not because everyone does it. A whole 60.1% strongly disagreed while a further 26.9% disagreed. 3% slightly disagreed. Asked whether they felt doping made up for the lost time here again majority of the athletes disagreed with the statement with up to 53.2% of them strongly disagreeing and a further 27.8% disagreeing. Only 19% agreed with the statement. Another question was raised on whether the quality of performance should matter and not the means of achieving it. Fifty four point one percent (54.1%) strongly disagreed, 22.1% just disagreed and a further 4.5% slightly disagreed. On the other hand a total of 19.1% agreed with the statement. This indicates that majority of Kenyan athletes value the means of achieving performance just as performance itself. Doping is therefore not justified.

On the issue of whether athletes take performance enhancing drugs because they are pressured to do so, a total of 81.2% disagreed with the statement with nearly 50% strongly disagreeing. Only 18.7% agreed with the statement. Asked if they use recreational drugs because they help them in sports situations, 47.4% strongly disagreed, 20.7% disagreed while a further 7.9% slightly disagreed. About a quarter of them (24.1%) agreed with the statement. Their feeling towards risk associated with doping was also explored. A total of 82.5% of the respondents were of the opinion that

the risk associated with doping was real. Only 17.5% were of the view that the risk was exaggerated.

Asked if athletes are forced to dope because they have no alternative choices except sport, 86.9% disagreed with the statement with majority of them (61%) strongly disagreeing. Only 13.1% agreed with the statement. Use of recreational drugs in relation to sports performance was also explored. The athletes were asked if they felt doping should be legalized. A total of 80.8% disagreed with the statement with 52.1% strongly disagreeing. Only 19.2% agreed with the statement. Asked if they felt doping was unavoidable part of competitive sport, a whole 77.1% disagreed. Only 20.5% agreed with the opinion.

The athletes were also asked if they felt that recreational drugs would help overcome boredom. Forty nine point eight percent (49.8%) strongly disagreed, 28.7% disagreed and a further 3% slightly disagreed. A total of 18.2% agreed with the opinion. Doping was compared to sport technology in terms of performance enhancement. Athletes were asked if they felt there was no difference between drugs, fiberglass poles and speedy swim suits. Majority (85.4%) of the athletes disagreed with the statement. Only 14.6% agreed with the statement. The findings reflect a strong trend of negative attitude towards doping by Kenyan elite athletes.

4.6 Evaluation of Practice of doping among Kenyan Elite Athletes

A number of questions were raised to establish possible occurrence and/or infringement of the eight anti-doping violations stipulated by WADA (Appendix III). Areas assessed included purposeful or accidental use of PEDs, possession or trafficking of prohibited

substances, aiding or abetting athletes to dope, refusing without justification to undertake test and failing to declare whereabouts during competitions.

4.6.1 Athletes' Perception of Extent of Doping

This section aimed to establish the athletes' perception and actual practice of doping. A question was post to establish athletes' perception of the extent of doping in their sport. Table 4.7 shows that doping was indicated as a major problem in various sports participated by Kenyan athletes. The results reveal that most (40.4%) athletes admitted that doping is a problem to a major extent in their sport, 7.1% indicated to good extent and 11.4% said it was neither high nor low as compared to only 34% who indicated that it is not a problem at all.

Table 4. 7: Perceived extent of doping

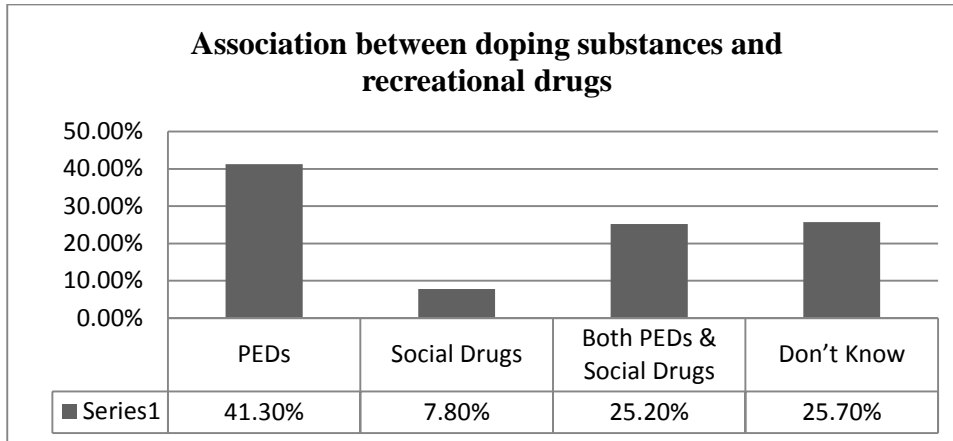
To what extent do you consider doping to be a problem in your sport?	Frequency	Percent (%)
To a major extent	120	40.4%
To a good extent	21	7.1%
Neither high or low	34	11.4%
To low extent	21	7.1%
Not a problem at all	101	34%
Total	297	100%
Missing	30	

4.6.2 Association between Doping and Social drugs

Those respondents who suggested that doping is a problem to a major and good extent were further asked whether doping was associated with social drugs or not. Majority (41.3%) of them were of the opinion that it is used as performance enhancing drug,

followed by 25.2% for both as performance enhancing and social drugs, while 25.7% said they did not know (Figure 4.14).

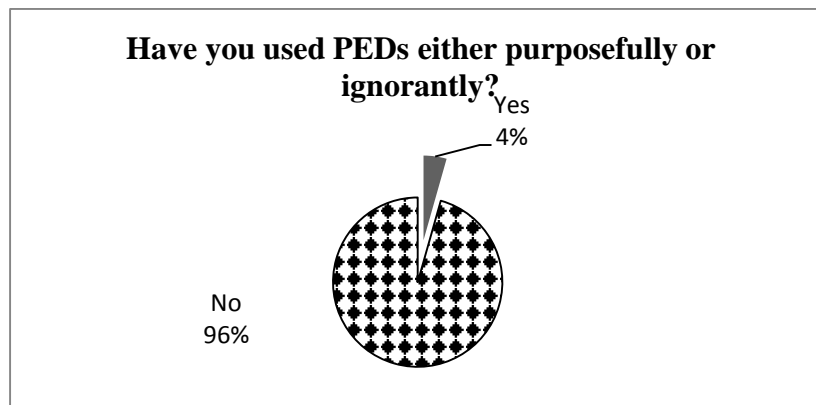
Figure 4.14: Association between doping and social drugs



4.6.3 Purposeful use of Performance Enhancing Drugs

When athletes were asked whether they have ever used performance enhancing drugs either ignorantly or purposely, 4% were positive while 96% were negative. This finding suggests low usage of performance enhancing drugs; however the fact that a section of the respondents had used PEDs may be a wake-up call to a changing reality in Kenyan athletics (Figure 4.15).

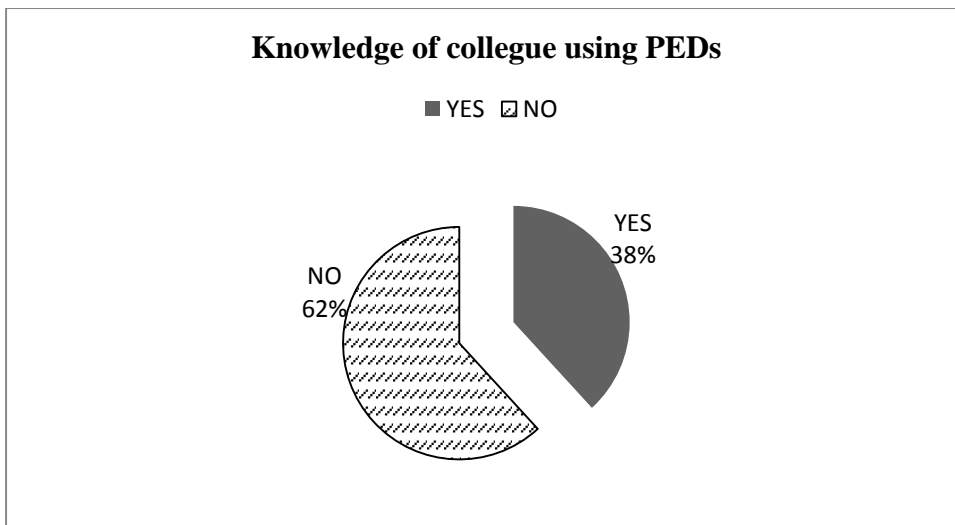
Figure 4.15: Use of performance enhancing drugs



4.6.4 Knowledge of colleague Athletes using Performance Enhancing Drugs

The same question was indirectly posted, this time not about themselves but on knowledge of colleague athletes who use performance enhancing drugs. In response to the question on Knowledge of colleague Athletes using performance enhancing drugs, 38% of the respondents admitted knowing a fellow athlete using PEDs while 62% did not. (Figure 4.16). These findings contradict the earlier claim that only 4.4% have used PEDs since the same athletes admitted that they have heard of colleague athletes who use performance enhancing drugs. On availability of PEDs, 15.1% indicated they have heard of outlet points from where the drugs can be accessed.

