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Original Research Article

Knowledge and Attitude Towards Performance-Enhancing Substances and Methods Among Wrestlers, Boxers, and Bodybuilders in Kenya

Wanjiku Agnes Mandu^{1*}, Dr. Festus Kiplamai¹, Prof. Andaje Mwisukha¹, Dr. Luka Waiganjo¹

¹Department of Physical Education and Exercise Science, Kenyatta University, Nairobi, Kenya

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*Corresponding author: Wanjiku Agnes Mandu

Department of Physical Education and Exercise Science, Kenyatta University, Nairobi, Kenya

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, as well as attitudes developed by athletes. The purpose of this study was to establish knowledge levels, attitudes towards the use of performance enhancing substances (PES), among athletes from boxing, wrestling, and bodybuilding federations in Kenya. 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. Close 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 ttest at confidence level of 0.05. Post hoc analysis was carried out using Duncan Multiple Range Test where differences were found to be significant. Results on knowledge indicated that 44.8% of respondents reported that ADAK can advise them on which performance enhancing substances were safe to use. 14.3% reported that they thought PES bought from a pharmacy (over the counter) was safe. In addition, 90% reported that an athlete can be sanctioned for testing positive after taking a performance enhancing substance which they thought was safe. With regards to attitudes, 61.5% of the respondents disagreed that athletes are pressured to take performance enhancing substances. Majority of the respondents (81.5%) disagreed that performance enhancing substances and food supplements should be legalized. Many respondents (95.8%) disagreed that athletes have no alternative career choices except sports, which was a positive attitude. Inferential results on one way ANOVA indicated significant differences in knowledge levels at F (2, 381) = 19.631, p<0.001 and attitudes at F (2, 381) = 25.605, p<0.001 three sports disciplines. In conclusion, knowledge and attitudes of athletes from the three sports disciplines were significantly different. The study recommended that sports federation officials from boxing, wrestling and bodybuilding should have a put proper structures for imparting knowledge and proper attitude on use of performance enhancing substances among athletes.

Keywords: Performance, drugs, doping, WADA, ADAK, wrestlers, boxers, and bodybuilders, knowledge, attitude.

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BACKGROUND

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). 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 Werner and Hatton (2010), athletes engage in doping to boost their performance in

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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).

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). Researchers have attempted to establish the factors that predict or influence use of prohibited substances.

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.

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.

Al Ghobain 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.

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%).

A gap on knowledge and 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).Therefore, this study sought to investigate the athletes' knowledge and attitude levels on performance-enhancing substances and methods among wrestlers, boxers, and bodybuilders in Kenya. 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.

METHODS

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). 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.

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.

Participants

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. 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 $\pm 10\%$. Taking the target population to be 1900 respondents with a 0.5 level of precision, the sample size for the study was 331. 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.

Protocol

Questionnaire was the research instrument used for data collection. 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. 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. Independent variables included gender, age, and sports discipline (bodybuilding, wrestling, or boxing). Dependent variables included knowledge levels, attitudes. 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. 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. Respondents were informed of the use of Open Data Kit (ODK) for data collection.

Statistical Analysis

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, and attitudes towards 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.

RESULTS

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 1 indicates the percentages of each gender of respondents from the three sports categories.



Figure 1: Gender of participants

Figure 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 1.

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%

 Table 1: Distribution of Gender per Sports Discipline

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 2.

Table 2: 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 2: Age Distribution per sports Discipline

Table 3 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 3: Age Distribution of Participants					
Age Category in	Number of	Percentage			
years	respondents				
10 - 20	4	1%			
21 - 30	323	84.1%			
31 - 40	56	14.6%			
41 - 50	1	0.3%			
Total	384	100%			

Wanjiku Agnes Mandu et al., J Adv Sport Phys Edu, Jun, 2023; 6(5): 67-81

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 shows different levels of experience in years that respondents had in their sports discipline.

Table 4: Expe	rience in	Partici	pation
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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%

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 5 shows the different percentages of participants, reflecting the number of respondents from each sports discipline.

 Table 5: Participants in Percentage per Sports Discipline

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

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 different personalities provided by 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.

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 6 shows the views of respondents on whether ADAK can tell them which food supplement is safe to use.

Wanjiku Agnes M	Iandu <i>et al.</i> , J	Adv Sport Phys	Edu, Jun,	2023; 6(5):	67-81
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Table 6: 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%	

Table 6. Anti-Doning Agency of Kanya ca	n Tall which FS is Safa to Usa

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 7 displays the different opinions.

