

**KNOWLEDGE, ATTITUDES, BELIEFS AND PRACTICES OF BOXERS,
WRESTLERS, AND BODYBUILDERS TOWARDS USE OF PERFORMANCE-
ENHANCING SUBSTANCES IN KENYA**

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**A RESEARCH THESIS SUBMITTED IN FULFILMENT OF THE
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UNIVERSITY**

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DECLARATION

This research thesis is my original work and has not been presented in any other university for the award of any degree.

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DEDICATION

This thesis is dedicated to my sons, Ronney and Davy Mandu, who navigated life to fill the gap in the absence of their father and I. Special dedication, in memory of the late Prof. Andanje Mwisukha who pushed me to pursue this degree, but never lived to celebrate my achievement.

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TABLE OF CONTENTS

DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES	xii
LIST OF FIGURES	xviii
ABBREVIATION AND ACRONYMS	xix
OPERATIONAL DEFINITION OF TERMS.....	xx
ABSTRACT.....	xxii
CHAPTER ONE: INTRODUCTION.....	1
1.0 Background of the Study	1
1.1 Statement of the Problem	4
1.2 Purpose of the Study.....	5
1.3 Study Objectives.....	6
1.4 Hypotheses of the Study.....	6
1.6 Significance of the Study	7
1.7 Delimitations of the Study.....	8
1.8 Limitations of the Study	8
1.9 Assumptions of the Study.....	9
1.10 Conceptual Framework	9
CHAPTER TWO: LITERATURE REVIEW	13
2.0 Performance Enhancing Substances and methods	13
2.1 History of Doping.....	15
2.2 History of Boxing, Bodybuilding and Wrestling	17
2.2.1 Boxing, Bodybuilding and Wrestling in relation to use of PES and methods.....	18
2.3 Some of the Commonly Used PES and Methods	19
2.3.1 Erythropoietin or EPO	19
2.3.2 Anabolic Steroids.....	20

2.3.3 Blood Doping.....	21
2.4 Food Supplements.....	22
2.5 Traditional Herbs	25
2.6 Prevalence in the use of Performance Enhancing Substances	27
2.6.1 Global Perspective	27
2.6.2 African Perspective.....	29
2.6.3 Kenyan Perspective in the Use of PES	29
2.7 Factors Contributing to the Use of Traditional Herbs, Food Supplements and PES and Methods.....	31
2.7.1 Factors Attributed to the Use of PES in Africa.....	34
2.8 Commonly Used Food Supplements, Traditional Herbs and PES by Boxers, Wrestlers, and Body Builders.....	35
2.9 Related Literature.....	36
2.9.1 Factors that influence use of PES	36
2.9.2 Knowledge, attitude, beliefs, and practices (use) of PES	39
2.10 Summary of Literature Review.....	51
CHAPTER THREE: METHODOLOGY	54
3.1 Research Design.....	54
3.2 Study Variables.....	54
3.3 Location of the Study.....	55
3.4 Target Population.....	55
3.5 Sampling Technique and Sample Size.....	56
3.6 Research Instruments	58
3.7 Pre-Testing.....	58
3.7.1 Validity and Reliability of Research Instruments.....	59
3.8 Data Collection Procedures.....	60
3.9 Data Analysis and Presentation	60
3.10 Ethical and Logistical Consideration	61
CHAPTER FOUR: FINDINGS.....	63

4.1 Findings of the Study	63
4.2 Demographic Characteristics of Respondents	63
4.2.1 Gender of the Respondents	63
4.2.2 Age Category of the Respondents.....	64
4.2.3 Experience in Years of Participation	65
4.2.4 Distribution of the Participants per Sports Discipline	66
4.3 Determination of Knowledge Levels on the Use of Performance Enhancing Substances and Methods among the Athletes	67
4.3.1 Knowledge Levels on the Safety of Food Supplements	67
4.3.2 Safety of Food Supplements Bought Over the Counter.....	68
4.3.3 Declaration of Prohibited Substances in Food Supplements by the Manufacturers	69
4.3.4 Sanctioning of an Athlete for Testing Positive for a Prohibited Substance.....	70
4.3.5 Knowledge Levels on Safety of Traditional Herbs by Athletes	71
4.3.6 Responses on whether ADAK can advise Athletes on which Traditional Herb to Use	71
4.3.7 Coach, Doctor or Physiotherapist can tell if a Traditional Herb Contains Prohibited Substances.....	73
4.3.8 Sanctioning of Athletes for Testing Positive after Use of Traditional Herbs	73
4.3.9 Knowledge levels on Performance Enhancing Substances and Methods.....	74
4.3.10 Safety of Performance Enhancing Substances bought Over the Counter.....	75
4.3.11 Coach, Team Doctor or Physiotherapist would know if a Performance Enhancing Substance Contained Prohibited Substances	76
4.3.12 Sanctioning of Athletes for Testing Positive after using Performance Enhancing Substances.....	77
4.3.13 Boosting Blood Levels can lead to an athlete Testing Positive for Performance Enhancing Method.....	77
4.3.14 Manipulation of Blood Components is Prohibited in Sports.....	78

4.3.15 Blood Manipulation can Lead to Infectious Diseases.....	79
4.3.16 A Doctor, Physician or Paramedical Personnel can be Sanctioned for Helping an Athlete Manipulate Blood Components.....	79
4.3.17 Mean knowledge score per sports discipline.	80
4.3.18 Significance of Knowledge Levels on PES and Methods among Athletes from the three Sports Disciplines.	81
4.4 Assessment of Attitudes of the Respondents	83
4.4.1 Food Supplements are Necessary in Sports Competition	83
4.4.2 Food Supplementation is not Cheating since Everyone Does it.	84
4.4.3 Athletes Often Lose Time Due to Injuries and FS can Help Make up Lost Time...	85
4.4.4 Only Quality Performance Should Matter, not the way its Achieved.	85
4.4.5 Use of Recreational Drugs can help in Sports Situations.	86
4.4.6 Athletes Should not Feel Guilty about Taking PES.....	87
4.4.7 TH and FS are Unavoidable Part of Competitive Sports.....	87
4.4.8 Athletes are Pressured to Take PES.....	88
4.4.9 There are Risks Related to Use of FS	88
4.4.10 Athletes Have No Career Alternatives.....	89
4.4.11 PES, FS and TH should be Legalized.....	90
4.4.12 TH and FS Help to Overcome Bored During Training.....	91
4.4.13 There is no Difference between PES, Fiber-Glass Poles, and Swimsuit.....	91
4.5 Assessment of Beliefs of Respondents on the use of PES and Methods.....	94
4.5.1 Food Supplements are a Form of Doping.....	94
4.5.2 Athletes must use PES to Win	95
4.5.3 Kenyan Athletes are using TH and FS as PES	95
4.5.4 Foreign Athletes Use TH and FS as PES.....	96
4.5.5 Kenyan Coaches Encourage Athletes to Use TH and FS as PES	97

4.5.6 Foreign Agents Encourage Athletes to Use PES	98
4.5.7 FS and TH are Necessary to Succeed in Sports.	99
4.5.8 Use of Traditional Herbs can Enhance Performance.	99
4.5.9 Energy drinks can improve performance.	100
4.5.10 Kenyan Coaches Encourage Athletes to us FS to Improve Performance.	101
4.5.11 Kenyan Coaches Encouraged Athletes to Use TH to Improve Performance.	101
4.5.12 Beliefs of the Athletes from the three Sports Disciplines on the Use of PES and Methods.	102
4.6 Assessment of use of Traditional Herbs, Food Supplements, PES, and Methods.	103
4.6.1 Use of FS by athletes is a major problem	103
4.6.2 Use of TH by athletes is a major problem	104
4.6.3 Use of PES by athletes is a major problem.	105
4.6.4 Use of TH, FS and PES by Respondents for Performance Improvement.	106
4.6.5 Assessment on Whether Respondents had Ever Been Given FS, TH or PES to Enhance Performance.	108
4.7 Pearson Correlation for Continuous Variables among the Three Sports Disciplines.	112
4.8 Assessment of Association Between Gender of the Respondents and Knowledge Levels, Attitudes, Beliefs and use of Performance-Enhancing Substances and Methods.	116
4.9 Assessment of Factors that Influence use of TH, FS, PES, and Methods.	118
4.9.1 Factors Influencing use of FS.	118
4.9.2 Factors Influencing Use of TH	120
4.9.3 Factors Influencing Use of PES.	122
4.9.4 Summary on Factors Influencing Use of FS, TH, and PES.	124
4.10 Assessment of Common Sources of Information on Traditional Herbs, Food Supplements, and PES.	126

4.10.1 The Most Likely Website to be Used by Respondents on Issues of FS, TH and PES and Methods.....	128
4.10.2 Personnel that have Ever Provided Information to Respondents on FS, TH and PES	130
4.10.3 Usefulness of Resources and Services Offered to Respondents	135
4.10.4 Need for more Information and Preferred Means of Receiving such Information.	138
4.10.5 Common Sources of Disseminating Anti-Doping Materials.	140
4.11 Legal FS, TH and PES	142
4.12 Common FS, TH, and PES Used by Sports Person	143
4.13 Ever Been Tested for Doping	145
4.13.1 Possibility of providing a wrong Sample.....	148
CHAPTER FIVE: DISCUSSION OF FINDINGS.....	150
5.1 Demographics Information of the Respondents	150
5.2 Participation and Experience of the Respondents.....	151
5.3 Evaluation of Knowledge Levels of Respondents	151
5.4 Assessment of Attitudes of the Respondents	156
5.5 Assessment of Beliefs of the Respondents	161
5.6 Assessment on use of Traditional Herbs, Food Supplements, and PES and Methods	168
5.7 Summary of Null Hypotheses.....	172
5.8 Pearson Correlation on Knowledge Levels, Experience, Attitudes, Beliefs and Use of FS, TH, PES, and Methods.....	174
5.9 Assessment on Association between Gender of the Respondents and Knowledge Levels, Attitudes, Beliefs and Use of PES and methods.....	175
5.10 Assessment of factors that Influence use of Traditional Herbs, Food Supplements, and PES	176
5.11 Assessment of Common Sources of Information on Traditional Herbs, Food Supplements, and PES and Methods	178
5.11.1 Personnel that ever-Provided Information to respondents on FS, TH and PES ..	179

5.12 Usefulness of Resources and Services Offered to Respondents	181
5.13 Preferred Way of Receiving Anti-Doping Information	181
5.14 Common Sources of Disseminating Anti-Doping Materials	182
5.15 Legal FS, TH, PES, and Methods	182
5.16 Common FS, TH and PES and Methods used by Respondents.....	184
5.17 Ever Been Tested and the Possibility of Providing a Wrong Sample.....	185
CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS..	188
6.1 SUMMARY OF THE FINDINGS	188
6.2 CONCLUSIONS.....	190
6.3 RECOMMENDATIONS	193
6.3.1 Recommendations for Policy	193
6.3.2 Recommendations for Further Research.....	195
REFERENCES.....	196
APPENDICES	212
APPENDIX A: PERMISSION TO CONDUCT RESEARCH	212
APPENDIX B: CONSENT FORM	213
APPENDIX C: ATHLETES' QUESTIONNAIRE.....	214
APPENDIX D: RESEARCH APPROVAL FROM KENYATTA UNIVERSITY	
ETHICS REVIEW COMMITTEE	225
APPENDIX E: INTRODUCTION LETTER FROM KENYATTEA UNIVERSITY	
GRADUATE SCHOOL TO NACOSTI	227
APPENDIX F: RESEARCH APPROVAL FROM KENYATTEA UNIVERSITY	
GRADUATE SCHOOL.....	228
APPENDIX G: MAP OF THE AREA OF STUDY	230
APPENDIX H: NACOSTI RESEARCH PERMIT	231

LIST OF TABLES

TABLE 3.1 SAMPLE SIZE	57
TABLE 3.2 CRONBACH ALPHA RELIABILITY ANALYSIS	60
TABLE 4.1: NUMBER OF RESPONDENTS SAMPLED FOR THE STUDY	63
TABLE 4.2 DISTRIBUTION OF GENDER PER SPORTS DISCIPLINE	64
TABLE 4.3 AGE DISTRIBUTION PER SPORTS DISCIPLINE.....	65
TABLE 4.4: AGE DISTRIBUTION OF PARTICIPANTS	65
TABLE 4.5 EXPERIENCE IN PARTICIPATION	66
TABLE 4.6 PARTICIPANTS IN PERCENTAGE PER SPORTS DISCIPLINE	66
TABLE 4.7 ANTI-DOPING AGENCY OF KENYA CAN TELL WHICH FS IS SAFE TO USE.....	68
TABLE 4.8 FOOD SUPPLEMENT BOUGHT OVER THE COUNTER IS SAFE TO USE.....	69
TABLE 4.9: PROHIBITED SUBSTANCE WILL BE DECLARED ON THE LABEL OF FOOD SUPPLEMENTS.....	70
TABLE 4.10: CAN AN ATHLETE BE SANCTIONED FOR TESTING POSITIVE AFTER USE OF FOOD SUPPLEMENTS.....	71
TABLE 4.11: ANTI-DOPING AGENCY KENYA CAN TELL WHICH TRADITIONAL HERB WAS SAFE TO USE.....	71
TABLE 4.12 TRADITIONAL HERB BOUGHT OVER THE COUNTER OR FROM AN HERBALIST IS SAFE TO USE.....	72
TABLE 4.13: A TEAM OFFICIAL CAN TELL IF A TRADITIONAL HREB CONTAINS A PROHIBITED SUBSTANCE.....	73
TABLE 4.14: CAN AN ATHLETE BE SANCTIONED FOR TESTING POSITIVE FOR A TRADITIONAL HERB.....	74

TABLE 4.15: ANTI-DOPING AGENCY OF KENYA CAN TELL SAFE PES FOR USE BY AN ATHLETE.....	75
TABLE 4.16: PES BOUGHT OVER THE COUNTER WOULD BE SAFE TO USE.....	75
TABLE 4.17: A TEAM OFFICIAL WOULD KNOW IF A PES CONTAINED A PROHIBITED SUBSTANCE.....	76
TABLE 4.18: I CAN BE SANCTIONED FOR TESTING POSITIVE AFTER TAKING A PES THOUGHT TO BE SAFE.....	77
TABLE 4.19: BOOSTING BLOOD LEVELS CAN LEAD TO TESTING POSITIVE FOR A PROHIBITED METHOD.	78
TABLE 4.20: MANIPULATION OF BLOOD COMPONENTS IS PROHIBITED IN SPORTS.	78
TABLE 4.21: BLOOD MANIPULATION CAN LEAD TO TRANSFER OF INFECTIOUS DISEASES.	79
TABLE 4.22: A DOCTOR, PHYSICIAN OR PARAMEDICAL PERSONNEL CAN BE SANCTIONED FOR HELPING AN ATHLETE MANIPULATE BLOOD COMPONENTS.	80
TABLE 4.23: MEAN KNOWLEDGE SCORE PER SPORTS DISCIPLINE.	81
TABLE 4.24 ONE-WAY ANOVA TO TEST SIGNIFICANCE DIFFERENCE BETWEEN MEANS OF ATHLETES ON KNOWLEDGE LEVEL ON PES AND METHODS ACROSS THE THREE SPORTS DISCIPLINES.....	82
TABLE 4.25 KNOWLEDGE LEVELS ON USE OF PES AND METHODS BY ATHLETES FROM THE THREE SPORTS DISCIPLINES.....	82
TABLE 4.26 FOOD SUPPLEMENTS ARE NECESSARY IN COMPETITIVE SPORTS.....	84
TABLE 4.27 FOOD SUPPLEMENTATION IS NOT CHEATING SINCE EVERYONE DOES IT.....	84
TABLE 4.28 FOOD SUPPLEMENTS CAN HELP MAKE UP FOR LOST TIME.	85
TABLE 4.29 ONLY THE QUALITY OF PERFORMANCE SHOULD MATTER.	86

TABLE 4.30 RECREATIONAL DRUGS HELP IN SPORTS SITUATIONS.	86
TABLE 4.31 ATHLETES SHOULD NOT FEEL GUILTY ABOUT TAKING PES.	87
TABLE 4.32 TRADITIONAL HERBS AND FOOD SUPPLEMENTS ARE UNAVOIDABLE.	88
TABLE 4.33 ATHLETES ARE PRESSURED TO TAKE PES.	88
TABLE 4.34 THERE ARE RISKS RELATED TO USE OF FS.	89
TABLE 4.35 ATHLETES HAVE NO ALTERNATIVE CAREER CHOICES.	90
TABLE 4.36 PES, TH AND FS SHOULD BE LEGALIZED.	90
TABLE 4.37 TH AND FS HELP OVERCOME BORED DURING TRAINING	91
TABLE 4.38 THERE IS NO DIFFERENCE BETWEEN PES, FGP AND SWIMSUIT.	92
TABLE 4:39 ONE-WAY ANOVA ON SIGNIFICANCE DIFFERENCE ON THE ATTITUDES OF ATHLETES FROM THE THREE SPORTS DISCIPLINES ON USE OF PES AND METHODS....	92
TABLE 4.40 ATTITUDES ON USE OF PES AND METHODS	93
TABLE 4:41 FOOD SUPPLEMENTS IS A FORM OF DOPING.....	94
TABLE 4:42 AN ATHLETE MUST USE PES TO WIN.....	95
TABLE 4:43 KENYAN ATHLETES USE TH, FS, AND PES.	96
TABLE 4:44 FOREIGN ATHLETES USE TH AND FS TO ENHANCE PERFORMANCE.....	96
TABLE 4:45 COACHES ENCOURAGE ATHLETES TO USE TH AND FS AS PES.....	97
TABLE 4:46 TRADITIONAL HERBS AND FOOD SUPPLEMENTS HELP IN SPORTS SITUATIONS.	98
TABLE 4:47 FOREIGN SPORTS AGENTS ENCOURAGE ATHLETES TO USE PES.....	98
TABLE 4:48 FS AND TH ARE NECESSARY TO SUCCEED IN SPORTS	99
TABLE 4:49 USE OF TRADITIONAL HERBS CAN ENHANCE PERFORMANCE.	100
TABLE 4.50 ENERGY DRINKS CAN IMPROVE PERFORMANCE.	100

TABLE 4.51 KENYAN COACHES ENCOURAGED ATHLETES TO USE FS.....	101
TABLE 4.52 KENYAN COACHES ENCOURAGED ATHLETES TO USE TH.....	102
TABLE 4.53 ONE-WAY ANOVA ON BELIEFS OF THE RESPONDENTS ON USE OF PES AND METHODS	102
TABLE 4.54 BELIEFS OF ATHLETES ACROSS THE THREE SPORTS DISCIPLINES ON USE OF PES AND METHODS.....	103
TABLE 4.57 USE OF PES BY KENYAN ATHLETES.....	105
TABLE 4.58 USE OF FOOD SUPPLEMENTS BY RESPONDENTS TO IMPROVE SPORTS PERFORMANCE.....	106
TABLE 4.59 USE OF TRADITIONAL HERBS BY RESPONDENTS TO IMPROVE SPORTS PERFORMANCE.....	107
TABLE 4.60 USE OF PES BY RESPONDENTS TO IMPROVE PERFORMANCE	107
TABLE 4.61 SUPPLY OF FOOD SUPPLEMENTS BY DIFFERENT OFFICIALS.....	108
TABLE 4.62 SUPPLY OF TRADITIONAL HERBS BY DIFFERENT OFFICIALS.....	109
TABLE 4.63 SUPPLY OF PES BY DIFFERENT OFFICIALS	110
TABLE 4.64 SUMMARY ON USE OF FS, TH, AND PES AMONG BOXERS, WRESTLERS, AND BODYBUILDERS.....	110
TABLE 4.67 PEARSON CORRELATION FOR CONTINUOUS VARIABLES AMONG THE RESPONDENTS.....	112
TABLE 4.68 PEARSON CORRELATION FOR CONTINUOUS VARIABLES AMONG BOXERS....	113
TABLE 4.69 PEARSON CORRELATION FOR WRESTLERS.....	114
TABLE 4.70 PEARSON CORRELATION FOR BODYBUILDERS	115
TABLE 4.71 KNOWLEDGE LEVELS IN RELATION TO GENDER.....	116

TABLE 4.72 ATTITUDES IN RELATION TO GENDER.....	116
TABLE 4.73 BELIEFS IN RELATION TO GENDER.....	117
TABLE 4.74 USE OF PES AND METHODS IN RELATION TO GENDER.....	117
TABLE 4.75 FACTORS THAT INFLUENCED USE OF FOOD SUPPLEMENTS.	120
TABLE 4.76 FACTORS THAT INFLUENCED USE OF TRADITIONAL HERBS.	122
TABLE 4.77 FACTORS THAT INFLUENCED USE OF PERFORMANCE ENHANCING SUBSTANCES	123
TABLE 4.78 SUMMARY OF FACTORS INFLUENCING USE OF FS AND TH	124
TABLE 4.79 REGRESSION MODEL	125
TABLE 4.80 REGRESSION COEFFICIENTS	125
TABLE 4.81 SOURCES OF INFORMATION	128
TABLE 4.82 WEBSITES LIKELY TO BE USED TO UPDATE INFORMATION ON FS, TH AND PES	130
TABLE 4.83 USEFULNESS OF AVAILABLE RESOURCES AND SERVICES	137
TABLE 4.84 ATTENDED A WORKSHOP AND HOW USEFUL IT WAS FOUND TO BE.	138
TABLE 4.85 NEED FOR MORE INFORMATION ON FS, TH AND PES	139
TABLE 4.86 PREFERRED MEANS OF RECEIVING INFORMATION ON DRUG-FREE SPORTS ISSUES.....	139
TABLE 4.87 DIFFERENT SOURCES OF DISSEMINATING ANTI-DOPING INFORMATION OR MATERIALS.....	141
TABLE 4.88 LEGAL FS, TH AND PES.....	143
TABLE 4.89 COMMON FS, TH AND PES BY SPORTS PERSONS.	145
TABLE 4.90 ATHLETES WHO HAVE EVER BEEN TESTED FOR DOPING.	146

TABLE 4.91 RESPONDENTS THAT HAD BEEN TESTED IN- OR OUT- OF - COMPETITION.	147
TABLE 4.92 RESPONDENTS THAT HAD EVER PARTICIPATED IN ANY COMPETITION.	147
TABLE 4.93 RESPONDENTS THAT HAD BEEN CALLED BY A TESTING OFFICIAL BEFORE PROVIDING A SAMPLE.	148
TABLE 4.94 IT IS POSSIBLE TO PROVIDE A WRONG SAMPLE.	148
TABLE 4.95 RESPONDENTS THAT HAD EVER PROVIDED A SAMPLE THAT WAS NOT THEIRS	149
TABLE 4.96 RESPONDENTS THAT KNEW AN ATHLETE THAT HAD PROVIDED A WRONG SAMPLE.	149

List of Figures

FIGURE 1.1 SPORTS DRUG CONTROL MODEL ADAPTED FROM DONOVAN, JALLEH AND
GUCCIARDI (2011)..... 10

FIGURE 4.1 GENDER OF PARTICIPANTS 64

FIGURE 4.2 DIFFERENT PERSONS THAT MAY HAVE PROVIDED INFORMATION ON FS, TH
AND PES TO BOXERS 133

FIGURE 4.3 DIFFERENT PERSONS THAT MAY HAVE PROVIDED INFORMATION ON FS, TH
AND PES TO WRESTLERS..... 134

FIGURE 4.4 DIFFERENT PERSONS THAT MAY HAVE PROVIDED INFORMATION ON FS, TH
AND PES TO BODYBUILDERS 134

ABBREVIATION AND ACRONYMS

AAF:	Adverse Analytical Finding
AAS:	Anabolic Androgenic Steroids
ADAK:	Anti-Doping Agency of Kenya
ADRV:	Anti-Doping Rule Violation
BAK	Boxing Association of Kenya
IAAF:	International Athletics Association Federation
IOC:	International Olympic Committee
KUREC:	Kenyatta University Review Ethical Committee
NACOSTI:	National Commission for Science, Technology, and Innovation
NADO:	National Anti-Doping Organization
OTC:	Over the Counter
PES:	Performance-enhancing Substance
FGP	Fibre Glass Poles
FS	Food Supplements
SAIDS:	South Africa Institute of Drug-Free Sports
SPSS:	Statistical Package for Social Scientists
SS	Swimsuits
TH	Traditional Herbs
TUE:	Therapeutic Use Exemption
UNESCO:	United Nations Education Scientists Cultural Organization
USADA:	United States Anti-Doping Agency
WADA:	World Anti-Doping Agency
WADC:	World Anti-Doping Code

OPERATIONAL DEFINITION OF TERMS

- Attitudes:** An individual's perception, both positive and negative, on the use of traditional herbs, food supplements, and performance-enhancing substances and methods among wrestling, boxing, and bodybuilding sports disciplines.
- Beliefs:** The influence on a person's state of mind towards issues of traditional herbs, food supplements, performance-enhancing substances, and methods.
- Busaa** A type of local brew made from maize.
- Doping:** Occurrence of one or more of the eleven ADRVs as postulated in the World Anti-Doping Code (WADC).
- Food Supplements:** Powders, tablets, capsules, or liquids that are alleged to be made from natural foods.
- Knowledge:** State of being aware of doping issues by athletes from boxing, wrestling, and bodybuilding.
- Methods:** Doping through manipulation of samples, either chemically or physically, or of blood and its components, including gene doping.
- Mukobero** A type of plant whose roots are believed to enhance performance after chewing.
- Mukuka** A type of khats believed to enhance performance after chewing its leaves.

Performance-Enhancing Substances: Food supplements, traditional herbs, and conventional medications that can be used either intravenously, orally, or through application for the purposes of improving performance in one's sports, as defined in the Prohibited List 2021.

Practice: The use of performance enhancing substances for the purpose of improving one's performance in specific sport activity.

Principle of Strict Liability: An athlete's responsibility for what they ingest, inject or apply to their bodies.

Prohibited list: A compiled list by WADA that indicates substances and methods banned for use in sports.

Traditional herbs: Roots and plants sought and used for treatment or leisure.

Practice: The use of performance enhancing substances for the purpose of improving one's performance in specific sport activity.

ABSTRACT

Boxing, wrestling, and bodybuilding are sports that require athletes to be highly conditioned from both endurance and strength perspective. Hence, the temptation to use performance enhancing substance has become rampant among athletes from these sports. Some of the athletes have tested positive for inadvertent doping after use of performance enhancing substances. This can be blamed on lack of knowledge, acquired beliefs and practices, as well as attitudes developed by athletes. The purpose of this study was to establish knowledge levels, attitudes, beliefs, and practices on the use of performance enhancing substances, among athletes from boxing, wrestling, and bodybuilding federations in Kenya. The main objective was to evaluate knowledge levels, beliefs, attitudes, and use of performance enhancing substances and methods among wrestlers, boxers, and bodybuilders in Kenya. The hypotheses sought to find out if there were any significant difference in knowledge levels, beliefs, attitudes, and use of performance enhancing substances and methods among these sports disciplines. Pressure from stakeholders and the nature of these sports discipline make them vulnerable to use performance enhancing substances. The findings of this study can be used by relevant institutions to plan programs on awareness creation among other sports disciplines. The study utilized cross-sectional analytical research design. The study population comprised of 1900 athletes from the three sports disciplines with a sample size of 384 athletes. Both closed and open-ended questionnaires were used as the data collection instrument. Data obtained from the respondents was coded and organized for analysis by use of SPSS version 25. Hypotheses were tested using one-way ANOVA and t-test at confidence level of 0.05. Post hoc analysis was carried out using Duncan Multiple Range Test where differences were found to be significant. Pearson Correlation was used to determine the associations between continuous variables of knowledge, attitudes, beliefs, and use/practice. Results on one way ANOVA indicated knowledge levels at $F(2, 381) = 19.631$, $p < 0.001$, attitudes at $F(2, 381) = 25.605$, $p < 0.001$, beliefs at $F(2, 381) = 46.646$, $p < 0.001$, and practice at $F(2, 381) = 24.050$, $p < 0.000$. three sports disciplines. Pearson correlations were found to be significant at $p < 0.001$, with a positive association between knowledge levels and experience ($r = 0.222$), use of FS, TH and PES and experience ($r = 0.187$), knowledge levels and attitude ($r = 0.380$), beliefs and use of FS, TH and PES ($r = 0.515$). However, a negative association was found with $p < 0.001$, between knowledge levels and beliefs ($r = -0.443$), beliefs and use of TH, FS, and PES ($r = -0.133$), beliefs and attitudes ($r = -0.677$), attitude and use ($r = -0.446$). Knowledge, attitudes, and beliefs of athletes from the three sports disciplines were significantly different. Officials from the three sports federations should develop structures necessary for imparting knowledge to athletes on use of PES.

CHAPTER ONE: INTRODUCTION

1.0 Background of the Study

Boxers, wrestlers, and bodybuilders use performance enhancing substances (PES) for various reasons. Unfortunately, consumption of these substances can impact negatively on their health, safety, and career. Therefore, deterring use of PES can go a long way in reducing such negative impacts (Westmattelmann et al., 2018). Studies on athletes' knowledge, attitudes, beliefs, and practices regarding PES can be an important mitigation in preventing doping among different levels of athletes (Westmattelmann et al., 2018).

Worldwide, sports have transformed from being a hobby but have become a lucrative career industry (El-Hamadi & Hunien, 2013). This has caused sports to become very competitive, posing a risk of using PES by athletes in order to win. According to Pipe (2011) PES are taken by athletes to boost their performance by enhancing their mental and physical abilities. According to Henning and Dimeo (2014), food supplements and traditional herbs are among the many substances that athletes take to enhance their performance in sports, some of which have ingredients that are prohibited in sports. International Olympic Committee (IOC) (2002) carried out a study on 634 food supplements and discovered that 14.8% of them were contaminated, implying that it was risky for athletes to use food supplements since it is not possible to tell which one is safe or not. A case in point is the Kenyan sprinter, Mark Otieno, who confessed of having tested positive for a banned substance after consuming contaminated food supplements (Maritim, 2022). It is therefore important to find out if athletes from these sports disciplines were

aware of this fact since they are known to prefer food supplements as they practice their sports.

A gap on attitude is evident where there exists a misconception that traditional herbs are harmless to the user, which is a risky trend making many athletes fail doping tests hence losing opportunities to participate in competitive sports, in addition to risk of causing harm to their health (Mahomoodally, 2013). This attitude was confirmed by Neilk (2008), who stated that chewing of miraa in Kenya is perceived as a time of relaxation and pleasurable gathering with fellow chewers. The chewers have no concern on the harm these herbs may cause to them. This misconception is proved through the positive doping test on David Munyasia, a Kenyan boxer, who tested positive after chewing miraa (Wikipedia, 2018).

There are studies that have investigated influence of attitudes and beliefs in use of PES. According to Petroczi (2007), athletes' attitudes are responsible for deviant behaviour of use of PES, and that a correlation exists between attitudes and experience whereby more experienced athletes had better attitudes. On the other hand, Miskulin et al. (2021) on a study on young Croatian Amateur Athletes, found that there was no significant difference in the attitudes of the athletes towards use of PES, and that use was not dependent on gender of the athlete or number of years of experience. However, female athletes' beliefs were found to be significantly different from those of the males.

Ransdell et al. (2009) carried a study on performance of masters athletes from athletics, swimming and cycling, in relation to age. They found out that performance of athletes aged between 35-45 years in sprints, declined from 2% to 9%, while at age 50 years, performance decline at 12,5% for men and 19% for women. After age 50 years, women

performance declined at much faster rate than that of men. For swimmers, they found that performance of athletes aged between 35-45 years declined at a rate of 6-17% and the decline increased as age increased. Cycling athletes recorded a decline of between 3-12% for ages 35-45 years, with gender difference ranging from 8% to 22% across the age-groups. According to Paloian (2022), the concept of gender is instilled in people at birth by attempting to define, evaluate and classify males to females, creating gender roles in relation masculinity and femininity. She noted that athletics in western culture is primarily male dominated and characterized by qualities such as strength, aggression, and competition, and the few women that participate in sports are expected to do so while maintaining hegemonic femininity.

In the past few decades, the sport industry has shown a major progress towards a highly competitive lucrative business attracting billions of dollars in investment (El-Hamadi & Hunien, 2013). These authors also found out that the yearning to shine in sports is a driving force for athletes to abuse PES and/or methods. A case in point is that of a Kenyan bodybuilder, Ronny Rono, who died after injecting steroids in his body, as reported by Tanui (2019). Rono's action could have been motivated by the desire to win and enjoy great earnings.

According to Morente-Sánchez and Zabala, (2013) coaches appear to be the main influence and source of information for athletes. It is important to find out who athletes from these three sports disciplines rely on as a source of information on the use of PES. Morente-Sánchez and Zabala (2013), recommended appropriate educational programmes that would provide information to coaches and officials, who in return would pass the same

information to their athletes and act as a remedy for lack of knowledge on use of PES by athletes.

1.1 Statement of the Problem

The nature of boxing, wrestling, and bodybuilding sports disciplines, together with pressure from stakeholders, make players from these sports disciplines vulnerable to the temptation of using performance-enhancing substances as a strategy to boost their competitiveness and resilience. Use of performance enhancing substances can lead to inadvertent doping from either banned substances or contaminated products. Some traditional herbs like miraa which are chewed in Kenya as part of leisure can lead to a positive doping test due to ingredients like cathine, which is prohibited in sports (Neilk, 2008). A case in point is David Munyasia, a boxer who tested positive for cathine, during Athens 2004 Olympics, a substance which was traced to his chewing of 'miraa' (Abrahamson, 2004). This positive test qualifies to be an inadvertent doping, out of ignorance or lack of knowledge. Refusing to be tested is an Anti-Doping rule violation according to the World Anti-Doping Code (2021) which athletes are expected to be aware of. Derrick Olara, a bodybuilder, was sanctioned for refusing to be tested (Ndunda, 2018), an act that displays ignorance of requirements of the World-Anti-Doping Code (WADC).

Few studies have been carried out in Kenya on use of prohibited substances. For instance, Kamenju (2014) on 'Influence of Sports Disciplines and Demographics of Kenya's Colleges Athletes on their Awareness, Perception, and Attitude to Performance-Enhancing Substances Use', and Kamenju et al. (2016) on 'Kenya Teachers Trainee Athletes' Awareness of Selected Performance-Enhancing Substances (PES) and their Effects to

Sports Performance'. Chebet (2014) found low knowledge levels, attitudes, and beliefs, on use of PES. On the other hand, Miskulin et al. (2021), found no significant difference in attitudes of male to female towards use of PES while beliefs of male to female were significantly different. However, there exists minimal information on knowledge, attitudes, beliefs and practices of wrestlers, boxers, and bodybuilders towards use of PES in Kenya.

Other studies have revealed that economic benefit is a factor that drives athletes to use PES (El-Hamadi & Hunien, 2013). According to Petroczi (2007), desire to win, influences doping attitudes. This is a proof that athletes view sports as a career and a means to livelihood hence can go to whatever length to win, which compromises the integrity and fairness of sports. Again Chebet (2014), found that majority of athletes are ignorant on information on doping and that they have no interest in checking information from websites. However, athletes preferred coaches and print media as a source of information on doping. This was corroborated by Morente-Sánchez, and Zabala (2013), who stated that coaches and officials were a reliable source of information on PES to athletes. It is in view of the above that the current study sought to investigate if knowledge, attitudes, beliefs, and practices of athletes from boxing, bodybuilding, and wrestling federations in Kenya, had any influence in the use of (PES) and methods.

1.2 Purpose of the Study

The purpose of this study was to assess knowledge, attitudes, beliefs, and practices of Kenyan boxers, bodybuilders, and wrestlers towards use of PES and methods. The study sought to establish facts about knowledge levels, beliefs, attitudes, possible sources, and

factors influencing the use of PES and methods among wrestlers, boxers, and bodybuilders in Kenya.

1.3 Study Objectives

- (i) To investigate the athletes' knowledge levels on performance-enhancing substances and methods among wrestlers, boxers, and bodybuilders in Kenya.
- (ii) To evaluate the attitude of boxers, wrestlers, and bodybuilders in Kenya regarding the use of PES and methods.
- (iii) To establish the beliefs among boxers, wrestlers, and bodybuilders in Kenya on the use of PES and methods.
- (iv) To assess the use of PES and methods by wrestlers, boxers, and bodybuilders in Kenya.
- (v) To assess association between gender of the respondents and knowledge levels, attitudes, beliefs and use of performance-enhancing substances and methods
- (vi) To identify factors influencing the use of performance-enhancing substances and methods by boxers, wrestlers, and bodybuilders in Kenya.
- (vii) To establish possible sources of information on performance-enhancing substances and methods among bodybuilders, wrestlers, and boxers in Kenya.

1.4 Hypotheses of the Study

H₀₁: There is no significant difference on knowledge scores on PES and methods among bodybuilders, boxers and, wrestlers in Kenya.

- H0₂:** There is no significant difference on attitudes scores of boxers, wrestlers, and bodybuilders in Kenya towards the use of PES and method.
- H0₃:** There is no significant difference on beliefs scores on use of PES and methods among wrestlers, boxers, and bodybuilders in Kenya.
- H0₄:** There is no significant difference on use scores on PES and methods among wrestlers, boxers, and bodybuilders in Kenya.
- H0₅:** There is no significant association between gender of the respondents and knowledge, attitudes, beliefs, and use scores on PES and methods.
- H0₆:** There is no significant difference on factors influencing use of PES and methods among boxers, wrestlers, and bodybuilders in Kenya.
- H0₇:** There is no significant difference in the sources of information on PES and methods for boxers, wrestlers, and bodybuilders in Kenya.

1.6 Significance of the Study

The study provides information that can be useful to stakeholders involved in the fight against doping in sports. The information will enable the stakeholders in making strategic and informed decisions necessary for proper planning for effective Anti-Doping education, as well as targeted testing. The information can also be useful to athletes from different sports disciplines in enabling them to make informed decisions when confronted with issues on whether to consume PES and methods, or not. The findings can also be used to address the gap on knowledge, attitudes, and beliefs towards use of PES, and methods among Kenyan athletes.

The study will expand the body of knowledge in the fight against doping in sports not only in Kenya, but also other parts of the world involved in protecting clean athletes, hence clean sports. The information can also be used by relevant institutions to guide formulation of policies and Anti-Doping regulations. The findings of the study could also form basis for future studies aimed at exploring the topic on the use of PES and methods in other sports disciplines.

1.7 Delimitations of the Study

The study delimitations included:

- (i) The target population was delimited to athletes from the three sports disciplines namely boxing, wrestling and bodybuilding.
- (ii) Respondents were sourced from active clubs spread out in different selected counties that are active in the three sports disciplines.
- (iii) The researcher depended on relevant athletes' support personnel to identify athletes who participated in the study.

1.8 Limitations of the Study

Due to the sensitive nature of the study some of the respondents may not have been factual considering the nature and stigma attached to doping. Fear by the respondents that the information given may be used in future to implicate them of using PES and methods may have also affected the credibility of their responses. In addition, gender disparities due to the nature of the sports disciplines being studied, where only few female athletes are bold

enough to participate in them might have caused gender disparities. To counter these limitations the researcher assured the participants of their confidentiality and anonymity. In addition, they were free to discontinue with the study at any point they felt unsafe or exposed.