Figure 4.16: Knowledge of other athletes using PEDs



4.6.5 Compliance with other anti-doping rule violations

An assessment was done to establish Kenyan elite athletes to a number of anti-doping rule violations outlined by WADA (2011). A number of questions were raised to establish compliance to particular regulations indicated in the WAD code.

Table 4. 8: Compliance to Anti-Doping Rule Violations

WADA RULE VIOLATIONS	YES	NO	TOTAL
Use of PEDs	4%	96%	100%
Refusing or failing to submit specimen	0.2%	99.8%	100%
Declaring whereabouts	42%	58%	100%
Possession & trafficking substances	1.2%	98.8%	100%
Aiding or abetting others	8%	92%	100%

Asked if they have, without genuine reason refused to provide specimen as requested by their local organization or WADA officials for purpose of testing, 0.2% agreed while the rest disagreed. This gives 99.8% compliance to the rule regarding sample collection. On the question of whether they declare their whereabouts when they have national or international meets, 42% said 'yes', while 58% said 'no'. This indicates a rate of 58% non-compliance to the rule regarding athletes' availability throughout the competition period. Asked if they have been involved in possession or trafficking of doping substances, 1.2% agreed while 98.8% denied, indicating a high compliance to this particular rule. Finally asked if they have been aided or abetted to use PEDs by colleagues or friends, 8% agreed while 92% denied. This indicates, though to a small degree, non-compliance the eight anti-doping rule violation (Table 4.8)

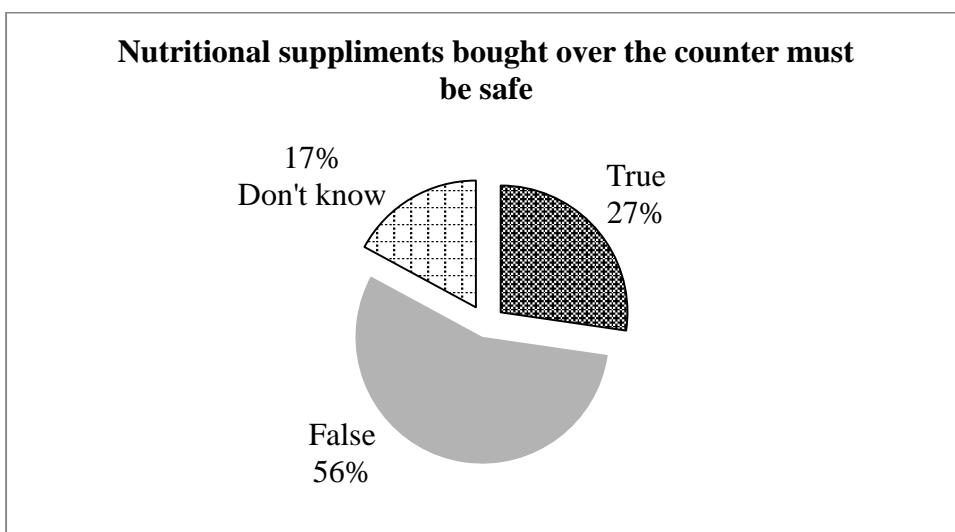
4.6.6 Assessment of risk associated with use of nutritional supplements

To establish possible use of PEDs ignorantly through the use of nutritional supplements bought over the counter two questions were raised, one on whether they were safe to use and another on whether the label would indicate prohibited substances. Asked

whether supplements are safe to use with regard to doping regulations, 47.2% agreed while 38.75 did not. Fourteen percent (14%) did not know.

In response to the question on whether nutritional supplements containing prohibited substances will always say so on the label, 27.3% of the athletes agreed with this question, while 55.6% indicated this was false, while a further 17.1% did not know if this was true or false (Figure 4.17). This indicates up to 44.4 % of these athletes could easily have used or currently using nutritional supplements with a prohibited substance solely on the basis that the label did not indicate presence of a prohibited substance, while those who did not know if the statement was true or false could be vulnerable to making a choice (unknowingly) that could easily ruin their athletic career in the event of using a nutritional supplement with a banned substance present in it but not indicated on the label. This perhaps underscores the need for more awareness, sensitization and education of these athletes so that they can make better decisions when in such situations.

Figure 4. 17: Use of Nutritional supplements bought OTC



4.7 Use of Herbal Supplements by Kenyan Elite Athletes

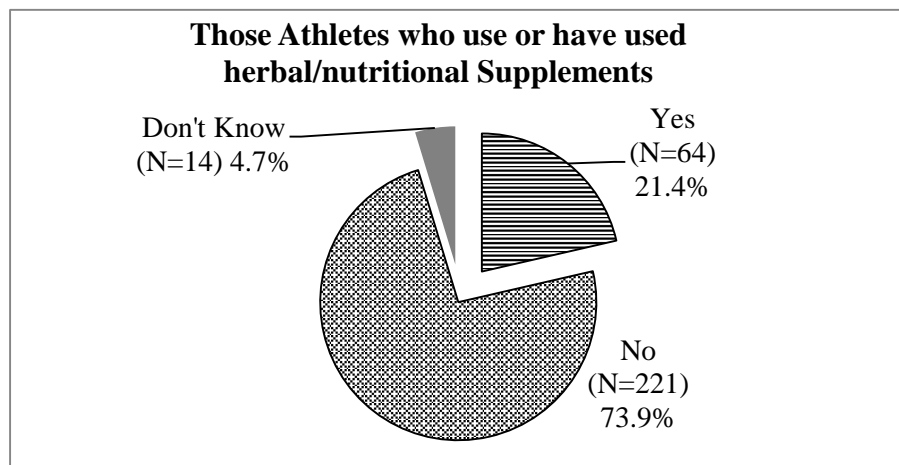
The purpose of this section was to establish the extent to which elite athletes use herbal supplements, the reasons behind their usage and how much they knew about the risk associated with herbal supplements in relation to WADA violations.

4.7.1 Extent of Use of Herbal and Nutritional Supplements

When athletes were asked whether they use or they had used herbal or nutritional supplements. Twenty one point four percent (21.4%) were positive, 73.9% declined while 4.7% were not aware what herbal/nutritional supplements are (Figure 4.18).

These results indicate a low usage of supplements by athletes.

Figure 4. 18: Those who Use or Have Used Herbal/Nutritional Supplements



4.7.2 Types of Supplements Used

Athletes were further asked to indicate the type of supplements used. Table 4.10 indicates that, apart from Vitamin C, which had been used by 16.7% of the respondents and multivitamins (8.5%), all other supplements had only been used at a rate of less than 3.3%.

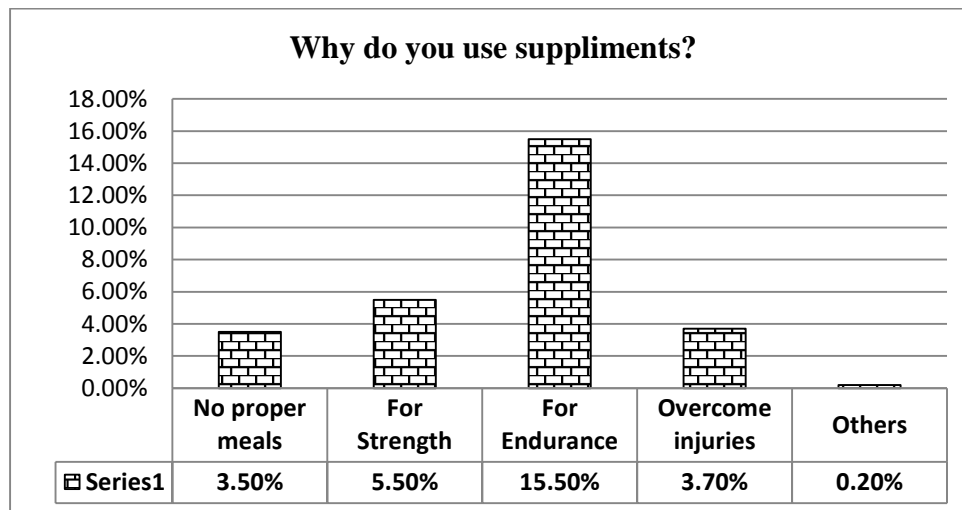
Table 4. 9: Types of herbal and nutritional supplements used

Supplement		Frequency	Percent
Creatine	Yes	4	1.2
	No	324	98.5
Iron	Yes	11	3.3
	No	318	96.7
Ginseng	Yes	2	0.6
	No	327	99.4
Multivitamins	Yes	28	8.5
	No	301	91.5
Vitamin C	Yes	55	16.7
	No	274	83.3
Caffeine	Yes	6	1.8
	No	323	98.2
Magnesium	Yes	7	2.1
	No	322	97.9
Whey Protein	Yes	3	0.9
	No	326	99.1
Echinacea	Yes	1	0.3
	No	328	99.7
Khat	Yes	0	0
	No	329	100
Others	Yes	2	0.6
	No	327	99.4

4.7.3 Reasons for Use of Herbal and Nutritional Supplements

Athletes were also asked about the reasons for using supplements. Though the study indicates that Kenyan athletes have diverse reasons for using multivitamins, the most common reason appears to be to enhance endurance (15.5%) followed by strength (5.5%), (Figure 4.19). The results suggest that there is a strong desire among the athletes to do better in the races. A small percentage (3.5%) took it to supplement diet, while a further 3.7% believed the supplements could aid in overcoming injuries.