	Table 7: Anti-Doping Agency of Keny	a can Tell Safe	PES for Use by	an Athlete.
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	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%

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 8.

Tuble 0. Mean knowledge score r er Sports Discipline.						
	n	% of Respondents	Correct Answers/16	Mean Score		
			Questions			
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		

Table 8: Mean knowledge score Per Sports Discipline.

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 9

Table 9: One-way ANOVA to Test Significance Difference between means of Athletes on Knowledge level on F	PES
and Methods across the three Sports Disciplines	

and victuous across the time 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 10.

Table 10: Knowledge I	Levels on use of PES	and Methods by	Athletes fron	n the three S	Sports Discipline
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No	Sports Discipline	Ν	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). Wresters 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.

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 PES, and methods, which can lead to doping or inadvertent doping.

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 11 displays the different attitudes.

	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 (31.8%)	1 (0.3%)	68.0%

Table 11: Food Supplements are Necessary in Competitive Sports.

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%).

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 12.

Table 12: Food	Supplementation	is not Ch	heating Since	Everyone Does It

				8	
	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.

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 13

reflects the different attitudes.

Iusie	Tuble 15. I bou Supplements can help blance op 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%			

Table 13: Food Supplements can Help Make Up for Lost Time

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.

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 14.

Table 14: 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.

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 15 reflects these attitudes.

140	Tuble 15. Recitational 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%)			

Table 15: Recreational Drugs Help in Sports Situations.

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 16

Table 10. Atmetes bildulu not Teel Guilty about Taking TEb							
	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%		

 Table 16: Athletes Should not Feel Guilty about Taking PES

Traditional Herbs and Food Supplements 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 17 reflects the different attitudes by the respondents.

	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%		

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 18.

Table	2 18: A	Athletes	are	e Pressured	l 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%	

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 19.

Table 17. There are Kisks Kelated to Use of FS							
	n	n Disagreed Agreed Do not Know					
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%		

Table 19: There are Risks Related to Use of FS

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 20 reflects the different attitudes.

Tabl	e 20:	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%		

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 21 displays the different attitudes.

	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%

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 led 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 22 reflects these different attitudes.

Table 22: TH and FS Help Overcome Bored During Training							
	n Disagreed Agreed Do not Know						
Boxing	162	139 (85.8%)	16 (9.9%)	7 (4.3%0	85.8%		
Wrestling	53	53 (100%)	0 (0%)	0 (0%)	100%		

31 (18.3%)

47 (12.2%)

133 (78.8%)

325 (84.6%)

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

Total

Bodybuilding

169

384

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 23.

78.8%

84.6%

5 (3,0%)

12 (3.1%)

Table 25. There is no unterence between TEB, TOT and Swinisuit							
	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%		

Table 23: There is no difference between PES, FGP and Swimsuit

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 24.

Disciplines on use of 1 ES 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						

Table 24: One-way ANOVA on Significance Difference on the attitudes of Athletes from the three Sports Disciplines on use of PFS and Methods

The results of Table 25, [F(2, 381) = 25.605, p]< 0 .001] indicated a significance 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 25: Attitudes on Use of PES and Methods								
No	Sports Discipline	Ν	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	ans with same superscript implied that they were							
	not significantly different.							

The results revealed that wresters 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.

DISCUSSION

This study sought to investigate the athletes' knowledge and attitude levels on performanceenhancing substances and methods among wrestlers, boxers, and bodybuilders in Kenya. 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 12hour 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.

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 drug users. 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 performanceenhancing 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.

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 performanceenhancing 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).

CONCLUSION & RECOMMENDATION

In conclusion, 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. There were significant differences in knowledge levels of boxers, bodybuilders and wrestlers on food supplements, traditional herbs, and performance enhancing substances and methods.

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. The attitudes of boxers, bodybuilders, and wrestlers towards use of food supplements, traditional herbs, PES, and methods are significantly different. The study recommends that 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.

In addition, 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.

DECLARATIONS

Ethics Approval

Ethical clearance was obtained from Kenyatta University Ethical Review Committee (KUREC).

Competing interest

The authors declare that they have no competing interests.

Disclaimer

The findings and conclusions presented in this manuscript are those of the authors and do not necessarily reflect the official position of Kenyatta University.

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