1.9 Assumptions of the Study

The study made the following assumptions:

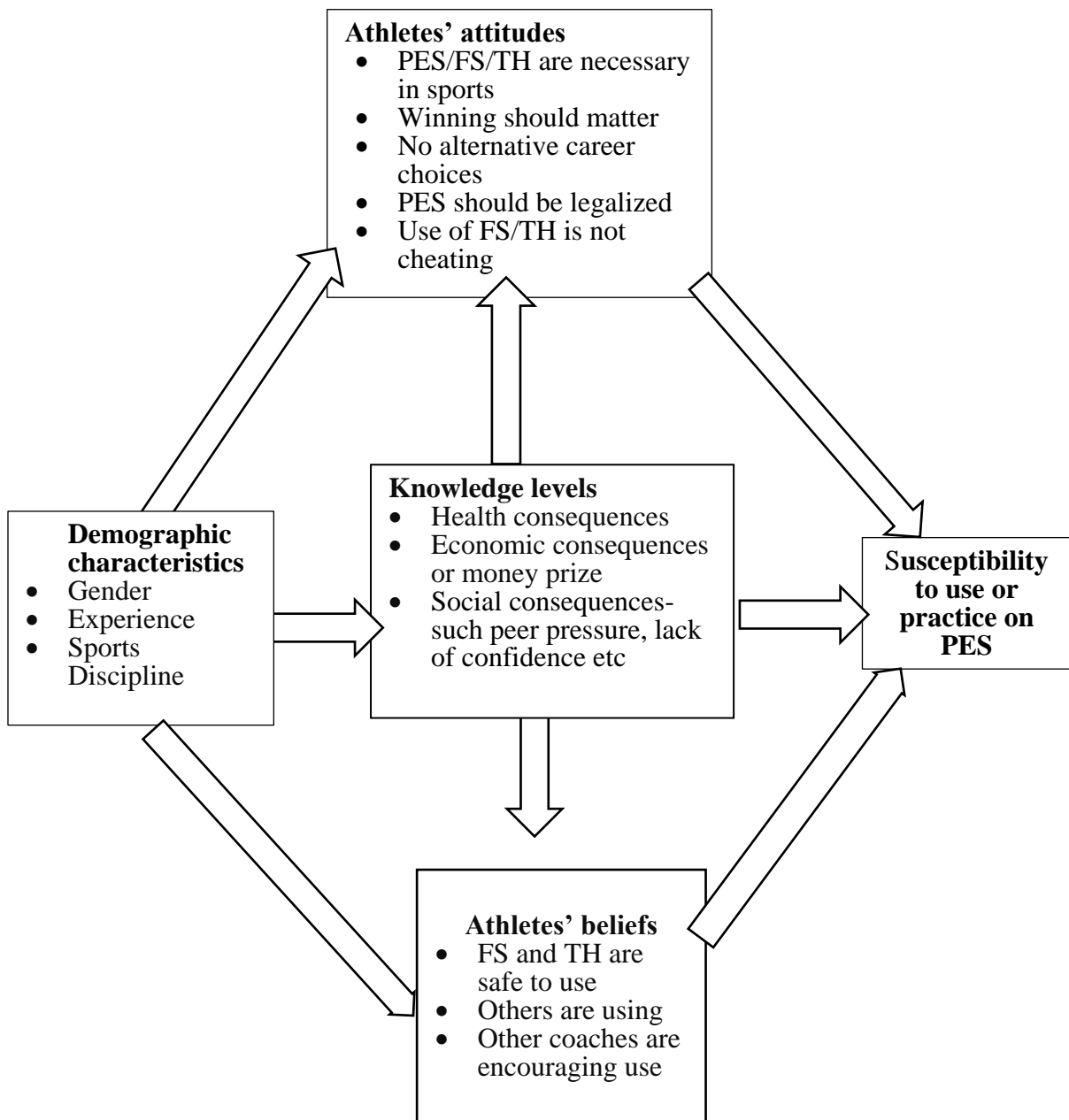
- (i) That athletes from boxing, wrestling and body building use PES and methods.
- (ii) That since the respondents were assured of confidentiality, the information they provided would be truthful.

1.10 Conceptual Framework

According to Donovan et al. (2011), medical and physiology researchers focus on improving methods (blood, urine, gene) for detecting and deterring athletes from doping, whereas social science researchers strive to better understand psycho-social variables (such as attitudes, beliefs, knowledge levels, and factors influencing) that may be important in education programs directed towards the prevention of such behaviour. This study used the revised Sports Control Model which best explain how factors influencing use are impacted by attitudes, beliefs and the kind of information that the athletes have on use of PES. The diagram below illustrates the Sports Drug Control Model and how different variables influence use of PES and methods by athletes.

Figure 1.1

Sports Drug Control Model adapted from Donovan, Jalleh and Gucciardi (2011)



According to the model, knowledge levels on PES and methods are affected by knowledge on social, health and economic consequences, which can influence an athlete to use or not use the substances. According to Baron et al. (2007), knowledge on money prize and endorsement rewards has lead to increase in use of PES, and in some instances, athletes

are doped without their knowledge by their support personnel who are driven by the desire to win the money prize attached to winning competitions. Chiang et al. (2018), stated that proper education programs based on identified athletes' knowledge levels and attitudes toward use of PES, is a primary prevention of doping in sports. According to Ransdell et al. (2009), performance in sports declines as age advances, and may lead to use of PES to improve performance as athletes grow older. On the other hand, Paloian (2022) stated that the concept of gender is instilled in people at birth and tends to evaluate, define and classify males and females, attaching roles according to masculinity or femininity of a person. This leads to males dominating in sports where they are expected to be strong, aggressive and competitive, whereas women who succeed in sports are expected to maintain hegemonic femininity. Nicholls et al. (2017) found a higher use of PES among young males than females athletes, and that males believed more on use of PES to improve performance than females. They also found that use of PES increased as age increased and that strength-based sports, such as boxing and bodybuilding, were more associated with use of PES.

If the attitude of an athlete holds winning as the ultimate goal, then such an athlete can be tempted to use PES. In most cases this is compounded with the desire for benefits accruing from such wins and sometimes, desire for fame. The same will apply to athletes who perceive sports as the only career choice. Diacin et al. (2003) stated that an athlete's attitude can be impacted by personality traits, previous experience and environmental factors. An athlete who believes that other athletes are using PES will also tend to use in order to keep at par during competition. A study carried out by Erickson et al. (2015), found that an athlete's belief, or personal control and sense of identity influences his/her behaviour where specific traits and characteristics appear to correspond with an athlete's

personal choice to use or not to use PES. On the other hand, gender can determine the direction of beliefs and attitudes, hence influencing the choices that athletes make to use or not use PES. Backhouse et al. (2015), in their study found out that the attitudes of male athletes are more inclined towards using PES than those of female athletes. Influence from peers and support personnel such as coaches, managers, and agents can lead to an athlete using PES and methods.

CHAPTER TWO: LITERATURE REVIEW

2.0 Performance Enhancing Substances and methods

During the ancient Olympic games of 668 BC, dating to over 2000 years, use of performance enhancing substances was in form of dried figs and leaves. For instance, Charmis took dried figs and ended up winning the Stade race (El-Hamadi & Hunien, 2013). Use of more sophisticated substances such as amphetamine began in 1960s, by professional European cyclists, which led to the tragic death of Tom Simpson, during the 1967 Tour de France (El-Hamadi & Hunien, 2013).

Performance-enhancing substances and methods can be taken using various strategies, which vary according to the type of substance in consideration. According to Dandoy and Gereige (2012), the methods of administration include chewing of fresh herbs, sniffing, injections, oral fluids, blood transfusion, tablets, and gene doping. Huestis et al. (2011) argue that the different methods of doping are prohibited by the International Olympic Committee on the basis that they violate the spirit of sport.

According to Werner and Hatton (2010), athletes engage in doping to boost their performance in sports. Of all physical activities, sport is the activity that is characterized by high usage of substances that enhance performance (Werner & Hatton, 2010). Johnson and Peters (2014) found that the primary motivation for athletes to use performance - enhancing substance is the satisfaction they get after winning medals, money, or other financial rewards. Masters (2015) states that the increased use of prohibited substances is

credited to the commercialization of sport where huge financial rewards are promised to athletes for wins or higher points earned in sports events. Societal pressure for the athletes to improve their performance also drives them to seek alternative measures to meet the expectations, which include engaging in doping (Masters, 2015).

According to Mayo Clinic Staff (2020), the use of PES has numerous risks involved. The risks vary from side effects of using these substances to the sanctions to an athlete who is revealed to be using prohibited substances. It was noted by Geeraets (2017) that the demand by the community for competitiveness is the basis that leads to the unethical practice of using PES, that kills the spirit of sport. For this reason, the World Anti-Doping Agency (WADA) was founded to foster fair play by regulating the use of prohibited substances and thus publishes a current list of prohibited substances and methods on its website annually (Malcourant et al. (2015). Athletes who have legitimate medical issues are permitted to use substances and/or methods on the list of prohibited substances for treatment, but only through a valid Therapeutic Use Exemption (TUE) (WADC, 2021).

The concept of PES does not only focus on chemically structured substances use, but also on the procedures undertaken with the goal of giving the athletes undue advantage during sports competitions (Al Ghobain, 2017). Some of these prohibited substances are natural while others are synthetic. The World Anti-Doping Agency (WADA) constantly revises the list of prohibited substances hence the number may differ from time to time. It is noted by Reardon and Creado (2014) that most of the prohibited substances were included on the prohibited list based on health concerns and the perception of performance enhancing capabilities on the athletes.

Failure by individual governments to enforce laws enacted by the WADA, may attract a ban that may lead to lack of participation in international competitions (Geeraert et al., 2013). Establishment of National Anti-Doping Organizations (NADOs) to function in conjunction with WADA in promotion of a drug free sport is part of factors that lead to compliance status of a country. Creation of awareness on the fight against doping in sport is one of the key mandates of NADOs (Kamber, 2011). Locally, the Anti-Doping Agency of Kenya (ADAK) is the NADO that was established to be the intermediary between WADA and the sports organizations/institutions in the country.

2.1 History of Doping

Doping came in early as sport itself. The Olden Greeks changed their mode of nutrition and drank engineered concoctions to improve their sport prowess to improve their performance. According to Lee (2006), Mexicans and Americans on the other hand used some cola leaves to enhance their sport prowess. Ricky Bruch, a Swedish, and Uwe Beyer, a West German, who were field event athletes admitted to doping by use of anabolic steroids in the early 1960s and 1970s, which was reported among the first cases of doping (Wikipedia, 2018).

Doping is defined by the World Anti-Doping Code (WADC) (2021) as the occurrence of one or more of the antidoping rule violations (ADRVs). According to the WADC (2021), there are eleven (11) ADRVs viz; presence of a prohibited substance or its metabolites or markers in an athlete's sample, evading, refusing or failing to submit to sample collection by an athlete, use or attempted use by an athlete of a prohibited substance or a prohibited method, tampering or attempted tampering with any part of doping control by an athlete or

other person, whereabouts failures by an athlete, possession of a prohibited substance or a prohibited method by an athlete or athlete support person, prohibited association by an athlete or other person, administration or attempted administration by an athlete or other person to any athlete, trafficking or attempted trafficking of any prohibited substance or prohibited method by an athlete or other person, complicity or attempted complicity by an athlete or other person and acts by an athlete or other person to discourage or retaliate against reporting to authorities.

According to Andren-Sandberg (2016), the practice of performance enhancing using foreign substances or other synthetic methods is as old as competitive sport itself, and that as early as BC 776, Greek Olympians were reported to use substances such as dried figs, mushrooms, and strychnine to enhance performance. In North America, American and Mexican athletes consumed cola leaves to boost their performance in sports (Lee, 2006). The realities that came with the effects of consuming performance enhancing substances led to their banning by the International Olympic Commission in 1967 and went ahead to create a list of the banned substances (Lee, 2006).

The first athlete to die in 1896, out of use of PES was Arthur Linton, a Welsh cyclist who died under the influence of stress and speed ball (cocaine and heroin) during the Tour de France, while Thomas Hicks, a marathoner nearly died from a mixture of brandy and strychnine during modern Olympic Games (Andren-Sandberg, 2016). According to Andren-Sandberg (2016), during a biking team time trial, 23-year-old Danish cyclist Knud Enemark Jensen collapsed, fractured his skull, and died. An autopsy reportedly found traces of amphetamine and a blood vessel dilator nicotinyl tartrate in his system.

According to Kremenik et al. (2006), a case of doping in wrestling occurred in 1988 during the Seoul Summer Olympics where Ali Dad, an Afghani wrestler was found to have used furosemide. A testing report by WADA carried out in the year 2017 where 1000 samples were collected, bodybuilders recorded the highest percentage of tests that resulted in an Adverse Analytical Finding (AAF) (WADA 2017 Testing Figures Report).

In Kenya, the first case of doping was reported in 1993 where William Tanui who won the 1992 Summer Olympics 800m was found to have consumed ephedrine, which is a prohibited substance under the list of prohibited substances (Chebet, 2014). Soon after, Janet Ongera and Ronald Rutto; long distance runners, tested positive for norandrosterone in 2002 and erythropoietin (EPO) in 2012 respectively (Wikipedia, 2018). David Munyasia, a boxer tested positive for cathine during the 2004 Summer Olympics in Athens. He admitted to having consumed miraa (a herbal substance), which contributed to the high levels of Cathine (Chebet, 2014). A bodybuilder, Mr Greater western (Derrick Olara), was denied a medal after failing to have his urine tested, which is one of the eleven (11) Anti-Doping Rule Violations (The Standard Newspaper, 2018).

2.2 History of Boxing, Bodybuilding and Wrestling

The history of Thai Wrestling, Judo, Karate, Jujitsu, Boxing and Muay Thai dates to 684 BC during the ancient Olympic Games where they were utilized as a strategy to train the Greek Army (Westney, 2012). The popularity of these sports declined when Emperor Theodosius banned the Olympics in 393CE, but they re-emerged in Brazil, in the year 1925 under Jujitsu. Westney (2012) states that the only rules or instructions given in these games

were no eye gorging or biting. The advent of the Ultimate Fighting Championship transformed the games by introducing new rules that made them less brutal. Such rules included setting of time limits, ranking the fighters, age limits and introduction of women ultimate fighting championships (Souza-Junior et al., 2015). New changes in rules culminated into increased popularity of the sports that spread to other countries across the globe including Kenya, a previously conservative society that had earlier banned the sport (Johan, 2016).

2.2.1 Boxing, Bodybuilding and Wrestling in relation to use of PES and methods

It is assumed that due to the high number of injuries associated with these sports, athletes are motivated to use the substances to guarantee quick recoveries. The prohibited substances serve the purpose of boosting their body power, where in this case, food supplements are quick source. For others they consume the substances for leisure purposes without much thought on implications it may have on their sporting careers, since it is a common practice in the societies, they descent from (Mahomoodally, 2013).

Boxing and wrestling are a type of sports with combat and full contact where participants can grapple, strike, and punch the opponent, according to Lystad et al. (2014). Athletes in these sports need endurance to get them through the game. These athletes are more susceptible to suffer injuries because of the physical nature of these sports and this contributes to the use of prohibited substances to enhance performance and increase their competitiveness (Lystad et al., 2014). Sekulic et al. (2017) stated that boxers and wrestlers who use performance enhancing substances, tend to use those which quicken the recovery process and relieve stress, which mostly are traditional herbs. A high number of athletes

from boxing, wrestling, and bodybuilding, have been found to be using prohibited performance enhancing substances, which has led to some being stripped off titles won after using the banned substances (Sekulic et al., 2017). Mayo Clinic Staff (2020) stated that inappropriate use of erythropoietin may increase the risk of stroke, heart attack and blockage in an artery in the lung (pulmonary embolism). Unfortunately, the use and abuse of performance-enhancing drugs by athletes has become common, creating complex challenges for the stakeholders in the world of sports (Michael, 2008).

2.3 Some of the Commonly Used PES and Methods

2.3.1 Erythropoietin or EPO

Erythropoietin (EPO) is a peptide hormone used in the stimulation of the production of red blood cells which increases oxygen supply to the tissues (Reichel & Gmeiner, 2009). EPO is produced by kidney cells to stimulate formation of erythrocytes in the bone marrow. When blood passes through the kidney with depleted oxygen levels, kidney cells are stimulated to produce EPO. Nabili (2019) notes that normal EPO levels vary between 4 to 24 mU/ml (milliunits per milliliter). Synthetic EPO and any of its mimetics have been prohibited from sport since 1990 (Robinson et al., 2006). EPO is on the updated 2021 Prohibited List under ‘S2 - Peptide Hormones, Growth Factors, Related Substances and Mimetics’ (Prohibited List, 2021). Synthetic EPO enhances an athlete’s performance by increasing transfer of oxygen to the body tissues. Consequently, there are dire health risks associated with synthetic EPO intake. Once introduced into the body for enhancement of performance, the heart experiences stress because of the surge in blood viscosity (WADC,

2021). There is more danger realized in the event of an athlete sleeping since the heart can stop pumping (Doyle, 2015).

The most noteworthy cases of EPO doping in Kenya were by two of the most renowned female marathoners, Jeptoo Rita and Sumgong Jemimah, in 2014 and 2017 respectively, both in out-of-competition tests. Asbel Kiprop, a middle-distance runner, is the most recent positive doping case for EPO in May 2018 (Ayodi, 2018).

2.3.2 Anabolic Steroids

The 2021 prohibited list categorizes Anabolic Steroids under section ‘S1 – Anabolic Agents’. Synthetic anabolic steroids, better known as anabolic androgenic steroids (AAS) have similar effects to the natural androgen testosterone. They may also have a related chemical structure and may be perceived as the synthetic version of testosterone. S1 is inclusive of all androgens that have anabolic impacts which means they stimulate muscle growth (WADA, 2018).

Athletes that have returned positive doping tests for anabolic agents in Kenya include, Elizabeth Muthoka, a sprinter, who was sanctioned for 2 years after testing positive for nandrolone, Ambrose Bitok, a 5,000m distance runner, tested positive for norandrosterone in 2003 in Linz, Austria, and Cheromei Joseph, who qualified to represent Kenya in Sydney 2000 Summer Olympics, returned a positive test for nandrolone (WADA, 2018). These incidences are some of the evidences of abuse of anabolic agents by athletes from Kenya, reflecting on why there should be further investigations on the extent of such use and on

the knowledge levels of the athletes on the risks involved, which can impact negatively on their careers.

2.3.3 Blood Doping

According to the WADA Prohibited List (2021), blood doping is a prohibited method, categories as M1, which includes: 1) Manipulation of blood and blood components which involve administration of any allogenic (homologous), autologous, or heterologous blood or blood cell products of any origin into the circulation system; or artificially enhancing the uptake, transport, or delivery of oxygen; or any form of intravascular manipulation of blood or blood components by physical or chemical means; 2) Chemical and physical manipulation including tampering or attempting to tamper, altering the integrity and validity of samples collected during doping control, for instance by urine substitution or adulteration; intravenous infusions or injections of a total of 100ml per 12 hours' period except for legitimate hospital treatment; 3) Gene and cell doping which include the use of polymers of nucleic acids or nucleic acid analogues; use of gene editing agents designed to alter genome sequences or the transcriptional, post-transcriptional or epigenetic regulation of gene expression; use of normal or genetically modified cells.

Oliveira et al. (2016) defined blood doping as the misuse of substances or certain methods to boost oxygen intake by muscles with the aim of enhancing performance in sports activities. It includes blood transfusion, administration of erythropoiesis-stimulating agents or blood substitutes, and gene manipulations.

Blood doping was first detected in Moscow in 1980 during the Summer Olympic Games. Kaarlo Maaninka transfused about a liter of blood. She ended up winning in the 5- and 10-

kilometer track races (Plumb et al., 2016). However, manipulating blood was not prohibited at the time (Mc Kay, 2013). According to Schwartz (2013), an American cyclist confessed to having manipulated blood in the Los Angeles Summer Olympics of 1984. In the same Olympics, about a third of cyclists from America were discovered to have had transfused blood which led to them winning 9 medals;- their first medals since the 1912 Stockholm Summer Olympics (Schwartz, 2013). This led to the decision by WADA to include prohibition of blood infusion and manipulation in the code (WADC, 2015).

According to Mayo Clinic Staff (2020), athletes who use prohibited substances and methods win unfairly in competitions, receive awards and subsequently, financial gain. They also noted that use of these prohibited substances and methods poses a health risk to athletes ranging from kidney failure, memory lapses, arrhythmia, or even death.

2.4 Food Supplements

Lentillon-Kaestner and Ohl (2011) noted that food supplements raise the probability of non-compliance to the WADC as they may contain prohibited substances. Food supplements are described as substances containing high concentration of certain nutrients for instance, proteins and vitamins taken in form of liquids, pills, capsules, and tablets in set dosage levels (Anders & Schroeter, 2017). Dwyer et al. (2018) argue that food supplements function to rectify nutritional deficiencies in the body that are required to boost specific psychological functions that only occur due to consumption of certain nutrients. In sports, they are used to increase the concentration of certain nutrients that are important in providing support during participation in extraneous physical activities, which in turn makes the athlete more competitive in sports (Dwyer et al., 2018). Sirico, et al.,

(2018) stated that athletes who suffer from nutritional deficiencies acquire benefits from using food supplements and that food supplements are harmless if used according to the right quantities or as prescribed.

Nevertheless, Ward (2014) postulates that consumption of dietary supplements puts users at risk of developing health issues such as damaged nerves especially from the prolonged consumption of vitamin B-6. The largest risk on use of food supplements is excessive intake mainly driven by the yearning to achieve certain body requirements in a short duration.

Matthias et al. (2003), in their study found that some food supplements had different substances than indicated on the label. Others had caffeine and ephedrine. They concluded that some food supplements are contaminated and athletes using them risk testing positive for doping.

Walpurgis et al. (2020) stated that anabolic androgenic steroids and stimulants have been frequently found as undeclared ingredients of dietary supplements, either because of cross-contaminations due to substandard manufacturing practices and missing quality controls or an intentional admixture to increase the effectiveness of the preparations. According to Bijl (2014), during the past decade, some dietary supplements have been shown to contain pharmaceutically active components not adequately identified on their package labels. Merwe and Grobbelaar (2004), in a study of dietary supplements found out that some dietary supplements were mislabeled or contaminated with banned substances, which resulted to inadvertent doping among athletes.

Bijl (2014) said that it is of great concern that a wide variety of dietary supplements contain ingredients not adequately chemically identified on their packaging labels. These ingredients, which are sometimes listed as ‘natural’, ‘herbal’ or otherwise, may constitute prohibited substances. They may have inadvertently entered the product, possibly because of accidental cross-contamination in manufacturing plants, or may have been intentionally added to the supplement, posing a potential health hazard to all consumers and may lead athletes to a failure in doping test (Bijl, 2014).

Jose et.al., (2017), stated that the use of dietary supplements is increasing among athletes which can be associated to high rates of unintentional doping among the athletes. Jose et al. (2017) quote the European Parliament Directive (2002/46/EC), that defined a food supplement as a product intended to supplement the normal diet, consisting of a concentrated source of a nutrient or of other substances that have a nutritional or physiological effect, in a simple or combined form, commercialized in dosed formulas, capsules, tablets, pills, bags of powder, vials of liquid, dropper bottles and other similar forms of liquids and powders, taken in small quantities. According to Elina et al. (2018), although the market offers numerous permitted supplementary products marketed as food supplements, their administration is not safe and hides certain real risks for the sportsmen and women because their post-production quality and quantity control is not mandatory unlike that on medicinal products.

According to Walpurgis et al. (2020), dietary supplements and chemical agents have been used for several decades among athletes striving to achieve increased strength and performance. This has led to a huge growing market for the food supplement industry. The

products are classified as ‘foods’ rather than drugs and are therefore free of the stringent requirements for registration of pharmaceuticals, i.e., no safety and efficacy data are required prior to registration. These pharmaceuticals may have unintentionally entered the product or may have been intentionally added (Walpurgis et al., 2020).

In most countries, including Kenya, food supplement industry is unregulated, a fact supported by Mathews (2017), who said that with the increasing use of unregulated dietary supplements, athletes are at continued risk of adverse medical events and inadvertent doping. Mathews (2017) stated that athletes will continue to be at risk for adverse effects and failed doping tests due to contaminated dietary supplements until legislations on regulation of FS are implemented.

2.5 Traditional Herbs

Sellami et al. (2018) indicated that an increase in awareness about the negative impact of food supplements has led to the increase of use of traditional herbs in sports. According to Sellami et al. (2018), the rise in consumption of herbal substances is attributed to their benefits such as elevated levels of bioactive compounds such as terpenoids, alkaloids and polyphenols. They also stated that the main purpose of the use of traditional herbs is to increase muscle strengths and body mass. Mulungwa and Holtzhausen (2015) caution that reference to traditional herbs as natural, should not mislead athletes to regard them as not harmful and therefore consumed excessively. Again, they stated that some of these traditional herbs contain harmful substances that may have detrimental effects on the health and career of the athlete. According to Dhillon et al. (2017), consumption of traditional herbs has significantly increased especially ginseng, soya bean, garlic echinacea, ephedra,

and St. John's, which are presumed to speed up the healing process from injuries. According to Blumenthal et al. (2011) consumption of traditional herbs has become popular in the US, a phenomenon that has coincided with rise in sales revenue of the herbs by 4.5 percent to about \$5.3 billion.

A Russian pharmacologists described adaptogens as safe to use even when taken in large measures, which contributed to the use of traditional herbs globally in sports. Adaptogens quicken the recovery process of injuries and alleviate the effects of stress and overtraining (Domene, 2013). Domene, (2013), argues that the reputation of adaptogens has created an attitude that they can boost natural resilience and therefore, make athletes more responsive to environmental stress. This has led to the belief that the stronger a person is, the faster they may recover from stress and injuries. In America, there is a popular herb known as Ginseng that contains ginsenosides active compounds that are recognized to contribute to benefits including raising the athlete's vitality, reducing stress, normalizing body systems, relieving mental and physical fatigue, and enhancing the immune system of the body (Megna et al., 2012). Other kinds of traditional herbs commonly used for enhancing performance include schisandra, ashwagandha, Gotu Cola, dang quai, He Shou Wu, tribulus, tribestron, ciwujia, terrestris, and herbs used for stimulation such as coffee, mate, guarana, synephrine, kola nut, licorice, ephedra, and green tea (Chen et al., 2012).

According to Sellami et al. (2018) use of herbal medicinal products and supplements has increased during last decades. At present, some herbs are used to enhance muscle strength and body mass. Emergent evidence suggests that the health benefits from plants are attributed to their bioactive compounds such as Polyphenols, Terpenoids, and Alkaloids which have several physiological effects on the human body. This has led to manufacturers

launching numerous products with banned ingredient inside with inappropriate amounts or fake supplement inducing harmful side effect. Sellami et al. (2018), also indicated that there is no guarantee that herbal supplements are safe for anyone to use and that there is confusion surrounding the herbal use especially in sport field. A study carried out in Korea, China, and Japan by Kim et al. (2019) revealed that some herbal medicines such as Ephedrae Herba, Cannabis Semen, Strychni Semen, Moschus, Strychni Ignatii Semen, and Otariae Testis et Penis, contained prohibited substances and that caution in relation to doping test, should be applied when using them.

The above incidences provide clear evidence that globally, athletes use food supplements, traditional herbs, PES, and methods, as influenced by the desire to win, compounded with lack or low knowledge on consequences of their use, negative attitudes, and beliefs. Kenyan athletes are not an exception to this use, hence the need to investigate the extent of practice by Kenyan boxers, wrestlers, and bodybuilders.

2.6 Prevalence in the use of Performance Enhancing Substances

2.6.1 Global Perspective

According to Pielke (2018), it is not only important to understand the prevalence of doping for policy making in the fight against doping but also for enhancing academic research. According to WADA, high occurrence rates of doping cases in athletes can be attributed to lack of a definite mechanism used in the promotion of clean sports. Houlihan et al. (2019) further argues that due to inter-twining political and economic factors true prevalence rates cannot be exactly determined when it comes to doping. According to Smith and Stewart

(2015), doping athletes are forced into early retirement to protect the image of their countries. This practice poses a major challenge to WADA with respect to curbing the doping menace in athletes.

The highest number of cases of doping are recorded during international competitions such as Diamond League, soccer World Cup and the Olympics (Hon et al., 2015). Blank et al. (2016), affirm the above argument that athletes that dope during international competitions are motivated by fame and financial rewards attached to winning. Opportunities such as sponsorship deals, playing for clubs and endorsements offered to athletes who perform well during international competitions are also factors attributed to high risk of doping. Use of prohibited substances carries dire consequences that athletes overlook for gain of such benefits (Dionigi et al., 2011). As an example, talent scouts in soccer attend international competitions for the purpose of spotting talent and recruiting it to their respective clubs. Many athletes carry the hope of participation in internationally renowned clubs which lead to doping temptation to help them exhibit their best talent (Dionigi et al., 2011).

Currently, the use of prohibited substances and methods is a global issue. Efforts by WADA, International Olympic Committee (IOC) and International Association of Athletics Federation (IAAF) to curb doping in the last fifty years has not been successful (Sumner, 2017). In efforts to curb this menace, countries such as the United Kingdom have resorted to the use of stiffer penalties such as freezing of proceeds earned by doping athletes (Anderson, 2013). According to Chappelet (2015), approaches used in combating the use of prohibited substances consist of educational programs on consequences of doping, establishment of rehabilitation services, doping tests on athletes during in and out of competition, and enforcement of penalties for those found culpable. It is important to note

that despite the application of all preventive and curative measures, it has proved difficult to measure up to sophisticated doping procedures by athletes who always find innovative methods of avoiding discovery (Oliveira et al., 2014).

2.6.2 African Perspective

According to Lewis (2010), most countries in Africa, and in particular East Africa, perform exceptionally well in sports. This is evidenced by the large number of medals accrued from sports such as track and field events, volleyball, rugby, and soccer, among others. However, this success is amid a growing doping culture resorting to a high number of athletes testing positive for doping, which has tainted the image of the continent (Louw et al., 2010). They also said that most athletes have been educated on the fight against doping in sports by the respective national anti-doping organizations. Despite the education given to the athletes, some have tested positive for prohibited substances in countries such as Ethiopia, South Africa, Nigeria, and Kenya. According to Merwe (2004), use of steroids, stimulants and diuretics increased in Africa between the year 1998 to 2002, and more so during the year 1999 when All Africa Games were held in Johannesburg. Substantial efforts have been made by national, regional, and international sports federations to fight doping in Africa. However, they still face difficulties which impede these efforts (Lindsey, 2017).

2.6.3 Kenyan Perspective in the Use of PES

According to Rintaugu, et al. (2011), Kenya is renowned as a sporting powerhouse in sports such as volleyball, athletics, and rugby. However, the high level of competitiveness has coincided with cases of some athletes testing positive for doping thereby getting punished

by WADA. Kamenju (2014) states that the Government of Kenya is making efforts to be compliant to WADA policies by establishing an agency to deal with the fight against doping in sports.

Weldon (2015) states that the economic development of countries is on the rise owing to sports. The development of sports economies in countries such as Kenya, is illustrated by improved venture in sports which is making governments' enhanced revenues. According to Rintaugu et al. (2011), this rise is connected to the regard by athletes on competitive sports not only as a hobby but also as a career. Factors such as increase in government investment in sports amenities, divergence to non-traditional sports in international competitions, improved remuneration to winners and an increase in number of athletes competing, define the development of sports economy. According to Mwisukha et al. (2003), the outcome of advancement in sports competitiveness in the country is the cause for the use of PES, food supplements and traditional herbs by athletes.

Soita (2017) states that there is lack of legal backing to support implementation of the provisions by WADA which lead to a country's compliance. It is for this reason that Kenya, at one point, was banned by WADA from participation in international sports events. It is a challenge to achieve WADA compliance provisions for most countries such as Kenya since the process is long and demanding. Additionally, the country lacks internal Anti-Doping control mechanisms such as political goodwill, shortage of facilities and support from international sports federations which are necessary in achieving WADA compliance (Okumu et al., 2017).

Deficiency of knowledge regarding what doping entails is a key contributor to the high cases of doping in Kenya. Kamenju et al. (2016) argue that those found to engage in doping defend themselves based on lack of knowledge that some things such as food supplements or medication may contain banned substances. This situation is aggravated by the fact that coaches, who in turn pass first-hand information to athletes, lack adequate anti-doping knowledge thus misleading athletes. Desire for enhancement of muscles and fast competitiveness leads young athletes to the temptation to use performance enhancing substances which may impact negatively to their health and sports career. According to Kimenju, et al. (2016), there are higher cases of males than females who have tested positive for banned substances.

2.7 Factors Contributing to the Use of Traditional Herbs, Food Supplements and PES and Methods

A study by LaBotz and Griesemer (2016) noted that, out of curiosity, athletes, especially young ones, may use PES and methods. They stated that young adults engage in the use of PES to improve their prowess and emulate what they regard older or professional athletes engage in. The findings by LaBotz and Griesemer (2016), are confirmed by Buckman et al. (2011), who state that student athletes are under pressure to sustain their academic scholarships and thus end up using PES. Children and adolescents use these substances without knowledge on the side effects that they may have on their health (Pope et al., 2013). Out of unsubstantiated information that students receive on PES, some wind-up fighting addiction to PES whereas others lose their scholarships due to poor performance or after discovery (Pope et al., 2013).

Johnson et al. (2010) stated that one of the factors attributed to the use of PES is that athletes think that they need PES to enhance their performance. Due to the lucrative benefits such as salary, endorsements and prize money received by professional athletes who win sport competitions, athletes develop a desire to win in competitions and are thus tempted to use PES (Johnson et al., 2010). Kamenju (2014), further stated that there is an increase in the number of sponsorship deals associated with the growth of the global economy of sports and thus athletes do everything within their power to win in competitions to receive the sponsorship deals associated with such wins.

Muwonge et al., (2015), stated that self-efficacy, attitude, individual beliefs, and social influence on performance outcomes significantly contribute to the use of performance enhancing substances. Athletes develop attitude on use of PES based on the limited information they receive on the positive and negative impacts of using PES (Muwonge et al., 2015). The surrounding social environment can influence the attitude towards the use of substances. Self-efficacy is the belief in the intrinsic ability to achieve goals in a competitive world (Muwonge et al., 2015). According to Kadden and Litt (2011), athletes with low self-efficacy have a higher likelihood to use PES than those with high efficacy levels. Advanced technology in the manufacture of drugs is one of the factors that supports the beliefs of athletes who perceive those new-found methods of using PES may not get detected by conventional testing procedures (Oliveira et al., 2014).

Athletes from boxing and wrestling are the largest consumers of food supplements which is necessitated by the need for physical strength and endurance, as well as the psychological ability to withstand pain to guarantee a win (Sirico et al., 2018). On the other hand, body builders consume substances that facilitate growth of the muscles and reduce body fats, to

avoid the strenuous training programs they need to develop the large muscles. (Sirico et al., 2018). Some of the food supplements are contaminated as supported by a study carried out by Newmaster et al. (2013), in the United States of America on 44 products from 12 companies. They found out that there were product swaps in 30 of the 44. Only 2 companies had no substitution, fillers, or contamination. Such contamination could be intentional where manufacturers are competing for customers, with a basis on the potency of their products. However, some occurrence of banned substances in food supplements can be inadvertent and attributed to the contamination that occurs during production process, where manufacturers use the same conveyer belt, but fail to observe high hygienic standards during production of food supplements (Newmaster et al., 2013).

According to Aliabadi and Hesami (2014), low levels of athletes' awareness of sports supplements and doping effects lead them to consuming herbs, food supplements and PES. The younger athletes look at the older ones with awe and want to be like them (Krumrie, 2014). Athletes use PES due to their attitudes that using them will increase their chances for winning while others do so due to lack of appropriate training programs (Aliabadi & Hesami 2014). According to Levy (2014), some athletes' belief that other competitors are using PES, hence they also tend to use to be at the same level. He also said that some athletes are determined to win at any cost. Others do it out of pressure from coaches, parents, and peers, while others are driven by community attitudes and expectations on their performance. Most of them do it for financial rewards (Levy, 2014).

In a study carried out by Johnson et al. (2010), there is a wide array of benefits that professional athletes get when they exhibit high level of competitiveness especially in

professional sports such as endorsements, prize money, salary, and other forms of monetary and non-monetary benefits when they win than those who take second positions. These leads to athletes developing higher motivation to win and get the first position to get the substantial benefits (Johnson et al., 2010). Kamenju (2014) argues that the growth and expansion of the sports economy at the national and global levels has been characterized by the rise in value and scale of sponsorship deals that athletes and teams get when they win in competitions. For this reason, they indulge in activities that sometimes are illegal to ensure they get a win which will guarantee them in getting the endorsement deals.

2.7.1 Factors Attributed to the Use of PES in Africa

Nolte et al. (2014), in their study, discovered that there is a high prevalence of doping cases in the continent because of athletes' attitude towards use of PES. The results of the study indicated that, 3.9% of the athletes had used PES and 14% admitted a likelihood of using PES with a guarantee that there would be no apprehension. The research further found that ambitions and emotional stress were the main driving force towards the use of PES in sport. The researchers concluded that it is important to regulate doping via frequent and random doping tests. Such mindsets make the athletes more susceptible to doping consortiums who trick them into using PES by claiming that standard tests cannot detect PES in their samples (Andren-Sandberg, 2015).

Inefficiencies in the governance of sport in African continent, such as poor implementation of anti-doping laws that leave loopholes that athletes take advantage of, have contributed to the rise of doping cases (Camporesi & McNamee, 2014). Both Serby (2017) and Soita (2017) add that anti-doping laws are ignored for financial and other kinds of gains attached

to winning sports competitions. Other contributing factors include political instability in some African countries such as Somalia, Libya, DR Congo, and South Sudan that prevents effective functioning of national anti-doping laws (Okafor, 2017).

The main problem hindering effective tackling of doping in Africa is the unavailability of testing laboratories compared to other regions like Europe and North America (Martínez-Sanz et al., 2017). In such cases, samples must be transported to Europe which at times limit effectiveness of the testing process. In a study carried out by Hanstad et al. (2010), the African region lacks anti-doping infrastructure required to tackle the doping menace.

2.8 Commonly Used Food Supplements, Traditional Herbs and PES by Boxers, Wrestlers, and Body Builders

According to Kendall (2021), bodybuilders use different food supplements for different reasons. For instance, protein powders (such as whey, casein, soy, egg) and creatine for muscle mass, glutamine for quick recovery from workout program, weight gainer powder which contains carbohydrates and fat calories for building lean muscles. Rogers (2018), states that women who train hard, commonly use calcium. Zinc and magnesium, which produce the male hormone testosterone, are used to boost immunity (Rogers, 2018). On the other hand, boxers use food supplements such as amino acids (proteins) to enhance effect of training and improve stamina (Willet, 2018). He also said that boxers use caffeine to enhance endurance and resistance to fatigue and antioxidant such as lutein, lycopene, and selenium to protect body cells from damage. According to Krumrie (2014), wrestlers commonly use fish oils, multivitamins, whey proteins and probiotics for strength and endurance.

These group of athletes also use traditional herbs for closely related reasons. For instance, Butea Superba is an herb from Thailand, said to increase androgenic effects hence increasing the level of aggression and strength (Ericksson, 2014). Another herb from Thailand is Kracharidam, also known as black ginger or ginseng, which is used to increase vitality and endurance, combats stress, and enables fast recovery from training sessions and injuries (Ericksson, 2014). According to Tietge, (2018), guarana is used to increase mental alertness and combat fatigue, while meadowsweet and willow bark are used to relieve pain.

Levy (2014) mentions some of the PES that are used by the three sports for different reasons as follows: Diuretics are commonly used by boxers and wrestlers for rapid weight loss; opioids is used by the three sports to relieve pain; amphetamines to delay fatigue and keep alert; steroids and Human Growth Hormones for muscles mass; while marijuana and cocaine are used for alertness and confidence.; cannabinoid, which is known to decrease anxiety, fear, depression and tension, is used more by male than female athletes.

2.9 Related Literature

2.9.1 Factors that influence use of PES

According to Dandoy and Gereige (2018), adolescents are vulnerable to risk-taking and more so for adolescents from sports disciplines of football, baseball, basketball, wrestling, Gymnastics, and weight training. Therefore, such adolescents are also at increased risk of using PES. This study revealed that some adolescents not involved in sports are still at risk

of using PES, though for different reasons, for instance, teenagers are preoccupied with appearance. Dandoy and Gereige (2018) carried out a longitudinal study on 2,500 adolescents, over a 5-year period, targeting their behaviour towards eating, weight control and other activities. The results indicated that 1.4% of girls and 1.7% of boys had used anabolic steroids in the past year. Male adolescents used the substance to achieve a body size larger than expected age group, as well as to control weight. In girls, the two predictors of steroid use were low weight and high Body Mass Index. Other factors that led to use of steroids by adolescents included peer pressure, media influence, and parental pressures.

From studies carried out by Lucidi et al. (2004, 2008), Lentillon-Kaestner and Carstairs (2010); and Chan et al. (2015), it was found out that attitudes, subjective norms, and beliefs significantly predicted intention to use PES, at 75%, of Gym users. Also, participants with positive attitudes, were able to wade peer pressure, hence low intentions to use PES. However, in the absence of positive attitude, peer pressure had a lot of influence on whether to use PES. This finding is also supported by Serpa et al. (2003), who found that social pressures and social norms among young athletes played a crucial role in shaping the individual's intentions to use PES. Armitage and Conner (2001) and Lucidi et al. (2004) contrasted this finding by indicating that peer pressure is a weak influence on use of PES. Tavares et al. (2020) in their study, hypothesized that males would be more susceptible to use PES than females. This hypothesis was in line with the findings of the studies carried out by Serpa et al. (2003), Pedersen (2010); Ntoumanis et al. (2013), Backhouse et al. (2015), who found out that females who believed less in the effects of PES were less susceptible to the influence of others, leading to low intentions to use PES than males. These studies concluded that males should be educated on specific information about the

negative health consequences of the use of PES and the fact that these consequences may occur several years after their use. A study by Adeola et al. (2020) found that financial and material gains ($p = 0.002$), desire for fame and success in short time possible, ($p = 0.0001$), as well as improving recovery rate from injury ($p=0.0003$), significantly influence doping in sport among athletes in Kogi State. Boit et al. (2014) in their study collaborated the findings of the above study whereby they found out that money prize (54%) was indicated as the greatest motivation of doping, followed by lack of knowledge on banned substances (18%) and influence by friends or trainers (14.4%), among elite Kenyan athletes. Chebet (2014) also collaborated the same findings and cited factors that influenced use of PES as ignorance, influence by friends, trainers, and desire for money prize, while majority of the athletes blamed external pressure for use of PES. Apart from knowledge, attitudes and beliefs, the current study sought to find out other factors that influenced athletes from boxing, wrestling and bodybuilding in Kenyan to use PES, as well as if these variables were affected by gender of the athlete.