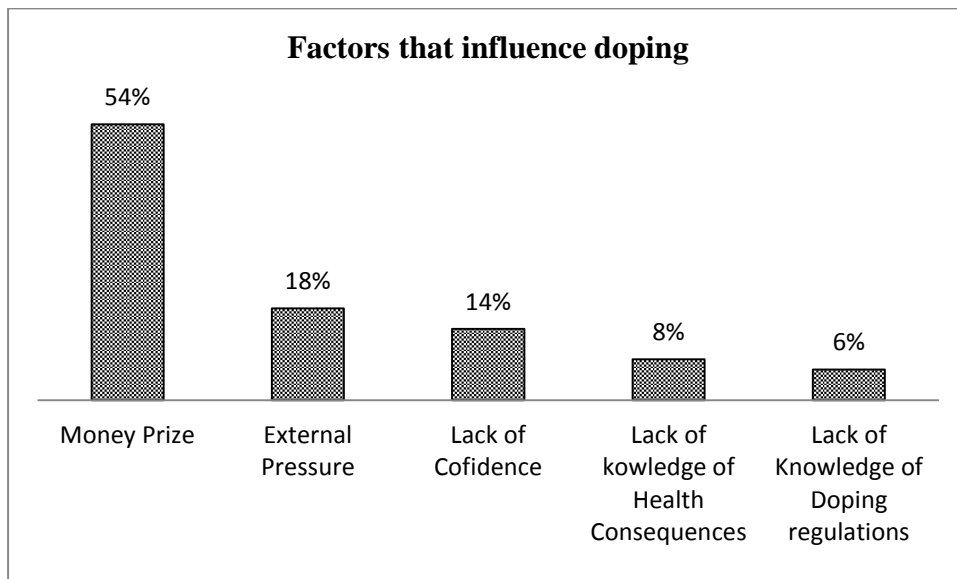
Figure 4. 19: Reasons for use supplements



4.8.1 Factors that Influence Doping practice

An assessment of potential factors that may influence Kenyan athletes to dope established that desire for money prize was the strongest factor, with up to 54% of the athletes in the study mentioning it. This was followed by external pressure, at 18%, and lack of confidence at 14.4%. Lack of knowledge of health consequences and doping regulations were least mentioned by athletes with 8% and 6% respectively (Figure 4.20).

Figure: 4.20 Factors influencing doping practice



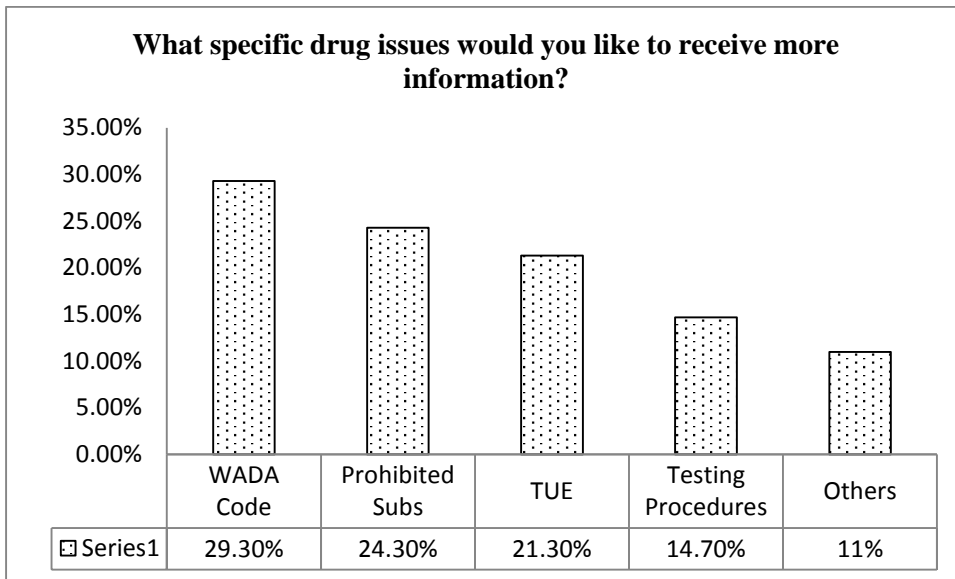
4.8.2 Athletes' Suggestions about Management of Doping in Sport

The final part of the questionnaire sought to establish the athlete's opinion on how best doping can be managed in their sport, and the areas that they would like to receive further information.

4.8.3 Further Information on Specific Drug-free Issues.

In response to the question on Specific drug free issues or testing procedures about which the athlete would like to receive more information, the most sought after issues were WADA Code (29.3%) followed by prohibited substances and methods (24.3%). Therapeutic Use Exception was third with 21.3%. Testing procedures was least with 14.7% (Figure 4.21).

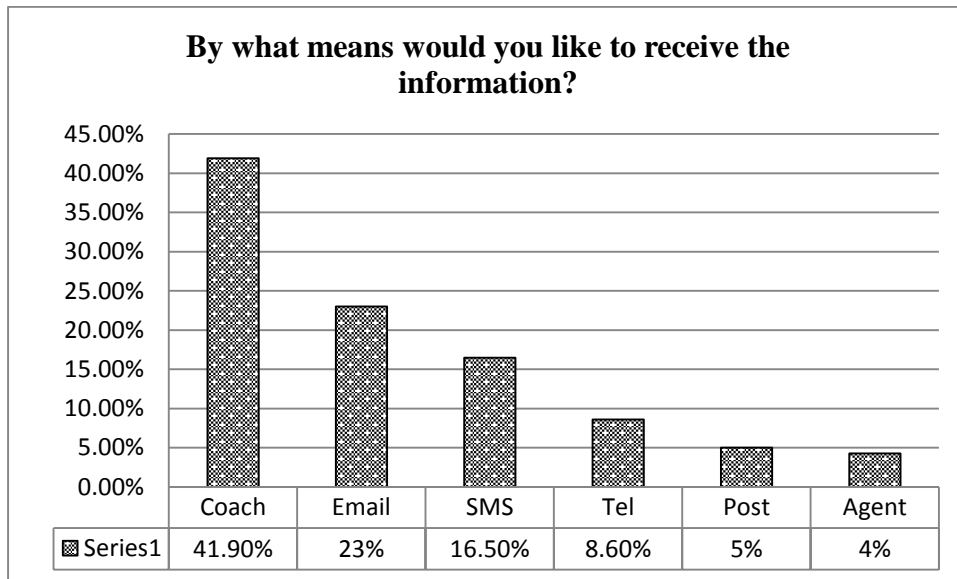
Figure 4. 21: Areas where there is need for further information



4.8.4 Preferred Means of Receiving Information

In response to the question by which means the athletes would prefer to be alerted on drug free sport, 41.90% indicated they would like to be alerted through their coach, 23% by email, 16.50% by SMS, 8.60% by telephone, while the rest 5% and 4.3% by post or by their agent respectively(Figure 4.22). From their responses it would appear almost half of the interviewed athletes would be willing to trust their coaches as their information source and about a quarter of them were tech-savvy enough to prefer to receive such information directly via their emails. These two avenues may need to be explored further so as to reach athletes at the level at which they feel most comfortable and confident to receive information on drug-free sport.

Figure 4. 22: Preferred means of receiving further information



4.9.0 Association between Age, Gender, Experience and Doping Knowledge

4.9.1 Association between Age of athletes and their knowledge of Doping

Knowledge scores were graded into four categories; Excellent ≥ 80 , Good (60-79) Average (40-59) and Poor (0-39). Cross tabulation was used to compare knowledge scores among different age groups. Findings indicated that among the under twenty, majority (81.6%) scored between average and poor. Only 18.4% scored between good and excellent. This was quite contrary to the 26-30 years category, which had 34.5% attaining the good to excellent grades. Scores were also low for the over 30 years and the 31-35 years groups with up to 61.2% and 66.7% scoring poorly respectively.

