

Assesment of Use of Performance-Enhancing Substances and Methods among Wrestlers, Boxers, and Bodybuilders in Kenya

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Abstract

Measuring prevalence of usage of performance enhancing drugs in Boxing, wrestling, and bodybuilding is difficult. However, to fit their initiatives, National Anti-Doping Organizations are interested in knowing the numbers so that their scarce resources are not wasted. 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 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. Results on usage showed that majority of the respondents (74.2%) never used food supplements (FS) to improve sports performance. Many of the respondents (93.8%) had never used traditional herbs (TH) to improve sports performance. 91.9% never used PES to improve sports performance. Majority of the respondents (96.6%) indicated as never having been given food supplements by a coach, doctor, or physiotherapist to enhance performance. On supply of PES, 91.7% of the respondents had no information of if medical practitioner, local chemist, or sports agents supplied PES and methods. The results of one-way ANOVA showed that there was a significant difference in the use of FS, TH, PES, and Methods by athletes from the three sports disciplines, [F (2, 381) = 24.050, p < 0.000]. In conclusion and in light of the limitations of this study generally majority of the respondents did not use PES and methods. There were also significant differences in use of PES and methods across the different sports. 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, practices.

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BACKGROUND

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 (Westmattmann *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 (Westmattmann *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. 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). 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.

A study by 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.

A study by 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.

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. Therefore, this study sought to investigate the athletes' use of 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. 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 scale was 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 variable was use of PES. 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. 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 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.

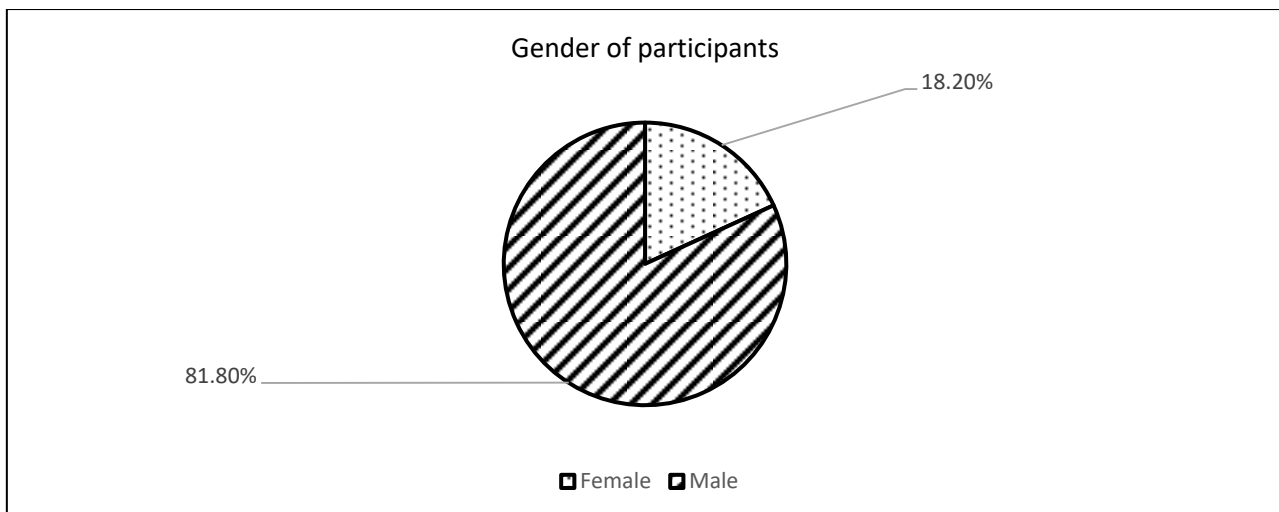


Figure 1: Gender of participants

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.

Table 1: 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%

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 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 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%

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: 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%

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

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 6 indicates this information.

Table 6: 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%)

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 7 indicates this information.

Table 7: 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%)

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 8 indicates the information on use of PES to improve sports performance.

Table 8: 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%)

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 9 indicates the information on supply of FS by different entities.

Table 9: 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%)

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 10 shows supply of traditional herbs by different officials.

Table 10: 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%)

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 11 shows the number of respondents who had any information on supply of PES.

Table 11: 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%)

Responses on use of FS, TH or PES by Respondents

Table 12 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 12: 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 13 displays the results.

Table 13: 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 14.

Table 14: Mean Scores of the Three Sports Disciplines on the use of FS, TH and PES

SI 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 14 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.

DISCUSSION

This study sought to investigate the athletes' use of performance-enhancing substances and methods among wrestlers, boxers, and bodybuilders in Kenya. 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.

Oyebode *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.

CONCLUSION & RECOMMENDATION

In conclusion, athletes from boxing, bodybuilding and wrestling avoid use of performance enhancing substances in competitive sports because they feel guilty when they do so. Athletes from boxing, wrestling and body building who use food supplements, traditional herbs, and PES, do so to improve performance. 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. The study recommends that Anti-doping agency of Kenya (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. The study also recommends that a similar study should be conducted among athletes support personnel since they have a high influence on athletes.

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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