According to Clancy (2020), reasons for use of PES by adolescents involved in her study included the need to improve performance (12.9%), need to build muscle (10.1%), need to increase energy (10%), need to recover faster from training or competition (8.6%), need to recover faster from injury (7.7%), and influence by others (6.6%). Haerinejad et al. (2016) in their study found that the primary motivations for starting PED use by bodybuilding athletes was: to increase muscle mass (164, 70.10%), increase strength (131, 56%), weight gain or loss (95, 40.60%), improve sport performance (68, 29.10%), increasing endurance (60, 25.60%), improving physical appearance (43, 8.40%) and preventing

injuries (31, 13.20%). They stated Androgenic Anabolic Steroids (AAS) as the most important substances for increasing muscle mass and weight gain.

2.9.2 Knowledge, attitude, beliefs, and practices (use) of PES

Haerinejad et al. (2016) carried out a study on prevalence and characteristics of PES use among 453 male bodybuilding athletes, who used Gyms, from South Iran. These athletes had an average age of 20-29 years. They found out that users of PES weighed more, with a corresponding body mass index than the non-users. PES users were also found to possess an aggressive behaviour than the non-users. Out of the 453 bodybuilders, 234 (51.7%) had used, or had a history of use of PES. The PES users reported an average of 3.80 ± 4.52 substance use in their programs and they had used PES for the average of 3.24 ± 3.99 years. The most used PES included androgenic anabolic steroids, stimulants, growth hormones and insulin. They found out that the average years of training or experience had a direct relation with the length of use ($r(453) = 0.37, p=0.000$). In addition, sexual and dermatologic effects were the most prevalent adverse effects reported by the PES user (114 (49.4%) and 103 (44.2%), respectively). Among the users, 92(39.50%) had complete knowledge about the effects of PES use before initiation of use, while 77 (33%) had no information at all. Among PES users, only 49 (21%) had consulted with a specialist on use, side effects, route, and dose of administration. The main motivation for use of PES among this group, was to increase muscle mass (164, 70.1%), strength (131, 56%), weight gain or loss, (95, 40.6%), improve performance, (68, 29.1%), increase endurance (60, 25.6%), improve physical appearance (43, 18.4%) and prevent injury (31, 13.2%). These participants had also used supplements ranging from protein, amino acids, glutamine,

carbohydrates, and creatine. While this study focused on use of PES and characteristics of male bodybuilding athletes that had visited gyms in South Iran, the current study looked at bodybuilding, wrestling and boxers on their knowledge, attitudes, beliefs, and practices on use of PES in Kenya.

Al Ghobain et al. (2016) interviewed 1142 male sport players, of an average age of 24 years, from various sports disciplines in Saudi Arabia, and found out that they had 4.3 % prevalence use of prohibited substances. The main reason for use was to improve performance (69 %) and social recognition (17 %). The prevalence use of food supplements was 38.4 %. Among these players, 30 % of them believed that such use was against the spirit of sport, while 70 % were aware of punishment against doping. Those that admitted to having received advice on prohibited substances were 65 %. The higher rate of using prohibited substances among Saudi Arabia players was associated with low education, young age of below 20 years, previous use of food supplements and lack of awareness on consequences of use. On the other hand, Boit et al. (2014) found that Kenyan elite athletes had average knowledge level of prohibited substances that enhance sport performance, which was attributed to testing programs and information received from coaches during international sports events. Kenyan athletes indicated that they knew fellow athletes that were using PES and that those who were using, attributed the use to pressure from colleagues, friends, and coaches.

Kaoche (2014) carried out a study on evaluation of the knowledge levels and attitudes on doping by football athletes, coaches, and sponsors in Malawi. He found out that majority

of the athletes (80%), coaches (83.3%) and sponsors (93.3%) had more than 4 years of experience playing, coaching, and sponsoring football events, respectively, and concluded that they were in a good position to share knowledge, attitudes, and practices of doping in football in Malawi. In this study, 42.6% of athletes had been tested for doping and out of those tested, 8.9% had been tested more than once in the prior years. Among these athletes, 1.7% knew a football player who had used PES. Among the coaches, 66.6% believed their football players never used PES, while a significant number of sponsors (60%) acknowledged that football athletes used PES. The study also revealed that 73.4% of the respondents had a high level of knowledge on PES, with 77% of the football athletes recording a high level of knowledge, while 45.8% coaches had a high level of knowledge. According to Kaoche (2014), a high number of football athletes (88.9%) received information on PES from their colleague athletes, while 65.1% of them received such information from their coaches. On the other hand, coaches (50%) relied on seminars (45.8%) on doctors, and (45.8%) on friends. A high number of sponsors (80%) relied on friends, while (67.7%) relied on team doctors for information on use of PES. Results of the study revealed that majority of the athletes (73.6%), used PES because others were using. However, 73.2% did so to win competitions, while 22.6% needed to change the shape of their bodies.

Kaoche (2014) found high negative attitudes among football athletes (74.5%), coaches (95.8%) and sponsors (60%). Using chi-square, the study found a significant association between age of the players ($\chi^2 = 161$, $P < 0.001$) and sources of information, as well as experience of the athletes ($\chi^2 = 138.28$, $P < 0.001$) and knowledge on use of PES. The

study found a weak significant relationship between knowledge (-0.201 , $P = 0.001$) and attitudes towards use of PES by athletes, coaches, and sponsors in Malawi, using Pearson Correlation analysis. The study found no significant differences in knowledge levels on use of PES among football players, coaches, and sponsors. However, significant mean difference in attitude towards use of PES was found between coaches and sponsors in Malawi. While the study focused on different cadres (athletes, coaches, and sponsors), this study focused on only athletes to investigate on knowledge levels beliefs, attitudes and use or practice on PES. However, while the study by Kaoche (2014) focused on only one sports discipline of football, this study focused on three sports disciplines of bodybuilding, boxing and wrestling in Kenya.

Another study carried out by Backhouse and McKenna (2012) reviewing knowledge, attitudes, and beliefs of coaches regarding doping in sports. Their opinion was that coaches were important as potential agents in the prevention of doping among athletes. They reviewed studies carried out in Norway, Italy, France, and Hong Kong. In the studies reviewed, male participants were found to dominate at 96% with a mean age of 30 years. They also noted that 17% of 260 coaches had been approached for information related to doping, and more so, on the prohibited list. From their review, they concluded that these coaches lacked knowledge in relation to doping in sports. Doping is defined by the WADC (2021) as violation of the eleven (11) Anti-Doping rules. The current study focused assessing the knowledge level, beliefs, attitudes, and practices on use of PES and methods among the boxing, body building and wrestling federations. Use of PES and methods is only one (1) rule among the possible eleven (11) rules that can be violated.

According to the reviewed studies, there was a general agreement that use of PES can enhance performance by 30% of the coaches. Out of the 260 coaches, 70% believed that most records that have been broken in sports was due to use of PES. These coaches believed that an athlete must use PES to win. Majority of the coaches (98%) agreed that they had a role to play in preventing doping. A high number of coaches demonstrated unfavorable attitude towards use of PES. For instance, 14% were ready to work with medical personnel to produce a high-quality banned substances list, 20% recommended scientific research to develop PES that cannot be detected during doping tests, 11% agreed that they could find ways to assist friends or relatives to acquire a banned substance, while 19% believed athletes can use PES so long as it is not harmful to their health. Though the four studies were on coaches and not athletes, the review indicated that they all used cross-sectional survey design. Backhouse and McKenna (2012) cautioned that these studies are not appropriate to be generalized to all countries since the choice of the countries (Norway, Italy, France, and Hong Kong) were not countries that can be considered as ‘powerhouses’ in sports. This study was therefore necessary since in Kenya, a country considered as one of the ‘powerhouses’ in sports.

Nolte et al. (2014) carried out a study to determine attitudes, beliefs, and knowledge of talented young athletes from Gauteng, South Africa on use of PES. A total of 346 athletes were involved in the study with 208 males and 138 females. The findings of the study indicated that 3.9% of the athletes would be willing to use a PES, with more than 14% admitting that they would consider use if they knew they would not be caught. A significant

number (46%) indicated ambition and emotional pressure (22.5%) as the reasons that influence their consideration. Less than half of the athletes (42.1%) felt that they were well informed on PES. This reflected a lack of knowledge on PES among most of the athletes, which could be remedied by use of anti – doping education programs. Respondents in this study received information on PES primarily from coaches (29.7%), parents (19.4%), friends (16.5%) and other athletes (16.2%). Nolte et al. (2014) stated that their findings were found to be like other studies where coaches were found to be the main influence and source of information to athletes. Unfavorable attitudes were found among the athletes where (14.7%) did not think that use of PES could negatively affect their health. However, 63% of them agreed that use of PES in sports is morally wrong. A high number of these athletes (70%) felt that other athletes in South Africa and in the world were using PES. This kind of attitude could easily influence them to using PES to keep up with pother athletes and may end up assuming use of PES is not cheating. Nolte et al (2014) recommended suitable interventions that can change attitudes towards use of PES, such as education programs that put more emphasis on health risks of using PES. While they studied talented young athletes from South Africa, the current study did not segregate athletes by age, but rather selected athletes depending on whether the sports club they played for had attained qualification for placement as a national level club.

Chang and Moore (2013) carried out a study in the USA to investigate the relationship between knowledge, attitudes, and prevalence of steroid use among athletes and non – athletes. Their total respondents were 222 with 116 males and 106 females. Out of the total number, 23% reported use of steroid. Users were found to be significantly more

knowledgeable than non – users. Using Pearson Correlation, they found a moderate significant correlation ($r = 0.48$, $P < 0.001$) between attitude and knowledge implying that as knowledge on steroid increased, their attitude towards use became more favorable. More athletes (32.5%) as compared to non – athletes (1.5%) reported use. A higher percentage of male athletes (35%) reported use as compared to 10% female athletes. Among the sports disciplines studied, powerlifters and bodybuilders were found to be more susceptible to use than the non-athletes. While the study focused on athletes and non-athletes from different sports disciplines, the current study focused on athletes only, from three sports disciplines viz, boxing, wrestling and bodybuilding.

Alharbi et al. (2019) carried out a community-based survey in Riyadh, Saudi Arabia, investigating knowledge, attitudes, and use of Anabolic – Androgenic Steroids (AAS) among gym users. They concluded that the level of knowledge and awareness on misuse of AAS was lacking in the Middle East. They used cross – sectional analytical study on male adult gym users. Majority of the participants (54.6%) who used gym for professional training were not aware of AAS, 45.4% were aware of use by bodybuilders and 53.2% knew that AAS could influence muscle mass, bodyweight and muscle strength. However, more than half of the participants were not aware of health side – effects caused by AAS. Favorable attitudes towards use of AAS ranged from 48% to 66.5%, while those who had attitude against use ranged from 48.5% to 69.4%. Alharbi et al. (2019) also found that majority of the respondents who had used AAS had also used nutritional supplements (81.2%). Out of those who reported use, 84.7% were aware that others were using AAS. While the study focused on male respondents who were gym users, on use of AAS, which

is a PES, this study focused on male and female respondents from sports disciplines of boxing, wrestling and bodybuilding on knowledge, attitudes, and beliefs on use of PES.

Boit et al. (2014), found that Kenyan elite athletes have average knowledge level of prohibited substances that enhance sports performance. The average knowledge was attributed to testing of doping during international events and information from coaches. Kenyan athletes indicated that they knew of fellow athletes that used PES, with use attributed to pressure from colleagues, friends, and coaches. According to Boit et al. (2014), sports associations such as Athletics Kenya (30.6%) and IAAF (19.4%) were found to be the most common sources of information, while AK website (40.3%) and WADA website (11.5%) were indicated as the most visited sites on drug – free sports information. A significant number of athletes (65.2%) found workshops on doping to be quite useful. Among officials, majority stated coaches (87.1%) as a main source of information on doping issues. They concluded that Kenyan elite athletes do not depend on doping to win, which was a positive attitude. However, 21% of the athletes admitted to using food supplements.

Rintangu and Mwangi (2021) assessed knowledge, attitudes, and perceptions on doping among university students in Physical Education and Sport Science. Below half of the respondents (43%) had attended workshops on doping. However, majority had above average knowledge on PES. Their attitudes towards doping were found to be negative. This finding was collaborated by Ogama et al. (2019), who explored the impact of knowledge and attitudes on doping behavior among Kenyan long-distance runners. Results indicated

that majority (70.2%) had received information on doping hence were aware of PES. The main source of information was colleague athletes (89.8%), followed by coaches (73.5%). Their attitudes towards doping were found to be negative where those who doped or desired to dope were influenced by the fact that they assumed other competitors were also doping. They also found a positive correlation between knowledge and attitudes of these athletes.

Morente – Sanchez et al. (2019) carried out a study on attitudes, beliefs, and knowledge on doping of football players in Spain categorized as elite, non – elite, top amateur, elite U18 and elite female players. They had a study population of 1324 Spanish football players from 88 football teams. Four hundred and sixteen (416) respondents admitted to having used supplements, with frequently mentioned supplements as recovery substances, amino acids, proteins, and vitamins. Significant differences on knowledge were found among the stated categories. However, majority of the respondents were not knowledgeable on prohibited substances. Factors that led to use of PES were stated as performance (35.3%), sports achievement (19.4%) and external pressure (4.4%). The authors concluded that amateur and U18 athletes were more permissive towards use of PES. About 5% of the footballers admitted as having used PES. These respondents showed a more permissive attitude toward doping. Though the study investigated beliefs, attitudes, and knowledge, among football players yet the target population was categorized in different levels of performance and age. The current study focused on athletes from national clubs of boxing, wrestling and bodybuilding, with an assumption that the level of performance of all athletes the same, regardless of sports discipline.

Ozkan et al. (2020) carried out a cross – sectional study of Turkish athletes on doping knowledge and attitudes from 11 sports disciplines totaling to 202. Most of the respondents admitted to using over – the – counter medication or supplements for pain (78.2%), cough and cold (64.9%) and antibiotics (55.4%). More than three quarters (78.4%) of the respondents lacked knowledge on doping. Majority of the participants believed that doping is not necessary to achieve best results (86.6%) and they were not pressured to use prohibited substances. Most of them (67.3%) did not believe that their colleagues and competitors were using prohibited substances. The main source of information on doping to these respondents was medical personnel (84.6%). However, coaches followed closely at 78.6% and teammates at 67.0%. Websites of WADA and Sports Federations were quoted as the most reliable websites in providing information on doping. The positive attitude among these respondents can be attributed to the fact that the study was carried out in a developed country where majority of the citizens are enlightened in many spears of life, developing countries. Technology such as internet provision in such countries is modern and available to all, hence majority can access and understand information posted on websites. The current study was based in Kenya, a developing country whose internet provision is not reliable, especially in the remote areas.

Miskulin et al. (2021) focused on doping attitudes, beliefs, and practices among young Croatian athletes. Four hundred (400) potential participants were selected, with a response rate of 83.8%. Among all the athletes, 80.4% were from team sports such as handball, football, basketball, and volleyball. The study used Mann – Whitney U test. The authors found no significant difference ($P = 0.099$) in the attitudes of male to female players

towards use of PES. The study also revealed that there was no significant difference in their attitudes towards PES use according to the type of sports they played ($P = 0.405$). However, significant difference was found in their beliefs in use of PES between male and female athletes ($P = 0.008$), as well as the type of sports played ($P = 0.522$). A low number of respondents (3.3%) admitted to having used PES. The study revealed that there was no correlation between athletes' attitudes towards use of PES and their current and past use of PES. There was no correlation between their beliefs and their current and past usage. However, a weak correlation was found between athletes' attitudes towards use of PES and their beliefs. While the study used Mann – Whitney U test to analyze significant differences, the current study used one way ANOVA to analyze significant differences in knowledge, attitudes, beliefs, and use of PES among athletes from boxing, wrestling and bodybuilding in Kenya.

Mse et al. (2021) investigated use of supplements among elite, middle- and long-distance runners from Kenya. Out of a sample of 600, majority admitted to having used nutritional supplements (75.7%). From 3000m and below events, 17.2% admitted to the use of nutritional supplements to improve performance. Among participants of 5000m and above events, 4.6% confirmed as having used nutritional supplements for performance improvement. While the study focused on use of nutritional supplements by middle- and long-distance runners in Kenya, the current study focused on use of food supplements, traditional herbs and PES by boxers, wrestlers, and bodybuilders in Kenya.

Chebet (2014) evaluated knowledge, attitudes, and practices of doping among elite middle- and long-distance runners in Kenya. Her study found out that 46.4% of these athletes had moderate knowledge on doping. According to Chebet (2014), Kenyan athletes from middle- and long-distance runners do not value doping for good performance. Her findings indicated a very low use of doping substances, which did not represent the true practice of use as she argued that most respondents could have given a wrong answer so as not to be associated with use. Herbal supplements were used by 21.4% of the athletes. The main source of information on doping for this group was their sports federation (30%). Though the study was carried out in Kenya, it focused on middle- and long-distance runners, while the current study focused on athletes from boxing, wrestling and bodybuilding.

Kamenju et al. (2016) carried out a study on Kenya Teacher Trainee athletes' awareness on PES and effects on sports performance. The study comprised of 422 male and female athletes from ball games, and track and field events. They found out that majority of the respondents believed some of the selected PES had no effect on performance viz. alcohol (81.8%), miraa (67.8%), caffeine (51.9%) and cocaine (55.5%). The only substances deemed to have effect on performance by these athletes were marijuana (53.0%) and anabolic (56.4%).

Kamenju et al. (2016) further sought awareness levels on the athletes based on familiarity with the World Anti – Doping Code (WADC), extent of knowledge on use, testing procedures and effect of use of PES. They found out that male athletes were more knowledgeable than the female athletes. They concluded that about half of the respondents

had no knowledge on the WADC, and on doping regulations. According to their findings, the higher the number of years participated in, the better the knowledge levels on PES. The results revealed significant differences in knowledge levels on PES from ball games, for instance volleyball and basketball ($P = 0.023$); hockey and volleyball ($P = 0.018$). While this study assessed awareness of PES among athletes from ball games, and track and field events from Kenya Teachers Training colleges, as well as effect of use of PES on performance, the current study sought to investigate not only knowledge levels, but also, attitudes, beliefs, and use of PES among boxers, wrestlers, and bodybuilders from top clubs in Kenya.

2.10 Summary of Literature Review

According to past studies, use of PES in sports was in form of concoctions made from leaves or some traditional herbs. The main purpose was to improve performance and gain a competitive edge over other competitor (Lee, 2006). As sports competitions advanced, the art of improving sports performance also advanced to the use of modern performance enhancing drugs such as amphetamines, strychnine, as well as cocaine and heroin (Andren – Sandberg, 2016). As early as 1896, some athletes died, especially from the sport discipline of cycling, after using performance enhancing drugs (Andren – Sandberg, 2016). However, as time progressed, athletes started using EPO and anabolic steroids, an act that quickly spread to developing countries, including Kenya. As early as 1980s, athletes from developed countries started manipulation of blood to enhance performance (Plumb et, al., 2018; Schwartz, 2013).

Use of food supplements by athletes was seen as safe and its use increased tremendously. Unfortunately, athletes using food supplements were at risk of testing positive for PES due to contamination (Pipe & Ayotte, 2002). Some athletes turned to using traditional herbs, which were perceived as natural, hence safe. However, traditional herbs have been proven to contain harmful substances that may be detrimental to the health of the athlete and may also jeopardize their career in sports (Mulungwa & Holtzhansen, 2015).

Most countries in Africa and more so, Ethiopia, South Africa, Nigeria, and Kenya, perform exceptionally well in sports. Testing positive for PES by athletes has been viewed as tainting the image of the country (Louw et al., 2010). There are several factors that have led to athletes from the continent of Africa to use PES. They include: lack of legal backing, poor governance, political instability and systems that support the fight against use of PES (Soita, 2017); advancement in sports competition (Mwisukha et al., 2003); lack of anti – doping control mechanisms (Okum et al., 2017); lack of inadequate knowledge on use of PES (Kamenju et al., 2016); young athletes emulating the older ones to improve performance (Labotz & Gnesemer, 2016); external and internal pressure which influence beliefs and attitudes of athletes (Krumie, 2014, Yusko et al., 2011); and economic gains (Johnson et al., 2010), Kamenju, 2014).

According to Lucidi et al. 2008), Lentillon – Kaestner and Carstairs, (2010) and Chan et al. (2015), attitudes and beliefs significantly influenced the decision to use PES, and that athletes with positive attitudes were able to downplay peer pressure geared towards use of PES. Several studies have been carried out among athletes from developed countries indicating factors influencing use of PES by athletes, but the few studies carried out in Kenya have not exhaustively discussed such factors.

Several studies have been carried out on attitudes and beliefs of athletes mainly from track and field events, and to a lesser extent ball games. However, none has been carried out on combat sports like boxing and wrestling or muscle building sports like bodybuilding.

From the different studies reviewed, it is justifiable to conclude that there is high prevalence of doping in several sports disciplines (Johnson & Peters 2014; Werner & Hatton, 2010; Dandoy & Gereige, 2012; Mayo Clinic Staff, 2020). However, these studies did not evaluate prevalence levels of doping among sports disciplines such as boxing, wrestling and bodybuilding.

Traditional herbs and food supplements are commonly used as PES mainly to quicken the healing process for injured athletes (Chen et al., 2012; Sirico et al., 2018; Dwyer et al., 2018; Sellami et al., 2018;). Combative sports like boxing and wrestling are susceptible to injuries, hence at risk of using PES for faster recovery. This study, therefore, focused on investigating the use of food supplements, traditional herbs, PES and methods among athletes from boxing, wrestling, and bodybuilding sports disciplines in Kenya.

CHAPTER THREE: METHODOLOGY

3.1 Research Design

The research used cross-sectional analytical study design. This design was suitable because it allows comparison of many different variables from a population at specific point in time. (Cherry, 2019). According to Setia (2016), this study allows the researcher to measure outcomes and exposure, whereas selection of participants is based on inclusion and exclusion criteria. This design was found to be more appropriate because according to Kesmodel (2018), it is more relevant when assessing the prevalence of variables such as attitudes, beliefs, and knowledge of participants. It was effective for measuring many variables without escalating cost and could be done within a short duration (Weiss et al., 2003). Weiss et al. (2003) further states that this research design was the best in creating a typical image of the characteristics and attitudes of people, which was part of the objectives of this study.

3.2 Study Variables

Independent variables included gender, age, and sports discipline (bodybuilding, wrestling, or boxing). Dependent variables included knowledge levels, attitudes, possible sources, beliefs, and factors influencing the use of PES and methods in relation to age, gender, and sports discipline. Knowledge levels on use of PES, FS and TH was measured using a fourteen (14) - item questionnaire. Attitudes were assessed through a set of thirteen (13) questions while beliefs were assessed using twelve (12) questions on the questionnaire. Respondents were provided with six (6) questions, each with several options as sources of

providing information. To assess if there was any use or practice on PES, FS, and TH by the respondents, a set of nine (9) questions on use was presented. Structured and unstructured questions were used to assess factors influencing use of PES, FS and TH. A 3-point Likert scale was used to test knowledge levels, ranging from 'true', 'false' or 'don't know', while a 6- point Likert scale was employed to measure attitudes and beliefs, with options ranging from (1) 'strongly disagree' to (6) 'strongly agree', for the different sections of assessment.

3.3 Location of the Study

The research took place in selected counties which were actively involved in the sports of boxing, wrestling, and bodybuilding, as guided by officials of the said sports disciplines. They included Nairobi, Baringo, Bungoma, Busia, Elgeyo-Marakwet, Kakamega, Kericho, Kiambu, Kilifi, Kisumu, Meru, Mombasa, Nakuru, Trans-Nzoia and Uasin-Gishu. Top clubs that participate at the national level in their respective sport were picked for the study. The diverse counties were expected to provide the researcher with athletes from diverse backgrounds whose opinions were likely to be unique, hence a rich source for information for the study.

3.4 Target Population

The study targeted 1900 respondents, in line with the total number of active athletes registered by boxing, wrestling, and bodybuilding, in their respective top clubs that participated during national competitions. These included 806 boxers from 53 national clubs spread out across the 15 counties. Nairobi, Kisumu, and Mombasa had the highest

number of top clubs, whereas other counties had one club each. Bodybuilding had a total of 836 respondents from 60 top clubs that competed at the national competitions, while wrestling had 262 subjects from 30 top clubs competing in their national competitions, spread out in the 15 counties. Again Nairobi, Kisumu and Mombasa had the highest number of clubs for these sports disciplines as well.

3.5 Sampling Technique and Sample Size

The study utilized stratified sampling technique to sample male and female athletes from the identified top clubs competing at national competitions, for the three sports disciplines respectively. This ensured that only active athletes were selected to participate in the study. Random sampling was then applied to give an equal opportunity to all subjects to participate in the study.

The sample size was determined using Yamane (1967) formula, which sets p value at 0.5 and confidence level at 95% with levels of precision ranging from $\pm 5\%$, $\pm 7\%$ and $\pm 10\%$ as represented in the following equation:

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

Where N is the population size

n is the sample size,

e is the level of precision.

Taking the target population to be 1900 respondents with a 0.5 level of precision, the sample size for the study was 331 as calculated below:

$$n = \frac{1900}{1 + 1900(0.05)^2} = 331$$

To mitigate on non-response, Nilima (2017) formula was used where:

Anticipated non-response rate is 20%, hence,

Final sample = Effective sample / (1- non-response rate anticipated).

$$\text{Final sample} = 331 / (1-20\%) = 331/0.8$$

$$= 3310/8 = 413.$$

Table 3.1 Illustrates the Sample Proportions Per Sport Discipline.

Table 3.1

Sample Size

S. no.	Sport Discipline	Respondents	Sample Size	Percentage
1	Boxing	802	174	42.2
2	Wrestling	262	57	13.8
3	Bodybuilding	836	182	44
	Total	1900	413	100

3.6 Research Instruments

Questionnaire was the research instrument used for data collection. The questionnaire contained a total of fifty-four (54) questions, with majority of the questions being closed-ended and a few open-ended, providing an opportunity to the respondents to indicate personal opinions. The questionnaire was administered to the respondents by the researcher and six (6) research assistants. The questionnaire was divided into different sections that addressed the objectives of the study such as, access to anti-doping education, knowledge on the concept of doping and how the substances are used, athletes' practices and beliefs about substances, traditional herbs, food supplements, performance enhancing substances and methods. The researcher adapted the questionnaire from a social package developed by WADA (WADA, 2012). Furthermore, the researcher incorporated Petroczi (2007) Performance Enhancement Attitude Scale (PEAS) in measuring the attitudes of athletes in boxing, wrestling, and bodybuilding towards doping and the methods involved. The measure of attitudes was based on a 6 - point Likert scale with points anchored from strongly disagree (1) to strongly agree (6).

3.7 Pre-Testing

The researcher undertook pretesting of the tools to test their effectiveness in collecting the required information before going to the field for actual data collection. The respondents were not informed about the nature of the study but was carried out in a manner that portrayed it to be the actual study. The purpose of the pretest was to enable the researcher to identify potential issues such as questions that were not very clear and required to be restructured to capture the spirit of the study. This was addressed before the main data was

collected. Six (6) research assistants with a background of Bachelor of Science, and research experience as an added advantage, were recruited and underwent a three (3)-day training from 11th to 13th March 2020, at a private hotel at KCA (Kipevu Restaurant), to familiarize with the questionnaire as well as the Open Data Kit (ODK), a software which was downloaded on tablets used to collect information. They were also involved in a one-day pretest of the instrument and the software on 14th March 2020, by collecting data from athletes that were individually training at Kasarani Stadium.

3.7.1 Validity and Reliability of Research Instruments

The researcher subjected the research instruments to a rigorous validation process, to ensure that the modification of the instrument retained the intended meaning and spirit of the original questions. Validation began with consulting the supervisors for scrutiny to ascertain their ability to collect information required to cover the research objectives based on Konthari (2009) arguments. Adjustments were made based on the suggestions given by the supervisors. Editions were carried out where statements were not clear, while omissions were incorporated to ensure clarity and relevance.

The second stage was the pretest to check for issues such as clarity of the questionnaire items and their appropriateness for the study. SPSS Cronbach Alpha was used to test reliability of the tool for different scales. The results for the three scales were all above recommended threshold of 0.7, indicating that the tool was reliable. Table 3.2 displays the results of Cronbach for the three scales.

Table 3.2
Cronbach Alpha Reliability Analysis

S. no.	Scale	Cronbach Alpha
1	Knowledge	0.872
2	Attitude	0.853
3	Beliefs	0.922

3.8 Data Collection Procedures

With support from trained research assistants, the researcher visited respondents from top national clubs during training or competition sessions, to administer the questionnaire. The head of the camp was sought and courteously requested to allow athletes to participate by answering questions read to them as set in the questionnaire. Once granted consent to carry on, the research assistants and the researcher randomly selected respondents, ensuring gender inclusivity. Respondents were informed of the use of Open Data Kit (ODK) for data collection. Respondents that accepted to be involved signed the consent form and were taken through the research objectives of the study as well as the questionnaire. Once the application of the questionnaire was completed, the respondents were thanked for their help and cooperation.

3.9 Data Analysis and Presentation

Collected data was uploaded to the server of the ODK, which was subjected to daily scrutiny, after which it was downloaded and analyzed using SPSS version 25. Descriptive

statistics such as standard deviations, frequencies, means, percentages, and associated measures were used in summarizing the data. The researcher used One Way Analysis of Variance (ANOVA) to test the research hypothesis by comparing the mean scores on knowledge, beliefs, attitudes and use of PES and methods at 0.5 level of significance. Hypothesis on gender and continuous variables were tested using t-test. Where significant differences were found, post hoc analysis was carried out using Duncan Multiple Range Test. Pearson correlation coefficient was used to test for any association between experience, attitudes, beliefs, knowledge levels, use of PES and methods among the respondents. Multiple regression analysis was used to predict whether stated factors had any influence on use of PES and methods among the respondents.

The study used quantitative and qualitative techniques. Textual data was analyzed through qualitative approach and represented the views of boxers, wrestlers, and bodybuilders about use of PES and methods in relation to the demographic variables. Numeric data, on the other hand, was obtained by use of quantitative techniques. This data was used to analyze levels of knowledge, attitudes, possible sources, beliefs, and factors influencing the use of PES and methods, of boxers, wrestlers, and bodybuilders, in relation to the demographic variables.

3.10 Ethical and Logistical Consideration

Before collecting data, the researcher sought clearance and permission from Kenyatta University Graduate School to carry out the research. Kenyatta University Ethical Review Committee (KUREC) reviewed the application for research and approved the same. National Commission for Science, Technology, and Innovation (NACOSTI) was sought

for approval to collect data from the selected sports disciplines through which they did through a formal letter. To maintain anonymity and confidentiality, respondents were not required to indicate their names on the questionnaire. The respondents who agreed to participate in the study signed the informed consent form before taking part in the study. Fairness in selection of respondents was observed by the fact that counties with top players from the three sports disciplines were involved in the study.

CHAPTER FOUR: FINDINGS

4.1 Findings of the Study

This chapter presents the findings of the study whose main purpose was to determine knowledge, attitudes, beliefs and practices of boxers, wrestlers, and bodybuilders toward use of performance-enhancing substances and methods in Kenya. The actual number of respondents who gave their consent to participate in the study totaled to 384. The breakdown of these respondents per sports discipline is as shown in Table 4.1.

Table 4.1
Number of Respondents Sampled for the Study

S No.	Sport	Athletes that consented
1	Boxing	162
2	Wrestling	53
3	Body building	169
Total		384

4.2 Demographic Characteristics of Respondents

The demographic characteristics under study included age, gender, and the category of sport.

4.2.1 Gender of the Respondents

The findings of the study indicated that more male (314, 81.8%) participated in the study as compared to the female (70, 18.2%) respondents. Figure 4.1 indicates the percentages of each gender of respondents from the three sports categories.

Figure 4.1
Gender of participants

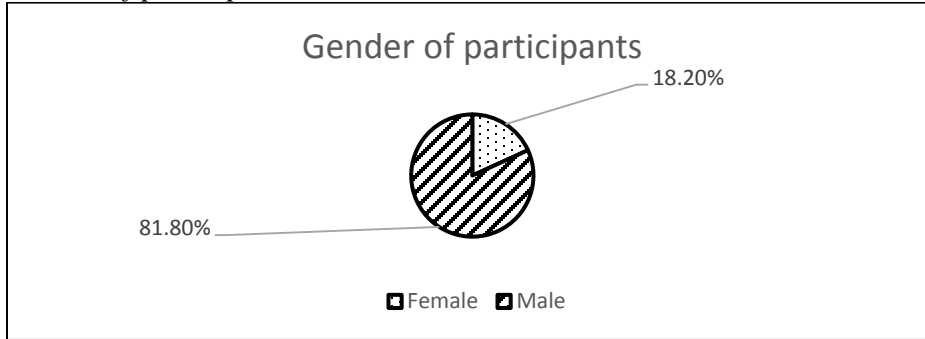


Figure 4.1 indicates gender distribution per discipline. Boxing registered the highest number of female participants (38, 23.5%) while wrestling registered the lowest (7, 13.2%). The three sports disciplines had a relatively high number of male participants. In addition, the study analyzed gender of the respondents in relation to sports discipline and the results are presented in table 4.2.

Table 4.2
Distribution of Gender per Sports Discipline

Sports Discipline	Totals	Gender	%
Boxing	n = 162	Female (38)	23.5%
		Male (124)	76.5%
Wrestling	n = 53	Female (7)	13.2%
		Male (46)	86.8%
Bodybuilding	n = 169	Female (25)	14.8%
		Male (144)	85.2%

4.2.2 Age Category of the Respondents

The participants' age ranged from 18 to 54 years with a median age of 25 years. The mean age was 26.8 ± 4.1 and their distribution per discipline is presented in table 4.3.

Table 4.3
Age Distribution per sports Discipline

Sports Discipline	Totals	Mean Age	SD
Boxing	n = 162	25.77	3.709
Wrestling	n = 53	25.79	2.727
Bodybuilding	n = 169	28.68	3.649

Table 4.4 shows the different age categories of the respondents. The findings indicated that most of the respondents were in the age category of 21-30 years (323, 84.1%), followed by those aged between 31- 40 years (56, 14.6%).

Table 4.4
Age Distribution of Participants

Age Category in years	Number of respondents	Percentage
10 - 20	4	1%
21 - 30	323	84.1%
31 - 40	56	14.6%
41 - 50	1	0.3%
Total	384	100%

4.2.3 Experience in Years of Participation

The number of years an athlete has participated in any sports is important in that the longer the experience the more the exposure to risks of doping. Wrestlers reported the highest number of years of experience. A total of 181 (47.1%) respondents had between 6 – 10 years of experience while 166 (43.3%) respondents had 1-5 years of experience. Only one (1) respondent was highly experienced with 21-25 years of experience. A total of 4 (1.0%)

respondents had an experience of between 16-20 years. Table 4.5 shows different levels of experience in years that respondents had in their sports discipline.

Table 4.5
Experience in Participation

Experience in years	No. of Respondents	%
1 - 5	166	43.3%
6 - 10	181	47.1%
16-20	4	1.0%
21-25	1	0.3%

4.2.4 Distribution of the Participants per Sports Discipline

Out of the sample of 384 respondents, Bodybuilding had the highest number of participants at 169 (44.0%) followed by Boxing with 162 (42.2%) and wrestling with 53 (13.8%) participants. Table 4.6 shows the different percentages of participants, reflecting the number of respondents from each sports discipline.

Table 4.6
Participants in Percentage per Sports Discipline

Sports Discipline	Totals	%
Boxing	n = 162	42.2
Bodybuilding	n = 169	44.0
Wrestling	n = 53	13.8

4.3 Determination of Knowledge Levels on the Use of Performance Enhancing Substances and Methods among the Athletes

Some Kenyan athletes have tested positive for prohibited substances (African News Agency, 2019). The study also sought to find out if Kenyan athletes were aware that testing positive for either performance enhancing substances or methods, could lead to sanctioning for an Anti-Doping Rule Violation (ADRV). Athletes are bound by the Principle of Strict Liability for what they ingest, inject, or apply (WADC) and therefore cannot apportion blame to any institution or support personnel if they tested positive for a prohibited substance. The knowledge level of the participants on acquisition, safety, declared information on label, consequences of testing positive, advice provided by different personalities on food supplements, traditional herbs and PES and methods, was examined using a set of 16 questions. To get the aggregate knowledge levels, the correct answers were labelled 1, incorrect ones labeled 0, and those who did not know were also labeled 0. The aggregate of the 16 questions created a composite variable which was labeled as the knowledge score.

4.3.1 Knowledge Levels on the Safety of Food Supplements

In this study 189 (49.2%) of the respondents, indicated that ADAK would know safe food supplements, while 126 (32.8%) indicated the contrary. However, 69 (18.0%) respondents did not know whether ADAK could tell or not. Majority of the boxers (77, 47.5%) indicated as true that ADAK can tell which food supplement was safe to use, while 31 (58.5%) wrestlers, which was more than half of their total number, indicated it as false. Most of the body builders (95, 56.2%) indicated as true, that ADAK can tell them which food

supplement was safe to use. In overall, those that answered this question correctly were 126 (32.8%). Among the wrestlers, 58.5% answered this question correctly. However, a higher percentage of bodybuilders (56.2%) and boxers (47.5%) answered it incorrectly meaning that they indicated that ADAK can tell them which FS was safe to use. Table 4.7 shows the views of respondents on whether ADAK can tell them which food supplement is safe to use.

Table 4.7
Anti-Doping Agency of Kenya can Tell which FS is Safe to Use

	n	True	False	Do not Know	Correct
Boxing	162	77 (47.5%)	59 (36.4%)	26 (16.0%)	36.4%
Wrestling	53	17 (32.1%)	31 (58.5%)	5 (9.4%)	58.5%
Bodybuilding	169	95(56.2%)	36 (21.3%)	38 (22.5%)	21.3%
Total	384	189 (49.2%)	126 (32.8%)	69 (18.0%)	32.8%

4.3.2 Safety of Food Supplements Bought Over the Counter

Many respondents (302, 78.6%) answered as false that food supplements acquired from a pharmacy or over the counter, were harmless to an athlete. Those who indicated it was safe to do so were 47 (12.2%). Majority of the respondents, wrestlers (49, 92.5%), boxers (125, 77.2%), and body builders (128, 75.7%) indicated correctly that food supplements purchased from the drugstore or over the counter (OTC) may not be safe for an athlete to use as shown in table 4.8.

Table 4.8
Food Supplement Bought Over The Counter is Safe to Use

	n	True	False	Do not Know	Correct
Boxing	162	22 (13.6%)	125 (77.2%)	15 (9.3%)	77.2%
Wrestling	53	3 (5.7%)	49 (92.5%),	1 (1.9%)	92.5%
Bodybuilding	169	22 (13.0%)	128 (75.7%)	19 (11.2%)	75.7%
Total	384	47 (12.2%)	302 (78.6%)	35 (9.1%)	78.6%

4.3.3 Declaration of Prohibited Substances in Food Supplements by the Manufacturers

Majority of the respondents (340, 88.5%) indicated as false that a food supplement that contained a PES will always declare it on the sticker, which was the correct answer. On the other hand, 23 (6.0%) indicated it as true, while 21 (5.5%) did not know whether it was true or false. Among boxers, 147 (90.7%) indicated correctly that a food supplement that contained a prohibited substance will not declare it on the label, with 52 (94.3%) of the wrestlers and 143 (84.6%) body builders also indicated it correctly. In overall, more than three quarters of the respondents (340, 88.5%) answered the question correctly shown in table 4.9.