Table 4. 10: Knowledge scores per age group (Cross tabulation)

Age group		Excellent	Good	Average	Poor	Total
<20	Count	5	18	44	58	125
	% within Age of respondent	4.0%	14.4%	35.2%	46.4%	100.0%
21-25	Count	5	35	55	32	127
	% within Age of respondent	3.9%	27.6%	43.3%	25.2%	100.0%
26-30	Count	3	17	25	13	58
	% within Age of respondent	5.2%	29.3%	43.1%	22.4%	100.0%
31-35	Count	0	2	3	8	13
	% within Age of respondent	.0%	15.4%	23.1%	61.5%	100.0%
>36 Years	Count	1	0	0	2	3
	% within Age of respondent	33.3%	.0%	.0%	66.7%	100.0%
Total Count		14	72	127	113	326
% within Age of respondent		4.3%	22.1%	39.0%	34.7%	100.0%

The data was further subjected to one-way ANOVA to compare knowledge mean scores of different age groups. The results indicated a significant difference with a p value of .002 and $f = 4.292$. (See Table 4.11). Pearson chi square test yielded similar results with χ^2 value of 31.6, $df = 4$ and $p = .002$ (table 4.12).

Table 4. 11: Association between Age and Knowledge (One Way ANOVA)

One way ANOVA –age and knowledge of doping					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.219	4	3.055	4.292	.002
Within Groups	229.182	322	.712		
Total	241.401	326			

Table 4. 12: Association between age and knowledge (Pearson chi square)

Pearson Chi Square – Age and Knowledge of Doping			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.673	12	.002
Likelihood Ratio	30.428	12	.002
Linear-by-Linear	3.729	1	.053
Association			
N of Valid Cases	326		

4.9.2 Association between Gender and Knowledge of Doping

Cross tabulation was used to compare knowledge scores between males and female athletes. Majority of the male athletes (42.1%) scored average marks. A total of 27.3% scored high to very high marks while 30.5% scored poor marks. The situation was slightly different with the female athletes who had a bigger percentage (40.9%) scoring poorly. Thirty four percent point three percent (34.3%) of them scored average, while a total of 24.8% scored good to excellent marks. Overall mean score for males was 47.7% which was slightly higher than that of females (44.7%). The combined mean score for the two groups was 46.4%.

Table 4. 13: Distribution of scores per gender

Gender of the respondent		Excellent	Good	Average	Poor	
Male	Frequency	9	43	80	58	190
	% within Gender of the respondent	4.7%	22.6%	42.1%	30.5%	100%
Female	Frequency	5	29	47	56	137
	% within Gender of the respondent	3.6%	21.2%	34.3%	40.9%	100%
Total	Frequency	14	72	127	114	327
	% per grade	4.3%	22.0%	38.8%	34.9%	100%

Pearson correlation was conducted to establish possible association between gender and knowledge scores. Results indicated a positive but weak correlation between the two variables. (Pearson correlation = 0.080 and $p = .147$). Similar results were recorded with non-parametric test using Kendall's tau b (correlation coefficient = 0.08 and $p = .121$) and Spearman's rho (correlation coefficient = .086 and $p = .121$).

Table 4. 14: Association between gender and knowledge of Doping

Pearson Correlations (Gender and Knowledge of Doping)			
		Gender of the respondent	Knowledge of Doping
Gender of the respondent	Pearson Correlation	1	.080
	Sig. (2-tailed)		.147
	N	327	327
Knowledge of doping	Pearson Correlation	.080	1
	Sig. (2-tailed)	.147	
	N	327	327

4.9.3 Association between Length of Experience and Knowledge of Doping

A cross tabulation between length of experience and knowledge scores revealed that athletes with longer experience tend to score better than recent athletes. Athletes with over twelve years of experience were leading in scores with 37.5% of them achieving good to excellent marks. Recent athletes with less than four years of experience were least with only 23.8% scoring from good to excellent.

Table 4. 15: Distribution of knowledge scores per experience of athletes

Cross tabulation - Length of experience * Knowledge of doping						
		Knowledge of Doping				Total
Length of Experience		Excellent	Good	Average	Poor	
≥15 years	Frequency	0	3	2	3	8
	% within length of experience	.0%	37.5%	25.0%	37.5%	100.0%
10 – 14 years	Frequency	1	8	18	8	35
	% within length of experience	2.9%	22.9%	51.4%	22.9%	100.0%
5-9 years	Frequency	7	27	46	36	116
	% within length of experience	6.0%	23.3%	39.7%	31.0%	100.0%
≤ 4 years	Frequency	6	34	61	67	168
	% within length of experience	3.6%	20.2%	36.3%	39.9%	100.0%
Total	Frequency	14	72	127	114	327
	% within length of experience	4.3%	22.0%	38.8%	34.9%	100%

Pearson chi square was used to establish possible association between length of experience and knowledge of doping. Results indicated no statistically significant association between the two variables, (Pearson chi square value of 8.03, df = 9 and p = .531).

Table 4. 16: Association between Experience and Knowledge of Doping

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.030 ^a	9	.531
Likelihood Ratio	8.260	9	.508
Linear-by-Linear Association	2.263	1	.132
N of Valid Cases	327		

CHAPTER FIVE

DISCUSSION

5.1 Evaluation of Knowledge on Doping Among Kenyan Elite Runners

Findings of the study indicated that Kenyan elite athletes have moderate knowledge (46.4%) of doping with slight variation in specific doping issues. While the athletes were more informed on their rights and responsibilities, they registered low scores in testing procedures (17.1%) and prohibited substances (30.6%). These patterns are similar to the findings of a study carried out in USA among elite athletes (Albrech et., 1992). In this study, like the Kenyan situation, overall means score were average, while knowledge of procedures was low (36%). Seventy percent of the athletes were unable to identify the testing protocol while only a small percentage was aware they were susceptible to testing.

The findings were also comparable to those of a study conducted in Cameroon among amateur footballers (Ama et al., 2003). Findings of the study indicated low levels of knowledge of banned substances, with 60% reporting they have never heard of cocaine, 74% indicated they have never heard of amphetamines. The findings however, contradicts those of a similar study, carried out among Nigerian professional sportsmen, which indicated knowledge levels of banned substances as reasonably high, ranging from 55% to 93% among different groups(Ohaeri, 1993).

According to the study, athlete's knowledge concerning supplements was fairly good with 45.0% of the respondents having good to excellent scores in knowledge of supplements compared to 30% who scored poorly. These results vary from those of Yaoundé (2009) which indicated very high scores of knowledge of unlawful substances (93%), lawful substances (55%), and food supplements (84%) among sportsmen in Cameroon.

Though Kenyan athletes' knowledge of various doping issues was established to be slightly below average (46.4%), it is comparable to athletes of other nations like Cameroon, Finland, France and USA. This dispels the notion that Kenyan athletes are completely ignorant of doping substances or procedures, or are poorly informed than other nations. None the less, effort must be made to improve knowledge of doping by athletes to empower them to make informed decisions when confronted with doping situations. It can also be noted that though the athletes scored poorly in knowledge of doping substances and testing procedures, more than half of them had adequate knowledge of their rights and responsibilities with regard to doping. This implies they are aware of their roles when it comes to compliance with doping regulations.

The low scores registered in knowledge of doping substances(30.6%) confirms the previous findings noted in the literature review, where a number of Kenyan athletes have tested positive for medicinal drugs s consumed without application of Therapeutic Use Exemption. The case of Lydia chepkemei who tested positive for

sulbutamol, which was taken to treat a chest infection, is an example. Another example is a recent case in which a Kenyan athlete tested positive for cathine after consuming recreational drug miraa. It is important that Kenyan athletes have thorough knowledge of what constitute prohibited substances in and out of competitions as majority of these substances are found in common medicinal drugs like piriton, cough syrups, ventolin or sulbutamol, which in Kenya , are dispensed over the counter without a doctor's prescription. It may also be found in a number of drinks or beverages.

The low scores on doping procedures (17.1%) could be the reason why a number of Kenyan athletes have breached the WADA code on testing procedures, as previously observed in literature review. Up to 58% of them reported that they don't declare their whereabouts when they go for national or international competitions. Among the athletes who have breached the regulations are Moses Kiptanui, who was caught in possession of EPO in London and John Ngugi, who refused to provide a sample for an out of competition test. A number of them also who have accidentally consumed banned substances have not exploited the appeal procedure to safe their careers. These findings should be a wakeup call that athletes need to be thoroughly aware of all the doping regulations and procedures.