Table 4.9
Prohibited Substance will be Declared on the Label of Food Supplements.

	n	True	False	Do not Know	Correct
Boxing	162	7 (4.3%)	147 (90.7%)	8 (4.9%)	90.7%
Wrestling	53	2 (3.8%)	50 (94.3%)	1 (1.9%)	94.3%
Bodybuilding	169	14 (8.3%)	143 (84.6%)	12 (7.1%)	84.6%
Total	384	23 (6.0%)	340 (88.5%)	21 (5.5%)	88.5%

4.3.4 Sanctioning of an Athlete for Testing Positive for a Prohibited Substance

On whether an athlete can be sanctioned for testing positive for a prohibited substance after taking a food supplement that they thought was safe, 342 (89.1%) respondents said that this was true. However, 12 (3.1%) respondents indicated it as false implying that an athlete cannot be sanctioned for testing positive after taking a food supplement thought to be safe, compared to 30 (7.8%) who were not aware of the correct answer. A high number of respondents from individual sports discipline indicated correctly that an athlete can be sanctioned for testing positive after taking a food supplement which they thought was safe to use as follows: 145 (89.5%) boxers, 52 (98.1%) wrestlers and 145 (85.8%) body builders. This also indicated that the wrestlers were highly knowledgeable at 98.1%, followed by boxers at 89.5% and bodybuilders at 85.8%. Table 4.10 shows the different knowledge levels by respondents on whether an athlete can be sanctioned after testing positive after taking a food supplement which they thought was safe.

Table 4.10*Can an Athlete be Sanctioned for Testing Positive after Use of Food Supplements?*

	n	True	False	Do not Know	Correct
Boxing	162	145 (89.5%)	6 (3.7%)	11 (6.8%)	89.5%
Wrestling	53	52 (98.1%)	1 (1.9%)	0 (0%)	98.1%
Bodybuilding	169	145 (85.8%)	5 (3.0%)	19 (11.2%)	85.8%
Total	384	342 (89.1%)	12 (3.1%)	30 (7.8%)	89.1%

4.3.5 Knowledge Levels on Safety of Traditional Herbs by Athletes

This study sought to find out the knowledge level of Kenyan athletes on safety of using traditional herbs as a form of treatment. A high number of respondents (152, 39.6%), indicated that ADAK could not tell them which traditional herb was safe to use. However, 121 (31.5%) indicated that ADAK was able to advise them which traditional herb was safe to use, while 111 (29.9%) did not know whether this was true or not. Table 4.11 displays the different knowledge levels of the respondents.

Table 4.11*Anti-Doping Agency Kenya can tell which Traditional Herb was safe to use*

	N	True	False	Do not Know	Correct
Boxing	162	63 (38.9%)	64 (39.5%)	35 (21.6%)	39.5%
Wrestling	53	13 (24.5%)	36 (67.9%)	4 (7.4%)	67.2%
Bodybuilding	169	45 (26.6%)	52 (30.8%)	72 (42.6%)	30.8%
Total	384	121 (31.5%)	152 (39.6%)	111 (28.9%)	39.6%

4.3.6 Responses on whether ADAK can advise Athletes on which Traditional Herb to Use

A large proportion of boxers (98, 60.5%) and body builders (117, 69.2%) indicated as true that ADAK can tell them which traditional herb is safe to use. However, most of the

wrestlers (36, 67.9%) indicated it as false that ADAK can tell which traditional herb is safe to use. Many wrestlers (36, 67.9%) correctly said that ADAK cannot tell them which traditional herb was safe to use. However, a high number of boxers (98, 60.5%) and body builders (117, 69.2%) answered this question incorrectly. Out of the sample population of 384, 297 (77.3%) indicated that traditional herbs bought from an herbalist (or over the counter) may not be safe to use. On the other hand, 38 (9.9%) respondents thought that such herbs bought from an herbalist would be safe, while 49 (12.8%) did not have a definite answer. Table 4.12 displays the different knowledge levels by respondents.

Table 4.12

Traditional Herb Bought Over the Counter or from an herbalist is Safe to Use.

	n	True	False	Do not Know	Correct
Boxing	162	24 (14.8%)	124 (76.5%)	14 (8.6%)	76.5%
Wrestling	53	3 (5.7%)	48 (90.6%)	2 (3.8%)	90.6%
Bodybuilding	169	11 (6.5%)	125 (74.0%)	343 (19.5%)	74.0%
Total	384	38 (9.9%)	297 (77.3%)	49 (12.8%)	77.3%

Most of the respondents: [boxers, 124(76.5%), wrestlers, 48(90.6%), and bodybuilders, 125(74.0%)] indicated that a TH purchased from a local herbalist or OTC is not safe for athletes to use. Majority from the three categories of respondents: [boxers (124, 76.5%), wrestlers (48, 90.6%) and body builders (125, 74.0%)] answered correctly that if a TH is bought from a local herbalist or OTC, does not imply that it is harmless.

4.3.7 Coach, Doctor or Physiotherapist can tell if a Traditional Herb Contains Prohibited Substances

Many respondents (299, 77.9%), indicated as false that their coach, team doctor or physiotherapist would know if a traditional herb contained a prohibited substance or not. However, 45 (11.7%) said that these team officials could know if a traditional herb contained a prohibited substance. Those who did not have a definite answer were 40 (10.4%). A high population of boxers (139, 85.8%), wrestlers (45, 84.9%) and body builders (115, 68.0%) believed that a coach, team doctor/physiotherapist would not know if a traditional herb contained a prohibited substance or not. Table 4.13 indicates the different knowledge levels by the respondents.

Table 4.13
A Team Official Can Tell if a Traditional Herb Contains a Prohibited Substance.

	n	True	False	Do not Know	Correct
Boxing	162	13 (8.0%)	139 (85.5%)	10 (6.2%)	85.5%
Wrestling	53	6 (11.3%)	45 (84.9%)	2 (3.8%)	84.9%
Bodybuilding	169	26 (15.4%)	115 (68.0%)	28 (16.6%)	68.0%
Total	384	45 (11.7%)	299 (77.9%)	40 (10.4%)	77.9%

4.3.8 Sanctioning of Athletes for Testing Positive after Use of Traditional Herbs

Majority of the respondents (334, 87.0%), indicated as true that they could be sanctioned if they tested positive after taking a traditional herb that they thought was safe. But 12 (3.1%) of the respondents indicated as false that they can be sanctioned, while 38 (9.9%) were not sure. A higher proportion of boxers (147, 90.7%), wrestlers (50, 94.3%) and body

builders (137, 81.1%) indicated as true that an athlete can be sanctioned if they tested positive after taking a traditional herb which they thought was safe. Majority from the three categories of respondents [boxers (147, 90.7%), wrestlers (50, 94.3%) and body builders (137, 81.1%)] answered correctly that one can be sanctioned for taking a traditional herb that they thought was safe to use. Table 4.14 shows the different opinions from the respondents.

Table 4.14

Can an Athlete be Sanctioned for Testing Positive for a Traditional Herb?

	n	True	False	Do not Know	Correct
Boxing	162	145 (89.5%)	6 (3.7%)	11 (6.8%)	89.5
Wrestling	53	52 (98.1%)	1 (1.9%)	0 (0%)	98.1
Bodybuilding	169	145 (85.8%)	5 (3.0%)	19 (11.2%)	85.8
Total	384	334 (87.0%)	12 (3.1%)	30 (7.8%)	87.0%

4.3.9 Knowledge levels on Performance Enhancing Substances and Methods

Respondents were asked if ADAK can advise them on which performance enhancing substances were safe to use. Those who indicated as true were 172 (44.8%), while those with a contrary opinion were 130 (33.9%) and those who did not know were 82 (21.4%). Majority of the boxers (82, 50.6%) and body builders (73, 43.2%) indicated as true that ADAK can tell them which PES is safe for an athlete to use. However, majority of the wrestlers (32, 60.4%) indicated that this was false. A high percentage of boxers (66.0%) and body builders (74.6%) answered incorrectly that ADAK can tell them what PES is safe to use. But majority of the wrestlers (60.4%) answered this question correctly. Table 4.15 displays the different opinions.

Table 4.15
Anti-Doping Agency of Kenya can Tell Safe PES for Use by an Athlete.

	n	True	False	Do not Know	Correct
Boxing	162	82 (50.6%)	55 (34.0%)	25 (15.4%)	34.0%
Wrestling	53	17 32.1%)	32 60.4%)	4 (7.5%)	60.4%
Bodybuilding	169	73 (43.2%)	43 25.4%)	53 (31.4%)	25.4%
Total	384	172 (44.8%)	130 (33.9%)	82 (21.4%)	33.9%

4.3.10 Safety of Performance Enhancing Substances bought Over the Counter.

Those who thought that a PES bought from a pharmacy (over the counter) was safe were 55(14.3%), with most of the respondents (295, 76.8%) indicating that this was not true. A lower number of respondents (34, 8.9%), were not aware of the correct response. Table 4.16 displays the different opinions.

Table 4.16
PES Bought Over the Counter Would be Safe to Use.

	n	True	False	Do not Know	Correct
Boxing	162	27 (16.7%)	125 (77.2%)	10 (6.2%)	77.2%
Wrestling	53	4 (7.5)	49 (92.5%)	0 (0%)	92.5%
Bodybuilding	169	24 (14.2%)	121 (71.6%)	24 (14.2%)	71.6%
Total	384	55 (14.5%)	295 (76.8%)	34 (8.9%)	76.8%

Majority from the three categories [boxers (125, 77.2 %), wrestlers (49, 92.5%), and body builders (121, 71.6%)] indicated as false that a PES bought from the pharmacy or over the counter was safe. Most of the respondents [boxers (77.2%), wrestlers (92.5%), and body

builders (71.6%)] answered correctly that a PES purchased from a pharmacy or OTC is not necessarily safe for athletes to use.

4.3.11 Coach, Team Doctor or Physiotherapist would know if a Performance Enhancing Substance Contained Prohibited Substances

Respondents that indicated as true that a coach, team doctor or physiotherapist would know if a PES contained a prohibited substance were 54 (14.1%), with 294 (76.6%) indicating a contrary opinion. Those who had no definite answer were 36 (9.4%). Table 4.17 shows the different knowledge levels of the respondents.

Table 4.17
A Team Official Would Know if a PES Contained a Prohibited Substance.

	n	True	False	Do not Know	Correct
Boxing	162	12 (7.4%)	140 (86.4%)	10 (6.2%)	86.4%
Wrestling	53	7 (13.2%)	44 (83.0%)	2 (3.8%)	83.0%
Bodybuilding	169	35 (20.7%)	110 (65.1%)	24 (14.2%)	65.1%
Total	384	54 (14.1%)	294 (76.6%)	36 (9.4%)	76.6%

Majority from the three categories: [boxers (140, 86.4%) wrestlers (44, 83.0%) and body builders (110, 65.1%)] were of the same opinion that a coach/team doctor/physiotherapist would not know whether a PES contained a prohibited substance or not, as such, majority of the athletes answered correctly that a coach, team doctor or physiotherapist would not know if a PES contained a prohibited substance or not.

4.3.12 Sanctioning of Athletes for Testing Positive after using Performance

Enhancing Substances

Respondents that indicated that an athlete can be sanctioned for testing positive after taking a performance enhancing substance which they thought was safe were 346 (90.1%), while 16 (4.2%) indicated as false that they can be sanctioned for such an act, and 22 (5.7%) indicated that they did not know whether they can be sanctioned or not. Table 4.18 reflects these different opinions.

Table 4.18

I Can be Sanctioned for Testing Positive after Taking a PES Thought to be Safe.

	n	True	False	Do not Know	Correct
Boxing	162	147 (90.7%)	7 (4.3%)	8 (4.9%)	90.7%
Wrestling	53	49 (92.5%)	4 (7.5%)	0 (0%)	92.5%
Bodybuilding	169	150 (88.8%)	5 (3.0%)	14 (8.3%)	88.8%
Total	384	346 (90.1%)	16 (4.2%)	22 (5.7%)	90.1%

A high percentage from the three categories: - [boxers, - 147 (90.7%), wrestlers - 49 (92.5%) and body builders 150 (88.8%) indicated as true that one can be sanctioned for testing positive after taking a PES that they thought was safe to use. Hence, they answered correctly that an athlete can be sanctioned if they tested positive after taking a PES that they thought was safe to use (boxers – 90.7%, wrestlers – 92.5%, and body builders – 88.8%).

4.3.13 Boosting Blood Levels can lead to an athlete Testing Positive for Performance

Enhancing Method.

Respondents that indicated as true that boosting blood levels can lead to an athlete testing positive for a performance method were 346 (90.1%), while 12 (3.1%) indicated it as false

that this cannot result to a positive test for a performance method. Those that did not know whether it was true or false were 26 (6.8%). Table 4.19 reflects these different opinions.

Table 4:19

Boosting Blood Levels Can Lead to Testing Positive for a Prohibited Method.

	n	True	False	Do not Know	Correct
Boxing	162	158 (97.5%)	0 (0%)	4 (2.5%)	97.5%
Wrestling	53	53 (100%)	0(0%)	0 (0%)	100%
Bodybuilding	169	135 (79.9%)	12 (7.1%)	22 (13.0%)	79.9%
Total	384	346 (90.1%)	12 (3.1%)	26 (6.8%)	90.1

A large population of respondents: - [boxers, – 158(97.0%), wrestlers, – 53(100.0%) and body builders – 135(79.9%)] were highly knowledgeable that boosting blood levels can lead to athletes testing positive for a prohibited method. Most of the athletes indicated the correct answer that boosting of blood levels can lead to athletes testing positive for prohibited method.

4.3.14 Manipulation of Blood Components is Prohibited in Sports.

Many respondents (354, 92.2%) indicated that in sports, blood components manipulation is prohibited. Those that thought it was not prohibited were 7 (1.8%), while 23 (6.0%) indicated that they did not know. Table 4.20 shows the different opinions by the respondents.

Table 4:20

Manipulation of Blood Components is Prohibited in Sports.

	n	True	False	Do not Know	Correct
Boxing	162	155 (95.7%)	0 (0%)	7 (4.3%)	95.7%
Wrestling	53	53 (100%)	0 (0%)	0 (0%)	100%
Bodybuilding	169	146 (86.4%)	7 (4.1%)	16 (9.5%)	86.4%
Total	384	354 (92.2%)	7 (1.8%)	23 (6.0%)	92.2%

4.3.15 Blood Manipulation can Lead to Infectious Diseases.

Most of the respondents [boxers – 155(95.7%), wrestlers – 53(100%) and body builders – 146(86.4%)] indicated as true that manipulation of blood components in an athlete is prohibited in sports, hence majority from the three sports disciplines answered this question correctly. The findings indicated that 161(99.4%) boxers, 53(100%) wrestlers and 148(87.6%) body builders believed manipulation of blood components can lead to transfer of infectious diseases, hence answering the question correctly.

While a high number of respondents (362, 94.3%) indicated that blood components manipulation can lead to transfer of infections or in worst case scenarios, death, a smaller proportion of respondents (5, 1.3%) indicated it as false, while 17 (4.4%) did not have knowledge on the same. This information is presented in table 4.21.

Table 4:21
Blood Manipulation Can Lead to Transfer of Infectious Diseases.

	n	True	False	Do not Know	Correct
Boxing	162	161 (99.1%)	0 (0%)	1 (0.6%)	99.1%
Wrestling	53	53 (100%)	0 (0%)	0 (0%)	100%
Bodybuilding	169	148 (87.6%)	5 (3.0%)	16 (9.5%)	87.6%
Total	384	362(94.3%)	5 (1.3%)	17 (4.4%)	94.3%

4.3.16 A Doctor, Physician or Paramedical Personnel can be Sanctioned for Helping an Athlete Manipulate Blood Components.

The number of respondents that said it was true that physician, doctor, or paramedical personnel aiding an athlete in blood doping can be banned together with, and if, the

athlete's sample returns a positive test for a prohibited method were 303 (78.9%). However, 37 (9.6%) respondents indicated this as false, while 43 (11.2%) were not sure how the case would be decided. The different opinions by the respondents are demonstrated in table 4.22.

Table 4.22

A Doctor, Physician or Paramedical Personnel can be Sanctioned for Helping an Athlete Manipulate Blood Components.

	n	True	False	Do not Know	Correct
Boxing	162	138 (85.2%)	9 (5.6%)	15 (9.3%)	85.2%
Wrestling	53	51 (96.2%)	0 (0%)	2 (3.8%)	96.2%
Bodybuilding	169	114 (67.5%)	28 (16.6%)	27 (16.0%)	67.5%
Total	384	303 (78.9%)	37 (9.6%)	44 (11.2%)	78.9%

Majority of the respondents (303, 78.9%) exhibited high level of knowledge that a physician or doctor or paramedical personnel aiding an athlete in blood doping can be banned together with, and if, the athlete's sample returns a positive test for a prohibited method. According to 138 (85.2%) boxers, 51 (96.2%) wrestlers and 114 (67.5%) body builders, a physician or doctor or paramedical personnel aiding an athlete in blood doping can be banned together with, and if, the athlete's sample returns a positive test for a prohibited method, the majority from the three sports disciplines answered this question correctly.

4.3.17 Mean knowledge score per sports discipline.

On overall knowledge score, majority of the boxers (139, 85.3%) answered more than ten (10) questions correctly, while 45(83.1%) wrestlers answered correctly more than thirteen

(13) questions, with 68.7% body builders answering ten (10) questions and above correctly. On average 85 (22.1%) respondents scored 13 out of 16 questions on performance enhancing methods correct, while 84 (21.9%) respondents answered all the questions correctly, that is, 16 out of 16 questions. Only 6 (1.6%) respondents scored zero, while most of the respondents (338, 88.0%) scored above 8 out of 16 questions. In general, the mean knowledge score for the three sports disciplines regarding the use of traditional herbs, food supplements, PES and methods was 14.06 for wrestlers, 12.52 for boxers and 10.93 for body builders, as shown by table 4.23.

Table 4.23
Mean knowledge score Per Sports Discipline.

	n	% of Respondents	Correct Answers/16 Questions	Mean Score
Boxing	162	139 (85.3%)	10	12.52
Wrestling	53	45 (83.1%)	13	14.06
Bodybuilding	169	117 (68.7%)	10	10.93
Total	384	301 (78.1%)	33	12.50

4.3.18 Significance of Knowledge Levels on PES and Methods among Athletes from the three Sports Disciplines.

It was hypothesized that there would be no significant difference in the knowledge levels on PES and methods among athletes from the three sports disciplines. To determine if the differences were significant, One Way ANOVA was carried out and results are shown in table 4.24.

Table 4.24

One-way ANOVA to Test Significance Difference between means of Athletes on Knowledge level on PES and Methods across the three Sports Disciplines.

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	459.974	2	229.987	19.631	.000
Within Groups	4463.515	381	11.715		
Total	4923.490	383			

Results in Table 4.24 reflect a significant difference on knowledge levels of athletes across the three sports disciplines whereby $F(2,381) = 19.631, p < 0.001$.

To determine which means were significantly different, post hoc analysis using Duncan Multiple Range Test (DMRT), was carried out and results were as demonstrated in table 4.25.

Table 4.25

Knowledge Levels on use of PES and Methods by Athletes from the three Sports Disciplines.

No	Sports Discipline	N	Mean/14	SD
1	Body Building	169	10.93 ^a	3.94
2	Boxing	162	12.52 ^b	3.11
3	Wrestling	53	14.06 ^c	2.41

Means with different superscript implied that they were significantly different.

Results in table 4.25 showed that athletes from wrestling had the highest knowledge (M=14.06 SD = 2.41), followed by boxing (M=12.52, SD=3.11), and bodybuilders (M=10.93, SD = 3.94).

Wrestlers were more knowledgeable on issues of food supplements, traditional herbs, PES, and methods, followed by boxers and bodybuilders with the lowest knowledge score. Knowledge score for each category was significantly different from each other. Therefore,

the null hypothesis that there would be no significant difference on knowledge levels on PES and methods among boxers, bodybuilders and wrestlers was rejected.

4.4 Assessment of Attitudes of the Respondents

According to Zucchetti, Candela and Villosio (2015), though less is known about factors that sustain the level of athletes' attitudes towards doping, their disposition and attitude towards doping is one of the factors that contribute to doping behavior. In their study they concluded that athletes who have an excessive perfectionism, extrinsically motivated and have contact with doping users have a positive attitude towards doping and should be considered at risk of doping. The researcher therefore sought to assess the attitude of boxers, wrestlers, and body builders towards use of FS, TH, PES, and methods, which can lead to doping or inadvertent doping.

4.4.1 Food Supplements are Necessary in Sports Competition

Respondents were asked whether food supplements are necessary in competitive sport. Majority of them (261, 68.0%) disagreed that food supplements were necessary in competitive sports, while 122 (31.8%) agreed with the statement. Only 1 (0.3%) respondent did not know what to say about it. Those who disagreed (261, 68.0%) demonstrated the positive attitude towards food supplements. Table 4.26 displays the different attitudes.

Table 4:26
Food Supplements are Necessary in Competitive Sports.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	125 (77.2%)	36 (22.2%)	1 (0.6)	77.2%
Wrestling	53	46 (86.8%)	7 (13.2%)	0 (0%)	86.8%
Bodybuilding	169	90 (53.3%)	79 (46.7%)	0 (0%)	53.3%
Total	384	261 (68.0%)	122	1 (0.3%)	68.0%
			(31.8%)		

Most of the respondents from individual sports disciplines agreed that food supplements are not necessary in competitive sports as follows; 125 boxers (77.2%), 46 wrestlers (86.8%) and 90 body builders (53.3%).

4.4.2 Food Supplementation is not Cheating since Everyone Does it.

Majority of the respondents (294, 76.6%), disagreed that food supplementation is not cheating since everyone does it. However, 86 (22.4%) respondents agreed that use of food supplements is not a form of cheating, while 4 (1.0%) respondents did not have a definite answer. The right attitude was demonstrated by most of the respondents (294, 76.6%) who disagreed with the statement that food supplementation is not cheating since everyone does it. The different attitudes are demonstrated in table 4.27.

Table 4.27
Food Supplementation is not Cheating Since Everyone Does It.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	144 (88.9%)	15 (9.3%)	3 (1.9%)	88.9%
Wrestling	53	48 (90.6%)	4 (7.5%)	1 (1.9%)	90.6%
Bodybuilding	169	102 (60.4%)	67 (39.6%)	0 (0%)	60.4%
Total	384	294 (76.6%)	86 (22.4%)	4 (1.0%)	76.6%

Most boxers (144, 88.9%), wrestlers (48, 90.6%) and body builders (102, 60.4%) disagreed with the statement that using food supplements is not cheating since everyone does it.

4.4.3 Athletes Often Lose Time Due to Injuries and FS can Help Make up Lost Time.

Those who disagreed with the statement that athletes with injuries lose time and use of food supplements can help make up the lost time were 275 (71.6%) respondents, hence demonstrating the positive attitude. Those who agreed with the statement were 109 (28.4%), with no one choosing 'I don't know'. Table 4.28 reflects the different attitudes.

Table 4.28
Food Supplements can Help Make Up for Lost Time.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	133 (82.1%)	29 17.9	0 (0%)	82.1%
Wrestling	53	49 (92.5%)	4 (7.5%)	0 (0%)	92.5%
Bodybuilding	169	93 (55.0%)	76 (45.0%)	0 (0%)	55.0%
Total	384	275 (71.6%)	109 (28.4%)	0 (0%)	71.6%

Majority of the boxers (133, 82.1%), wrestlers (49, 92.4%) and body builders (93, 56.1%) disagreed that food supplements can help in making up for lost time of an athlete in case of injuries.

4.4.4 Only Quality Performance Should Matter, not the way its Achieved.

Majority of the respondents (330, 85.9%) disagreed that only quality of performance should matter, not the way athletes achieve it. Those who agreed were 53 (13.8%)

respondents, while 1 (0.3%) did not know what to say. The majority (330, 85.9%) demonstrated positive attitude. These attitudes are seen in table 4.29.

Table 4.29
Only the Quality of Performance Should Matter.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	154 (95.1%)	7 (4.3%)	1 (0.6%)	95.1%
Wrestling	53	53 (100%)	0 (0%)	0 (0%)	100%
Bodybuilding	169	123 (72.8%)	123 (72.8%)	0 (0%)	72.8%
Total	384	330 (85.9%)	53 (13.8%)	1 (0.3%)	85.9%

All the wrestlers (53, 100%), 154 (95.1%) boxers and 123 (72.8%) body builders disagreed with the statement that only excellence in performance should be important and not the way athletes attain it.

4.4.5 Use of Recreational Drugs can help in Sports Situations.

Many respondents (240, 62.5%) demonstrated the positive attitude by disagreeing that use of recreational drugs by athletes helps them in sports situations. But 134 (34.9%) agreed with the statement, while 10 (2.6%) respondents did not know what to say about it. Most boxers (111, 68.5%), wrestlers (42, 79.3%) and body builders (87, 51.5%) disagreed that athletes who use recreational drugs take them for assistance in sports circumstances. Table 4.30 reflects these attitudes.

Table 4.30
Recreational Drugs Help in Sports Situations.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	111 (68.5%),	44 (27.2%)	7 (4.3%)	68.5%
Wrestling	53	42 (79.3%)	11 (20.8%)	0 (0%)	79.3%
Bodybuilding	169	87 (51.5%)	79 (46.7%)	3 (1.8%)	51.5%
Total	384	240 (62.5%)	134 (34.9%)	10 (2.6%)	62.5%

4.4.6 Athletes Should not Feel Guilty about Taking PES

According to table 4:30, 337 (87.8%) of the respondents, athletes should have a guilty conscience about going against the rules and using PES. However, 46 (12.0%) respondents had the wrong attitude that athletes should not have a guilty conscience about going against the rules and using PES. Only 1(0.3%) did not know what to say. Almost all the wrestlers (52, 98.1%) and majority of boxers (153, 94.4%) and body builders (132, 78.1%) disagreed that athletes should not feel guilty about breaking the rules and taking PES. The different attitudes are demonstrated in table 4.31.

Table 4.31
Athletes Should not Feel Guilty about Taking PES.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	153 (94.4%)	8 (4.9%)	1 (0.6%)	94.4%
Wrestling	53	52 (98.1%)	1 (1.9%)	0 (0%)	98.1%
Bodybuilding	169	132 (78.1%)	37 (21.9%)	0 (0%)	78.1%
Total	384	337 (87.8%)	46 (12.0%)	1(0.3%)	87.8%

4.4.7 TH and FS are Unavoidable Part of Competitive Sports

Majority of the respondents (333, 86.7%) demonstrated a positive attitude by disagreeing that traditional herbs and food supplements are an unavoidable part of competitive sport. Those who supported this statement were 51 (13.3%) respondents. Majority of the boxers (146, 91.3%), wrestlers (53, 100%) and body builders (134, 79.3%) disagreed that traditional herbs and food supplements are an unavoidable part of competitive sport. Table 4.32 reflects the different attitudes by the respondents.

Table 4.32
Traditional Herbs and Food Supplements are Unavoidable.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	146 (91.3%),	16 (9.9%)	0 (0%)	91.3%
Wrestling	53	53 (100%)	0 (0%)	0 (0%)	100%
Bodybuilding	169	134 (79.3%)	35 (20.7%)	0 (0%)	79.3%
Total	384	333 (86.7%)	51 (13.3%)	0 (0%)	86.7%

4.4.8 Athletes are Pressured to Take PES

A total of 236 (61.5%) respondents disagreed that athletes are pressured to take performance enhancing substances, which was a positive attitude, because athletes that belief are pressured means they will take anything given to them by their coach. But those with contrary attitude will be in a position to question anything given to them by anyone. However, 141 (36.7%) respondents supported the statement, while 7 (1.8%) respondents did not know what to say about it. Many boxers (108, 66.7%), wrestlers 29, 54.7%) and body builders (99, 58.6%) disagreed that athletes are pressured to take performance enhancing substances. These attitudes are demonstrated in table 4.33.

Table 4.33
Athletes are Pressured to Take PES.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	108 (66.7%)	48 (29.6%)	6 (3.7%)	66.7%
Wrestling	53	29 (54.7%)	24 (45.3%)	0 (0%)	54.7%
Bodybuilding	169	99 (58.6%)	69 (40.8%)	1 (0.6%)	58.6%
Total	384	236 (61.5%)	141 (36.7%)	7 (1.8%)	61.5%

4.4.9 There are Risks Related to Use of FS

Majority of the respondents (315, 82.0%) agreed that there are risks related to use of food supplements in sports. Such are considered to have positive attitudes in that if they are view

food supplements as carrying risks, then they will most likely avoid them. Those who disagreed with the statement were 69 (18.0%) respondents. Those with positive attitude were 315 (82.0%). Many boxers (139, 85.8%), wrestlers (44, 83.0%) and body builders (132, 77.9%) agreed that there are risks related to the use of supplements in sports. These attitudes are demonstrated in table 4.34.

Table 4.34
There are Risks Related to Use of FS.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	23 (14.2%)	139 (85.8%)	0 (0%)	85.8%
Wrestling	53	9 (17.0%)	44 (83.0%)		83.0%
Bodybuilding	169	37 (21.9%)	132 (78.1%)	0 (0%)	78.1%
Total	384	69 (18.0%)	315 (82.0%)	0 (0%)	82.0%

4.4.10 Athletes Have No Career Alternatives.

Many respondents (368, 95.8%) disagreed that athletes have no alternative career choices except sports, which was a positive attitude. Athletes that look at sports as the only career alternative risk doing anything to excel in it, hence a negative attitude. Those who supported the statement were 16 (4.2%) respondents demonstrating positive attitude. All the wrestlers (53, 100%) and a high number of boxers (155, 95.7%) and body builders (160, 95.7%) disagreed that athletes have no alternative career choices except sports. Table 4.35 reflects the different attitudes.

Table 4.35
Athletes have no Alternative Career Choices.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	155 (95.7%)	7 (4.3%)	0 (0%)	95.7%
Wrestling	53	53 (100%)	0 (0%)	0 (0%)	100%
Bodybuilding	169	160 (95.7%)	9 (5.3%)	0 (0%)	95.7%
Total	384	368 (95.8%)	16 (3.9%)	0 (0%)	95.8%

4.4.11 PES, FS and TH should be Legalized.

Majority of the respondents (313, 81.5%) disagreed that performance enhancing substances and food supplements should be legalized, which was a positive attitude. Athletes desiring legalization of food supplements imply that they uphold use of food supplements which is against the spirit of sports. Those that supported the statement were 62 (16.4%) respondents, while 9 (2.3%) did not know what to say. Analysis on individual sports discipline revealed that majority of boxers (143, 88.3%), wrestlers (49, 92.5%) and bodybuilders (130, 76.9%) disagreed that performance-enhancing substances, traditional herbs, and food supplements should be legalized. Table 4.36 displays the different attitudes.

Table 4.36
PES, TH and FS should be legalized.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	139 (85.8%)	19 (11.7%)	4 (2.5%)	85.8%
Wrestling	53	48 (90.6%)	4 (7.5%)	1 (1.9%)	90.6%
Bodybuilding	169	126 (74.6%)	39 (23.1%)	4 (2.4%)	74.6%
Total	384	313 (81.5%)	62 (16.4%)	9 (2.3%)	81.5%

4.4.12 TH and FS Help to Overcome Bored During Training

According to 325 (84.6%) respondents, traditional herbs and food supplements do not help to overcome boredom during training, which demonstrated a positive attitude. If athletes consider use of food supplements and traditional herbs as a way of overcoming boredom, this is an attitude that lead them to consume these substances for leisure. However, 47 (12.2%) respondents thought it does, while 12 (3.1%) did not know what to say about it. All the wrestlers (53, 100%) and majority of boxers (139, 85.8%) and body builders (133, 78.8%) disagreed that traditional herbs and food supplements help to overcome boredom during training. Table 4. 37 reflects these different attitudes.

Table 4.37
TH and FS Help Overcome Bored During Training

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	139 (85.8%)	16 (9.9%)	7 (4.3%)	85.8%
Wrestling	53	53 (100%)	0 (0%)	0 (0%)	100%
Bodybuilding	169	133 (78.8%)	31 (18.3%)	5 (3,0%)	78.8%
Total	384	325 (84.6%)	47 (12.2%)	12 (3.1%)	84.6%

4.4.13 There is no Difference between PES, Fiber-Glass Poles, and Swimsuit

Majority of the respondents (241, 62.8%) disagreed that there is no difference between PES, speedy swimsuits, and fiber glass poles that are all used to improve performance. On the other hand, 53 (13.8%) agreed with the statement reflecting positive attitude. Anything that an athlete may want to use other than hard training, to improve performance, it's an attitude that can lead to use of PES. Those who had no answer were 90 (23.4%). A high number of body builders (116, 53.9%) agreed that there is no difference between PES,

fiberglass poles and speedy swimsuits that are used to enhance performance. However, boxers (121, 74.6%) and wrestlers (40, 75.4%) disagreed that there is no difference between PES, fiberglass poles and speedy swimsuits that are all used to enhance performance. These attitudes are reflected in table 4.38.

Table 4.38

There is no difference between PES, FGP and Swimsuit.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	121 (74.7%)	18 (11.1%)	23 (14.2%)	74.7%
Wrestling	53	40 (75.5%)	10 (18.7%)	3 (5.7%)	75.5%
Bodybuilding	169	80 (47.3%)	25 (14.8%)	64 (37.9%)	47.3%
Total	384	241 (62.8%)	53 (13.8%)	90 (23.4%)	62.8%

It was hypothesized that there is no significance difference in the attitudes of athletes from the three sports disciplines towards use of PES and methods. Table 4.39 displays the results of the attitudes.

To determine whether there was significance difference in the attitude of athletes from the three sports disciplines, one-way ANOVA was used. The results are presented in table 4.39.

Table 4:39

One-way ANOVA on Significance Difference on the attitudes of Athletes from the three Sports Disciplines on use of PES and Methods.

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	401.115	2	201.058	25.605	.000
Within Groups	2991.695	381	7.852		
Total	3393.810	383			

The results of Table 4.39, [$F(2, 381) = 25.605, p < 0.001$] indicated a significant difference in the attitudes of athletes from the three sports disciplines on use of PES and methods. Post-hoc analysis was carried out using Duncan's Multiple Range Test to ascertain which means were different. Results were as indicated in table 4.40, whereby bodybuilders ($M=9.28, SD=3.44$) attitudes were lower than those of boxers ($M= 11.23, SD = 2.38$) and wrestlers ($M=11.60, SD = 1.35$). The attitudes of boxers and wrestlers was relatively the same.

Table 4.40
Attitudes on Use of PES and Methods

No	Sports Discipline	N	Mean/13	SD
1	Body Building	169	9.28 ^a	3.44
2	Boxing	162	11.23 ^b	2.38
3	Wrestling	53	11.60 ^b	1.35

Means with same superscript implied that they were not significantly different.

The results revealed that wrestlers and boxers had a better attitude towards use of food supplements, traditional herbs, PES, and methods, as compared to that of bodybuilders. This implied that the bodybuilders were more prone to use these substances for performance enhancing, than wrestlers and body builders. Attitude scores for wrestlers and boxers were not significantly different, whereas that of bodybuilders was significantly different from the two. Therefore, the null hypothesis that there is no significant difference on the attitudes of the athletes from the three sports disciplines on the use of PES and methods was rejected.

4.5 Assessment of Beliefs of Respondents on the use of PES and Methods.

The researcher sought to find out whether athletes from wrestling, bodybuilding and boxing had the correct beliefs on use of PES and methods.

4.5.1 Food Supplements are a Form of Doping.

The statement posed to the respondents stated that ‘some people believe that food supplements are a form of doping’. Majority of them (203, 52.9%) disagreed with that statement demonstrating a favorable belief. However, 177 (46.1%) respondents agreed with the statement, while 4 (1.0%) did not know what to say about it. Majority of the boxers (96, 59.3%) and wrestlers (43, 81.1%) disagreed with the statement, which implied that they believed that food supplements are not a form of doping. However, majority of the body builders (104, 61.5%) agreed with the statement, which meant that they believed that food supplements are a form of doping. Table 4.41 displays the different beliefs.

Table 4:41
Food Supplements is a Form of Doping.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	96 (59.3%)	63 (38.9%)	3 (1,9%)	59,3%
Wrestling	53	43 (81.1%)	10 (18.9%)	0 (0%)	81.3%
Bodybuilding	169	64 (37.9%)	104, 61.5%)	1 (0,6%)	37.9%
Total	384	203 (52.9%)	177 (46.1%)	4 (1.0%)	52.9%

4.5.2 Athletes must use PES to Win

Many respondents (280, 72.9%) disagreed with the statement that some people believe that an athlete must use PES to win. But among the total respondents, 102 (26.6%) agreed with the statement, while 2 (0.5%) respondents did not have a definite answer. A higher proportion of boxers (143, 88.3%), wrestlers (51, 96.2%) and body builders (86, 50.9%) did not believe that an athlete must use a performance enhancing substance to win. The different beliefs are demonstrated by table 4.42.

Table 4:42
An Athlete must Use PES to Win.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	143 (88.3%),	18 (11.1%)	1 (0.6%)	88.3%
Wrestling	53	51 (96.2%)	2 (3.8%)	0 (0%)	96.2%
Bodybuilding	169	86 (50.9%)	82 (48.5%)	1 (0,6%)	50.9%
Total	384	280 (72.9%)	102 (26.6%)	2 (0.5%)	72.9%

4.5.3 Kenyan Athletes are using TH and FS as PES

Among the total respondents, those who did not believe that Kenyan athletes were using traditional herbs/food supplements as PES were 209 (54.4%). Those who believed they did were 166 (43.2%), while 9 (2.3%) did not know what to believe. Many of the boxers (92, 56.9%) and wrestlers (46, 86.8%) disagreed that some Kenyan athletes are using food supplements, traditional herbs as PES holding the belief that traditional herbs/supplements cannot be used as performance enhancing substances. However, many of the body builders (97, 57.4%) agreed with the statement, implying that they believed that some Kenyan

athletes are using food supplements, traditional herbs as PES. These beliefs are demonstrated in table 4.43.

Table 4:43
Kenyan Athletes use TH, FS, and PES.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	92 (56.8%)	62 (38,3%)	8 (4.9%)	56.8%
Wrestling	53	46 (86.8%)	7 (13.2%)	0 (0%)	86.8%
Bodybuilding	169	71 (42.0%)	97 (53.4%)	1 (0.6%)	42.0%
Total	384	209 (54.4%).	166 (43.2%),	9 (2.3%)	54.4%

4.5.4 Foreign Athletes Use TH and FS as PES

Respondents were asked if they believed that foreign athletes use food supplements, traditional herbs as PES. Many of them (200, 52.1%) did not believe that foreign athletes use traditional herbs/food supplements as PES. However, 152 (39.6%) respondents believed so, while 32 (8.3%) did not know what to believe. Majority of the respondents from the individual sports disciplines, 91 (56.2%) boxers, 47 (88.7%) wrestlers and 62 (36.7%) body builders, disagreed with the statement implying that they did not believe that foreign athletes use food supplements, traditional herbs as PES. Table 4.44 reflects the different beliefs.

Table 4:44
Foreign Athletes use TH and FS to Enhance Performance.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	91 (56.2%)	54 (33.3%)	17 (10.5%)	56.2%
Wrestling	53	47 (88.7%)	6 (11.3%)	0 (0%)	88.7%
Bodybuilding	169	62 (36.7%)	92 (54.4%)	15 (8.9%)	36.7%
Total	384	200 (52.1%)	152 (39.6%)	32 (8.3%)	52.1%

4.5.5 Kenyan Coaches Encourage Athletes to Use TH and FS as PES

Asked if they believe that coaches encourage their athletes to use food supplements, traditional herbs as PES, 255 (66.4%) respondents disagreed with the statement, while 97 (25.3%) respondents agreed with it, with 32 (8.3%) not knowing what to believe. Again, many respondents among the individual sports, 100 (61.7%) boxers, 49 (92.5%) wrestlers and 106 (62.7%) body builders, disagreed that Kenyan coaches encouraged their athlete to use traditional herbs and food supplements as PES. This implied that most of the respondents did not believe that coaches from Kenya do persuade their athletes to use food supplements, traditional herbs as PES, which was a favorable belief. However, the percentage of those who believed that coaches do encourage athletes to use TH and FS as for performance enhancing was quiet high at 97 (25.3%) These different beliefs are indicated in Table 4.45.

Table 4:45
Coaches Encourage Athletes to Use TH and FS as PES.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	100 (61.7%)	41 (23.3%)	21 (13.0%)	61.7%
Wrestling	53	49 (92.5%)	4 (7.5%)	0 (0%)	92.5%
Bodybuilding	169	106 (62.7%)	52 (30.8%)	11 (6.5%)	62.7%
Total	384	255 (66.4%)	97 (25.3%)	32 (8.3%)	66.4%

According to 242 (63.0%) respondents, athletes who take food supplements, traditional herbs use them but not because they help them in sports situations, which was a favorable belief. However, 118 (30.7%) believed that athletes who use food supplements, traditional herbs do so because they help them in sports situations. But 14 (3.6%) respondents did not know what to believe. Majority of the boxers (94, 58.0%) wrestlers (42, 79.2%) and bodybuilders 106 (62.7%) disagreed that athletes who take food supplements, traditional

herbs do so because they help them in sports situations. In other words, many of the boxers and wrestlers believed that traditional herbs and food supplements are not helpful in sports situations. Table 4.46 indicates these different beliefs.

Table 4:46

Traditional Herbs and Food Supplements Help in Sports Situations.

	N	Disagreed	Agreed	Do not Know	Correct
Boxing	162	94 (58.0%)	60 (37.0%)	8 (4.9%)	58.0%
Wrestling	53	42 (79.2%)	11 (20.8%)	0 (0%)	79.2%
Bodybuilding	169	106 (62.7%)	57 (33.7%)	6 (3.6%)	62.7%
Total	384	242 (63.0%)	128 (33.3%)	14 (3.6%)	63.0%

4.5.6 Foreign Agents Encourage Athletes to Use PES

Majority of the respondents (202, 52.6%) did not believe that foreign sports agents encourage athletes to use PES, which was a favorable belief. Those who believed that foreign sports agents encourage athletes to use PES were 139 (36.2%) and 43 (11.2%) did not know what to believe. While majority of the body builders (99, 58.6%) believed that foreign sports agents encouraged their athletes to use PES, 93 (75.4%) boxers and 47 (88.7%) wrestlers had a contrary belief that foreign sports agents do not encourage their athletes to use PES. Table 4.47 displays these beliefs.

Table 4:47

Foreign Sports Agents Encourage Athletes to Use PES.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	93 (75.4%)	34 (21.0%)	35 (21.6%)	75.4%
Wrestling	53	47 (88.7%)	6 (11.3%)	0 (0%)	88.7%
Bodybuilding	169	62 (37.7%)	99 (58.6%)	8 (4.7%)	37.7%
Total	384	202 (52.6%)	139 (36.2%)	43 (11.2%)	52.6%

4.5.7 FS and TH are Necessary to Succeed in Sports.

Many respondents (259, 67.4%) had a favorable belief that one did not need to use traditional herbs and food supplements to succeed in sports. On the other hand, 116 (30.2%) respondents believed that use of traditional herbs and food supplements are necessary to succeed in sports. But 9 (2.3%) respondents did not know what to believe. Majority of the body builders (88, 52.1%) agreed with the statement that some people believe one must use traditional herbs and food supplements to succeed in sports. However, 129 (79.6%) boxers and 49 (92.5%) wrestlers held the belief that one does not have to use traditional herbs and food supplements to succeed in sports. Table 4.48 displays these beliefs.

Table 4:48
FS and TH are Necessary to Succeed in Sports

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	129 (79.6%)	24 (14.8%)	9 (5.6%)	79.6%
Wrestling	53	49 (92.5%)	4 (7.5%)	0 (0%)	92.5%
Bodybuilding	169	81 (47.9%)	88 (52.1%)	0 (0%)	47.9%
Total	384	259 (67.4%)	116 (30.2%)	9 (2.3%)	67.4%

4.5.8 Use of Traditional Herbs can Enhance Performance.

A high proportion of the respondents (241, 62.8%) had a favorable belief that use of traditional herbs cannot enhance their performance. However, 115 (29.9%) believed that use of traditional herbs can enhance their performance, with 28 (7.3%) respondents not knowing what to believe. Many of the boxers (113, 69.8%), wrestlers (46, 86.8%) and bodybuilders (82, 86.8%) did not believe that use of traditional herbs could enhance performance in sports. These beliefs are indicated in Table 4.49.

Table 4:49*Use of Traditional Herbs Can Enhance Performance.*

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	113 (69.8%)	30 (18.5%)	19 (11.7%)	69.8%
Wrestling	53	46 (86.8%)	6 (11.3%)	1 (1.9%)	86.8%
Bodybuilding	169	82 (48.5%)	79 (46.7%)	8 (4.7%)	48.5%
Total	384	241 (62.8%)	115 (29.9%)	28 (7.3%)	62.8%

4.5.9 Energy drinks can improve performance.

Majority of the respondents (186, 48.4%) did not believe that energy drinks can improve their performance, which was a favorable belief. Almost an equal number of respondents (184, 47.9%) had a contrary opinion, believing that energy drinks can improve their performance. However, 14 (3.6%) respondents did not know what to believe. Many of the boxers (88, 54.3%) and wrestlers (41, 77.4%) disagreed with the statement that energy drinks can improve one's performance in sports. In other words, they believed that energy drinks cannot improve one's performance in sports. However, many body builders (112, 66.3%) agreed with the statement, implying that they believed energy drinks can improve one's performance in sports. Table 4.50 indicates the different beliefs.

Table 4.50*Energy Drinks can Improve Performance.*

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	88 (54.3%)	60 (37.0%)	14 (8.6%)	54.3%
Wrestling	53	41 (77.4%)	12 (22.6%)	0 (0%)	77.4%
Bodybuilding	169	57 (33.7%)	112 (66.3%)	0 (0%)	33.7%
Total	384	186 (48.4%)	184 (47.9%)	14 (3.6%)	48.4%

4.5.10 Kenyan Coaches Encourage Athletes to use FS to Improve Performance.

Respondents who did not believe that Kenyan coaches encouraged their athletes to use food supplements to improve sports performance were 223 (58.1%). However, 134 (34.9%) respondents agreed with the statement. But 27 (7.0%) did not know what to believe. Many boxers (102, 63.0%) and wrestlers (47, 88.7%) disagreed that some coaches from Kenya encourage their athletes to use food supplements to enhance sports performance. This implied that majority of boxers and wrestlers believed that Kenyan coaches do not encourage their athletes to use food supplements. However, 91 (53.8%) bodybuilders held a contrary belief, where they agreed with the statement, hence believing that coaches from Kenya encourage their athletes to use food supplements to enhance performance. Table 4.51 displays this information.

Table 4.51
Kenyan Coaches Encouraged Athletes to Use FS.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	102 (63.0%)	37 (22.8%)	23 (14.2%)	63.0%
Wrestling	53	47 (88.7%)	6 (11.3%)	0 (0%)	88.7%
Bodybuilding	169	74 (43.8%)	91 (53.8%)	4 (2.4%)	43.8%
Total	384	223 (58.1%)	134 (34.9%)	27 (7.0%)	58.1%

4.5.11 Kenyan Coaches Encouraged Athletes to Use TH to Improve Performance.

Majority of the respondents (246, 64.1%) had a favorable belief where they disagreed that Kenyan coaches encouraged their athletes to use traditional herbs to improve sports performance. On the other hand, 102 (26.6%) respondents had a contrary opinion where they believed that Kenyan coaches encouraged their athletes to use traditional herbs to improve sports performance. However, 36 (9.4%) did not know what to believe. Many of

the boxers (100, 61.7%), wrestlers (48, 90.6%) and bodybuilders (98, 58.0%) disagreed that coaches from Kenya persuade their athletes to use traditional herbs to enhance sports performance. This implies that majority of the boxers, wrestlers and bodybuilders did not believe that coaches from Kenya encourage their athletes to use traditional herbs to enhance sports performance. Table 4.52 indicates this information.

Table 4.52
Kenyan Coaches Encouraged Athletes to use TH.

	n	Disagreed	Agreed	Do not Know	Correct
Boxing	162	100 (61.7%)	36 (22.2%)	26 (16.0%)	61.7%
Wrestling	53	48 (90.6%)	5 (9.4%)	0 (0%)	90.6%
Bodybuilding	169	98 (58.0%)	61 (36.1%)	10 (5.9%)	58.0%
Total	384	246 (64.1%)	102 (26.6)	36 (9.4%)	64.1%

4.5.12 Beliefs of the Athletes from the three Sports Disciplines on the Use of PES and Methods.

The null hypothesis on beliefs stated that there is no significance difference in the beliefs of athletes from boxing, bodybuilding, and wrestling on the use of PES and methods. One way ANOVA was used to find out if there were significant differences in the attitudes of the respondents. Results are as indicated in table 4.53.

Table 4:53
One-way ANOVA on Beliefs of the Respondents on Use of PES and Methods

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	1310.421	2	655.211	46.646	.000
Within Groups	53561.735	381	7.852		
Total	6662	383			

The results of table 4.53, [$F(2, 381) = 46.646, p < 0.001$] showed significant difference in the beliefs of athletes from the three sports disciplines on the use of PES and methods. To ascertain which means were significantly different, post hoc analysis, using DMRT was applied. Results in table 4.54 reflected a difference in beliefs on the use of PES and methods between bodybuilders ($M=6.29, SD=4.42$), boxers ($M= 3.14, SD = 3.26$) and wrestlers ($M=1.47 SD = 2.65$).

Table 4.54

Beliefs of Athletes across the three sports disciplines on use of PES and methods.

No	Sports Discipline	n	Mean/12	SD
1	Body Building	169	6.29 ^c	4.42
2	Boxing	162	3.14 ^b	3.26
3	Wrestling	53	1.47 ^a	2.65

Means with different superscript implied that they were significantly different.

The results in table 4.54 revealed that bodybuilders beliefs on use of food supplements, traditional herbs, PES, and methods, were better than those of boxers and wrestlers. This implied that wrestlers who had the lowest score were more susceptible to use these substances for performance enhancing than body builders and boxers. Therefore, the null hypothesis that there is no significant difference on the beliefs of the athletes from the three sports disciplines on the use of PES and methods was rejected.

4.6 Assessment of use of Traditional Herbs, Food Supplements, PES, and Methods

4.6.1 Use of FS by athletes is a major problem

Majority of the respondents (276, 71.8%) indicated that the use of food supplements by athletes from Kenya during training or competition was a problem. However, those who saw it as a minor problem or not a problem at all were 108 (28.2%). A higher proportion

of boxers (116, 71.6%) saw the use of food supplements by athletes from Kenya as a problem whereas 46 (28.4%) thought it was a minor problem or not a problem at all. Among the wrestlers, saw the use of food supplements as a problem, while 24 (45.2%) saw it as a small issue. On the other hand, 131 (77.5%) bodybuilders indicated use of food supplements as a problem, with 38 (22.5%) of them indicating it as a minor problem or not a problem at all. Table 4.55 reflects the information on the use of food supplements by Kenyan athletes.

Table 4.55

Use of Food Supplements by Kenyan Athletes

Sports Discipline	Not a Problem /Minor	A problem
Boxing	46 (28.4%)	116 (71.6%)
Wrestling	24 (45.2%)	29 (54.8%)
Bodybuilding	38 (22.5%)	131 (77.5%)
Total	108 (28.1%)	276 (71%)

4.6.2 Use of TH by athletes is a major problem

Most respondents (214, 55.8%) indicated that the use of traditional herbs by athletes from Kenya during training or competition was a problem, but 170 (44.2%) of the respondents saw it as a minor or not a problem at all. Among the boxers, 105 (64.8%) thought the use of traditional herbs by athletes from Kenya during training or competition was a problem, but 57 (14.8%) indicated it as a minor problem or not a problem at all. More than half of the wrestlers (30, 56.6%) saw the use of traditional herbs as a problem. However, 23 (43.4%) indicated this use as a minor or not a problem at all. On the other hand, 79 (46.7%) bodybuilders thought the use of traditional herbs was a problem, but a higher number of them (90, 53.3%) indicated this as a minor or not a problem at all. Table 4.56 shows the extent of use of traditional herbs by Kenyan athletes.

Table 4.56*Use of Traditional Herbs by Kenyan Athletes*

Sports Discipline	Not a Problem /Minor	A problem
Boxing	57 (64.8%)	105 (64.8%)
Wrestling	23 (43.4%)	30 (56.6%)
Bodybuilding	90 (53.3%)	79 (46.7%)
Total	170 (44.3%)	214 (55.7%)

4.6.3 Use of PES by athletes is a major problem.

Majority of the respondents (332, 86.5%) indicated that use of PES by athletes from Kenya during training or competition was a problem, but a small proportion (52, 13.5%) indicated this use as a minor or not a problem at all. Also, a high proportion of boxers (141, 87.0%) indicated use of PES as a problem but a few of them (21, 13.0%) indicated it as a minor or not a problem at all. On the other hand, more than half of wrestlers indicated 30 (56.6%) indicating it as a problem and 21 (43.4%) as a minor or not a problem at all. Majority of bodybuilders (144, 85.2%) indicated this use as a problem, but 25 (14.8%) of them believed this was a minor or not a problem at all. This information is reflected through table 4.57.

Table 4.57*Use of PES by Kenyan Athletes*

Sports Discipline	Not a Problem /Minor	A problem
Boxing	21 (13.0%)	141 (87.0)
Wrestling	23 (43.4%)	30 (56.6%)
Bodybuilding	25 (14.8%)	144 (85.2%)
Total	69 (18.0%)	315 (82.0%)

4.6.4 Use of TH, FS and PES by Respondents for Performance Improvement.

4.6.4.1 Use of FS to Improve Performance.

On use of food supplements to improve sports performance, 285 (74.2%) respondents said they have never used while 99 (25.8%) indicated as having used food supplements to improve performance. Among the boxers, 139 (85.8%) indicated that they had never used food supplements to improve sports performance but, 23 (14.2%) confirmed as having used. On the other hand, most of the wrestlers (52, 98.1%) indicated as having never used food supplements with 1 (1.9%) having used. More than half of the body builders (94, 55.6%) had never used food supplements to improve sports performance, but still a high number (75, 44.4%) indicated as having used. Table 4.58 indicates this information.

Table 4.58

Use of Food Supplements by Respondents to Improve Sports Performance

Sports Discipline	Yes	No
Boxing	23 (14.2%)	139 (85.8%)
Wrestling	1 (1.9%)	52 (98.1%)
Bodybuilding	75 (44.4%)	94 (55.6%)
Total	99 (25.8%)	285 (74.2%)

4.6.4.2 Use of TH to Improve Performance.

Many of the respondents (360, 93.8%) had never used traditional herbs to improve sports performance, but 24 (6.3%) confirmed use of the same. A high number of boxers (157, 96.9%) indicated as having never used traditional herbs for improving sports performance, but 5 (3.1%) confirmed use. Apart from 1 (1.9%) wrestler who had ever used traditional herbs to improve sports performance, 52 (98.1%) of them indicated as having never used.

Among the bodybuilders, 18 (10.7%) of them confirmed use of traditional herbs while 151 (89.3%) indicated as not having used. Table 4.59 indicates this information.

Table 4.59

Use of Traditional Herbs by Respondents to Improve Sports Performance

Sports Discipline	Yes	No
Boxing	5 (3.1%)	157 (96.9%)
Wrestling	1 (1.9%)	52 (98.1%)
Bodybuilding	18 (10.7%)	151 (89.3%)
Total	24 (6.3%)	360 (93.7%)

4.6.4.3 Use of PES to Improve Performance

Those who had never used PES to improve sports performance among the total number of respondents were 353 (91.9%). However, 31 (8.1%) confirmed as having used PES. For individual sports disciplines, 154 (95.1%) boxers had never used PES to improve sports performance, but 8 (4.9%) confirmed use. According to the findings, none of the wrestlers (53, 100%) had ever used PES to improve sports performance. A substantive number of bodybuilders (146, 86.4%) indicated as having never used PES while 23 (13.6%) confirmed use of PES to improve sports performance. Table 4.60 indicates the information on use of PES to improve sports performance.

Table 4.60

Use of PES by Respondents to Improve Performance

Sports Discipline	Yes	No
Boxing	8 (4.9%)	154 (95.1%)
Wrestling	N/A	53 (100%)
Bodybuilding	23 (13.6%)	46 (86.4%)
Total	31 (8.1%)	253 (65.9%)

4.6.5 Assessment on Whether Respondents had Ever Been Given FS, TH or PES to Enhance Performance.

4.6.5.1 Ever Been Given FS to Enhance Performance

Majority of the respondents (371, 96.6%) indicated as never having been given food supplements by a coach, doctor, or physiotherapist to enhance performance. However, 13 (3.4%) indicated as having received food supplements from either a coach, doctor, or physiotherapist to enhance performance. Among the boxers, 156 (96.3%) had never received food supplements from a coach, doctor, or physiotherapist to enhance performance, but 6 (3.7%) confirmed as having been given food supplements by either of the three mentioned to enhance performance. All the wrestlers (53, 100%) indicated as never having received food supplements from a coach, doctor, or physiotherapist to enhance performance. However, 7 (4.1%) bodybuilders confirmed as having received, while 162 (95.9%) had never been given food supplements by such officials. Table 4.61 indicates the information on supply of FS by different entities.

Table 4.61
Supply of Food Supplements by Different Officials.

Sports Discipline	Yes	No
Boxing	6 (3.7%)	156 (96.3%)
Wrestling	0 (0%)	53 (100%)
Bodybuilding	7 (4.1%)	162 (95.9%)
Total	13 (3.4%)	371 (96.6%)

4.6.5.2 Ever Been Given TH to Enhance Performance

Most of the respondents (382, 99.5%) had never received traditional herbs from a coach, doctor, or physiotherapist, whereas 2 (0.5%) of them confirmed as having received

traditional herbs from a coach, doctor, or physiotherapist to enhance performance. Again, a high number of boxers (161, 99.4%) and all the wrestlers (53, 100%) indicated as having never been given traditional herbs for performance enhancing by the mentioned officials. However, 1 (0.6%) boxer confirmed as having received such from either a coach, doctor, or physio to enhance performance. On contrary, a substantive number of bodybuilders (20, 11.8%) confirmed as having been given traditional herbs by either a coach, doctor, or physiotherapist to enhance performance. Table 4.62 shows supply of traditional herbs by different officials.

Table 4.62
Supply of Traditional Herbs by Different Officials.

Ever been given TH by either a coach/Team Doctor / Physiotherapists		
Sports Discipline	Yes	No
Boxing	1 (0.6%)	161 (99.4%)
Wrestling	0 (0%)	53 (100%)
Bodybuilding	20 (11.8%)	149 (88.2%)
Total	21 (5.5%)	363 (94.5%)

4.6.5.3 Ever Been Given PES to Enhance Performance.

On supply of PES, 352 (91.7%) respondents had no information, but 32 (8.3%) indicated that they had heard either a medical practitioner, local chemist, or sports agents supplying PES and methods. Among the boxers and body builders, those who had no information on supply of PES and methods from a local chemist, medical practitioner or sports agents were 150 (92.6%) and 150 (92.6%) respectively. However, those with some information on such supply were 12 (7.4%) from boxing and 20 (11.8%) from bodybuilding. However, all the

wrestlers (53, 100%) had no information on supply of PES and methods. Table 4.63 shows the number of respondents who had any information on supply of PES.

Table 4.63

Supply of PES by Different Officials

Ever heard a local chemist, medical practitioner, sports agents supplying PES

Sports Discipline	Yes	No
Boxing	12 (7.4%)	150 (92.6%)
Wrestling	0 (0%)	53 (100%)
Bodybuilding	12 (7.4%)	157 (92.9%)
Total	24 (6.3%)	360 (93.7%)

4.6.5.4 Responses on use of FS, TH or PES by Respondents

Table 4.64 shows the summary of athletes who have ever used at least one of FS, TH, or PES. Bodybuilders had the highest number (80, 47.3%), followed by boxers (30, 18.5%) and lastly wrestlers (2, 3.8%).

Table 4.64

Summary on use of FS, TH, and PES among Boxers, Wrestlers, and Bodybuilders

Type of sport	Number of athletes who have used PES	Percentage
Boxing	30	18.5%
Wrestler	2	3.8%
Bodybuilders	80	47.3%
Total	112	29.2%

To test if there was significant difference in the use of FS, TH, PES and Methods by the respondents, one-way ANOVA was used. Table 4.65 displays the results.

Table 4.65

One-way ANOVA on use of FS, TH, PES and Methods by Athletes from the Three Sports Disciplines.

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	28.094	2	14.047	24.050	.000
Within Groups	222.529	381	.584		
Total	250.622	383			

The results of one-way ANOVA in Table 4.65, [F (2, 381) = 24.050, p < 0.000] showed that there was a significant difference in the use of FS, TH, PES, and Methods by athletes from the three sports disciplines. To test differences between the means, post hoc analysis was carried out using DMRT. Results are presented in table 4.66.

Table 4.66

Mean Scores of the Three Sports Disciplines on the use of FS, TH and PES

No	Sports Discipline	n	Mean/9	SD	p-value
1	Body Building	169	0.73 ^c	0.97	<0.001
2	Boxing	162	0.27 ^b	0.67	
3	Wrestling	53	0.04 ^a	0.19	

Means with the same superscript are not significantly different

Results in table 4.66 showed that there was a marked difference on the use of FS, TH and PES between bodybuilders (M=0.73, SD=0.97), boxers (M= 0.27, SD = 0.67) and wrestlers (M=0.04 SD = 0.19). This implied that bodybuilders were less likely to use food supplements, traditional herbs, PES, and methods for performance enhancing, while wrestlers were more susceptible to use than boxers. Therefore, the null hypothesis that there would be no significant difference on the use of FS, TH, PES, and Methods by athletes from the boxing, wrestling and body building was rejected.

4.7 Pearson Correlation for Continuous Variables among the Three Sports Disciplines.

Pearson correlation was used to test for relationships between variables such as knowledge levels, experience, attitudes, beliefs, and use of PES among boxers, wrestlers, and bodybuilders. Table 4.67 indicates the correlations of these variables among all the respondents.

Table 4.67
Pearson Correlation for Continuous Variables among the Respondents

Continuous variables	n	r	p-value
Knowledge levels and experiences	384	0.222	<0.001
Experience and use of PES	384	0.187	< 0.001
Knowledge levels and attitudes	384	0.380	<0.001
Knowledge levels and beliefs	384	-0.443	<0.001
Knowledge and use of PES	384	-0.133	<0.001
Attitudes and beliefs	384	-0.677	<0.001
Attitudes and use of PES	384	-0.446	<0.001
Beliefs and use of PES	384	0.515	<0.001

The results on Pearson correlation of the continuous variables for the respondents from the three sports disciplines combined, were found to be significant at 95% confidence level. There was a significant positive association where knowledge levels and experience returned a positive association at [$r(384) = 0.222, p < 0.001$], implying that knowledge level increased with increase in experience, use of PES increased as experience increased [$r(384) = 0.187, p < 0.001$], increase in knowledge level led to increase in attitude [$r(384) = 0.380, p < 0.001$], and as beliefs increased, use of PES increased [$r(384) = 0.515, p < 0.001$].

However, a significant negative association was found where increase in knowledge level led to a decrease in beliefs [$r(384) = -0.443, p < 0.001$], as well as a decrease in use of PES [$r(384) = -0.133, p < 0.001$], whereas an increase in attitude led to a decrease in beliefs [$r(384) = -0.677, p < 0.001$], and a decrease in use of PES [$r(384) = -0.446, p < 0.001$].

Table 4.68
Pearson Correlation for Continuous Variables among Boxers.

Continuous variables	n	correlation value (r)	significance value (p)
Experience and Knowledge	162	0.168*	< 0.033
Experience and Use of PES	162	0.336*	< 0.001
Knowledge and attitude	162	0.478*	<0.001
Knowledge and belief	162	-0.263*	<0.001
Knowledge and Use of PES	162	-0.108	0.170
Attitude and belief	162	-0.578*	<0.001
Attitude and use of PES	162	-0.292*	<0.001
Belief and use of PES	162	0.348*	<0.001
Experience and attitudes	162	0.064	0.421
Experience and beliefs	162	-0.143	0.069
* Means there was significant correlation			

Table 4.68 displays results on Pearson correlation between the continuous variables among boxers, which revealed a significant positive association between knowledge level and experience [$r(162) = 0.168, p < 0.033$], implying that increase in experience led to increase in knowledge. Also increase in experience led to increase in use of PES [$r(162) = 0.336, p < 0.001$], while increase in knowledge led to increase in attitude [$r(162) = 0.478, p < 0.001$] and increase in beliefs led to increase in use of PES [$r(162) = 0.348, p < 0.001$]. On

the other hand, there was a significant negative association where increase in knowledge among the boxers led to a decrease in beliefs [$r(162) = -0.263, p < 0.001$], increase in attitude led to a decrease in beliefs [$r(162) = -0.578, p < 0.001$] and a decrease in use of PES [$r(162) = -0.292, p < 0.001$].

Table 4.69
Pearson Correlation for Wrestlers

Continuous variables	n	correlation value (r)	p - value
Knowledge and experience	53	0.108	0.443
Experience and use of PES	53	-0.014	0.922
Knowledge and attitude	53	0.172	0.217
Knowledge and belief	53	-0.482*	<0.001
Knowledge and use of PES	53	-0.170	0.223
Attitude and belief	53	-0.528*	<0.001
Attitude and use of PES	53	-0.386*	<0.004
Belief and use of PES	53	0.455*	<0.001
Experience and attitudes	53	-0.233	0.092
Experience and beliefs	53	0.180	0.197
* Means there was significant correlation			

Table 4.69 shows the findings on Pearson correlation between the continuous variables among wrestlers which returned a significant positive association where increase in beliefs led to an increase in use of PES [$r(53) = 0.455, p < 0.001$]. However other variables had a significant negative association where increase in knowledge level led to decrease in beliefs [$r(53) = -0.482, p < 0.001$], increase in attitude led to decrease in beliefs [$r(53) = -0.528, p < 0.001$], as well as a decrease in use of PES [$r(53) = -0.386, p < 0.001$].

Table 4.70
Pearson Correlation for Bodybuilders

Continuous variables	n	correlation value (r)	significance value (p)
Experience and Knowledge	169	0.261*	< 0.001
Experience and use of PES	169	0.167*	<0.030
Knowledge and attitude	169	0.242*	<0.002
Knowledge and belief	169	-0.404*	< 0.001
Knowledge and use of PES	169	0.002	0.983
Attitude and belief	169	-0.663*	< 0.001
Attitude and use of PES	169	-0.414*	< 0.001
Belief and use of PES	169	0.484*	< 0.001
Experience and attitude	169	-0.084	0.280
Experience and belief	169	-0.056	0.468
* Means there was significant correlation			

As demonstrated on table 4.70, the results on Pearson correlation continuous variables among bodybuilders revealed a significant positive association on knowledge level and experience [$r(169) = 0.261$, $p < 0.001$], implying that as experience increased, knowledge level increased. Increase in experience also led to increase on use of PES [$r(169) = 0.167$, $p < 0.030$]. There was also a positive significant association where increase in knowledge levels led to increase on attitudes [$r(169) = 0.242$, $p < 0.001$], while increase in beliefs had an association with increased use of PES [$r(169) = 0.484$, $p < 0.001$]. However, the following continuous variables had a significant negative association; increase in knowledge level led to decrease in beliefs [$r(169) = -0.404$, $p < 0.001$], increase in attitudes led to a decrease in beliefs [$r(169) = -0.663$, $p < 0.001$], as well as a decrease in use of PES [$r(169) = -0.414$, $p < 0.001$].

4.8 Assessment of Association Between Gender of the Respondents and Knowledge Levels, Attitudes, Beliefs and use of Performance-Enhancing Substances and Methods.

It was hypothesized that there is no significant difference in beliefs, attitudes, knowledge levels and use of PES and methods in relation to gender of respondents. To determine if there were any significant differences, t-test was used. Table 4.71 displays the computed values on knowledge levels.

Table 4.71
Knowledge Levels in Relation to Gender

Gender	n	M	SD	df	t-value	p-value
Female	70	12.66	3.353	382	1.605	0.109
Male	314	11.90	3.626			

Results in Table 4.71 show that female respondents had a higher knowledge level ($M = 12.66$, $SD = 3.353$) in relation to male ($M = 11.90$, $SD = 3.626$). However, the t-test results [$t(382) = 1.605$, $p = 0.109$] indicated that there was no significant difference in the knowledge levels between male and female respondents. Therefore, sub hypothesis that there will be no significant difference in knowledge levels between male and female was not rejected. Table 4.72 reflects the results on attitudes of the respondents in relation to gender.

Table 4.72
Attitudes in Relation to Gender

Gender	n	M	SD	df	t-value	p-value
Female	70	11.56	2.165	382	3.574	<0.001
Male	314	10.17	3.076			

Table 4.72 reveals female respondents ($M = 11.56$, $SD = 2.165$), had the right attitude towards use of PES and methods than male ($M = 10.17$, $SD = 3.076$). The results of t-test [$t(382) = 3.574$, $p < 0.001$] on this sub hypothesis indicated that there was a significant difference in the attitudes of female and male respondents towards use of PES and methods, hence the null sub hypothesis was rejected. Table 4.73 presents the results on beliefs of respondents in relation to gender.

Table 4.73
Beliefs in Relation to Gender

Gender	n	M	SD	df	t-value	p-value
Female	70	2.13	3.327	382	-4.956	<0.001
Male	314	4.78	4.190			

Table 4.73 on beliefs, indicated that female respondents had lower beliefs towards use of PES and methods ($M = 2.13$, $SD = 3.327$), compared to male ($M = 4.78$, $SD = 4.190$). However, the results of t-test [$t(382) = -4.956$, $p < 0.001$] reveals that there was a significant difference in their beliefs leading to rejection of the sub hypothesis that there would be no significant difference on the beliefs of female to male on use of PES and methods. Table 4.74 presents the results on use of PES and methods by respondents in relation to gender.

Table 4.74
Use of PES and Methods in Relation to Gender

Gender	n	M	SD	df	t-value	p-value
Female	70	0.23	0.487	382	-2.435	0.015
Male	314	0.49	0.858			

Table 4.74 displays the result of t-test and mean values on use of PES and methods in relation to gender, which reveals that female respondents had a lower tendency ($M = 0.23$, $SD = 0.487$) in relation to male ($M = 0.49$, $SD = 0.858$). However, the computed results of t-test [$t(382) = -2.435$, $p = 0.015$], indicates that there was significant difference in the use of PES and methods among female and male respondents from boxing, wrestling, and bodybuilding. Therefore, the sub hypothesis that there would be no significant association between gender of the respondents and knowledge levels, attitudes, beliefs and use of PES and methods was rejected.

4.9 Assessment of Factors that Influence use of TH, FS, PES, and Methods.

4.9.1 Factors Influencing use of FS.

Respondents had different responses on factors that influence use of food supplements by Kenyan athletes. Majority of them (222, 57.8%) indicated money prize/to boost economic status as the most influencing factors. Lack of confidence/pressure from self, was the second most influential with 62 (16.1%) respondents indicating it. Pressure from coaches, family and colleagues played a big role with 59 (15.4%) respondents indicating it as a factor of influence. Others were lack of information of health consequences of doping, doping control regulations and practices, as well as desire to get famous and travel abroad, with 25 (6.5%), 11 (2.9%) and 5 (1.3%) respectively. The pattern was almost similar for individual sports disciplines with 113 ((69.8%) boxers indicating money prize/to boost economic status as the first, followed by pressure from family, colleague athletes, and coaches (16, 9.9%), low level of anti-doping knowledge on health consequences of doping (13, 8.0%), low confidence levels and pressure from within self (11, 6.8%), low levels of

knowledge of doping control regulations and practices (8, 4.9%) and desire for fame (1, 0.6%).

Among the wrestlers, the highest influencing factor was lack of confidence/pressure from self (14, 26.4%), followed by pressure from coaches, family, and colleague athletes (13, 24.5%), money prize/to boost economic status (12, 22.6%), low levels of knowledge of health side effects of doping (12, 22.6%), low levels of knowledge of doping control regulations and practices (1, 1.9%) and desire to get famous and travel abroad (1, 1.9%). However, bodybuilders were highly influenced by money prize/to boost economic status (97, 57.4%), followed by lack of confidence/pressure from self (37, 21.9%), pressure from coaches, family, and colleague athletes (30, 17.8%), desire to get famous and travel abroad (3, 1.8%) and 2 (1.2%) lacked knowledge on health consequences of doping. To bodybuilders, having no knowledge on doping control regulations and practices was not a factor of influence. Table 4.75 shows the different factors that influenced respondents to use food supplements.

Table 4.75
Factors that Influenced use of Food Supplements.

Factors	Overall	Boxing	Wrestling	Bodybuilding
Money Prize	214 (55.7%)	115 (71.0%)	13 (24.5%)	86 (50.9%)
Pressure from Coach, Family, Athletes	47 (12.2%)	12 (7.4%)	9 (17.0%)	26 (15.4%)
Lack of Confidence/Pressure from Self	87 (22.7%)	17 (10.5%)	14 (26.4%)	56 (33.1%)
Lack of Knowledge on Health	28 (7.3%)	14 (8.6%)	14 (26.4%)	0 (0%)
Lack of Knowledge on Doping Control	5 (1.3%)	3 (1.9%)	2 (3.8%)	0 (0%)
Desire for Fame	3 (0.8%)	1 (0.6%)	1 (1.9%)	1 (0.6%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

4.9.2 Factors Influencing Use of TH

For factors that influenced use of traditional herbs to enhance performance by Kenyan athletes, majority of respondents ranked money prize/to boost economic status (314, 55.7%) as the highest. Next in rank was lack of confidence/pressure from self (87, 22.7%) followed by pressure from family, coaches, and fellow athletes (47, 12.2%). Lack of knowledge on health consequences of doping (28, 7.3%) also had an influence on use of traditional herbs to enhance performance. The lowest influencing factors included having no prior knowledge on doping control practices and regulations (5, 1.3%) and desire to get famous and travel abroad (3, 0.8%). For individual sports, boxing and bodybuilding ranked money prize/to boost economic status highest as a factor that influenced them to use traditional herbs to enhance performance at 115 (71.0%) and 86 (50.9%) respectively. The second highest factor for both boxing and bodybuilding was lack of confidence/pressure

from self at 17 (10.5%) and 56 (33.1%) respectively. The other factor of influence for boxing was lack of knowledge on health consequences of doping (14, 8.6%) followed by pressure from coaches, family, and colleague athletes (12, 7.4%). For bodybuilding, the factor that followed was pressure from coaches, family, and colleague athletes, while desire for fame and travelling abroad (1, 0.6%) came last in their ranking. Having no prior knowledge on doping control regulations and practices and desire for fame and travelling abroad, came at the bottom for bodybuilders at 3 (1.9%) and 1 (0.6%) respectively.

Lack of knowledge on health consequences of doping and doping control practices and regulations were not factors of influence for bodybuilders. Wrestlers had two factors of influence ranked highest. They included lack of confidence/pressure from self (14, 26.4%) and lack of knowledge on health consequences of doping also at 14 (26.4%). The next highest ranked factor was prize money/to improve economic status, followed by pressure from family, coaches, and colleague athletes. Low levels of knowledge of doping control regulations and practices (2, 3.8%) and desire for fame and travelling abroad came last. Table 4.76 reflects factors that influenced respondents to use traditional herbs.

Table 4.76
Factors that Influenced use of Traditional Herbs.

Factors	Overall	Boxing	Wrestling	Bodybuilding
Money Prize	214 (55.7%)	115 (71.0%)	13 (24.5%)	86 (50.9%)
Pressure from Coach, Family, Athletes	47 (12.2%)	12 (7.4%)	9 (17.0%)	26 (15.4%)
Lack of Confidence/Pressure from Self	87 (22.7%)	17 (10.5%)	14 (26.4%)	56 (33.1%)
Lack of Knowledge on Health	28 (7.3%)	14 (8.6%)	14 (26.4%)	0 (0%)
Lack of Knowledge on Doping Control	5 (1.3%)	3 (1.9%)	2 (3.8%)	0 (0%)
Desire for Fame	3 (0.8%)	1 (0.6%)	1 (1.9%)	1 (0.6%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

4.9.3 Factors Influencing Use of PES.

On use of performance enhancing substances and methods to improve performance, the highest ranked factor of influence by majority of the respondents (232, 60.4%) was money prize/to boost economic status. This was followed by lack of knowledge on health consequences of doping (56, 14.3%) and lack of confidence/pressure from self (42, 10.9%). Next in rank was pressure from family, colleague athletes and coaches (28, 7.3%), low levels of knowledge of doping control regulations and practices (19, 4.9%), with desire for fame and travelling abroad (8, 2.1%) coming last.

Majority of the boxers (116, 71.6%) ranked money prize/to boost economic status as the highest factor that influenced them to use PES and methods. The same was ranked highest by wrestlers (15, 28.3%) as well as body builders (101, 59.8%). Lack of knowledge on

health consequences of doping came second for the three sports disciplines with 21 (13.0%) boxers, 12 (22.6%) wrestlers and 22 (13.0%) bodybuilders. Lack of confidence/pressure from self, was ranked third by all the three sports disciplines with 11 (6.8%) boxers, 11 (20.8%) wrestlers and 20 (11.8%) bodybuilders. Pressure from coaches, family, and colleague athletes also influenced the use of PES and methods by boxing (9, 5.6%), wrestlers (9, 17.0%) and bodybuilders (10, 5.9%). Desire to become famous and travel abroad was not a factor of influence for boxing and wrestling. However, the desire to become famous and travel abroad influenced 8 (4.7%) bodybuilders to use PES and methods to improve performance. Table 4.77 indicates factors that influenced respondents to use performance enhancing substances.

Table 4.77*Factors that Influenced Use of Performance Enhancing Substances*

Factors	Overall	Boxing	Wrestling	Bodybuilding
Money Prize	232 (60.4%)	116 (71.6%)	15 (28.3%)	101 (59.8%)
Pressure from Coach, Family, Athletes	28 (7.3%)	9 (5.6%)	9 (17.0%)	10 (5.9%)
Lack of Confidence/Pressure from Self	42 (10.9%)	11 (6.8%)	11 (20.8%)	20 (11.8%)
Lack of Knowledge on Health	56 (14.3%)	21 (13.0%)	12 (22.6%)	22 (13.0%)
Lack of Knowledge on Doping Control	19 (4.9%)	5 (3.1%)	6 (11.3%)	8 (4.7%)
Desire for Fame	8 (2.1%)	0 (0%)	0 (0%)	0 (0%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

4.9.4 Summary on Factors Influencing Use of FS, TH, and PES

The following table indicates the summary of factors that influenced the use of FS, TH, and PES by athletes from boxing, wrestling and bodybuilding sports disciplines. For use of FS and TH, money prize came as number one factor, followed by lack of confidence/pressure from self. Again, money prize was rated highest for use of PES and methods followed by lack of knowledge on health issues. Table 4.78 indicates the summary of these factors.

Table 4.78
Summary of Factors Influencing Use of FS and TH

	Boxers(n=162)	Wrestlers(n=53)	Bodybuilders (n=169)
Money prize	115 (71. %)	13 (24.5%)	86 (50.9%)
Lack of Confidence/Pressure from self	17 (10.5%)	14 (26.4%)	56 (33.1%)
PES and Methods			
Money Prize	116 (71.6%)	15 (28.3%)	101 (59.8%)
Lack of Knowledge on Health	21 (13.0%)	12 (22.6%)	22 (13.0%)

Table 4.78 displays a summary of factors that influenced the respondents to use FS, TH, PES, and methods. It is evidence that use of FS and TH was highly influenced by money prize and lack of confidence/pressure from self. On the other hand, use of PES and methods was highly influenced by money prize and lack of knowledge on health consequences after use. The summary indicates that money prize, lack of confidence/pressure from self, and lack of knowledge on health consequences, were the main factors that highly influenced the use FS, TH, PES, and methods among the respondents. Therefore, the hypothesis that

there would be no significance difference in the factors that influenced the use of FS, TH, PES and methods among boxers, wrestlers and bodybuilders was accepted.

To conclude on whether the factors were significantly influencing the use of PES and methods, multiple regression analysis was used. Table 4.79 indicates the summary of multiple regression on factors that influenced use of PES and methods among the respondents. The statistical results of the multiple regression [$F(6, 377) = 25.755$, $p < 0.001$, $R^2 = 0.291$], reflect a significant influence on the use of PES and methods, by the six factors, hence the null hypothesis was rejected.

Table 4.79
Regression Model

	Sum of Squares	Df	Mean Square	F	R²	Sig
Regression	72.862	6	12.144	25.755	0.291	.000
Residual	177.761	377	0.472			
Total	250.62	383				

Table 4.79 reflects the level of significant that each factor had in influencing the use of PES and methods among the respondents.

Table 4.80
Regression Coefficients

	Standardized Coefficient	t	Sig
Money Prize	0.190	3.773	< 0.001
Pressure from Coaches	0.070	1.386	0.167
Lack of Confidence	0.073	1.186	0.236
Lack of knowledge on health	0.082	1.376	0.170
Lack of knowledge on doping control practices	0.142	2.597	< 0.010

Desire to be famous	0.395	8.378	< 0.001
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According to table 4.80, three factors, money prize ($p < 0.001$), lack of knowledge on doping control practices and regulations ($p = 0.010$) and desire to be famous ($p < 0.001$), had a significant influence on the use of PES and methods. However, the other three, pressure from coaches ($p = 0.167$), lack of confidence ($p = 0.236$), and lack of knowledge on health consequences ($p = 0.170$) did not have a significant influence on the use of PES and methods.