5.2 Attitude of Kenyan Runners towards Doping

The findings of this study on attitude indicate that most Kenyan athletes do not value doping as a means for exemplary performance. Other studies conducted in other parts of the world show similar results. The study by Alaranta et al. (2006) carried out in Finland among elite athletes receiving financial support from National Finish Olympic Committee, whose main focus was on attitudes of these athletes towards doping practices and performance, established that over 90% believed that it is possible to attain highest level of performance without doping thus giving credence to the current study. The findings are also similar to those of a study conducted in France, among elite athletes (Paretti, 2004). Like the Kenyan athletes, 90% of the French athletes believed doping was dishonest, unhealthy and hazardous.

The findings on attitude of doping however, contradict several other studies elsewhere in the world. The findings contrast those of a study carried out among Italian elite athletes, which indicated a strong positive attitude of doping, with 60% of athletes and coaches indicating that PEDs are necessary to improve performance, and a further 30% advocating for use of PEDs (Scarpino et al.,).

On the issue of satisfaction with, and fairness of testing procedures, up to 82% of Kenyan athletes expressed confidence with the testing procedures outlined by WADA. The findings contradicts those of a study conducted in USA among elite athletes (Combs et al., 1997), which indicated that up to 47% of the subjects were

uncomfortable with testing procedures, terming it as embarrassing, humiliating and upsetting, and that athletes may falsely be identified as users of PEDs.

Kenyan situation concerning confidence in testing procedures also contradicts that of British elite athletes (Mc Ardle, 1999). According to the study, up to 82% of the athletes did not have faith in testing procedures. However these findings could have been influence by the case of Diane Modahl, a Brithish athlete who was banned and subsequently cleared after she was proved innocent.

5.3 Doping Practices among Kenyan Elite Runners

The findings of this study indicated very low use of doping substances and methods. However, it is possible that current prevalence rate might be much higher than indicated because most athletes may not wish to be directly associated with its usage. The answer may be residing on the methodology; Otieno and Ofulla (2007) propose that young people may feel comfortable to answer a question about the opportunity to use drugs rather than a question about actual drug use, because the opportunity is less likely to be illegal or particularly sensitive. However, they quickly reiterate that the accuracy of this approach may be open to debate.

The findings however, are consistent with a number of studies that have been done to explore the same. A study conducted by Wroble et al. (2002) in 34 states in USA on doping knowledge and prevalence among elite athletes also indicated a low

prevalence rate of 1% of anabolic steroids with higher percentage in males than females. Studies that have been conducted indicate a general athlete's denial of drug usage. The findings are also comparable to those of a study conducted among Finish elite athletes (Alaranta, 2006), which indicated similar practice trend. Like in the Kenyan situation, none of the subjects of the study admitted doping, but asked if they knew a colleague who dopes, 32% of them admitted it.

The findings slightly vary from those of a similar study carried out among Italian athletes (Scarpino, 1990), which indicated that up to 10% of the subjects in the study admitted using different forms of PEDs.

On the issue of whether doping was associated with social drugs, a good percentage (41.3%) did not find social drugs an influencing factor rather than the performance itself. The findings are consistent with those of Wroble et al., (2002) study where reasons given included improving performance (56%) and personal appearance and peer pressure (34%). In general, 66% of the athletes indicated they believe that drugs would improve their performance.

While purposeful use of PEDs was low (4%), non-compliance to other doping regulations, especially that of declaring where-about was established to be high (58%). Apart from the case of Jonh Ngugi, a number of athletes who are identified for random testing at local competitions fail to turn up for test. It is not clear why athletes chose to avoid the test. Possible reasons could be that they fear being falsely identified as having doped, or it could be that they have actually doped and fear

being caught. It is also possible that they are not aware that failing to turn up, or refusing to provide sample constitute a breach of doping regulations and therefore attracts a penalty that is equal to actual use of PEDs. It is therefore important that the athletes are fully aware of all the eight anti-doping rule violations outlined by the WADA, and that they comply to all of them as they equally attract penalties.

5.4 Use of Herbal and Nutritional Supplements

A small percentage of Kenyan athletes (21.4%) admitted using supplements while majority did not. This is a common trend among athletes as reported in Backhouse report (2007). On assessment of reasons for using supplements, results were similar to those of Cameroon players (Yaoundé, 2009) with up to 41.6% of the respondents indicating that they often excelled due to supplement intake.

The findings of this research are also comparable to a number of studies in the WADA report (Backhouse et al., 2011) where it is noted that the majority (52.5%) of participants believed it was necessary to use supplements quite often, while over a quarter (26.7%) felt they were not necessary. The findings concur with those of other studies on supplements. A study conducted by Kimiywe (2009), on knowledge of supplements by Kenyan rugby players' yielded similar results, with moderate levels of knowledge of supplements and low consumption of the same.

Previous findings on use of nutritional supplements and herbal medicine in Kenya as indicated in a number of studies, was established to be high (Orwa et al., (2007),

Koros, (2008), Kimiywe, (2009)). Findings of this study established that knowledge of supplements was moderate, but an assessment of risk of consuming banned substances that may be contained in food supplements and herbs was substantial, with up to 34.4% of the athletes being at risk.

5.5 Factors that Influence Doping Practices among Kenyan Elite Runners

On the question of what may influence athletes to adapt doping behavior among Kenyan athletes, the most commonly cited factors were ignorance, influence by friends, trainers and desire for money prize. This is comparable to most studies in Africa which indicate lack of knowledge of banned substances and doping procedures and influence of friends as main cause of non-compliance to doping procedures.

The major reason for doping and which appears to be a stumbling block to effective implementation of anti-doping regulations and policies is the desire to excel in sport, no matter the course. These findings concur with those of a number of studies. In a study conducted by Scarpino et al. (1990) among Italian elite athletes whose key themes were knowledge, attitude and use of illegal substances in sport, it was revealed that 10% of athletes use amphetamines at national or international level. The study also indicated that 30% of athletes, coaches and managers thought athletic performance could be enhanced by doping.

Like the Kenya Athletes, subjects of this study most frequently cited reasons for using doping agents as; to win in competition (63%), improve training performance (9%), reduce pain (6%) by the request of a coach (6%). Majority of athletes believed that they had been put under external pressure to use drugs or doping practices. Three-quarters of athletes indicated that access to illegal substances was not difficult.

The findings of this study and those by Scarpino et al., (1990) reveals five major factors as being the greatest influence of doping practices among Kenyan athletes; namely monetary gains, desire to excel, external pressure, ease of access and lack of sufficient knowledge of supplements. These findings are in line with other studies: for example Backhouse et al., (2011) argues in their report, that many doping offenses were said to occur due to ignorance of what constitutes lawful and unlawful substances, hence this lack of knowledge of what constitutes doping appeared to make athletes vulnerable to manipulation of influential others; Scarpino et al., (1990) in his study reveals that the growing popularity and increasing commercialization of sports is urging young athletes to dope in order to succeed.

The current economic hardships in Kenya support the athletes' claims that doping could be encouraged by the desire to improve economic status. Even with good education, one does not easily find a job in Kenya, and if they do, it may not be as paying as athletics. This opinion is also supported by findings from literature review. Many studies cited poverty as a driving factor which endears them to seek

agents or scholarships abroad to improve their living standards. This involves signing a contract which in turn puts pressure on them at all cost. In such situations, doping becomes an option.

5.6 Common Sources of Doping Information Used by Kenya Runners

Observation from this study suggest that athletes sources of information is limited with up to 20.4% indicating they have never received information, and a further 35.8% saying they don't spend time on websites. This therefore, encourages ignorance among them. Previous studies have revealed similar sentiments, for example, Otieno and Ofulla (2007) in their study indicates that only 11% of athletes had seen the country's anti-doping regulation. This may imply that athletes remain largely ignorant of prohibited substances, testing procedures and even their rights and responsibilities.

On internet use, the findings of the study suggest that most athletes are either not aware of the internet as a powerful tool of information dissemination of doping information or have not caring attitude towards doping information. Similar finding has been reported by Bell and Richard (2009) who indicted most athletes in Africa have not embraced the use of internet as source of sporting information. They noted that only 30.45% of respondents were using the internet for ant doping information.

From these findings, it emerges that AK has maintained a close presence among the elite athletes with up to 30.6% sourcing information directly from the

association, and a further 41.3% accessing their website. This is a fact which can be exploited to bring change among the athletes.

On other resources and services, print media, chemist and doctors were indicated as sources of doping information. This indicates a possibility of Kenyan athletes receiving inaccurate information that may lead to doping. Otieno and Ofulla (2007) argues that without organized easy access to information, athletes find out about drugs predominantly through friends and the media and about the negative effects, from their trainers. In line with this observation, all possible sources of doping information should be mainstreamed and controlled to ensure accurate information gets to the athletes.