4.10 Assessment of Common Sources of Information on Traditional Herbs, Food Supplements, and PES

According to the findings, respondents from the three sports disciplines indicated their sources of information on traditional herbs, food supplements, and PES as received from different sources. The breakdown of the number of respondents in line with different sources of information indicated their source of information as from Kenya Body Building Federation (54, 14.1%), Boxing Association of Kenya (62, 16.1%), Wrestling (21, 5.5%), from Weightlifting (1, 0.3%), from ADAK (123, 32.0%), NACADA (10, 2.6%), WADA (35, 9.1%) and fellow athletes (24, 6.3%). Out of 384 respondents, 35 (9.4%) indicated that they had received information on drug-free sport, but they could not remember the source. Again, 18 (4.7%) respondents recorded that they had never received any information on drug-free sport.

To most boxers, ADAK (65, 40.1%) and BAK (60, 37.0%) were sources from which they most often received information on food supplement, traditional herbs, and PES and

methods. Among them, 13 (8.0%) received such information from WADA and 5 (3.1%) received from fellow athletes. Those who had received information on food supplement, traditional herbs, and PES and methods but could not tell the source were 8 (4.9%). Few indicated as having never received such information (6, 3.7%). Wrestlers who mostly received information on food supplement, traditional herbs, and PES and methods from ADAK and Wrestling Federation were 23 (43.4%) and 21 (39.6%) respectively. However, 6 (11.3%) indicated as having received such information from WADA, while 3 (5.7%) indicated as having never received such information at all. According to body builders, those who received information on food supplement, traditional herbs, and PES and methods from the Federation were 53 (31.4%) and 35 (20.7%) received from ADAK. Those that received such information from fellow athletes were (19, 11.2%) and from NACADA were 6 (3.6%). There were 2 (1.2%) body builders who received such information from BAK while 1 (0.6%) received from weightlifting. However, 28 (16.6%) received this information but could not tell the source while 9 (5.3%) indicated as having never received such information. Table 4.81 reflects the different sources of information to different respondents.

Table 4.81
Sources of Information

SOURCE	Boxing	Wrestling	Bodybuilding
Kenya Bodybuilding Federation	0 (0%)	0 (0%)	53 (31.4%)
Boxing Association of Kenya	60 (37.0%)	0 (0%)	2 (1.2%)
Kenya Amateur Wrestling Federation	21 (39.6%)	21 (39.6%)	0 (0%)
Kenya Weightlifting	0 (0%)	0 (0%)	1 (0.6%)
ADAK	65 (40.1%)	23 (43.4%)	35 (20.7%)
NACADA	0 (0%)	0 (0%)	6 (3.6%)
World Anti-Doping Agency	13 (8.0%)	6 (11.3%)	0 (0%)
Traditional Herbalists	0 (0%)	0 (0%)	0 (0%)
Received but source not known	8 (4.9%)		28 (16.6%)
Fellow Athletes	0 (0%)	0 (0%)	19 (11.2%)
Never received any information	(6, 3.7%)	3 (5.7%)	9 (5.3%)

4.10.1 The Most Likely Website to be Used by Respondents on Issues of FS, TH and PES and Methods.

Respondents were also asked to indicate the websites (if any) that they were most likely to use to be up to date with TH, FS, PES and methods. According to the findings, 31 (8.1%) respondents indicated that they would use Kenya Body Building Federations website, 1 (0.3%) respondents indicated website of Kenya Amateur Wrestling Federation, 58 (15.1%) respondents were likely to use website of Boxing Association of Kenya, 22 (5.7%) respondents were likely to use Wrestling Association Website, 1 (0.3%) respondent indicated Weightlifting Website, 2 (0.5%) indicated the National Federation Website, 65 (16.9%) indicated WADA website and 15 (3.9%) indicated other websites. These who were most likely to use ADAK website for such information were 87 (22.7%). However, 88

(22.9%) respondents stated that they do not spend any time looking for information about drug-free sports and testing procedures.

The websites that boxers were likely to use to be up to date with traditional herbs, food supplement, and PES and methods were BAK website (57, 35.2%), WADA (43, 26.5%) and ADAK (38, 23.5%). A few (5, 3.1%) used other websites. However, (5, 3.1%) boxers indicated that they do not spend time looking for information on drug-free sport issues and testing procedures. A high number of wrestlers (24, 45.3%) and (22, 41.5%) relied on ADAK, and Wrestling Federation website respectively to get information on drug-free sport issues and testing procedures. Those who sought such information from other websites were 3 (5.7%). Most of the body builders (69, 40.8%) indicated that they do not spend time seeking for information on drug-free sport issues and testing procedures. Those who relied on Kenya Bodybuilding Federation website were 46 (27.2%) while 25 (14.8%) relied on ADAK website. Only 1 (0.6%) body builder used Kenya Amateur Wrestling Federation's website and another 1 (0.6%) used Weightlifting Association website. Those who used ADAK website were 25 (14.8%) and 2 (1.2%) used BAK's website. Table 4.82 displays the different websites used by different respondents.

Table 4.82
Websites Likely to be used to Update Information on FS, TH and PES

Website	Boxing	Wrestling	Bodybuilding
Kenya Amateur Wrestling Federation	0 (0%)	22 (41.5%)	1 (0.6%)
Boxing Association of Kenya	57 (35.2%),	0 (0%)	2 (1.2%)
Bodybuilding Federation	0 (0%)	0 (0%)	46 (27.2%)
World Anti-Doping Agency	43 (26.5%)	0 (0%)	0 (0%)
Other Websites	(5, 3.1%)	3 (5.7%).	0 (0%)
No time spent looking for information on drug-free sports	(5, 3.1%)	0 (0%)	69 (40.8%)
Anti-Doping Agency of Kenya	38 (23.5%)	24 (45.3%)	25 (14.8%)

4.10.2 Personnel that have Ever Provided Information to Respondents on FS, TH and PES

For people who may have ever provided information or advice on food supplements, traditional herbs and PES and methods, most respondents (236, 61.5%) indicated that their coaches had ever provided such information, while 148 (38.5%) respondents indicated that their coaches have never given them such information or advice. Most respondents (334, 89.6%) indicated that their doctors had never provided them with information or advice on traditional herbs, food supplements, and PES and methods. Only 40 (10.4%) respondents indicated their doctors as having provided them with such information. According to majority of the respondents (297, 77.3%), their team physio had never provided them with information or advice about traditional herbs, food supplements, and PES and methods. Very few respondents (87, 22.7%) had received information or advice on this area, from their physio. Again, many of the respondents (325, 84.6%) had never received information or advice on food supplement, traditional herbs, and PES and methods from any official

from their governing body. Only 59 (15.4%) respondents had received information or advice on this area from an official from their governing body.

According to 335 (87.2%) respondents, no official from ADAK had ever given them information or advice on food supplement, traditional herbs, and PES and methods. Only 49 (12.8%) respondents had received information or advice on this area from an official from ADAK. Many of the respondents (206, 54.2%) indicated as never having received information on food supplement, traditional herbs, and PES and methods from another athlete. However, 176 (45.8%) respondents indicated that they had received information or advice on this area from another athlete. Only 37 (9.6%) respondents had received information or advice on food supplement, traditional herbs, and PES and methods from researchers. However, 347 (90.4%) respondents had never received such information or advice from researchers.

Results from individual sports disciplines was also analyzed. According to 101 (62.3%) boxers, they had received advice from their coach on food supplements, traditional herbs, and PES and methods. However, 61 (37.7%) said they had never received such advice. A low number of wrestlers (20, 37.7%) had received such advice from their coach, but a majority (33, 62.3%) had not. Many of the body builders (115, 68.0%) had received advice from their coach, but 54 (32.0%) had not. Among the boxers, those who received advice from their doctor were 10 (6.2%) while 152 (93.8%) had never received such an advice from their doctor. A few of the wrestlers (5, 9.4%) had received such an advice from their doctor, but many of them (48, 90.6%) had not. Again, a few of the body builders (25, 14.8%) had received such advice from their doctor, while the majority (144, 85.2%) had

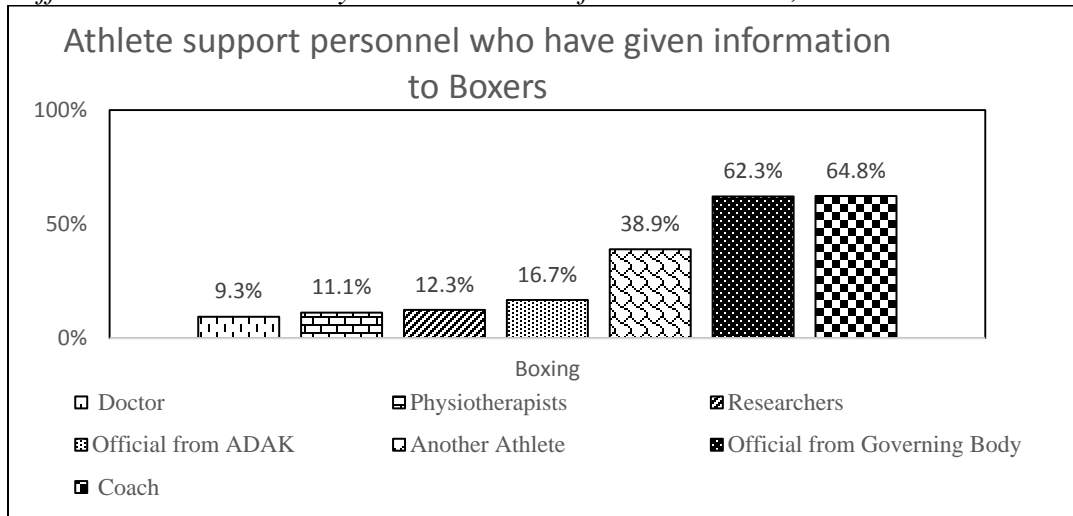
not. According to 15 (9.3%) boxers, their team doctor had given them advice on food supplements, traditional herbs, and PES and methods, but many of them (147, 90.7%) had never received such advice from their team doctor. A low proportion of wrestlers (6, 11.3%) had received such advice from their team doctor, while most of them (47, 88.7%) had not. The same case applied to body builders where only 37 (21.9%) had received such advice from their team doctor, while 132 (78.1%) had not. Team Physio had given advice on food supplements, traditional herbs, and PES and methods to 18 (11.1%) boxers, but 144 (88.9%) of them had never received such advice from their team physio. Only 5 (9.4%) wrestlers had received such advice from their team physio, with 48 (90.6%) of them indicating that they had never received such advice. Among the body builders, 64 (37.9%) had received advice on food supplements, traditional herbs, and PES and methods from their team physio, but 105 (62.1%) had never received such advice. Those who had received advice on food supplements, traditional herbs, and PES and methods from an official from their governing body were 105 (64.8%) from boxing, 105 (62.1%) from bodybuilding and 12 (22.6%) from wrestling. A majority from these sport disciplines had not received any such advice, with 57 (35.2%) from boxing, 41 (77.4%) from wrestling and 64 (37.9%) from bodybuilding.

Advice on food supplements, traditional herbs, and PES and methods received from an official from ADAK was received by 27 (16.7%) boxers, 7 (13.2%) wrestlers and 15 (8.9%) bodybuilders. Many of the boxers (135, 83.3%), wrestlers (46, 86.8%) and bodybuilders (154, 91.1%) had not received such advice from any official from ADAK. Advice from another athlete on food supplements, traditional herbs, and PES and methods

was received by 63 (38.9%) boxers, 11 (20.8%) wrestlers and many of the bodybuilders (102, 60.4%). However, a majority from boxing (99, 61.1%) and wrestling (42, 79.2%) did not receive such advice from another athlete. A few of body builders (67, 39.6%) also indicated as never having received such advice from another athlete. Those who had received advice on food supplements, traditional herbs, and PES and methods from researchers were 20 (12.3%) boxers and 17 (10.1%) bodybuilders, while 142 (87.7%) boxers and 152 (89.9%) body builders had never received such advice. However, all the wrestlers (53, 100%) indicated that they had never received such advice from researchers. Figures 4.2, 4.3 and 4.4 indicate the number of respondents that may have been provided with information.

Figure 4.2

Different Persons that may have Provided Information on FS, TH and PES to Boxers



According to figure 4.2 athletes support personnel that were rated highly as having provided information on FS, TH, and PES to boxers were 101(62.3%) coaches and 105 (64.8%) officials from their governing body.

Figure 4.3

Different Persons that may have Provided Information on FS, TH and PES to Wrestlers

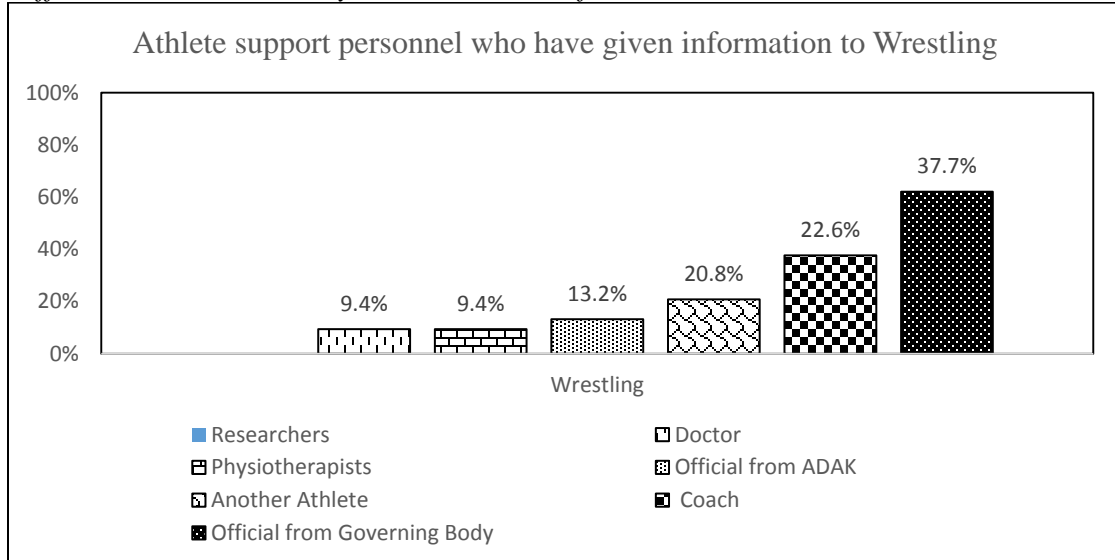
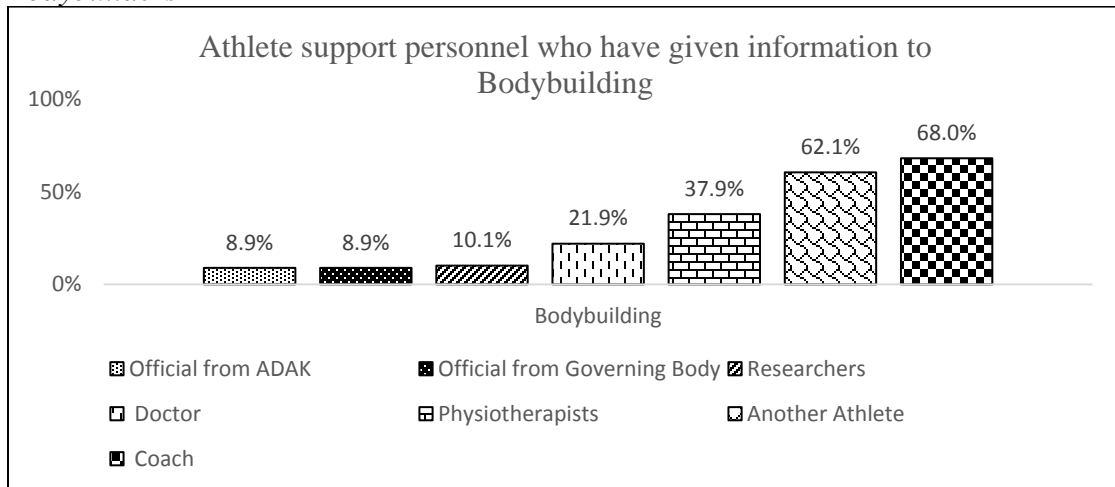


Figure 4.3 indicated coaches (20, 37.7%) and officials from governing body (12, 22.6%), as the athletes support personnel ranked highly as having provided information on FS, TH, and PES to athletes from wrestling.

Figure 4.4

Different Persons that may have Provided Information on FS, TH and PES to Bodybuilders



Figures 4.4, indicates athletes support personnel from bodybuilding sports disciplines that ranked high in providing information on FS, TH, and PES, as coaches (115, 68.0% and officials from governing body (105, 62.1%).

4.10.3 Usefulness of Resources and Services Offered to Respondents

On resources and services offered on drug-free information, respondents had different views regarding their usefulness. For instance, on drug information database, 167 (46.1%) respondents found it to be useful, while 195 (53.9%) found it not to be useful. Where information was provided through email, 154 (42.5%) respondents found it to be useful, with 208 (57.5%) finding it not useful. With drug information line as a resource for information, 141 (39.0%) respondents found it useful while 221 (61.0%) found it not useful. For advice card as a form of resource for drug information, 140 (38.7%) found it useful while 222 (61.3%) found it not useful. Testing procedure leaflet was another option for drug information. Many respondents (188, 51.9%) found it not useful with 174 (48.1%) finding it useful. For competitors and official guide, majority of the respondents (194, 53.6%) found it to be useful, while 168 (46.4%) respondents found it not useful.

Among the boxers, those who found Drug Information Database useful were 89 (54.9%) while 73 (45.1%) did not find it useful. Among the wrestlers 10 (18.7%) found Drug Information Database useful while 43 (81.1%) did not find it useful. Majority of the bodybuilders (101, 59.8%) found Drug Information database not useful, with 68 (40.2%) of them finding it useful. Drug Information email was found useful by 80 (49.3%) boxers while 82 (50.9%) found it not useful. The same resource or service was found useful by 18 (34.0%) wrestlers with 35 (66.0%) of them finding it not useful. Among the body builders,

56 (33.1%) found Drug Information email useful while a majority (113, 66.9%) found it not useful.

For Drug Information Line, 72 (44.4%) boxers found it not useful. Only 14 (26.4%) wrestlers found this resource useful with 39 (73.6%) finding it not useful. Most of the body builders (114, 67.4%) found this resource not useful with 55 (32.6%) finding it useful. Advice Card was found useful by 70 (43.2%) boxers, with 92 (56.8%) of them finding it not useful. Majority of the wrestlers (31, 58.5%) found Advice Card useful as a resource while 22 (41.5%) found it not useful. The same resource was found not useful by many bodybuilders (117, 69.2%) while 52 (30.8%) of them found it useful. With Testing Procedure Leaflet, 86 (53.1%) boxers found it to be useful, while 76 (46.9%) found it not useful. For wrestlers 32 (60.4%) of them found this resource useful while 21 (39.6%) found it not useful. This resource was found useful by 69 (40.8%) body builders, while 100 (59.2%) found it not useful. Majority of the boxers (103, 63.6%) found Competitors and Official Guide useful as a resource while 59 (36.4%) of them found it not useful. Again, majority of the wrestlers (46, 86.8%) found this resource useful while 7 (13.2%) found it not useful. Only 64 (37.8%) body builders found Competitors and Official Guide useful as a resource, while the majority (105, 62.2%) found it not useful. Table 4.83 reflects the information on the usefulness of the sources used.

Table 4.83
Usefulness of Available Resources and Services

Resource/Service	Boxing		Wrestling		Bodybuilding	
	Useful	Not useful	Useful	Not useful	Useful	Not useful
Drug Information	89	73	10	43	101	68
Database	(54.9%)	(45.1%)	(22.6%)	(81.1%)	(59.8%)	(40.2%)
Drug Information	80	82	18	35	56	113
Email	(49.3%)	(50.9%)	(34.0%)	(66.0%)	(33.1%)	(66.9%)
Drug Information	90	72	18	35	55	114
Line	(55.6%)	(44.4%)	(34.0%)	(66.0%)	(32.6%)	(67.4%)
Advice Card	70	92	31	22	52	117
	(43.2%)	(56.8%)	(58.5%)	(41.5%)	(30.8%)	(69.2%)
Testing Procedure	86	76	32	21	69	100
Leaflet	(53.1%)	(46.9%)	(60.4%)	(39.6%)	(40.8%)	(59.2%)
Competitors and	103,	59	46	7	64	105
Official Guide	(63.6%)	(36.4%)	(86.8%)	(13.2%)	(37.8%)	(62.2%)

4.10.3.1 Usefulness of Workshops on FS, TH and PES

Majority of the respondents (246, 64.0%) were found not to have attended any workshop on sports nutrition, food supplements, traditional herbs, and PES and methods, while only 138 (36.0%) respondents had ever attended such a workshop. Those who attended the workshop, 118 (85.5%) found it useful while 20 (14.5%) found it not to be useful.

Majority of the boxers (91, 66.2%) had not attended a workshop on sports nutrition, food supplements, traditional herbs, and PES and methods, while 71 (43.8%) of them had attended such a workshop. Majority of the wrestlers (39, 73.6%) had also not attended such a workshop but 14 (26.4%) had attended. Again, many body builders 116 (68.6%) had never attended such a workshop, while 53 (31.4%) had attended.

According to 58 (81.7%) boxers who had attended a workshop on sports nutrition, food supplements, traditional herbs, and PES and methods, found it useful while 13 (18.3%) did not find it useful. Among the wrestlers that had attended such a workshop, 13 (92.9%) of them found it useful, while 1 (7.1%) did not find it useful. For the body builders that had attended such a workshop, 47 (88.7%) found it useful while 6 (11.3%) did not find it useful. Table 4.84 reflects the number of respondents that have attended workshops and how useful it was.

Table 4.84

Attended a Workshop and How Useful it was Found to Be.

Sports Discipline	Attended	Not Attended	Useful	Not Useful
Boxing	71 (43.8%)	91, 66.2%)	58 (81.7%)	13 (18.3%)
Wrestling	14 (26.4%)	39, 73.6%)	13 (92.9%)	1 (7.1%)
Bodybuilding	53 (31.4%)	116 (68.6%)	47 (88.7%)	6 (11.3%)

4.10.4 Need for more Information and Preferred Means of Receiving such Information.

Among the respondents, 151 (39.3%) indicated that there were specific food supplements, traditional herbs, and PES that they needed to receive more or regular information on. However, 233 (60.7%) respondents did not think they needed any regular information about specific food supplements and traditional herbs. Among the boxers (78, 48.1%), wrestlers (29, 54.7%) and bodybuilders (44, 26.0%), there are those who needed information on specific food supplements, traditional herbs and PES and methods. However, 84 (51.9%) boxers, 24 (45.3%) wrestlers and 125 (74.0%) bodybuilders, thought there was no need for regular updates on food supplements, traditional herbs, and PES and methods. Table 4.85 reflects these different opinions.

Table 4.85
Need for more Information on FS, TH and PES

Factors	Overall	Boxing	Wrestling	Bodybuilding
YES	151 (39.3%)	78 (48.1%)	29 (54.7%)	44 (26.0%)
NO	233 (60.7%)	84 (51.9%)	24 (45.3%)	125 (74.0%)
	384 (100%)	162 (100%)	53 (100%)	169 (100%)

For preferred method of receiving information on drug-free sports or changes to testing procedures, majority of the respondents (143, 37.2%) selected SMS. Telephone (105, 27.3%), coach (73, 19.0%), email (38, 9.9%) and agent (25, 6.5%). Boxers followed the same ranking with 51 (31.5%) SMS, 48 (29.6%) telephone, 32 (19.8%) coach, 17 (10.5%) email and 14 (8.6%) agents. Wrestlers' order of rank was a bit different with 20 (37.7%) telephone, 13 (24.5%) SMS, 10 (18.9%) coach, 7 (13.2%) email and finally 3 (5.7%) agents. For body builders SMS (79, 46.7%) ranked highest, followed by telephone (37, 21.9%), coach (31, 18.3%), email (14, 8.3%) with agent (8, 4.7%) coming last. Table 4.86 shows respondents preferred means of receiving information on drug-free sports issues and testing procedures.

Table 4:86
Preferred Means of Receiving Information on Drug-Free Sports Issues.

Means	Overall	Boxing	Wrestling	Bodybuilding
Telephone	105(27.3%)	48 (29.6%)	20 (37.7%)	37 (21.9%)
SMS	143(37.2%)	51 (31.5%)	13 (24.5%)	79 (46.7%)
Email	38 (9.9%)	17 (10.5%)	7 (13.2%)	14 (8.3%)
Coach	73 (9.9%)	32 (19.8%)	10 (18.9%)	31 (18.3%)
Agent	25 (6.5%)	14 (8.6%)	3 (5.7%)	8 (4.7%)
Total	384(100%)	162 (100%)	53 (100%)	169 (100%)

4.10.5 Common Sources of Disseminating Anti-Doping Materials.

Majority of the respondents (176, 45.8%) indicated ADAK website, internet, and leaflets as the most common source of disseminating anti-doping materials. Coaches and fellow athletes were second with 40 (10.4%) respondents. Seminars and workshops were also a preferred way of disseminating anti-doping materials or information, with 38 (9.9%) respondents. Others included reading books, circulars, and journals (31, 8.1%), listening to media and reading newspapers, including social media (28, 7.3%) and finally research (21, 5.5%). Those who did not know which source was common were 50 (13.0%) respondents.

According to majority of boxers (79, 48.8%), ADAK website, leaflets and internet were the most common sources of disseminating anti-doping materials or information. Those who indicated reading books, circulars and journals were 22 (13.6%), while 15 (9.3%) indicated seminars and workshops. Media, including social media and newspapers were indicated as common by 14 (8.6%) boxers, while research was quoted by 7 (4.3%) of the boxers. Those among boxers who did not know what to say were 25 (15.4%). On the other hand, 21 (39.6%) wrestlers indicated ADAK website, leaflets, and internet as the most common source for receiving anti-doping materials or information. Research came second for wrestlers with 11 (20.8%). Reading books, circulars and journals was indicated as a common source by 7 (13.2%) wrestlers. Use of media including social media and newspapers was also a common source for 6 (11.3%) wrestlers. Seminars and workshops came last with 2 (3.8%) wrestlers. Among the wrestlers, those who did not know what to say were 6 (11.3%). The most common source for bodybuilders was ADAK website, leaflets, and internet with 74 (43.8%) bodybuilders. This was followed by coaches and

fellow athletes at 33 (19.5%). Seminars and workshops were indicated by 21 (12.4%) bodybuilders. Those who saw media, including social media and newspapers as a common source of disseminating anti-doping materials were 8 (4.7%). Research was quoted by 3 (1.8%) bodybuilders. Those who did not know what to say among the wrestlers were 18 (10.7%). Table 4.87 reflects the different sources of disseminating anti-doping information or materials to respondents.

Table 4.87*Different Sources of Disseminating Anti-Doping Information or Materials*

Common Sources	Overall	Boxing	Wrestling	Bodybuilding
ADAK Website, Leaflets, and Internet	183 (47.7%)	79 (48.8%)	21 (39.6%)	74 (43.8%)
Research	21 (5.5%)	7 (4.3%)	11 (20.8%)	3 (1.8%)
Seminars and Workshops	38 (9.9%)	15 (9.3%)	2 (3.8%)	21 (12.4%)
Media (Social, Audio and Print)	28 (7.3%)	14 (8.6%)	6 (11.3%)	8 (4.7%)
Books, Circulars and Journals	31 (8.1%)	22 (13.6%)	7 (13.2%)	12 (7.1%)
Fellow Athletes and Coaches	33 (8.6%)	0 (0%)	0 (0%)	33 (19.5%)
Don't Know	50 (13.0%)	25 (15.4%)	6 (11.3%)	18 (10.7%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

According to the information provided by most respondents the most common sources of information for the three sports disciplines were relevant Federation Officials, ADAK, and WADA. Again, the most likely websites to be used by respondents were their own Federation websites, ADAK website and to a small extent, WADA website. According to most of the respondents, personnel that provided them with information on FS, TH, PES,

and methods were their relevant Federation Officials, Coaches and Fellow Athletes. The results on establishment of possible sources of information on PES and methods among bodybuilders, wrestlers and boxers revealed that the three sports disciplines relied on the same ways of receiving information, that is, from ADAK, relevant Federation Officials and website, Coaches and Fellow Athletes. Therefore, the null hypothesis that there would be no significant difference in the sources of information on PES and methods for boxers, wrestlers, and bodybuilders, was not rejected.

4.11 Legal FS, TH and PES

Most respondents (88, 22.9%) stated food supplements such as creatine, whey amino acids and mega mass as being legalized. Those who thought traditional herbs such as mukobero, weed, bhang and miraa are legalized were 4 (1.0%). Energy drinks were indicated as legalized by 5 (1.3%) respondents. For performance enhancing substances, 17 (4.4%), respondents indicated EPO and steroids as legalized. Those who did not know which food supplements, traditional herbs or PES is legalized were 270 (70.3%) respondents.

Among the boxers, creatine, whey, and protein supplements were indicated as being legalized by 12 (7.4%) boxers. One (1) boxer (0.6%) quoted weed as a legalized traditional herb. Under PES, 3 (1.9%) boxers indicated steroids and EPO as legalized. Those who did not know which food supplements, traditional herbs and PES are legalized were 146 (90.1%). Three (3) of the wrestlers (5.7%) indicated creatine and whey as food supplements that are legalized. However, 50 (94.3%) wrestlers did not know which food supplements, traditional herbs or PES were legalized. A high number of bodybuilders (73, 43.2%) indicated creatine, whey, mega mass, and amino acids as food supplements that are

legalized. Energy drinks such as energizers were quoted by 5 (2.9%) bodybuilders as being legalized. Under traditional herbs, miraa, bhang and mukobero were indicated by 4 (2.4%) bodybuilders as legalized. For PES, 12 (7.1%) bodybuilders quoted EPO and steroids as being legalized. Those who did not know which food supplement, traditional herb or PES were legalized were 75 (44.4%). Table 4.88 shows different FS, TH, and PES that respondents thought were legal.

Table 4.88
Legal FS, TH and PES

Food Supplements, Traditional Herbs and PES	Overall	Boxing	Wrestling	Bodybuilding
Food supplements	92 (24.0%)	15 (9.3%)	3 (5.7%)	74 (43.8%)
Traditional Herbs	4 (1.0%)	1 (0.6%)	0 (0%)	4 (2.4%)
PES	15 (3.9%)	3 (1.9%)	0 (0%)	12 (7.1%)
Don't Know	27 (71.1%)	143 (88.3%)	50 (94.3%)	79 (46.7%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

Examples of food supplements quoted by participants included creatine, whey, mega mass, amino acids, omega 3 and energy drinks, while for traditional herbs included mukobero, weed, miraa, mukuka, bhang and for PES included EPO and steroids.

4.12 Common FS, TH, and PES Used by Sports Person

Respondents were asked to indicate common food supplements used by sports persons. Majority of the respondents (140, 36.5%) indicated creatine, amino acids; energy drinks (energizers), mega mass and Omega 3 as some of the food supplements used by sports persons. Under this category, 2 (0.5%) indicated use of EPO as a food supplement.

However, 242 (63.0%) did not know which food supplements are commonly used by sports persons.

Among the boxers, creatine, whey, and other protein supplements were indicated by 37 (22.8%) boxers as commonly used by sports persons. Glutamine was quoted by 1 (0.6%) boxer as part of food supplements commonly used by sports persons. However, 124 (76.5%) boxers did not know which food supplements were commonly used by sports persons. Among the wrestlers, creatine, whey and other protein supplements were indicated by 6 (11.3%) of them as being commonly used by sports persons. However, majority of them (47, 86.7%) did not know which food supplements were commonly used by sports persons. Again, creatine, whey, mega mass, energy drinks (energizers) and other protein supplements were indicated by 98 (58.0%) bodybuilders as commonly used by sports persons. Those who did not know the commonly used food supplements by sports persons among the bodybuilders were 71 (42.0%).

On performance enhancing substances that are commonly used by sports persons, 26 (6.8%) respondents indicated EPO, 7 (1.8%) steroids, 4 (1.0%) indicated stimulants, diuretics and glutamine as commonly used by sports persons. Cocaine, heroin, caffeine, beta 2 and bhang was indicated by 25 (6.5%) respondents as being commonly used by sports persons. Others included energy drinks (energizers), tobacco, busaa, miraa, creatine, mega mass, mukuka and mukobero were indicated by 41 (10.7%) respondents as commonly used by sports persons. Those who did not know the PES commonly used were 281 (73.2%) respondents.

Among the boxers, 23 (14.2%) indicated beta-2, EPO, steroids, stimulants, glutamine, diuretics, and caffeine as the commonly used PES by sports persons. Whey and other proteins were indicated by 4 (2.5%) boxers as commonly used PES. However, 135 (83.3%) boxers did not know which PES are commonly used by sports persons. A higher number of bodybuilders (35 (20.7%) indicated bhang, cocaine, heroin, EPO, glutamine, and steroids as PES which are commonly used by sports persons. Energy drinks, mega mass, creatine, other proteins, miraa, mukobero, tobacco and mukuka were indicated as commonly used by sports persons by 35 (20.7%) bodybuilders. Table 4.89 reflects the common food supplements used by sports persons as indicated by respondents.

Table 4:89
Common FS, TH and PES by sports persons.

Food Supplements,	Overall	Boxing	Wrestling	Bodybuilding
Traditional Herbs and PES				
Food supplements	167 (43.5%)	38 (23.5%)	7 (13.2%)	123 (72.8%)
PES	2 (0.5%)	0 (0%)	0 (0%)	2 (1.2%)
Don't Know	214 (57.7%)	124(76.5%)	46 (86.8%)	44 (26.0%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

Examples of food supplements quoted by participants included creatine, whey, megamass, amino acids, omega 3 and energy drinks, while for PES included EPO and steroids.

4.13 Ever Been Tested for Doping

Among the respondents, 83 (21.6%) had ever been tested, while 301 (78.4%) had never been tested. Out of those tested, 51 (13.3%) were tested in-competition while 31 (8.1%) were tested out- of-competition. Those who had ever participated in any sports competition were 309 (80.5%) while 75 (19.5%) had never participated in a sports competition. Boxers

who indicated as having been tested were 42 (25.9%), while 120 (74.1%) had never been tested. On the other hand, 8 (15.1%) wrestlers affirmed that they had been tested while 45 (84.9%) had never been tested. For the bodybuilders, those who had ever been tested were 33 (19.5%), while 136 (80.5%) had never been tested. Table 4.90 shows the number of respondents who had been tested for doping.

Table 4.90
Athletes who have ever been tested for doping.

	Overall	Boxing	Wrestling	Bodybuilding
Yes	83 (21.6%)	42 (25.9%)	8 (15.1%)	33 (19.5%)
No	301 (78.4%)	120 (74.1%)	45 (84.9%)	136 (80.5%)
	154 (100%)	162 (100%)	53 (100%)	169 (100%)

Respondents who had been called by a testing official before providing a sample were 37 (9.6%). Many respondents (136, 35.4%) indicated that it was possible to give a wrong sample. Those who knew an athlete that had given a sample which was not theirs were 25 (6.5%), while 6 (1.6%) among the respondents had provided a sample which was not theirs.

Among boxers who had been tested, 27 (16.7%) of them were tested in-competition while 14 (8.6%) were tested out-of-competition. Among the bodybuilders that had been tested, 16 (9.5%) were tested in-competition while 13 (7.7%) were tested out-of-competition. Out of wrestlers that had been tested, 8 (15.1%) were tested in-competition and 4 (7.5%) declared as having been tested in out-of-competition testing. Table 4.91 shows the type of testing that had been carried out on those respondents that had ever been tested (In- or out-of competition).

Table 4.91*Respondents that had been Tested In- or Out- of - Competition.*

	Overall	Boxing	Wrestling	Bodybuilding
In-Competition	51 (62.2%)	27 (65.9%)	8 (66.7%)	16 (55.2%)
Out-of-Competition	31 (37.8%)	14 (34.1%)	4 (33.3%)	13 (44.8%)
Total	82 (100%)	41 (100%)	12 (100%)	29 (100%)

Boxers who had ever participated in a sports competition were 128 (79.0%) while 34 (21.0%) had never participated in a sports competition. Wrestlers who had ever participated in a sports competition were 47 (88.7%) while 6 (11.3%) had never taken part in a sports competition. According to the findings, 134 (79.3%) bodybuilders had participated in a sports competition, while 35 (20.7%) had never participated. Table 4.92 shows respondents that had ever participated in any competition.

Table 4.92*Respondents that had ever participated in any Competition.*

	Overall	Boxing	Wrestling	Bodybuilding
Yes	309 (80.5%)	128 (79.0%)	47 (88.7%)	134 (79.3%)
No	75 (19.5%)	34 (21.0%)	6 (11.3%)	35 (20.7%)
	384 (100%)	162 (100%)	53 (100%)	169 (100%)

Among the boxers tested, 16 (9.9%) had been called by a testing official before providing the sample. Wrestlers who indicated that they had been called by a testing official before providing a sample were 6 (11.3%). Close to a third (15 8.9%) of bodybuilders indicated that they had been called by a testing official before providing a sample. Table 4.93 reflects the findings on respondents that had been called by a testing official before providing a sample.

Table 4.93*Respondents that had been called by a Testing Official before Providing a Sample.*

	Overall	Boxing	Wrestling	Bodybuilding
Yes	37 (45.1%)	16 (39.0%)	6 (50%)	15 (51.7%)
No	45 (54.9%)	25 (61.0%)	6 (50%)	14 (48.3%)
Total	82 (100%)	41 (100%)	12 (100%)	29 (100%)

4.13.1 Possibility of providing a wrong Sample

Many of the bodybuilders (79, 46.7%) indicated that it was possible to provide a wrong sample. Boxers who thought it was possible for an athlete to provide a wrong sample were 53 (32.7%), while wrestlers who indicated as possible to provide a wrong sample were 4 (7.5%). Table 4.94 shows the findings on whether it was possible to provide a wrong sample.

Table 4.94*It is Possible to Provide a Wrong Sample.*

	Overall	Boxing	Wrestling	Bodybuilding
Yes	136 (35.4%)	53 (32.7%)	4 (7.5%)	79 (46.7%)
No	248 (64.6%)	109 (67.3%)	49 (92.5%)	90 (53.3%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

Boxers that declared as having ever given a sample that was not theirs were 5 (3.1%). One (1, 0.6%) bodybuilder confirmed having given a sample which was not theirs. However, all the wrestlers indicated that they had never given a sample that was not theirs. Table 4.95 indicates the findings on respondents that had ever provided a sample that was not theirs.

Table 4.95*Respondents that had ever provided a Sample that was not theirs*

	Overall	Boxing	Wrestling	Bodybuilding
Yes	6 (1.6%)	5 (3.1%)	–	1 (6.6%)
No	378 (98.4%)	157 (96.9%)	53 (100%)	168 (99.4%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

Asked if they knew an athlete that had ever given a sample that is not theirs, 15 (9.3%) boxers were on the affirmative, while 3 (5.7%) wrestlers and 7 (4.1%) bodybuilders knew an athlete who had provided a sample which was not theirs. Table 4.96 reflects the findings on respondents that knew an athlete that had ever given a wrong sample.

Table 4.96*Respondents that knew an Athlete that had provided a Wrong sample.*

	Overall	Boxing	Wrestling	Bodybuilding
Yes	25 (6.5%)	15 (9.3%)	3 (5.7%)	7 (4.1%)
No	359 (93.5%)	147 (90.7%)	50 (94.3%)	162 (95.9%)
Total	384 (100%)	162 (100%)	53 (100%)	169 (100%)

CHAPTER FIVE: DISCUSSION OF FINDINGS

5.1 Demographics Information of the Respondents

Out of the sample of 384 respondents from the three sports disciplines, 314 (81.8%) were male and 70 (18.2%) were female. Boxing, wrestling, and bodybuilding are sports that require a lot of strength for one to remain relevant. According to Lahart and Robertson (2016), strength is necessary for combative sports which place unique metabolic demands on the competitors. This could be the reason for the discrepancies in gender of the participants for the three sports disciplines. Two of these sports disciplines (Boxing and Wrestling) are combative sports, while Bodybuilding is not appealing to females, where muscle formation is the standard measure of victory. In a study carried out by Paloian (2022), participants indicated that sports such as rugby, wrestling, hockey, and bodybuilding are meant for male athletes, and it was considered 'weird' or 'odd' for female participants to be involved in them. Most of the participants were in their prime ages (21-30 years), where physical body performance for many people is at its best. This high number of participants supports the statement by Vertonghen and Theeboom (2010), that martial arts involvement among the youth is believed to enhance personal, social, and positive learning opportunities for those that participates. Apart from body strength, these sports disciplines also require swiftness in action, flexibility, and agility for better performance, hence attracting participants that are still in their youth. Katralli et. al. (2019), defined flexibility as the maximal passive physiological range of motion in each joint movement, and agility as the ability to move the body to change directions quickly and accurately.

5.2 Participation and Experience of the Respondents

Results revealed that majority of the respondents had between 6-10 years of experience (181, 47.1%), followed by 1-5 years of experience (166, 43.3%). Only one respondent had over 20 years of experience. The increased in participation in these three sports disciplines dates a few years back, which can be attributed to several factors including Government sponsorship to various sports disciplines, as well as improved cash awards to sportsmen and women that performed well in international sports competitions as well as the enactment of Sports Act (2013) that introduced several institutions aimed at improving sports in Kenya, (Capital News, 2008. According to the data collected, only one (1) participant had an experience of 22 years in the sports discipline of body building. The majority had an experience of 2 to 11 years in their respective sports disciplines (357, 93%). This implies that these sports disciplines were not popular before the year 2010. According to Wikipedia (13th August 2020), Kenya won the most medals in summer Olympics for the years 2008, 2012 and 2016. In 2004, Athens Olympics, Kenya presented four (4) sports disciplines including Athletics, Rowing, Swimming and Volleyball. The first time Kenya presented a boxing team was 2008, Beijing Olympics. Since then, Boxing has continued to qualify players for Olympics, with different sports disciplines qualifying in subsequent years such as, Weightlifting, Archery, Rugby 7s and Judo (Wikipedia, 13th August 2020).

5.3 Evaluation of Knowledge Levels of Respondents

The findings of this study revealed that majority of the respondents (67.2%) had low knowledge on food supplements. This finding resonates with a study carried out by Alowais and Selim (2019) who found out that participants from health science in Saudi

Arabia had low knowledge on food supplements. Others studies that collaborated this finding include: Dlamini et al. (2021), in their study based in Westland, Kenya, found out that majority of the population (53.96%) were less knowledgeable on food supplements; Jovanov et al. (2019) studied athletes from four (4) counties viz Serbia, Germany, Japan and Croatia, and from eighteen (18) sports disciplines, where 40% of the athletes demonstrated low knowledge on food supplements; and Duvenage et al. (2015) in their study on U16 Rugby players found majority lacked comprehensive knowledge on food supplements. On contrary, Chebet (2014) in her study on Kenyan elite runners found that 43% of the respondents had a good knowledge on food supplements. Though Nazni and Vimala (2010) found athletes from weightlifting in India to be less knowledgeable, those from Volleyball and other sports were found to be knowledgeable on food supplements, a finding supported by Bakhtiar et al. (2021) in their study on athletes from various sports in Bangladesh, of whom, 50% had good knowledge on food supplements.

The findings of this study found out that majority of the respondents (80.4%) and 90% were highly knowledgeable that food supplement purchased from a drugstore or OTC is not necessarily safe for use, while 90% of them were knowledgeable that food supplement containing a prohibited substance will not declare it on the label. On contrary, Bakhtiar (2020) in a study on eleven sports disciplines, found that participants had insufficient knowledge, negative attitude, and poor practices on use of food supplements. This finding was supported by Mathews (2017), who stated that athletes consume dietary supplements at a high rate but have limited knowledge about important aspects of their use. Mathews (2017), in his study on college-aged athletes, found out that 86% of them were unaware that dietary supplements can have adverse effects. His findings indicated that elite

Australian athletes did not know the active ingredient in dietary supplements, with (62%), not understanding the side effects (57%), while (52%) did not know the recommended dose of their dietary supplements. In elite, young German athletes, only 36% were aware of issues with contamination.

The findings of the study found most of the respondents (89.1%) to be highly knowledgeable that they can be sanctioned if they tested positive after taking a food supplement that they thought was safe. According to WADA (2021), the 'Principle of Strict Liability' applies to all athletes, which apportions the sole responsibility to athletes for what they ingest, inject, and apply to their bodies (WADC, 2021). Therefore, an athlete who tests positive for taking food supplement they thought was safe to use will be sanctioned for doping, and it would not matter if the positive test was because of coach, doctor, physiotherapist, or any other support personnel administering to them a prohibited substance WADC (2021). Richardson (2020), in his study stated that numerous athletes representing a variety of sports have faced allegations of doping after testing positive for a substance known as Ostarine. Many of the athletes claimed that the chemical - an unapproved drug that can build muscle mass had contaminated supplements they used and believed to be harmless to their health and careers. Taylor Lewan, an offensive tackle athlete for the Tennessee Titans, received a four-game suspension after traces of Ostarine were found in his system (Richardson 2020). According to Beck, Thomson, Swift, and Hurst (2015), an unregulated supplement industry and inadvertent contamination of supplements with banned substances, increases the risk of a positive doping result.

According to the findings of this study, majority of the respondents (80.4%) demonstrated a high level of knowledge that traditional herbs were not safe for use whichever way they were acquired from. Walpurgis et al. (2020) in their study found that several allegedly herbal preparations were found to contain glucocorticoids such as hydrocortisone, betamethasone, and prednisolone, which were presumed as intentionally added to obtain a higher effectiveness of the therapeutics. Again Mario, et al (2013), in their study found that athletes who had been treated using TCM-based musk pod resulted in AAF for steroid.

The findings reflected that most of the respondents (88.0%) were knowledgeable about performance enhancing substances and methods, and that use of performance enhancing substances was not only prohibited in sports, but that it can also lead to health complications or even transfer of infectious diseases and death in cases of boosting blood levels or manipulation of blood components. Again 90.7% were aware that they can be sanctioned after taking PES that they thought was safe. According to the findings, most of the respondents (90.1%) understood that blood manipulation can lead to a positive test for a performance method. They equally understood that blood manipulation in sports is prohibited (92.2%). This finding was in line with the findings of the study on elite runners in Kenya by Chebet (2014), who indicated that about 50% of the respondents were knowledgeable about PES. Kaoche (2014) in his study on Malawian footballers, found that 73.4% had a high knowledge on PES.

The high knowledge on FS, TH and PES, can only be attributed to creation of awareness by relevant institutions on prohibited substances. This finding can lead to the conclusion that athletes that test positive for performance enhancing substances, make such decisions

from an informed position, and in disregard of the dire consequences on use. Mayo Clinic Staff (2020) stated that use of performance enhancing substances increases health risk including death. For instance, erythropoietin use among competitive cyclists was common in the 1990s and allegedly contributed to at least 18 deaths (Mayo Clinic Staff, 2020). The WADC (2021), states that an athlete will be responsible for what they ingest, inject, or apply to their body, which is referred to as the 'Principle of Strict Liability'. In other words, they are solely responsible if they test positive for doping, or any prohibited substance was found in their sample. Presence of a prohibited substance in a sample of an athlete attracts a sanction of not less than four (4) years ban from any sports participation (WADC, 2021).

The World Anti-Doping Agency (WADA), through the Prohibited List (2021) prohibits manipulation of blood and its components by athletes. These include administration or reintroduction of any quantity of autologous, allogenic (homologous) or heterologous blood, or red blood cell products of any origin into the circulatory system; artificially enhancing the uptake, transport or delivery of oxygen; any form of intravascular manipulation of the blood or blood components by physical or chemical means; sample substitution and/or adulteration; intravenous infusions and/or injections of more than a total of 100 mL per 12-hour period except for those legitimately received in the course of hospital treatments; gene editing, gene silencing and gene transfer technologies; or the use of normal or genetically modified cells. This is because such manipulation enhances the performance of such an athlete thereby giving them undue advantage over others. According to Michaël, (2008), the integrity of sport is predicated on the assumption that all athletes compete on a level playing field.

According to Oliveira et al. (2014), homologous transfusion may trigger transfusion reactions characterized by fever, urticaria, and anaphylactic shock. It also has the risk of contracting infectious diseases including hepatitis, HIV, malaria, CMV, and Creutzfeldt-Jacob disease. They also said that since blood transfusion for doping purposes is always clandestine, the quality of the blood is doubtful and the risk for infections is certainly higher in these conditions. Manipulation of blood and blood components also poses the probability of ischemia and heart attack, cerebral hemorrhage, deep vein thrombosis, arterial thrombosis, pulmonary embolism, and thrombosis retina is high (Oliveira et al., 2014).

The findings indicated that 83% were highly knowledgeable that a physician, doctor, or paramedical personnel aiding athlete in blood doping can be banned together with athlete, if, the athlete's sample returns a positive test for a prohibited substance. The WADC (2021), has provision under Anti-Doping Rule Violations that anyone found to be administering, possessing, or trafficking a prohibited substance or method, is liable to a sanction for four (4) years to life ban, depending on the gravity of the violation.

5.4 Assessment of Attitudes of the Respondents

Positive attitude was demonstrated when most respondents (77.6%) disagreed with the statements that food supplementation is not cheating since everyone does it; 68.2% agreed that food supplements are not necessary in competitive sports; 71.6% disagreed that injured athletes regularly lose time and FS can cater for the lost time; while 86.2% agreed that the way excellence in performance is attained by athletes should also matter. This finding was collaborated by the findings by Chebet (2014), on elite runners in Kenya where 53.5% were against use of doping substances in sports. However, Kaoche (2014), in his study on

Malawian footballers found out that majority (75.5%) had negative attitudes that accommodated doping. Morente-Sanchez et al. (2019), carried out a study on Spanish elite football players and reported that majority of the players did not tolerate doping. However, the top amateur and U18 players demonstrated more permissiveness to the use of PES. Maughan (2011), who chairs the Sports Nutrition Group of the International Olympic Committee Medical Commission, warned of the dangers of commercially available supplements which could turn athletes into unwitting drugs cheats. He said that minute levels of banned substances in some dietary supplements are leaving athletes susceptible to failed drugs tests. Murray (2019) also says that it would be unfair to put athletes who want to compete without drugs at a competitive disadvantage by permitting everything - to tilt the playing field in favor of the drugusers.

Majority of the respondents (63.3%) reported that athletes are not pressured to take PES, and therefore those who use them do it on their own accord. Mayo Clinic Staff (2020) supported this finding by indicating that most athletes confess that the drive to win is fierce, hence their personal decision to use. Besides the satisfaction of personal accomplishment, athletes often pursue dreams of winning a medal for their country or securing a spot on a professional team. In such an environment, the use of performance-enhancing drugs becomes increasingly common. Mulinero and Marquez (2009), also support this finding where they stated that many recreational and elite athletes use nutritional supplements in hope of improving performance.

Majority of the (88.0%) and (82.0%) respondents, demonstrated a positive attitude by indicating that athletes who break rules and take PES should feel guilty about it and that

there are risks related to the use of food supplements in sports, respectively. This finding was supported by Koske (2020) study on elite athletes from North Rift, Kenya, where majority of the athletes agreed that those who use PES to enhance sports performance should feel guilty. Hon et al. (2011), in their study on Dutch athletes also supported the finding where 91% of the athletes indicated that they would feel guilty if they used PES. A study by Mukherjee (2017), on athletes from Singapore revealed that 74.4% would not consider using PES, while 92.1% were confident of refusing any offer to use PES. Generally, Singapore elite athletes had attitudes that did not favour use of PES in sports. Savulescu et al. (2003), had a contrary opinion that some athletes have the wrong attitude and do not feel guilty using PES because the days for amateur sporting competition are far gone.

From the findings, majority of the respondents (95.8%) were aware that athletes have alternative career choices. This positive attitude was supported by Cummings (2012), who gave the example of Morten Gamst Pedersen, a footballer who "starred" for Blackburn Rovers, but was also the front man of Norwegian boy band 'The Players'. He stated that Eric Cantona, after being perhaps, the most flamboyant footballer of the 1990s, made a name for himself as an actor, model and politician. The same support was given by Dimengo (2014), who quoted Kerri Strug, a gold-medalist for the 1996 U.S. women's gymnastics team, who became a teacher in California, before moving to Washington D.C. to work at the Office of the Presidential Student Correspondence. Kevin Johnson, former NBA guard was a threat to go off any time he took the court during his playing days. But he later became the mayor of California city. Michael Strahan, after playing 15 years for the New York Giants, starred on a TV show, sat in as a studio analyst for *NFL on Fox* and

is now a host on *Good Morning America*. Brent Jones a four-time Pro Bowler and three-time Super Bowl champion during his 11 years with the San Francisco 49ers, played with a rough and tough style that was respected by his teammates. Maybe the same mentality helped him become a successful managing director at a private equity firm that he co-founded in 2000. Stuart Pearce, who played for six clubs between 1978 and 2002, was also a trained electrician (Dimengo (2014)). This is a proof that athletes have many career alternatives that can be a source of living hence, hence they have no reason to use PES to win and earn awards.

The findings of this study revealed that 83.9% of respondents demonstrated a positive attitude by disagreeing that performance enhancing herbs and food supplements should be legalized. Again 86.7% of respondents had a positive attitude that traditional herbs and supplements can be avoided in competitive sport. This finding was supported by Bloodworth et al. (2010), who in their study on talented young athletes from UK, found majority of them expressing a strong attitude that PES should never be allowed in sports. However, 15% of the respondents agreed that food supplements are necessary in competitive sports. They also found out that male athletes tended to express a more permissive attitude towards use of PES than female athletes. Again, the findings were supported by Clifford and Maloney (2015), who stated that athletes can achieve peak performance by training and eating a balanced diet including a variety of foods rather than using PES.

Findings of this study indicated majority of the respondents (87.7%) as demonstrating positive attitude by reporting that traditional herbs and supplements are not an unavoidable part of competitive sport and neither do they help in avoiding boredom (87.8%). According to Williams (2004), health professionals indicate that vitamin supplements are not necessary for the individual on a well-balanced diet, but they may be recommended for certain individuals, such as the elderly, vegans, and women of childbearing age, hence healthy sports persons only need a balanced diet. Williams (2004) stated that monitoring of the recovery–fatigue continuum represents the first step toward performance enhancement, and that based on a systematic and comprehensive monitoring of training and competition loads, interventions need to be derived and established to maximize performance. Since boredom is in the mind, Williams (2004), recommends that coaches can manipulate both training and recovery activities to produce required and specific physiological and psychological outcomes.

Positive attitude was expressed by 86.2% who indicated that there was a difference between PES, fiberglass poles and speedy swimsuits though all of them are used to improve performance. Partridge (2011) explores the implications that the use of performance-enhancing swimsuits had on fairness in relative and absolute outcomes in swimming. The author claimed that the use of ‘super swimsuits’ unfairly influenced relative outcomes within the competition because not all swimmers used, or had access to, the same types of swimsuits, some of which were clearly ‘faster’ than others. On use of fiber-glass poles Sommerfeld (2012), notes that the flexibility of fiberglass poles allowed athletes to translate the energy of their run-ups into vaulting height more effectively. According to Davis (2007), introduction of fiber-glass pole led to a step change in performance where

their flexibility allowed a different athletic style and a more energy-efficient vault. However, whereas swimsuits and fiber glass poles are externally used, performance-enhancing substances are either ingested, injected, or applied to one's skin hence interfering with hormonal body functions. Frank (2015), quotes Dr. Chris Gordon, Assistant Director of the Utah Valley Sports Medicine Clinic who references many different potential health risks on use of performance enhancing substances including increased risk for heart attack, stroke and blood clots because of thickened blood that slows blood flow. Increased cholesterol levels, hair loss, acne, enlarged prostates and abnormal liver function issues, are also associated risks. Increased hormone levels can also lead to aggressive behavior and mood swings among sports persons (Frank, 2015).

5.5 Assessment of Beliefs of the Respondents

With more than half of the respondents (53.9%) believing that food supplements are not a form of doping, posed the danger of most of them taking food supplements and risking testing positive for doping. This belief implied that most of these respondents would consume food supplements without any fear of testing positive for doping. The findings by Sirico et al. (2018) in their study on Italian sports students, support the finding of this study where they found out that 41.7% of their respondents believed that food supplements can enhance performance. Such a belief would lead to a deliberate use of the same. Al Ghobain (2019), findings on a study of Saudi Arabia elite football players were contrary to this finding where a majority (77.9%), believed that use of PES was morally wrong. However, 52% believed that less than 25% of football players were using PES and 71.8% believed that less than 25% of the coaches were encouraging athletes to use PES. Bloodworth et al.

(2010) in their study on UK athletes support the findings of Al Ghobain (2019), where majority of their respondents expressed a strong belief that PES should not be allowed in sports. Bijl (2014) said that pressure to perform and the potential rewards coupled with success, are powerful driving forces for many top athletes to continue striving for that chemical competitive edge. For this purpose, they use these dietary supplements as part of their regular training or competition routine. According to Merwe and Grobbelaar (2004) non-hormonal nutritional supplements such as vitamins, minerals and amino acids may contain banned substances not listed on the label. A study carried out by International Olympic Committee (IOC) (2001), on nutritional supplements from 13 countries, showed that 94 (14.8%) of 634 samples contained prohormones not listed on the label. This makes it very risky for athletes that trust food supplements while they are still in competitive sports. A study carried out by Merwe and Grobbelaar (2004), showed that approximately 7% of supplements may be mislabeled or contaminated with banned substances and that inadvertent doping through nutritional supplement use is a reality for athletes.

Findings of the study indicated many respondents (72.9%) having a positive belief that an athlete should not use PES to win. In other words, they believed that an athlete could win clean and by playing true to the rule of the game without using PES. A study carried out by Alaranta et al. (2006), found more than 90% of athletes who were financially supported by National Finnish Olympic Committee, believed that PES improved performance. More than 14% of athletes involved in a study by Nolte, et al., (2014) were ready to use PES if they were sure they would not be caught. This finding was collaborated by Blood worth, et al., (2010) who stated that a significant minority of British athletes entertained the

possibility of using a PES if they were guaranteed of success and undetectability. But contrary to these findings, Mukherjee (2017) on his study on Singapore athletes found that 88.9% of the athletes believed that use of PES was morally wrong under whatever circumstances. This indicated a strong moral norms and beliefs against doping by these athletes. According to Loland (2018), use of performance-enhancing drugs in sports represents cheating, and cheating is, by definition, wrong. While a ban on use of performance-enhancing drugs represented fairness, it is worth noting that most performance-enhancing drugs have serious and harmful side effects. Despite this positive belief by Kenyan boxers, wrestlers, and bodybuilders, some among them have been sanctioned for doping, for instance, David Munyasia and Ronny Rono.

This study found that majority of the respondents (55.0%) did not believe that Kenyan athletes were using food supplements/traditional herbs as PES, while 60.4% of them believed that foreign athletes do not use traditional herbs/food supplements as PES, which was a favorable belief. These results are contrary to that of a study carried out by Duvenage et al. (2015) who found out that 60% of U16 Rugby players in South Africa believed that food supplements were safe to use. Handelsman (2020) stated that athletes who use PES do so because they are suspicious that other athlete are using, or their entourage may be encouraging them to use, which he refers to as a “false consensus belief. But when they trust that other athletes are not using food supplements/traditional herbs as PES, then they are not likely to be swayed to taking traditional herbs/food supplements as PES. They would trust in winning without such since they can emulate those who they believe are winning without any unnatural enhancement. However, most of the bodybuilders (57.4%)

believed that some Kenyan athletes were using traditional herbs/food supplements as PES. Such athletes would therefore find it normal to use food supplements/traditional herbs, arguing that others are also using, or else they can be easily lured into the use of such. This belief also poses a danger to Kenyan athletes testing positive for doping after using traditional herbs/food supplements that they believed are safe to use. Clifford and Maloney (2015) support the belief that an athlete can win without use of food supplements/traditional herbs which pose a risk to testing positive for doping. They said that becoming an elite athlete requires good genes, good training and conditioning, and a sensible diet. They emphasized that optimal nutrition is essential for peak performance. Walpurgis et al. (2020), stated that inadvertent administrations of doping agents have been proven in the past, to be caused by, amongst others, the ingestion of contaminated dietary supplements. Though controversial positions concerning the effectiveness of dietary supplements in healthy subjects exist, they are frequently used by athletes, anticipating positive effects on health, recovery, and performance. However, most supplement users are unaware of the fact that the administration of such products can be associated with unforeseeable health risks and Adverse Analytical Findings (AAFs) in sports.

In this study 74.7% of the respondents exonerated Kenyan coaches as the cause of using PES by athletes. These respondents believed that Kenyan coaches do not persuade their athletes to use food supplements and traditional herbs as PES. However, 25.3% of the respondents believed that coaches from Kenya encouraged their athletes to use food supplements and traditional herbs as PES. This implies that such athletes will easily take traditional herbs and food supplements, if supplied by their coaches. According to

Aschwanden (2012), most coaches and trainers, have little scientific training and therefore are often fooled by supplement industries that bombard them with literature about nutrition, accompanied with plenty of incentives to entice them to believe the hype. Endorsement deals from supplement companies provide a major source of income for many teams, coaches, and athletes, and trainers. Sometimes coaches get paid to peddle supplements to their athletes.

A total 50.3% and 62.8% respondents did not believe that food supplements and traditional herbs help in sport situations, or improve performance, respectively. However, 49.7% believed that food supplements and traditional herbs do help in sport situations. This implied that almost half of the respondents could easily be deceived into using food supplements or traditional herbs in the hope of benefiting in sport situations, risking testing positive for PES. According to Hon and Coumans (2007) IOC, in 1990s, issued a public warning when certain supplements appeared to contain unlabeled pseudo-ephedrine, at that time a prohibited substance. This was after sprinter Linford Christie, tested positive for pseudo-ephedrine during the Olympic Games of 1988, believed to have been caused by drinking ginseng tea, which is a herbal product. Henning and Dimeo (2017), advising against food supplements usage said that it is important to realize that early exposure to supplements may increase the likelihood of reverting to illegal performance enhancing strategies.

According Tietge (2018), most of the traditional herbs are known to have medicinal value that could be part of the prohibited substances and that most people do not realize that half

of the drugs used today are artificial recreations of natural plant derived chemicals. He gave the example of Aspirin, which he said is nothing more than the chemical imitation of salicin, a substance that comes from the bark of the white willow tree. Bautista (2015), states that no herb can facilitate muscle growth without diet and exercise. However, some medicinal herbs can increase a person's testosterone levels, leading to improved stamina and muscle mass.

The belief by 67.4% respondents that traditional herbs and food supplements are not necessary for an athlete to succeed in sports, can imply that majority of Kenyan athletes are aware of the risk posed by use of traditional herbs and food supplements where one can test positive for PES. However, majority of bodybuilders (52.1%) believed that use of traditional herbs and food supplements was necessary to succeed in sports, which can be associated with their desire to grow muscles that are key to winning in their sport. This poses a danger of testing positive for PES since such products are either contaminated or intentionally added PES to make them more competitive in the market. According to Sellami, et al. (2018), use of herbal medicinal products and supplements has increased during last decades. They stated that some herbs are used to enhance muscle strength and body mass, and at times, manufacturers launch numerous products with banned ingredients and inappropriate amounts that can induce harmful side effect. Therefore, there is no guarantee that herbal supplements are safe for anyone to use and the confusion surrounding herbal use in sport field remains (Sellami et al., 2018).

Slightly more than half of the respondents (52.1%) believed that energy drinks cannot improve their performance. However close to half (47.9%) believed otherwise, which was risky since most of these products do not explicitly declare on the label all the ingredients contained in it. Sports persons are bound by the principle of strict liability in that whatever they ingest, inject, or apply will be their personal responsibility (WADC, 2015).

According to 64.6% of the respondents, Kenyan coaches do not encourage their athletes to use food supplements or traditional herbs to improve performance, which was a positive belief. However, 35.4% seems to believe otherwise. A study by Perko (2002) on young athletes and dietary supplements, placed the coach as a strong influence on use/not use of food supplements by athletes. He stated that the sport trainers have come dangerously close to practicing medicine without a license, whereby they recommend a dietary product to athletes based on symptomology, imitating "diagnosis and prescription" to a treatment. Coaches from Kenya cannot be exceptional to this finding and therefore it can be concluded that the respondents in this study were not comfortable in implicating their coaches. Cherian et al. (2020), supported the study by Perko (2002) where they stated that though nutrition has evolved as a separate faculty in sports, the work of sports nutritionists is often carried out by the coaches in resource-deprived countries.

According to Winterstein and Storrs (2001), athletic trainer is often called upon to serve as an educational resource for athletes wishing to learn more about herbal supplements. They stated that herbal products are vigorously marketed to both competitive and recreational athletes with claims of performance gains and improved health and wellness. Beliefs on

use of PES and methods would influence an athlete to use or not to use PES and methods depending on whether the belief is positive or negative. Al Ghobain (2019), in a study on Saudi Arabia football players found out that majority of the players believed that use of PES is morally wrong and that one would feel shame and guilt if caught using PES. These players also believed that less than 25% of coaches would encourage their athletes to use PES.

5.6 Assessment on use of Traditional Herbs, Food Supplements, and PES and Methods

Results of the study indicated that 28.2%, 44.2%, and 18,0% of the respondents perceived use of food supplements, traditional herbs, and PES respectively, as not a problem. This implied that such respondents could easily use these substances if an opportunity arose. Al Ghobain (2019), in his study found less than 20% of elite football players from Saudi Arabia who used PES. Though the percentage is low, it still poses a risk of athletes influencing each other to the use of such substances. Jovanov et al. (2019) in his study of athletes from 18 sports disciplines drawn from Serbia, German, Croatia, and Japan, contradicts the findings of this study where he found an overwhelming number of athletes (82.2%) that were using food supplements to improve sports performance. Sanchez, et al., (2019) in their study indicated that 31.7% of Spanish football players admitted use of food supplements. A study by Sirico et al. (2018), indicates that 38.4% of the Italian sports students admitted use of food supplements. Sanchez and Zabala (2013) carried a study on Spain cyclist and 86% admitted use of FS to improve performance, while 74% used for financial gain. Contrary to all these findings is the study by Mukherjee (2017), on elite

Singapore athletes where majority (98.7%) indicated that they had never used PES in their sporting career. The study by Mukherjee (2017), is collaborated by Miskulin et al. (2021), who found that 99.3% of Croatian professional and non-professional athletes were not using PES. Sousa et al. (2016) supports these findings where in their study on athletes from 13 sports disciplines in Portugal found out that 64% of them were using nutritional supplements. Most of the respondents in this study therefore could have failed to give truthful answers concerning use of food supplements. Aschwanden (2012) stated that despite the scarcity of evidence, athletes continue to take supplements at high rates. She quotes a study carried out in 2009 that estimated 85% elite track and field athletes and 87% Canadian athletes that took supplements. Krumrie (2014) concluded that many young athletes, seeking to gain a competitive edge, consider nutritional supplements. Oyeboode et al. (2016), stated that in scientific literature frequently quote official reports and press that state that 80% of Asian and African populations use traditional medicine to meet their healthcare needs. According to Bakhtiar et al. (2021), athletes with higher knowledge tend to use food supplements more. Kenya is no exception with most of its athletes being brought up in such rural settings, where use of traditional herbs as medication is a normal trend. It has been confirmed that use of traditional herbs by athletes can lead to a positive test in doping as in the case of Munyasia who tested positive for Cathine during Athens Olympics, after chewing miraa (Abrahamson, 2004). Chewing of miraa was a normal occurrence from where Munyasia was brought up, hence the confidence in chewing it. Another case in point is that of Sri-Lanka batman who used traditional herbs (alternative medicine) to treat bronchitis but tested positive for a substance known as prednisolone (Hopps, 2011).

According to Mottram (2013), athletes take drugs for a variety of reasons. The principal reasons include therapeutic use for the treatment of medical conditions, social and 'recreational' use and lastly performance enhancement. According to Reardon and Creado (2014), doping or use of drugs or other substances for performance enhancement, has become an important topic in virtually every sport and is being used by athletes of all ages and at every level of competition.

Results of this study indicated revealed a considerable number of respondents (25.8%), (6.3%) and (8.1%), that were using traditional herbs, food supplements and PES respectively. Though the numbers are looking few, it is worthy worrying since athletes can influence each other. Outram and Stewart (2015), stated that, despite the fact of willingly consuming prohibited substances, athletes may face the problem of false labeling or contaminations and with it the risk of positive doping tests. According to them, available data indicates that between 40-70% of athletes use supplements, which is contrary to the findings of this study. The discrepancy could be that the respondents were not truthful in their reporting in this section. According to Outram and Stewart (2015), between 10-15% of supplements may contain prohibited substances, hence a considerable risk of accidental or inadvertent doping through using supplements. This is proven by the case of an American swimmer, Jessica Hardy who set two world records in 2008 and was poised to take home medals from the Olympics, but never made it to Beijing. Instead, she was booted from the Olympic team after testing positive for clenbuterol, an asthma medication that can increase muscle growth. What Hardy had taken was something called Arginine Extreme, a nutritional supplement (Aschwanden, 2012).

Ratajczak et al. (2020) stated that dietary supplements cover a wide range of products, and the most popular contain plant-based ingredients. But lack of unified regulation in this sector increases the probability that supplements are poor chemical and microbiological quality and can be dangerous to the user. This statement was also supported by Mathews (2017) who said that with increasing use of unregulated dietary supplements, athletes are at continued risk from adverse medical events and inadvertent doping. Kenya is no exception, since it has not regulated its food supplement industry, which poses a risk of contamination to its athletes.

Traditional herbs such as miraa, bhang and mukuka are stimulants that boxers use to keep alert. Boxers may also tend to use PES in form of steroids to gain body strength. Bodybuilders would use steroids to build muscles, which is the rule for winning in this sport. Use of PES expose such players to a great danger of health consequences, which can even lead to death. A case in point is the Kenyan 30-year-old bodybuilder, Ronny Rono, who died after he developed abnormal swelling in his arms and chest after a suspected injection of Synthol (Wanjohi, 2019).

Several respondents had either been given a food supplement (3.4%), traditional herb (0.5%), or a PES (8.3%) by either a coach, team doctor or a physiotherapist. These findings clearly indicated that some Kenyan athletes support personnel are doping the athletes. Among the respondents, (8.3%) had heard a local chemist, medical practitioners or sports agent supplying PES and methods. This was evident that in Kenya there were local

suppliers of PES and methods supplying to athletes. This compounds the problem of innocent Kenya athletes testing positive for PES and methods.

5.7 Summary of Null Hypotheses

One way ANOVA was used to compute the null hypothesis on knowledge levels on FS, TH, PES, and methods among boxers, wrestlers, and bodybuilders. The hypothesis was rejected where [$F(2, 381) = 19.631, p = 0.000$] implying that there was significant difference in the knowledge levels of the three groups. Post hoc analysis was carried out using DMRT to identify differences which indicated that wrestlers had a higher mean score on knowledge ($M = 14.06, SD = 2.41$), followed by boxers ($M = 12.52, SD = 3.11$), and bodybuilders ($M = 10.93, SD = 3.94$). On attitudes the null hypothesis was also rejected, [$F(2, 381) = 25.605, P = 0.001$], indicating that there was significant difference in the attitudes of the three groups whereby the attitude of boxers ($M = 11.23, SD = 2.38$) and wrestlers ($M = 11.60, SD = 1.35$), was significantly different from that bodybuilder ($M = 9.28, SD = 3.44$). However, the attitude of boxers and wrestlers was not significantly different. It was hypothesized that the beliefs of the respondents on FS, TH, PES, and methods would not be significantly different. The results of one-way ANOVA led to the rejection of the null hypothesis that there would be no significant difference in beliefs of the respondents [$F(2, 381) = 46.646, p < 0.001$], whereas the bodybuilders ($M = 6.29, SD = 4.42$) had a higher mean, followed by boxers ($M = 3.14, SD = 3.26$) and wrestlers, ($M = 1.47, SD = 2.65$). This implied that the bodybuilders' belief towards FS, TH, PES, and methods was better than that of boxers and wrestlers. A significant difference was found in the use of FS, TH, PES and methods among boxers, wrestlers and bodybuilders as determined by the results of

one-way ANOVA on use [$F(2, 381), p = 0.000$]. The means of the three sports disciplines revealed that bodybuilders ($M=0.73, SD=0.97$), use was higher than that of boxers ($M=0.27, SD = 0.67$) and wrestlers ($M=0.04, SD = 0.19$). For factors influencing use of PES and methods, money prize, lack of knowledge on doping control practices and regulations, and desire to be famous, were seen to have a significant influence on use of PES and methods. In general, the multiple regression analysis [$F(6, 377) = 25.755, p < 0.001, R^2 = 0.292$], on the influence by the six factors showed a significant influence on respondents on use of PES and methods, hence the null hypothesis that there would be no significant difference on the influence of use of PES and methods by the six factors was rejected.

T-test was used to compute for significant differences in the sub null hypothesis on the independent variable on gender in relation to knowledge levels, beliefs, and attitudes of the respondents. The t-value for the sub null hypothesis that there would be no significant difference in the knowledge levels of male and female respondents on FS, TH, PES, and methods, [$t(382) = 1.605, p = 0.109$], was not rejected implying that the knowledge levels of male and female respondents were significantly different. The sub hypothesis that there would be no significant difference in beliefs of male and female on FS, TH, PES, and methods, [$t(382) = 3.574, P = 0.000$], was rejected implying that the beliefs of male were significantly different from those of female. The results on beliefs [$t(382) = -4.956, p < 0.001$], as well as use [$t(382) = -2.433, p = 0.015$], led to rejection of the sub hypotheses implying that beliefs for male were significantly different from those of female respondents, and that use of FS, TH, PES, and methods by male was significantly different from that of female respondents.

5.8 Pearson Correlation on Knowledge Levels, Experience, Attitudes, Beliefs and Use of FS, TH, PES, and Methods

The findings on Pearson Correlation Coefficient on continuous variables such as knowledge levels, experience, attitudes, beliefs and use of FS, TH, PES, and methods were found to be significant at 95% confidence level. Positive association found between knowledge and experience [$r(384) = 0.222, p < 0.001$], implied that the more respondents became experienced, the high the likelihood of acquiring high knowledge level on FS, TH, PES, and methods. Use of FS, TH, PES, and methods had a positive association with experience [$r(384) = 0.187, p < 0.001$], in that respondents with more experience had a high level of use. On the other hand, knowledge levels and attitude had a positive association of [$r(384) = 0.380, p < 0.001$], implying that respondents with high knowledge levels exhibited a positive attitude towards use of FS, TH, PES, and methods whereas increase in beliefs led to increase in use [$r(384) = 0.515, p < 0.001$].

However, a significant negative association was found where increase in knowledge led to a decrease in beliefs [$r(384) = - 0.443, p < 0.001$], implying that respondents who were well informed in matters of FS, TH, PES, and methods, did not believe in them to improve performance, leading to a decrease in use [$r(384) = - 0.133, p < 0.001$]. A positive attitude towards FS, TH, PES, and methods led to a decrease in beliefs [$r(384) = - 0.677, p < 0.001$], hence a decrease in in use of the same [$r(384) = - 0.446, p < 0.001$].

5.9 Assessment on Association between Gender of the Respondents and Knowledge Levels, Attitudes, Beliefs and Use of PES and methods.

According to the mean value for male and female, the results indicated that female respondents had a higher knowledge level ($M = 12.66$, $SD = 3.353$), than male respondents ($M = 11.90$, $SD = 3.626$). However, the t-test results [$t(382) = 1.605$, $p = 0.109$], indicated a no significant difference in knowledge levels between male and female respondents. This finding is supported by Sekulic et al. (2016), who in their study on team sports, concluded that though all the athletes had low knowledge level on doping, female athletes possessed better knowledge as compared to male athletes. Again, the female respondents ($M = 11.56$, $SD = 2.165$) had the right attitude, compared to male respondents ($M = 10.17$, $SD = 3.076$), as supported by the results of t-test [$t(382) = 3.574$, $p < 0.001$], which indicated a significant difference in their attitudes. This negates a study carried out by Muwonge et al. (2015), where they found no significant difference in the attitudes of male from that of female on doping. However, Bloodworth et al. (2010), in their study on talented young athletes from UK, found male athletes to have more permissive attitudes towards use of PES than female athletes. Female respondents ($M = 2.14$, $SD = 3.327$) had a lower belief than male ($M = 4.78$, $SD = 4.190$). The results of t-test supported these results [$t(382) = -4.956$, $p < 0.001$], reflecting a significant difference in their beliefs. Tavares et al. (2020), in their study, support this finding whereby they compared the beliefs of male to female athletes on use of PES and concluded that female athletes had less belief as compared to male. On use of PES and methods, the mean values indicated that female respondents ($M = 0.23$, $SD = 0.487$) had a lower tendency in use of PES and methods, than their male counterparts ($M = 0.49$, $SD = 0.858$). However, the t-test results showed no significant

difference [$t(382) = -2.435, p = 0.015$] in the use of PES and methods between female and male respondents. The study by Buckman et al. (2011), supports this finding in that they indicated that male had a higher use than female athletes, whereby one third of male were in use of PES, as compared to one quarter of female athletes. Also, Sekulic et al. (2016), found out that male athletes had a higher likelihood to doping than female athletes. Finamore et al. (2022) in their study on Gym users in Roman area, supported the findings by stating that more males (61.9%) than females (48.9%) were using PES.

5.10 Assessment of factors that Influence use of Traditional Herbs, Food Supplements, and PES

Several factors were seen to influence use of traditional herbs, food supplements, and PES and Methods. Majority of the respondents (57.8%) quoted money prize and need to boost economic status as the highest factor of influence to the use of food supplements. This was followed by lack of confidence and pressure from self (16.1%). This implied that such respondents were driven to the use of food supplements by the desire to win and earn money prize, which would help them boost their economic status. The drive was from within coupled with lack of confidence. Savulescu, et al (2003) stated that elite athletes can earn tens of millions of dollars every year in prize money alone, and millions more in sponsorships and endorsements, making the lure of success great. Pressure from coaches, family, and colleague athletes (15.4%) was also a factor of great influence. This meant that coaches could exert pressure through great demand for a win until players are forced to use alternative ways to boost their performance. Apart from these two factors desire for fame (1.3%) and travel abroad also played a role as a factor of influence. Lack of knowledge on

health consequences (6.9%) and doping control practices (2.9%) were factors that could be associated with low coverage on anti-doping education among this group of respondents.

A higher number of respondents (51.2%) had the factor of money prize and boost of economic status as the highest influencing factors, followed by pressure from family, colleague athletes, and coaches. Factors influencing use of traditional herbs, and PES and methods among many respondents again had a similar pattern to that of use of food supplements, whereby money prize came first for use of traditional herbs (55.7%) and PES and methods (60.4%). It was followed by lack of confidence and pressure from self for traditional herbs (22.7%) and lack of knowledge on health consequences for PES and methods (14.3%).

For PES and methods, money prize came first for most of the respondents (50.3%), followed by lack of knowledge on health, lack of confidence and pressure from self. According to Boit et al. (2014) athletes who used PES did so because they thought they were safe, while 41.3% used them to enhance performance. Desire to enhance performance can be related to the desire to win, hence money prize. Aliabadi and Hesami (2014) stated that nowadays, athletes compete at the highest level and are often under the pressures of proponents, politicians, coaches, parents, organizations, and gyms to achieve sport triumphs. All these pressures cause them to seek for physiologic supremacy, nutritional and mental biomechanics at any cost. According to Levy (2014), factors that influence use of food supplements, traditional herbs and PES include belief: that competitors take drugs; determination to do anything to win; pressures from coaches, parents, peers; community

attitudes and expectations; financial rewards; media influence; and belief of enhanced performance. Bloodworth et al. (2010) in their study on British athletes highlighted emotional and pressure from parents (22.5%) and financial gain (11.3%), as factors that motivated athletes to use PES. Chebet (2014), in her study on elite athlete runners from Kenya supports the finding of this study by indicating money prize (54%) as the highest factor that influences athletes to dope, followed by external pressure (18%) and lack of confidence (14.4%). The findings are also supported by Petroczi and Aidman (2008), who found athletes to be highly motivated by self-esteem, level of confidence, integrity, expectations from coaches, parents, vulnerability to peer pressure, attitudes towards peers and beliefs about doping efficacy. Kaoche (2014), stated that the desire to imitate others (73.6%) and to win competition (73.2%), were the main factors that influenced football players in Malawi to use PES.