5.7 Association between Age, Gender, Experience and Doping Knowledge

The first research hypothesis had predicted that age, gender and experience would not have a significant effect on knowledge of doping. The research established mixed results, with age having a significant association with knowledge (chi square = 31.6 and $p = 0.002$). According to the findings, younger athletes scored lower than their older colleagues. This could be as a result of their education level (most of the young ones being in primary school ages) and language barrier (difficulty in understanding English).

This trend is also reflected on the assessment of association between length of experience and knowledge of doping. Findings indicated though not significantly,

that more experienced athletes score better than the new athletes. This can be attributed to the fact that athletes who have been in athletics for a long time may have participated in a number of athletic meets both nationally and internationally. This implies such athletes have had a chance to interact with officials and other athletes, therefore gaining more information. The athletes could also have been exposed to testing severally, thus gaining knowledge and experience in the process. Focus of doping education should be more on young upcoming athletes.

Findings on gender did not indicate a significant association with knowledge though there was a slight variation of mean scores for the two sexes with males scoring slightly higher than females (47.7% & 44.7% respectively). This means women have not been left far behind in doping information as would be assumed. Doping programmes should target both genders, though with a little more emphasis on women.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMENDATIONS

6.1 Summary

6.1.1 Demographic Information

Three hundred and twenty seven (327) athletes participated in the study giving a response rate of 81.75%. They consisted of 190 (58.2%) males and 137 (41.8%) females. Majority (77.3%) of the respondents were under 25 years. Only 3 athletes were over 36 years. Twenty one percent (21.7%) were between 26 and 35 years. Majority (80%) of the elite athletes had an experience of 5 to 14 years. The most common athletic discipline was track events (long races >800M; 58.1%) and least common walking race at 0.3%.

6.1.2 Knowledge of Doping among Kenyan Elite Runners

This objective sought to evaluate the knowledge of doping among Kenyan elite runners. Findings established that they had moderate knowledge of doping with a mean score of 46.4%. There was a slight variation on scores for specific doping issues; prohibited substances (30.6%), testing procedures (17.1%), athletes' rights and responsibilities (31.2%) and knowledge of supplements (45.0%).

6.1.3 Attitude of Kenyan Elite Runners towards Doping

The second objective sought to assess the attitude of elite athletes towards doping practice. The findings reflected a very strong negative attitude towards doping among majority of the athletes, with up to 82.3% of the respondents disagreeing with statements in favor of doping. Only 17.7% either agreed or slightly agreed with the statements. This was reflected in most of the 13 statements used in the likert scale.

6.1.4 Doping Practices among Kenyan Elite Distance Runners

The objective sought to establish possible practice of doping in Kenya by assessing the occurrence of any of the eight anti-doping rule violations outlined by WADA. Purposeful use of performance enhancing drugs as confessed by the athletes was low at 4%. However, 38% of them reported knowing another athlete who uses performance enhancing drugs. This suggests that the prevalence could be more than the reported 4%. On compliance with other anti-doping rule violations, 42% do not declare their where-about during competitions as required by WADA code, another 8% have been aided or abetted to dope by other athletes. 1.2% admitted possession and trafficking of banned substances, and a further 0.2% refusing or failing to submit specimen.

6.1.5 Use of Herbal and Nutritional Supplements

This objective aimed to establish athlete's knowledge and use of supplements in order to assess the risk involved with regard to doping regulations. Twenty one point four percent (21.4%) of the respondents admitted using supplements while 73.9% did not. A further 4.7% were not sure. From these findings it can be concluded that supplements use among athletes is low. The results further indicated that apart from multivitamins which 16.7% of the respondents admitted using or having used, all other supplements (creatine, iron, ginseng, vit C, caffeine, magnesium, whey protein, Echinacea, and khat) had only been used by less than 3.3% of the athletes. The major reason cited for using supplements were to enhance endurance (15.5%) followed by to allow the athletes to train longer (5.5%), to overcome injuries (3.0%) and advice from the doctor and or nutritionist. A question was posed to established athletes' awareness with regard to risk of using supplements and doping violations. Findings indicated that up to 44.4% of the athlete who use supplements could be at risk of consuming banned substances.

6.1.6 Common Sources of Doping Information

This objective aimed to establish the common sources of doping information used by athletes as well as the usefulness of the resources to the athletes. The study established that the most common source of doping information is AK (30.6%) followed by IAAF at 19.4%, World Anti-Doping Agency (9.2%) and NACADA (7.0%). The results also reveal that a substantial number (20.4%) of athletes have

never received information on drug free sport while 9.2% indicated that they have received information on drug free sport but they are not certain about the source. The most preferred websites for up-to-date information for drug-free sport were AK (41.3%), World Anti-Doping Agency (12.3%), IAAF (5.5%). The results reveal two distinct categories of athletes; those who use the internet (64.2%) and those who indicated they had no time to spend on browsing the internet (35.8%). When respondents were asked to name other sources of anti-doping dissemination materials, media came first at 26.9% followed by coaches at 17.3%, AK officials /offices at 15.4% and chemists at 14.4%.

6.1.7 Factors that Influence Doping Practices

The reasons given by elite athletes for doping and therefore acts as a catalyst to their use were varied. Money prize emerged outstanding reason with upto 54% of athletes mentioning it. External pressure was second with 18%, followed by lack of confidence with 14%. Lack of knowledge of health consequences and doping regulations were least with 8% and 6% respectively.

6.1.8 Association between Age and Knowledge of doping

Pearson chi square confirmed a significant association between age of athletes and their knowledge of doping with χ^2 value of 31.6, $df = 4$ and $p = .002$. One way ANOVA also indicated a significant difference with $p = .002$, $f = 4.299$. Older athletes score better than younger athletes.

6.1.9 Association between Gender and Knowledge of doping

A close examination of knowledge mean scores indicated a slight variation on different genders with males scoring slightly higher than females. However Pearson correlation did not indicate a significant association between the two variables (Pearson correlation .08, $p = .147$).

6.1.10 Association between Experience and Knowledge of Doping

Though a cross tabulation between knowledge of doping and experience of athletes showed slight variation of knowledge scores with the length of experience, there was no significant association between the two variables. (Pearson chi square value = 8.03, $p = .531$).

6.2 Conclusions

From the study, it can be concluded that Kenyan elite athletes have moderate knowledge of doping with slight variation on specific doping issues. It can further be concluded that the athletes are more informed of their rights and responsibilities, but lack substantial information on prohibited substances, testing procedures and use of supplements. On assessment of attitude, Kenyan athletes can also be said to be disapproving of doping practices. This was seen in their strong negative attitude towards the practice. The prevalence of doping practices in the country was established to be very low. Apart from the violation on declaring where-about

during competition, with up to 42% non-compliance rate, all other regulations on doping registered a compliance rate of 92% and above.

The common sources of doping information used by athletes were mainly Athletics Kenya website and officials, closely followed by WADA and IAAF websites. It emerged that a large number (33.6%) of the athletes do not spend time to check information on drug-free sport and a good number (20.4%) also, have never received information on doping. These points towards a population that are at risk of violating doping regulations as a result of ignorance. It can be concluded from the findings that more than half of elite athletes do not access the information released by WADA through their website, which is the most accurate and up to date source of doping information. Instead they rely more on media, their personal officials and officials of local federation which may not be very accurate.

Though the findings established low usage of herbal and nutritional supplements, an assessment of knowledge of these supplements indicated that a high number of those who used it lacked basic knowledge and therefore were vulnerable to consuming banned substances contained in the supplements.

Age appeared to have significant effect on knowledge with younger athletes scoring poorly. Education programs should target different age groups appropriately. Gender did not have a significant effect on knowledge but female athletes registered slightly lower scores than their male counterparts. The programs should therefore, be tailored to raise female athletes' awareness on doping issues.

In conclusion, though doping practice is established to be low, there is evidence of existence of the practice in the country. If left unaddressed, there is a likelihood that it can grow, given the possible factors driving athletes to dope being so real (hard economic circumstances and ease of accessing the drugs). The concerned sports organizations and arms of government should explore all possible means of addressing the problem, which may include improving access to doping information and developing doping structures and regulations.

6.3 Recommendations for Policy and Practice

6.3.1. Doping education

Findings of the research revealed moderate to low (40% -17.1%) knowledge of doping substances, methods, testing procedures and rights and responsibility. It is, therefore, highly recommended that the government, through the relevant sports association establish doping education programme and ensure that such programme are effectively administered. This will help athletes make more informed decisions when confronted with issues of doping. The education programme should not target elite athletes but more at the young upcoming athletes as the research revealed they were less informed.