5.11 Assessment of Common Sources of Information on Traditional Herbs, Food Supplements, and PES and Methods

The most common source of information on traditional herbs, food supplements, and PES and methods for the three sports disciplines was found to be relevant federations (34.9%), followed by ADAK (32.0%) and finally WADA (9.1%). Other sources were at an aggregate of (19.3%), with the remaining (4.7%) having never received such information. Respondents indicated the most likely website to use to be up to date with information on traditional herbs, food supplements, and PES and methods, as specific federations website (32.3%), followed by ADAK website (22.9%), and WADA website (16.9%). Those who never checked websites were (22.9%), leaving the balance of (4.9%) as those who checked

information from other websites. This finding was supported by a study by Boit, et al., (2014) that indicated sports federations as the highest source of information to athletes at 30.6%, while preferred websites by athletes as that of sports federation at 40% with 33.6% having never checked the website. According to Chebet (2014), 30.6% of the respondents preferred to receive information on PES from their national and international federation federations' websites, (23%) personal emails, and (16.5%) SMS. From the findings it is evident that websites owned by sports federations are key to providing information on the fight against doping in sports.

Testing Procedures Leaflet as well as the Competitors and Official Guide were found to be useful by many respondents (51.3%) and (62.8%) respectively. These findings could be influenced by the fact that Testing Procedures Leaflets, and Competitors and Official Guides are provided during sporting activities. Information from database or email, as well as making a telephone call to find out information on drugs or doping would require the effort of an athlete. Majority of the respondents (64.1%) had never attended a workshop on sports nutrition, traditional herbs, food supplements, and PES and methods. However, majority (87.8%) of those who had ever attended such a workshop found it useful. Boit et al. (2014) indicated that 65.2% of those who had attended workshops found it to be useful.

5.11.1 Personnel that ever-Provided Information to respondents on FS, TH and PES

For information or advice provided on food supplements, traditional herbs, and PES and methods by different individuals, the coach was indicated by majority of the respondents (61.5%) as providing such information or advice. This finding is supported by Subbarao et al (2020), in a study carried out in Iran where 89.4 % athletes found coaches to be their

main nutrition informers while in Egypt they reported that coaches were the primary source of nutrition information for the athletes. The study by Boit et al. (2014) found coaches as the highest source of information at 87.1% followed by team doctors at 58.4%. Muwonge et al. (2015), in their study also found coaches, fellow athletes and federation officials as being the main source of information to athletes regarding performance enhancing substances. They also quoted media, team doctor and internet as other sources of information. According to Kaoche (2014), sources of information on PES to Malawian football players included teammates (88.9%), coaches (65.1%) and seminars (18.3%). Finamore et al. (2022) in their study on Gym users in Roman area, indicated that 84% males than females, preferred gym trainer, who can also be referred to as a coach, as source of information on PES. Jovanov et al. (2019) in their study found coaches (41.4%) as the primary source of information on food supplements. These findings are supported by Bakhtair et al. (2014) who in their study in Bangladesh, found the coaches (98%), to be the primary source of information. However, 40% of these respondents relied on textbooks for such information.

On the other hand, personal doctor did not seem to provide such information as indicated by many of the respondents (84.9%). The same was replicated on a team doctor (84.9%) and Team Physiotherapists (77.3%), an official from a Governing Body (84.6%), an official from ADAK (87.2%) and researchers (90.4%), who the majority indicated as not having provided information on traditional herbs, food supplements, and PES and methods. Though majority of the bodybuilders (60.4%) received such information from another athlete, still the overall score from majority of the respondents (24.2%) was that they did

not receive such information from another athlete. This finding was supported by the study by Boit et al. (2014) where media (26.9% and the coach (17.3%) ranked highest in provision of important information on the fight against doping in sports to athletes. According to this finding, it can be deduced that athletes rely more on their coaches rather than personal doctor, team doctor, physio, or any other individual for information important to their career development. Shalan et al. (2018) in their study found that apart from family and friends, coaches highly influenced athletes on use of food supplements to improve energy and sports performance. Therefore, coaches have a lot of influence on athletes.

5.12 Usefulness of Resources and Services Offered to Respondents

From the findings, it can be concluded that respondents found competitors and official guide (53.6%) and testing procedure leaflets (48.1%), useful resources on information on PES. To some extent, drug information data base (46.1%) and drug information email (42.5%), were also found to be useful. Leaflets and officials' competition guides are resources that are issued to athletes during sports competition. This could have contributed to the two methods being ranked high by athletes, since to them, so long as they are at the venue of competition, they are assured of receiving such resources hence being seen as reliable. Being in the era of technology, athletes would also prefer a reliable drug information data base and email where they can easily search for desired information.

5.13 Preferred Way of Receiving Anti-Doping Information

Most of the respondents preferred to receive information through SMS, followed by telephone, coach, email and agent in that order. This could only mean that this group of

respondents had personal mobile phones which they could rely on. The findings indicate that a coach is an important person to the athletes, who can be trusted by most of them. Respondents were asked to state the common sources of disseminating anti-doping information and materials. Most respondents (47.7%) indicated ADAK as a main source of disseminating anti-doping information and materials. However, (13.0%) had no idea on this issue. Seminars and workshops were also a key source of disseminating anti-doping materials.

5.14 Common Sources of Disseminating Anti-Doping Materials

The most popular sources of disseminating anti-doping materials to the respondents were quoted as websites (45.8%), internet and leaflets. This was followed by coaches and fellow athletes (0.4%), seminars and workshops (9.9%). According to this finding, though websites and internet are important for passing information to athletes, the role of coaches and fellow athletes cannot be ignored. This finding is collaborated by Nic-Banea (2016), who stated that apart from the physician, coaches and fellow athletes have a lot of influence on decisions made by athletes on doping issues. Implying that they are key source of information to the athletes.

5.15 Legal FS, TH, PES, and Methods

Majority of the respondents (24.7%) thought that food supplements such as creatine, whey, megamass, amino acids and energy drinks were legal. Apparently, there were respondents (3.9%) that thought that PES such as EPO and steroids were legal, with (1.0%) thinking that mukobero, weed, miraa, mukuka and bhang were legal. This poses a great danger to

the athletes from these federations, especially from boxing and bodybuilding who thought PES such as EPO and steroids were legal with (1.9%) from boxing and (7.1%) from bodybuilding. According to Pipe and Ayotte (2002), the dietary supplement industry is unregulated and consequently, an abundance of supplement products of dubious value, content, and quality are now available around the world with many of them containing substances that are prohibited in sport. (Pipe & Ayotte, 2002) stated that sport practitioners have responsibilities in addressing this issue, and that athletes need to be aware of the problems that can follow supplement use, and sport authorities need to ensure that nutritional education and guidance for athletes is of the highest standard.

Most respondents (43.5%) were using food supplements. Apparently, none of the respondents was using traditional herbs though they had declared some of them as legal such as mukuka, mukobero, and miraa. Those who were using PES such as EPO were (0.5%), both coming from bodybuilding. Though few were using, it was still a risk to other athletes who could be influenced to use. According to Mathews (2017), along with risks for inadvertent doping, dietary supplement use is strongly associated with intentional doping in elite and amateur sports. Adolescents who used dietary supplements had significantly stronger doping intentions and more positive attitudes and favorable behaviors toward doping. Dietary supplement use is a “gateway to doping,” with doping being 3.5 times higher in a dietary supplement user group than a nonuser group. A higher number of respondents were not aware of the common food supplements, traditional herbs, or PES in use. Food supplements have been found to be contaminated, hence posing a risk of athletes testing positive for doping. This is supported by Mathews (2017), who stated

that poor manufacturing processes and intentional contamination with many banned substances continue to occur in dietary supplements. He points out that certain sectors, such as weight loss and muscle-building supplements, pose a greater threat because they are more likely to be contaminated.

5.16 Common FS, TH and PES and Methods used by Respondents

Majority of the respondents (36.5%), listed creatine, amino acids, energy drinks (energizers), mega mass and omega 3 as the most common food supplements used by sports persons. Other food supplements quoted by individual sports disciplines, included whey and glutamine. Commonly used PES quoted by the team included EPO (6.8%), steroids (1.8%), stimulants (1.0%), cocaine, heroin, caffeine, Beta 2 and bhang (6.5%). Traditional herbs indicated as commonly used were tobacco, busaa, miraa, mukuka and mukobero.

Different countries use traditional herbs with different names, but essentially with almost the same (if not the same) compounds. The use of traditional herbs across nations is also equally the same – for treatment or performance enhancing purposes. Sellami et al. (2018) state that use of herbal medicinal products and supplements has increased during the last decades. They also said that herbal products are extracted from seeds, gums, roots, leaves, bark, berries, or flowers. Sekulic et al. (2019), on a study on Canadian athletes quoted the commonly used food supplements as protein supplements such as sports bar, multivitamins, and energy drinks, collaborating the food supplements being used by the respondents in this study. The findings of a study by Aljaloud and Ibrahim (2013), on dietary supplements for professional athletes from Saudi Arabia, support the findings of

this study where they found out that the athletes were using food supplements for performance enhancement and health benefits. The commonly used food supplements by these athletes included multivitamins, sports drinks (energy drinks), creatine and omega 6. Mayo Clinic Staff (2020) quoted the most common performance enhancing substances used by athletes as creatine, steroids, stimulants, and caffeine, which supports the findings of this study. Shalan et al. (2018) in their study on Malaysia athletes found the commonly used food supplements as amino acids, mega mass, creatine, energy boosters, omega-3, fat burners, and various vitamins. The findings by Duvenage et al. (2015) also supports the findings of this study whereby in their study on U16 Rugby players, found creatine as the commonly used food supplements by these players. Alaranta et al. (2006), found athletes in their study were using stimulants and anabolic steroids. The gym users in the study by Finamore et al. (2022) were found to use multivitamins, amino acids, minerals, and protein powders.

5.17 Ever Been Tested and the Possibility of Providing a Wrong Sample

Most respondents (21.6%) had been tested. From the three sports disciplines those who had been tested were (25.9%) from boxing, (15.1%) from wrestling, and (19.5%) from bodybuilding. The findings on those who had ever participated in a sports competition again supported the fact that most of these respondents (80.5%) were at a considerably high level of sports participation probably, national, or international level. Athletes at this level are expected to be fully aware of issues related to doping especially that they could test positive for taking food supplements or traditional herbs. This is according to the WADC (2021), that spells out ‘the principle of strict liability’ to the athletes, meaning that athletes

are responsible for what they ingest, inject, or apply on their bodies. This principle safeguards athletes from of health consequences of doping, as well as sanctions related to the Anti-Doping Rule Violations (ADRVs) as stated in the WADC (2021).

Among those tested (62.2%) were tested ‘in-competition’ and (37.8%) were tested out-of-competition. A sports event that attracts testing, in most cases, has a reward such as money prize attached to it, posing a temptation to participants to dope to win. It was evident that among those tested, a high number (45.1%), was given advance notice whereby they received a telephone call from the testing official before providing the sample. The WADC (2021) and International Standard for Testing and Investigation (ISTI) 2021 require that sample collection for doping test is carried out at ‘no advance notice’. Therefore, telephoning an athlete before testing tantamount to advance notice or warning. According to ISTI (2021) advance notice can lead to tampering or sample manipulation, hindering detection of prohibited substance(s) during testing.

Providing a wrong sample can mean giving a sample from someone else, using some concoction or providing a sample from an animal. According to (35.4%) respondents, it was possible for an athlete to provide a wrong sample. There were (1.6%) respondents that confirmed having provided a sample that was not theirs. Out of the six (6), (3.1%) were from boxing and (0.6%) from bodybuilding. This confirms that provision of wrong samples was taking place among the three sports disciplines, implying that the results that come from the laboratory are not credible and probably cannot be connected to the tested athlete.

In this case it can be concluded that Sample Collection Officers were not observing sample collection procedures as stipulated by the WADC (2021) or ISTI (2021).

Several respondents (6.5%) confirmed that they knew an athlete who had given a wrong sample. These respondents were spread out in all the three sports disciplines with (9.3%) coming from boxing, (5.7%) and (4.1%) from wrestling and bodybuilding, respectively. This confirms that collection of wrong samples is happening across sports federations, pointing to poor application or observation of sample collection procedures by Sample Collection Officers. According to ISTI (2021) Sample Collection Personnel (SCP) are expected to chaperone the athletes from the point of notification until samples are provided. Sample Collection Personnel are expected to chaperone the movements and actions of the notified athletes until samples have been provided. Chaperoning includes physically witnessing where the passing of the sample is coming out from the body of the identified athlete. Hence, SCP need to position themselves strategically after ensuring a clear view of the body of the athlete, as recommended by the WADC (2021) and ISTI (2021) for testing.

CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY OF THE FINDINGS

The study was to assess knowledge levels, attitudes, beliefs and practices of boxers, wrestlers, and bodybuilders towards use of performances enhancing substances in Kenya.

The following are the main findings of the study.

- (i) The One-way ANOVA revealed a significant difference in the knowledge levels of boxers, bodybuilders and wrestlers on FS, TH and PES. The mean knowledge score of wrestlers on FS, TH and PES and methods was higher than that of bodybuilders and boxers.
- (ii) One-way ANOVA reflected a significant difference in the attitudes of respondents from the three sport disciplines towards use of FS, TH and PES. The attitudes of boxers and wrestlers towards use of FS, TH and PES was better than that of the bodybuilders.
- (iii) The One-way ANOVA revealed a significant difference in the beliefs of boxers, wrestlers, and bodybuilders towards use of FS, TH, and PES. The mean values on beliefs of the respondents on FS, TH, and PES, reflected that bodybuilders belief was better than that of boxers and wrestlers.
- (iv) One-way ANOVA reflected a significant difference in the use of FS, TH, and PES, while the means scores reflected those bodybuilders were more likely to use FS, TH, and PES than boxers and wrestlers.
- (v) Pearson correlation revealed a significant positive association whereby knowledge levels on use of FS, TH and PES by respondents increased with increase in

experience, use increased as experience increased, increase in knowledge led to increase in attitude, while increase in beliefs led to increase in use.

- (vi) Pearson correlation revealed a significant negative association in the use of FS, TH, and PES by respondents indicating that increase in knowledge led to a decrease in beliefs, and a decrease in use. Increase in attitude led to a decrease in beliefs, as well as a decrease in use.
- (vii) The mean score on knowledge levels of male to female respondents revealed a better knowledge level for female as compared with that of male. The results also revealed that there was no significant difference in the knowledge levels of male in relation to female participants.
- (viii) The mean score on attitude revealed that female had a better attitude than male respondents, which was confirmed through the t-test that returned a significant difference in the attitudes of female to male respondents.
- (ix) The mean value on beliefs indicated that female respondents had a lower belief in comparison to male counterparts. The t-test results revealed a significant difference in the beliefs of male to female.
- (x) The mean value on use of PES revealed a lower tendency by female than male respondents, which was confirmed through t-test analysis which indicated a significant difference between the two.
- (xi) Analysis of multiple regression revealed three of the six factors as highly influencing the use of FS, TH, and PES among boxers, wrestlers, and bodybuilders. These are money prize, lack of knowledge on doping control practices and regulations as well as the desire to be famous.

- (xii) Sports federations, ADAK, WADA, and fellow athlete were named by the respondents as the most common sources of information on FS, TH, and PES in that order.
- (xiii) Personnel that mostly provided respondents with information on FS, TH and PES included, coaches, fellow athletes, and officials from their relevant federations.

6.2 CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

- (i) There are gender disparities of athletes from boxing, wrestling, and bodybuilding federations in Kenya, whereby there are more male in comparison to female athletes.
- (ii) Athletes from boxing, bodybuilding and wrestling federations understand that food supplements, traditional herbs or PES bought from a drugstore or over the counter are not necessarily safe to use; prohibited substances would not be declared on the label of such products; they can be sanctioned if they tested positive for a prohibited substance after taking such substances; and that a coach, team doctor or a physiotherapist cannot tell which of these substances contains a prohibited substance.
- (iii) Athletes from boxing, bodybuilding and wrestling are aware that boosting blood levels is prohibited in sports, blood manipulation can lead to infectious diseases and that they could test positive for a prohibited method if they boosted their blood levels. They were also aware that doctor, physician, or paramedical personnel assisting an athlete to manipulate blood components can be sanctioned together with the athlete, if the athlete tested positive for a prohibited method.

- (iv) There were significant differences in knowledge levels of boxers, bodybuilders and wrestlers on food supplements, traditional herbs, and performance enhancing substances and methods.
- (v) Athletes from boxing, wrestling and bodybuilding are aware that food supplementation in sports is cheating even when everyone does it. They also understand that the strategies used to achieve quality performance are important and that use of recreation drugs does not solve problems in sports.
- (vi) Athletes from boxing, bodybuilding and wrestling avoid use of performance enhancing substances in competitive sports because they feel guilty when they do so.
- (vii) Athletes from boxing, bodybuilding, and wrestling who use PES are aware of risks involved and those who use them are not pressured by anyone but willingly choose to do so. They are also aware that there are alternative career choices for athletes.
- (viii) The attitudes of boxers, bodybuilders, and wrestlers towards use of food supplements, traditional herbs, PES, and methods are significantly different.
- (ix) The beliefs of bodybuilders, boxers, and wrestlers on use of PES, food supplements and traditional herbs are significantly different.
- (x) There was significant difference in the use of FS, TH, and PES by bodybuilders, wrestlers, and boxers.
- (xi) Experienced athletes are more knowledgeable, hence have a likelihood to use food supplements, traditional herbs and PES and methods
- (xii) These athletes are also aware that food supplements are a form of doping and that energy drinks do not improve an athlete's performance in sports.

- (xiii) Knowledge levels of male respondents was not significantly differently from that of female respondents.
- (xiv) Attitudes, beliefs, and use of FS, TH, PES, and methods by male respondents was not significantly different from that of female respondents.
- (xv) Money prize, lack of knowledge on doping control practices and regulations and desire to be famous are some of the factors that highly influence athletes to use food supplements, traditional herbs, and PES.
- (xvi) Athletes from boxing, wrestling and body building who use food supplements, traditional herbs, and PES, do so to improve performance.
- (xvii) Coaches, local chemists, sports agents, team doctors, physiotherapists and other medical practitioners are suppliers of food supplements, traditional herbs, and PES to athletes from boxing and bodybuilding.
- (xviii) These athletes trust their federation officials, ADAK, and to some extent WADA, and fellow athletes, for information on food supplements, traditional herbs, and PES.
- (xix) Coaches and federation officials are highly relied upon by athletes for advice on food supplements, traditional herbs, and PES.
- (xx) Conducting anti-doping workshops is an effective method of sharing information on food supplements, traditional herbs, and PES with athletes. However, providing Testing Procedure Leaflets, and Competitors and Official Guide to athletes especially during sports competitions, is also effective sources of passing such information.
- (xxi) Athletes from bodybuilding, wrestling and boxing are misinformed on regulations on food supplements, traditional herbs, and PES, and as such they consider the

following substances as legal: creatine, whey, megamass, amino acids and energy drinks, mukobero, weed, miraa and mukuka, EPO and steroids.

(xxii) Most athletes from bodybuilding, boxing and wrestling are subjected to in-and out-of competition doping tests and are among athletes who provided wrong samples for testing. They also receive advance notices from testing officials before the actual testing.

6.3 RECOMMENDATIONS

The following recommendations were made based on the conclusions of this study:

6.3.1 Recommendations for Policy

- i. Sports federation officials from boxing, wrestling and bodybuilding should have a put proper structures for imparting knowledge and consequences on use of performance enhancing substances to athletes.
- ii. Sports federation officials from boxing, wrestling and bodybuilding should put more emphasis on values that develop right attitudes and beliefs of athletes towards use of PES to improve outcomes on sports competitions.
- iii. The study revealed that anti-doping workshops are useful and effective to sharing information with athletes on food supplements, traditional herbs and PES and methods. Therefore, it is recommended that ADAK and sports federations plan a robust program on anti-doping workshops for athletes and their support personnel to share information on food supplements, traditional herbs and PES and methods. Emphasis should be put on regulation status of such substances.

- iv. Since athletes rely and trust information from coaches and federation officials, sports federations should partner with ADAK to train and impart proper information to coaches and federations officials, on food supplements, traditional herbs and PES and methods which will ensure that athletes receive legitimate information on these topics.
- v. Sports federations from the three sports disciplines should come up with modalities of supplying leaflets and competition guides or manuals containing information on food supplements, traditional herbs, PES, and methods, to be provided to athletes during sports competitions or events.
- vi. Sports Federations of boxing, wrestling, and bodybuilding should carry out a thorough training for testing officials, on procedures and requirements of sample collection to cure the anomaly of providing athletes with advance notices or collecting wrong samples from athletes.
- vii. The findings revealed that money prize, among others, is a key factor that influence athletes to use food supplements, traditional herbs, and PES, to improve sports performance. Therefore, ADAK should enhance its program on testing of athletes, especially where stakes are high in a sports competition, to catch those who are tempted to use such substances.
- viii. It was also revealed that local chemists and support personnel supply athletes with FS, TH and PES. This calls for a rigorous intelligent gathering and investigations by relevant arms of Government to curb such supply.
- ix. Athletes and officials from boxing, wrestling and bodybuilding should put effective strategies for training and conditioning athletes, as well as advice on proper use of

nutritional diet to improve sports performance, rather than engaging in short-cuts like use of PES substances.

6.3.2 Recommendations for Further Research

- i. There is need to conduct studies on athletes from other sports federations especially martial arts, on their knowledge levels, attitudes, beliefs and practices on FS, TH and PES and methods.
- ii. A similar study should be conducted among athletes support personnel since they have a high influence on athletes.

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APPENDICES

APPENDIX A: PERMISSION TO CONDUCT RESEARCH

Boxing Association of Kenya (BAK)

Kenya Wrestling Federation

Kenya Bodybuilding Federation

Agnes Wanjiku Mandu

Anti-Doping Agency of Kenya

P.O. Box 66458-80100

Nairobi

Dear Sir/Madam

RE: PERMISSION TO CONDUCT RESEARCH ON KNOWLEDGE, ATTITUDES, BELIEFS AND PRACTICES OF BOXERS, BODYBUILDERS AND WRESTLERS ON USE OF PERFORMANCE-ENHANCING SUBSTANCES AND METHODS IN KENYA

I am a postgraduate student at Kenyatta University, Pursuing a degree in Doctor of Philosophy, (Exercise and Sports Science). To complete my degree program, I am required to conduct research. This research will be based on 'Evaluation of knowledge, attitudes, beliefs and practices of boxers, bodybuilders and wrestlers on the use of performance-enhancing substances and methods in Kenya'.

I am humbly requesting for permission and support from your federation necessary in conducting this study. The study will be carried out through administration of questionnaires to athletes and their support personnel.

I assure you confidentiality of the data that will be collected which will be solely used for research purposes.

I highly appreciate your support in advance.

Yours faithfully,

Agnes Wanjiku Mandu.

APPENDIX B: CONSENT FORM

Evaluation of the knowledge, attitudes, beliefs and practices of boxers, wrestlers and body builders in the use of performance-enhancing substances and method in Kenya.

Dear athlete

You have been chosen to participate in this research, which will assess boxers, wrestlers, and bodybuilders' knowledge, attitudes, beliefs, and practices in the use of performance-enhancing substances and methods in Kenya.

If it is not too much trouble, set aside some effort to go through the directions and do not spare a moment to ask any query on the off chance that there is anything not clear to you. You are generously required to offer your genuine input when reacting to the things in the tool. Your investment in this investigation is deliberate and you may pick to stop whenever you feel that a portion of the inquiries are encroaching on your privacy.

All the data you give will just be utilized for objectives behind the research and will be treated with secrecy. This cycle will not take quite a bit of your time. Upon finish, if it is not too much trouble, return the tool. If there should arise an occurrence of any further inquiries, do not hesitate to contact the researcher through the contact data given.

The demonstration of signing the form mirrors your own consent to take part in this research.

Much thanks to you for your participation in this significant endeavour.

Sign

Agnes Wanjiku Mandu
0722654144
wanjikumandu@gmail.com

APPENDIX C: ATHLETES' QUESTIONNAIRE

SECTION ONE

Dear Athlete

This questionnaire is designed for mixed martial arts sports research and the researcher aims at establishing the knowledge levels on food supplements traditional herbs and performance enhancing substances and methods among their athletes. All the information you give shall only be used for research purposes and will be treated with confidentiality. The findings of this study may be of help to the Anti-Doping Agency of Kenya (ADAK) and other sports federations on the fight against doping in sports.

Read the items carefully and give your honest responses according to the key provided. Tick your most appropriate response

I need to find out what you know and think about performance enhancing substances issues. So please participate in filing this questionnaire using the mobile data collection. 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? (years) _____
2. What is your gender?
A. Male
B. Female
3. In which year did you first join competitive performance in martial arts in Kenya?

4. Which is your category in the martial arts? _____

Knowledge Evaluation

How well-informed are you about the following procedures with regard to Food Supplements (FS), Traditional Herbs (TH) and Performance Enhancing (PES) and Methods?

Please answer using a scale of 1 to 3, where 1 means you are very well-informed and 3 means that you are very poorly informed.

Food Supplements

5. ADAK can tell me which nutrition supplements are safe to use?
1 True
2 False
3 Don't know
6. If a food supplement is bought from the pharmacy (over-the-counter), it must be safe for an athlete to use.
1 True
2 False
3 Don't know
7. If a food supplement contains a prohibited substance, it will always say so on the label.

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

8. I can be sanctioned if I test positive after taking what I thought was a safe food supplement.

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

Traditional Herbs

9. ADAK can tell me which Traditional Herbs are safe to use?

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

10. If a Traditional Herb is bought from a herbalist (or over-the-counter), it is definitely safe for an athlete to use.

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

11. If a Traditional Herb contains a prohibited substance, my coach/team doctor/physiotherapist would know.

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

12. I can be sanctioned if I test positive after taking what I thought was a safe Traditional Herb

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

Performance Enhancing Substances and methods

13. ADAK can tell me which Performance Enhancing Substances are safe to use?

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

14. If a Performance Enhancing Substance is bought from the pharmacy (over-the-counter), it must be safe for an athlete to use.

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

15. If a Performance Enhancing Substance contains a prohibited substance, my

Athletes should not feel guilty about breaking the rules and taking Performance-Enhancing Substances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are risks related to use of supplements in sports.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Athletes have no alternative career choices, except sport.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performance-Enhancing herbs and supplements should be legalized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional herbs and supplements are an unavoidable part of competitive sport.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional Herbs and Food Supplements help to overcome boredom during training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is no difference Performance-Enhancing Substances, fiber glass poles, and speedy swim suits that are all used to enhance performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Beliefs Assessment

18. The statements below represent what athletes may believe about Food Supplements. Please select the number that best reflects your agreement. There is no right or wrong answer.

<u>Strongly disagree</u>	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
1	2	3	4	5	6

<p>Do you believe some Kenyan Coaches encourage their athletes to use Nutrition Supplements to improve athletic performance?</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p>Do you believe some Kenyan Coaches encourage their athletes to use Traditional Herbs to improve athletic performance?</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Assessment of Common Sources of Information on Food supplements, Traditional Herbs and Performance enhancing substances and methods

19. From which of the following sources do you most often receive information on NS, TH and PES in sport?(please circle one number only)
- 1 Kenya Body Building Federation
 - 2 Kenya Amateur Wrestling Federation
 - 3 Boxing Association of Kenya
 - 4 ADAK
 - 5 NACADA
 - 6 World Anti-Doping Agency
 - 7 Traditional herbalists
 - 8 I have received information on drug-free sport but I don't know the source(s)
 - 9 Fellow athletes
 - 10 I have never received information on drug-free sport
20. Which of the following websites (if any) are you most likely to use to keep up-to-date with **Food supplements, Traditional Herbs and Performance enhancing substances and methods?** (please circle one number only)
- 1 Kenya Amateur Wrestling Federation
 - 2 Kenya Amateur Wrestling Federation
 - 3 Boxing Association of Kenya

- 4 Your National Governing Body website
- 5 Your National Federation website
- 6 World Anti-Doping Agency website
- 7 Other website
- 8 I don't really spend any time looking for information about drug-free sport issues and testing procedures
- 9 ADAK-Anti-doping Agency of Kenya

21. How useful did you find the following resources and services. Please answer using a scale of 1to5, 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

22. Have you ever attended a Sports Nutrition, **food supplements, Traditional Herbs and Performance enhancing substances and methods** workshop?
- 1 Yes
 - 2 No
 - 3 Don't know

IF NO, GO TO Q23

23. 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

24. Have any of the following people ever provided you with information and/or advice about **Food supplements, Traditional Herbs and Performance enhancing substances and methods?** (Please circle one number for each type)

	Yes	No	Not sure/ Can't remember	Not applicabl e
Your coach (current or previous)	1	2	3	4
Your <u>Doctor</u> (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 ADAK (not including a Doping Control Officer)	1	2	3	4
Another athlete	1	2	3	4
Researchers	1	2	3	4
Others				

25. Assessment on use of Food supplements, Traditional Herbs and Performance enhancing substances and methods

To what extent is use of Food Supplements by Kenyan Athletes during training or competition? 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. Food Supplement use by Kenyan Athletes is major problem
- 2.
- 3.
- 4.
5. Food Supplement use by Kenyan Athletes is NOT a problem at all

26. To what extent is use of Traditional Herbs by Kenyan Athletes during training or competition? 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. Use of Traditional Herbs Kenyan Athletes is a major problem
- 2.
- 3.
- 4.
5. Use of Traditional Herbs by Kenyan Athletes is NOT a problem at all

27. To what extent is use of Performance Enhancing Substances by Kenyan Athletes during training or competition? 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. Use of Performance Enhancing Substances by Kenyan Athletes is a major problem
- 2.
- 3.
- 4.
5. Use of Performance Enhancing Substances by Kenyan Athletes is NOT a problem at all

28. a) Have you ever used a Nutrition Supplement to improve your sports performance?

1. Yes
2. No

b) IF YES Name(s)

29. a) Have you ever used a Traditional Herb to improve your sports performance?

1. Yes

2. No
b) IF YES Name(s)

30. a) Have you ever used any other Performance Enhancing Substance to improve your sports performance?

1. Yes
2. No

b) IF YES Name(s)

31. a) Have you ever been given a Food Supplement by a Coach, Team Doctor/Physio to enhance your performance?

1. Yes
2. No

b) IF YES Name(s)

32. Have you ever been given a Traditional Herb by a Coach/ Doctor/Physio to enhance your performance?

1. Yes
2. No

b) IF YES Name(s)

33.) Have you heard of a local chemist, medical practitioners or sports agents supplying performance enhancing substances and methods?

1. Yes
2. No

b) IF YES Name(s)

Assessment on Factors that Influence use of Food Supplements, Traditional Herbs and Performance Enhancing Substances

34. Which of the following factors best represent the reason why Kenyan athletes would use Food Supplements?

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

35. Which of the following factors best represent the reason why Kenyan athletes would use Traditional Herbs to enhance performance?

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
36. Which of the following factors best represent the reason why Kenyan athletes would use Performance Enhancing Substances and methods?

- 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

37. Are there any specific Food Supplement, Traditional Herbs and Performance Enhancing substances to receive more information or more regular information? (please select the number(s) that apply to you)

- 1 Yes
- 2 No

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

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

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

40. State the legal Food supplements, Traditional Herbs and Performance Enhancing Substance and methods commonly used by elite athletes in Kenya
.....
.....
.....
.....
.....

41. What are the common food supplements that are used by Sports persons?
.....
.....
.....
.....

42. What are the common food supplements that are used by Sports Persons?
.....
.....

**APPENDIX D: RESEARCH APPROVAL FROM KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE**



Kenyatta University
P.O Box 43844-00100
Nairobi-Kenya

REF: KU/ERC/APPROVAL/VOL1/5

Date: 17th September, 2019

Wanjiku Agnes Mandu
P.o Box 43844-00100
Nairobi

Dear Ms. Mandu,

**RE: KNOWLEDGE, ATTITUDES, BELIEFS AND PRACTICES OF
BOXERS, WRESTLERS AND BODY BUILDERS TOWARDS USE OF PERFORMANCE-
ENHANCING SUBSTANCES IN KENYA**

This is to inform you that **KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE** has reviewed and approved your above research proposal. Your application approval number is **PKU/1068/I1118**. The approval period is **10th September, 2019-10th September, 2020**.

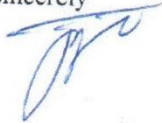
This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by **KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE**.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to **KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE** within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.

- vii. Submission of an executive summary report within 90 days upon completion of the study to **KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE**.

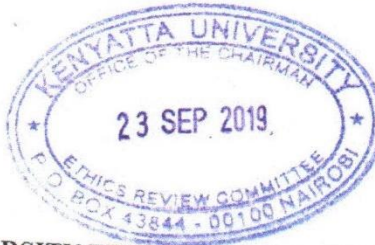
Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely



Prof. Judith Kimiywe

CHAIRPERSON - KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE.



**APPENDIX E: INTRODUCTION LETTER FROM KENYATTA UNIVERSITY
GRADUATE SCHOOL TO NACOSTI**



**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

**P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530**

OUR REF: H87/37806/16

Date: 24th July, 2019

The Director General,
National Commission for Science, Technology & Innovation
P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MS. WANJIKU A. MANDU REG. NO. H87/37806/16

I write to introduce Ms. **Mandu** who is a Postgraduate Student of this University. She is registered for Ph.D. Degree programme in the **Department of Physical Education, Exercise and Sports Science** in the **School of Public Health & Applied Human Sciences**.

Ms. **Mandu** intends to conduct research for Ph.D. Thesis entitled, **“Knowledge, Attitude, Beliefs and Practices of Boxers, Wrestlers and Bodybuilders towards use of Performance Enhancing Substances in Kenya”**

Any assistance given will be highly appreciated.

Yours faithfully,


**PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL**



RM/cao

**APPENDIX F: RESEARCH APPROVAL FROM KENYATTEA UNIVERSITY
GRADUATE SCHOOL**



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100

NAIROBI, KENYA

Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School

DATE: 24th July, 2019

TO: Ms. Wanjiku A. Mandu
C/o Department of Physical Edu, Exer, & Sports Sci.
Kenyatta University

REF: H87/37806/16

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge the receipt of your revised Research Proposal entitled "Knowledge, Attitude, Beliefs and Practices of Boxers, Wrestlers and Bodybuilders towards use of Performance Enhancing Substances in Kenya" as per recommendations raised by the Graduate School Board of 26th June, 2019.

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed supervision Tracking Forms per semester. The form has been developed to replace the progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

By copy of this letter, the Registrar (Academic) is hereby requested to grant you substantive registration for your Ph.D. studies.

Thank you

REUBEN MURUKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Registrar (Academic) Att. Mrs. Lucy Njenga
Chairman, Department of Physical Edu, Exer, & Sports Sci.

Supervisor


1. Dr. Festus Kiplamai
C/o Dept. of Physical Edu, Exer, & Sports Sci.
Kenyatta University
2. Dr. Andanje Mwisukha
C/o Dept. of Physical Edu, Exer, & Sports Sci.
Kenyatta University

RM/cao

Committed to Creativity, Excellence & Self-Reliance

5/24/2021

PHOTO-2021-05-18-15-47-48.jpg


**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean_graduate@ku.ac.ke P.O. Box 43844, 00100
NAIROBI, KENYA
Website: www.ku.ac.ke Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School **DATE:** 6th May, 2021

TO: Ms. Wanjiku A. Mandu **REF:** H87/37806/16
C/o Department of Physical Edu, Exer, & Sports Sci.
Kenyatta University

SUBJECT: APPROVAL OF RESEARCH PROPOSAL


We acknowledge the receipt of your revised Research Proposal entitled "Knowledge, Attitude, Beliefs and Practices of Boxers, Wrestlers and Bodybuilders towards use of Performance Enhancing Substances in Kenya" as per recommendations raised by the Graduate School Board of 26th June 2019.

You may now proceed with your Data collection, subject to clearance with the Director General National Commission for Science Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed supervision Tracking Forms per semester. The form has been developed to replace the progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

By copy of this letter, the Registrar (Academic) is hereby requested to grant you substantial registration for your Ph.D. studies.

Thank you.


REUBEN MURIUKI
FOR: DEAN, GRADUATE SCHOOL

c. Registrar (Academic) Att. Mrs. Lucy Njenga
Chairman, Department of Physical Edu, Exer, & Sports Sci.

Supervisor

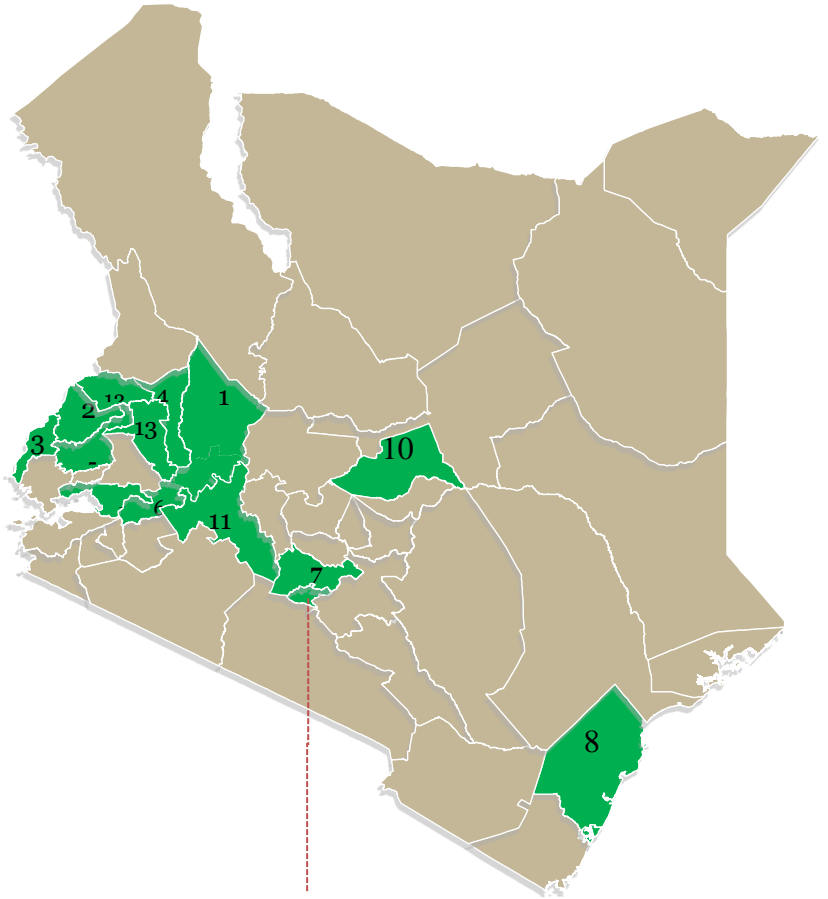
1. Dr. Festus Kiplamai
C/o Dept. of Physical Edu, Exer, & Sports Sci.
Kenyatta University
2. Dr. Andanje Mwisukha
C/o Dept. of Physical Edu, Exer, & Sports Sci.
Kenyatta University
3. Dr. Luka Waiganjo
C/o Dept. of Physical Edu, Exer, & Sports Sci.
Kenyatta University

CAO

Committed to Creativity, Excellence & Self-Reliance

APPENDIX G: MAP OF THE AREA OF STUDY

- KEY:**
- 1. Baringo
 - 2. Bungoma
 - 3. Busia
 - 4. Elgeyo-Marakwet
 - 5. Kakamega
 - 6. Kericho
 - 7. Kiambu
 - 8. Kilifi
 - 9. Kisumu
 - 10. Meru
 - 11. Nakuru
 - 12. Trans-Nzoia
 - 13. Uasin-Gishu



APPENDIX H: NACOSTI RESEARCH PERMIT

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 890347	Date of Issue: 25/September/2019
RESEARCH LICENSE	
	
<p>This is to Certify that Ms.. AGNES MANDU of Kenyatta University, has been licensed to conduct research in Busia, Embu, Kakamega, Kisumu, Meru, Mombasa, Muranga, Nairobi, Nakuru, Vihiga on the topic: KNOWLEDGE , ATTITUDES, BELIEFS AND PRACTICES OF BOXERS, WRESTLERS AND BODY BUILDERS TOWARDS USE OF PERFORMANCE-ENHANCING SUBSTANCES IN KENYA for the period ending : 25/September/2020.</p>	
License No: NACOSTI/P/19/1792	
890347 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p>	

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

1. The License is valid for the proposed research, location and specified period
2. The License any rights thereunder are non-transferable
3. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies
5. The License does not give authority to transfer research materials
6. NACOSTI may monitor and evaluate the licensed research project
7. The Licensee shall submit one hard copy and upload a soft copy of their final report (thesis) within one of completion of the research
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice

National Commission for Science, Technology and Innovation
off Waiyaki Way, Upper Kabete,
P. O. Box 30623, 00100 Nairobi, KENYA
Land line: 020 4007000, 020 2241349, 020 3310571, 020 8001077
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E-mail: dg@nacosti.go.ke / registry@nacosti.go.ke
Website: www.nacosti.go.ke