Methods of education should be varied and affordable to ensure access by as many of the athletes as possible. Majority of the athletes indicated workshops as being very useful. Possible actions could be establishing annual free workshops per

county either funded by the county government or the national government or both. It should further be made a requirement to undertake doping seminar/workshop to be allowed to compete on Kenya passports. Athletics Kenya and NOCK should take charge of this and empower athletes with knowledge of doping.

6.3.2 Improvement of dissemination of doping information

Part of the research was to establish how Kenyan athletes access doping disseminated information. Findings revealed that a good percentage of the athletes (35.8%) do not bother to go to the internet which is the main means of disseminating information used by the World Anti-Doping Federation. The Kenyan government should endeavor to enhance access to this information by athletes by varying the means of communication. This would include encouraging writers to publish easy-to-read books with summary of doping information, preparing leaflets to be distributed in athletes training grounds, using television, radio and print media to cover topics on doping. Coaches and print media were indicated as preferred means of receiving information by majority of the athletes. This should be enhanced to provide accurate information.

Furthermore, the research indicated AK website as most preferred by those who access internet. It is, therefore, recommended that AK improves its website by creating direct links to specific information on the WADA website. Besides, AK

can provide simplified information directly on their website for ease of access by athletes.

6.3.3 Establishing/Improving Doping Control Structures

A survey of doping control practices during the literature review revealed poor structures of doping control among sports associations. Athletics Kenya should develop refined policies, procedures and regulations of handling doping cases. Such policies will guide on issues related to registration of athletes, coaches, agents and other officials. This will enable them monitor to their practices in a view of castigating their role in perpetuating doping. From the findings of the study, it is possible for an individual to visit Kenya on a tourist visa, and while in the country become agents of athletes and actually facilitate their relocation overseas without AK knowing it. Such situations can be avoided with defined regulations. AK should also be empowered to have control over all athletes who compete on Kenyan passports. It should be made a requirement that they seek clearance from AK to compete over a period of time and indicate the meets they wish to attend. This will make it easy for AK to monitor them, educate them and even test them randomly before major events. It is also recommended that AK makes it a requirement for elite athletes to undertake doping seminar/workshop in order to be allowed to compete on Kenya passports.

6.4 Recommendations for further research

- 1) The target population in this study was Kenyan elite runners in middle and long distance races. The findings pointed out that the problem is more with young upcoming athletes than with the senior athletes. It is recommended that a survey be done on knowledge and practice of doping among Kenya athletes without restricting it to elitism or particular events.
- 2) The study revealed average to low levels of knowledge of doping issues among athletes. It is recommended that a survey be carried out on effectiveness of doping education programs already in place with a view of recommending best practice with regard to the same.
- 3) A review to be done on sports related legal structures with a view of recommending the incorporation of doping regulations as part of Kenya law. This will facilitate compliance to regulations outlined by WADA.

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Appendix I: Participants Statement and Consent Form

TO:

Full Project Title:

Evaluation of Knowledge, Attitude and Practice of Doping among Kenyan Elite Middle and Long Distance Runners

Principal Researcher: Selina Chebet Sigei

1 Your Consent

You are invited to take part in this research project.

This Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this research so that you can make a fully informed decision whether you are going to participate.

Please read this Statement carefully. Feel free to ask questions about any information in the document. Once you understand what the research is about and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project.

You will be given a copy of the Statement and Consent Form to keep as a record.

2 Purpose and Background

The research is carried out as a requirement of Kenyatta University Doctor of Philosophy in Health and Physical Education. A total of 400 athletes will participate in this research. The research is carried out as a result of concerns that most Kenyan athletes who have tested positive for doping have confessed having done it out of ignorance rather than by intention. The purpose of the research therefore is to evaluate Kenyan elite athletes' awareness of doping substances, methods and procedures in order to generate information that can be used to improve doping education in the country.

Athletics Kenya has been requested to assist in identification of athletes. You have been identified as a potential participant as a result of your past participation in middle and long distance races both national and internationally. Participation in this research is voluntary and if you wish to take part please register your interest by signing and submitting the consent form attached. The results of this research may be used to help researcher Selina Sigei to obtain PhD degree in Health and Physical Education at Kenyatta University.

3 Procedures

Research procedures will take three stages:

1) Consultation and:

Consist of brief session with researcher during which the purpose, nature and scope of the research shall be explained to you. Your role in the research

shall be explained. Opportunity will be given for you to raise any questions or concerns.

2) Recruitment stage

On accepting to participate you will register your interest by signing and submitting the consent form to the researcher.

3) Actual participation:

This will involve about half an hour's session during which you will be issued a questionnaire. You will be required to fill in the questionnaire and submit it to the researcher.

4 Possible Risks

Discomforts that may arise from the research include prolong conversation during the interview, uneasiness when responding to certain questions and length of time that will be taken to fill the questionnaires. However there is no foreseen physical risk involved in the study. You will be free to suspend or end your participation if you feel uncomfortable about the issues being raised. This shall be done by communicating it to the research directly

5 Privacy, Confidentiality and Disclosure of Information

Privacy and confidentiality shall be ensured throughout the whole research process. The information shall be de-identified immediately after collection. Any information provided by the participants shall be treated with high confidentiality

and shall only be used for the purpose for which it was collected. In the final publication no identifiers shall be used.

6 Participation is Voluntary

Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. Any information obtained from you to date will not be used and will be destroyed. If you decide to withdraw from this project, please notify a member of the research team or complete and return the Revocation of Consent Form attached.

7 Further Information, Queries or Any Problems

If you require further information, wish to withdraw your participation or if you have any problems concerning this project you can contact the researcher responsible for this project using the contact details given below:

scsigey@gmail.com Tel 0717111984

CONSENT FORM

KENYATTA UNIVERSITY

CONSENT FORM

NAME

Full Project Title:

**EVALUATION OF KNOWLEDGE, ATTITUDE AND PRACTICE OF
DOPING AMONG KENYAN ELITE MIDDLE AND LONG DISTANCE
RUNNERS.**

I have read, and I understand the attached Statement.

I freely agree to participate in this project according to the conditions in the Statement. I have been given a copy of the Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details, including where information about this project is published, or presented in any public form.

Participant's Name (printed)

Signature.....Date.....

KENYATTA UNIVERSITY
REVOCAION OF CONSENT FORM

(To be used for participants who wish to withdraw from the project)

NAME

Full Project Title:

**EVALUATION OF KNOWLEDGE, ATTITUDE AND PRACTICE OF
DOPING AMONG KENYAN ELITE MIDDLE AND LONG DISTANCE
RUNNERS**

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardize my relationship with Kenyatta University and the researcher.

Participant's Name (printed)

SignatureDate.....

Please mail this form to:

Selina Sigei

P. Box 43844

Nairobi

Tel. 0717111984 or email to scsigey@gmail.com

Appendix II: Athletes' Questionnaire**Kenyatta University**

Kenyan Athlete

Thank you for taking part in this Survey.

My name is Selina Sigei. I am PhD student at Kenyatta University, currently undertaking a research for the fulfillment of the requirements of this degree. I am conducting this research in an effort to provide information that can be used in improving doping education in Kenya.

I need to find out what you know and think about drugs issues and testing procedures. So please complete this questionnaire to the best of your ability and return it to the interviewer or post to Kenyatta University using the envelopes provided. Please be assured that your responses will remain confidential and that nothing that appears in the final report will be attributable to any individual athlete.

Demographic Information

1. What is your age? _____
2. What is your gender?
 - A. Male
 - B. Female
3. In which year did you first join the World Class Performance athletics in Kenya? _____
4. Which is your major Athletic Discipline _____

General Knowledge and Attitude assessment

How well-informed are you about the following procedures with regard to doping
Please answer using a scale of 1 to 5, where 1 means you are very well-informed
and 5 means that you are very poorly informed.

5. Drug testing procedures - ie. the procedures that operate from the time you are notified about a test to the time that your sample arrives at the testing laboratory?
 - 1 Very well-informed
 - 2
 - 3
 - 4
 - 5 Very poorly informed
6. The procedure that follows if and when the laboratory reports a positive test?
 - 1 Very well-informed
 - 2
 - 3
 - 4

5 Very poorly informed

7. Have you ever undergone any drug test either in or out of competition?

1 Yes

2 No

IF NO, GO TO Q11

8. If yes, how many times have you been tested before?

1 1-3 times

2 4-6 times

3 7-10 times

4 10+ times

6 Not sure/don't know

Thinking about the last occasion you were tested in competition, to what extent were you satisfied:

9. With the explanation you received about the testing process?

1 Very satisfied

2 Satisfied

4 Dissatisfied

5 Very dissatisfied

7 I didn't receive any explanation

10. That the test was carried out fairly and accurately?
- 1 Very satisfied
 - 2 Satisfied
 - 3 Dissatisfied
 - 5 Very dissatisfied

Assessment of Common Sources of doping Information

11. From which of the following sources do you most often receive information on drug-free sport? (please circle one number only)
- 1 Athletics Kenya
 - 2 NACADA
 - 3 IAAF
 - 4 World Anti-Doping Agency
 - 5 Other
 - 6 I have received information on drug-free sport but I don't know the source(s)
 - 7 I have never received information on drug-free sport
12. Which of the following websites (if any) are you most likely to use to keep up-to-date with drug-free sport issues and testing procedures? (please circle one number only)
- 1 Athletics Kenya
 - 2 your National Governing Body website
 - 3 your International Federation website
 - 4 World Anti-Doping Agency website
 - 5 Other website
 - 6 I don't really spend any time looking for information about drug-free sport issues and testing procedures

13. How useful did you find the following resources and services. Please answer using a scale of 1 to 5, where 1 means you found them very useful and 5 means that you didn't find them useful at all.

	Very useful				Not at all Useful
Drug Information Database	1	2	3	4	5
Drug Information Email	1	2	3	4	5
Drug Information Line	1	2	3	4	5
Advice Card	1	2	3	4	5
Testing Procedures Leaflet	1	2	3	4	5
Competitors and Officials Guide	1	2	3	4	5

14. Have you ever attended a workshop on drug-free sport?

- 1 Yes
2 No
3 Don't know

IF NO, GO TO Q17

15. How useful did you find the workshop (s)? Please use a scale of 1 to 5 to answer this question where 1 means you found the workshop very useful and 5 means that you didn't find the workshop useful at all.

- 1 The workshop(s) was very useful
- 2
- 3
- 4
- 5 The workshop(s) was not at all useful

16. Have any of the following people ever provided you with information and/or advice about drug-free sport? (Please circle one number for each type)

	Yes	No	Not sure/ Can't remember	Not applicable
Your coach (current or previous)	1	2	3	4
Your GP (current or previous)	1	2	3	4
Your team doctor(current or previous)	1	2	3	4
Your team physio (current or previous)	1	2	3	4
An official from your Governing Body	1	2	3	4
An official from AK (not including a Doping Control Officer)	1	2	3	4
Another athlete	1	2	3	4
Researchers	1	2	3	4
Others				

Assessment of Prevalence of Doping Substances and Practices

17. To what extent do you consider there is a doping problem in your sport?
Please answer using a scale of 1 to 5, where 1 means there is a major problem and 5 means there is no problem at all.
1. Doping is a major problem in my sport
 - 2.
 - 3.
 - 4.
 5. Doping is not a problem in my sport at all
18. Do you always declare your whereabouts when you leave competition venues during competitions?
1. Yes
 2. No
19. Have you ever refused or fail without justification to submit to sample collection after notification or otherwise evaded sample collection?
1. Yes
 2. No
20. Has anybody ever encouraged, aided, assisted or abetted you to use performance enhancing substance?
1. Yes
 2. No
21. How you ever been involved in possession and/or trafficking of any prohibited substances?
1. Yes
 2. No
22. Have you ever used performance enhancing drugs either ignorantly or purposefully?
1. Yes
 2. No

23. Have you ever heard of colleague athletes in your country who use performance enhancing drugs?
1. Yes
 2. No
24. Have you ever heard of a chemist, medical practitioners or agents that supply performance enhancing drugs in your country?
1. Yes
 2. No

Assessment of Knowledge on Specific Areas

Topic 1: Prohibited Substances and Methods

(A therapeutic use exemption (TUE) allows an athlete to take a medication deemed necessary for their health which appears on the list of prohibited substances in sport).

25. I have to submit a TUE application even if I am prescribed a prohibited medication by my doctor.
- 1 True
 - 2 False
 - 3 Don't know
26. If I buy a medication that's permitted in Kenya, the same medication purchased overseas will be safe
- 1 True
 - 2 False
 - 3 Don't know
27. In terms of the anti-doping rules, I am solely responsible for what I swallow,

inject or apply to my body?

- 1 True
- 2 False
- 3 Don't know

28. Caffeine is a substance on the 2009 prohibited List

- 1 True
- 2 False
- 3 Don't know

Assessment Topic 2: Testing Procedures

29. If I am notified that I am to be tested at an inconvenient time, I can refuse to be tested?

- 1 True
- 2 False
- 3 Don't know

30. I should stay in full view of the doping control officer or chaperone once notified of doping control

- 1 True
- 2 False
- 3 Don't know

31. My name should be on the form that goes to the laboratory so they can identify me?
- 1 True
 - 2 False
 - 3 Don't know
32. In most cases urine testing is more effective in terms of detection than blood testing?
- 1 True
 - 2 False
 - 3 Don't know

Assessment Topic 3 - Athlete Rights and Responsibilities

33. I cannot take a representative of my choice to the Doping Control Station once I am notified of doping controls?
- 1 True
 - 2 False
 - 3 Don't know
34. During Sample Collection only a Doping Control Officer of the same sex should be present?
- 1 True
 - 2 False
 - 3 Don't know

35. I cannot warm down or attend a medal ceremony before going to the Doping Control Station?

- 1 True
- 2 False
- 3 Don't know

36. It is my responsibility to be available for testing at anytime

- 1 True
- 2 False

Assessment topic 4: Supplements

37. AK can tell me which nutritional supplements are safe to use?

- 1 True
- 2 False
- 3 Don't know

38. If a nutritional supplement is bought from the pharmacy (over-the-counter), it must be safe to use.

- 1 True
- 2 False
- 3 Don't know

39. If a nutritional supplement contains a prohibited substance, it will always say so on the label.

- 1 True
- 2 False
- 3 Don't know

40. I can be sanctioned if I test positive after taking what I thought was a safe supplement.
- 1 True
 - 2 False
 - 3 Don't know

Assessment of Factors that Influence Doping

41. Which of the following factors best represent the reason why Kenyan athletes would practice doping?
- 1. Money prize/to boost economic status
 - 2. Pressure from coaches, family and colleague athletes
 - 3. Lack of confidence/pressure from self
 - 4. Lack of knowledge of health consequences of doping
 - 5. Lack of knowledge of doping control practices and regulations

Athlete's Recommendations

42. Are there any improvements you would like to see made to the drug-free sport system – eg. drug-testing procedures, anti-doping programmes etc? (*open question*) 1. Yes 2. No --Elaborate

43. Are there any specific drug-free sport issues and/or testing procedures about which you would like to receive more or more regular information? (please circle any number that applies)

- 1 World Anti-Doping Code
- 2 anti-doping rules of your sport
- 3 testing procedures
- 4 prohibited substances and methods
- 5 Therapeutic Use Exemptions
- 6 results management process
- 7 appeals
- 8 other (please specify)

44. By which means would you prefer to be alerted to news about drug-free sport issues or changes to testing procedures? (circle one number only)

- 1 Post
- 2 Telephone
- 3 Fax
- 4 SMS
- 5 Email
- 6 Coach
- 7 Agent

45. What do you think are the effects of doping and anti-doping practices.....

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46. What are the common sources of anti-doping dissemination materials

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47. State the factors that influence resistance to anti-doping regulations and policies among the Kenyan athletes

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48. State the banned substances and techniques commonly used by elite Kenyan athletes

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49. State the legal nutritional supplements and stimulants commonly used by elite athletes in Kenya

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Appendix III: The Eight Anti-Doping Rule Violations

- 1) The presence of a prohibited substance or its metabolites in athletes' bodily specimen
- 2) Use or attempted use of prohibited substance or a prohibited method
- 3) Refusing or failing without justification to submit to sample collection after notification as applicable in anti-doping rules or otherwise evading sample collection.
- 4) Violation of applicable requirements regarding athlete's availability throughout the competition, including failure to provide whereabouts information and missed tests
- 5) Tampering or attempting to tamper with any part of the doping control
- 6) Possession of prohibited substances or methods
- 7) Trafficking any prohibited substances or tools of prohibited methods
- 8) Administration of any prohibited substance or method to an athlete, or assisting, encouraging, aiding, abetting, covering up or any other type of complicity involving an anti-doping rule violation or any attempted violation. (WADA 2009)

Appendix IV: Sample Size Table

Table 1. Sample size for $\pm 3\%$, $\pm 5\%$, $\pm 7\%$ and $\pm 10\%$ Precision Levels Where Confidence Level is 95% and $P=.5$.

Size of Population	Sample Size (n) for Precision (e) of:			
	$\pm 3\%$	$\pm 5\%$	$\pm 7\%$	$\pm 10\%$
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100

a = Assumption of normal population is poor (Yamane, 1967). The entire population should be sampled.

